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June 26, 2019

In The Matter of the Petition of
Public Service Electric and Gas Company
to Revise its Weather Normalization Charge
for the 2019-2020 Annual Period

BPU Docket No. _____

***VIA BPU E-FILING SYSTEM & OVERNIGHT MAIL***

Aida Camacho-Welch, Secretary
Board of Public Utilities
44 South Clinton Avenue, 3rd Flr.
P.O. Box 350
Trenton, New Jersey 08625-0350

Dear Secretary Camacho-Welch:

Public Service Electric and Gas Company respectfully submits its Petition, Testimony and Supporting Schedules in the above-referenced proceeding on the Board of Public Utilities' E-Filing system.

Very truly yours,

Justin B. Incardone

Attachment
C Attached Service List

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STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES

| | | |
|---|---|---|
| IN THE MATTER OF THE PETITION OF PUBLIC SERVICE ELECTRIC AND GAS COMPANY TO REVISE ITS WEATHER NORMALIZATION CHARGE FOR THE 2019-2020 ANNUAL PERIOD | ) ) ) ) ) | PETITION BPU Docket No._____ |

Public Service Electric and Gas Company ("PSE&G" or "Company"), a corporation of the State of New Jersey, having its principal offices at 80 Park Plaza, Newark, New Jersey, respectfully petitions the New Jersey Board of Public Utilities ("Board" or "BPU") as follows:

## INTRODUCTION

1. PSE&G is a public utility engaged in the distribution of electricity and the provision of Basic Generation Service ("BGS") and distribution of gas and the provision of Basic Gas Supply Service ("BGSS") for residential, commercial, and industrial purposes within the State of New Jersey. PSE&G provides service to approximately 2.2 million electric and 1.8 million gas customers in an area having a population in excess of six million persons and that extends from the Hudson River opposite New York City, southwest to the Delaware River at Trenton, and south to Camden, New Jersey.

2. PSE&G is subject to regulation by the Board for the purposes of setting its retail distribution rates and to assure safe, adequate, and reliable electric distribution and natural gas distribution service pursuant to N.J.S.A. 48:2-21 *et seq*.

**PSE&G WEATHER NORMALIZATION CHARGE DESCRIPTION**

3. This filing seeks BPU approval of PSE&G's request to return to customers $(8,251,009) over the 2019-2020 Winter Period (*i.e.*, October 1-May 31). The Weather Normalization Charge ("WNC") will be returned to PSE&G gas customers receiving service under Rate Schedules Residential Service (RSG), General Service (GSG), and Large Volume Gas (LVG) during the 2019-2020 Winter Period.

4. B.P.U.N.J. No. 15 Gas Tariff Sheets Nos. 45, 46, 47 ("WNC Tariff") were initially approved by the Board on July 9, 2010 as part of the Stipulation of Settlement of PSE&G's 2009-2010 base rate case. Decision and Order, *I/M/O the Petition of PSE&G for Approval of an Increase in Electric and Gas Rates and for Changes in the Tariffs for Electric and Gas Service*, Dkt. No. GR09050422 (NJBPU July 9, 2010).

5. The WNC Tariff requires PSE&G to calculate, at the end of each Winter Period, the level by which Margin Revenues differed from what would have resulted if normal weather had occurred. "Margin Revenues," which directly impact the Company's earnings, are the distribution revenues from relevant rate classes from the per therm charge. The base level of normal degree days for the 2018-2019 Winter Period is defined in PSE&G's WNC Tariff. As approved by the Board, any excess or deficiency is to be credited or recovered in the following year during the Winter Period through the WNC.

6. In accordance with the WNC Tariff, the Company is required to true-up the Degree Day Consumption Factors utilized in the determination of the proposed WNC at the end of the Winter Period. Schedule SAW-WNC-1, included in the testimony of Stephen A. Wreschnig (Attachment 1), presents the true-up of the 2018-2019 Winter Period Degree Day Consumption Factors.

7. In addition, the revised WNC Tariff Sheets (Attachment 4) reflect updated Degree Day Consumption Factors for the 2019-2020 Winter Period.

8. Actual heating degree days for the 2018-2019 Winter Period were 125.04 degree days colder than the normal heating degree days (adjusted for a ½ percent dead band). *See* Attachment 1, Schedule SAW-WNC-2. The 125.04 heating degree days colder than the normal degree days results in a Margin Revenue excess of $(8,341,123). See Attachment 1, Schedule SAW-WNC-2.

9. PSE&G has made one adjustment to the Margin Revenue excess to calculate the 2019-2020 WNC refund request in accordance with the WNC Tariff, as described in the Testimony of Donna M. Powell, Assistant Controller (Attachment 2) and the Testimony of Stephen Swetz, Senior Director (Attachment 3). In Docket No. GR18060675, the Board approved the collection of $14,297,150, which was to be recovered over the 2018-2019 Winter Period. Of that amount, $90,114 represents the remaining under-collection from the 2017-2018 Winter Period that the Board

approved for collection over the 2018-2019 Winter Period. The Margin Revenue excess of $(8,341,123) net of $90,114 equals a total excess of $(8,251,009).

10. Based on the Board-approved method for calculating the WNC, the Company respectfully requests approval to return to the applicable customer classes $(8,251,009) during the 2019-2020 Winter Period. (See Attachment 2, Schedule DMP-WNC-4).

11. In the Company's pending Basic Gas Supply Service ("BGSS") filing submitted on June 1, 2019 in Docket No. GR19060699, it proposed an adjustment to its Balancing charge, including changing the balancing period from five months (November through March) to an eight month period (October through May). The Company's proposed WNC is based on the proposed eight month balancing period. However, the WNC based on the five month period used in prior filings is included for illustrative purposes.

12. In order to return this Margin Revenue excess, PSE&G proposes a WNC of $(0.004800) without New Jersey Sales and Use Tax ("SUT") $(0.005118) including SUT per Balancing Therm. For the supporting calculation, see Attachment 3, Testimony of Stephen Swetz.

13. As a result of the proposed WNC for the 2019-2020 WNC Winter Period, as described in the testimony of Stephen Swetz, PSE&G's typical residential gas heating customers using 172 therms in a winter month and 1,040 therms annually

would experience a decrease in their annual bill from $893.03 to $882.95 or $10.08 or approximately 1.13%, based upon Delivery Rates and BGSS-RSG charges in effect on June 1, 2019, with the WNC set to the rate that was in effect for the 2018-2019 Annual Period, and assuming the customer receives commodity service from PSE&G.

14. Attached hereto and made a part of this Petition are:

a. The testimony and supporting schedules of Stephen A. Wreschnig, Manager, Electric and Gas Sales and Revenue Forecasting (Attachment 1), which describe and support the calculation of the therm sales subject to the WNC, the sales forecast of Balancing Therms used in determining the WNC, the normal heating degree days, and development of the proposed monthly Degree Day Consumption Factors to be used for the 2019-2020 Winter Period.

b. The testimony and supporting schedules of Donna M. Powell, Assistant Controller-PSE&G (Attachment 2), which describe and support the Company's calculation of the 2018-2019 Margin Revenue excess and adjustment to the WNC balance supporting the proposed 2019-2020 Winter Period WNC rate.

c. The testimony and supporting schedule of Stephen Swetz, Senior Director-Corporate Rates and Revenue Requirements, PSEG Services Corporation (Attachment 3), which describe and support the Company's

derivation of the WNC to be implemented for the 2019-2020 Winter Period and collected from the Company's RSG, GSG, and LVG customers.

d. Proposed B.P.U.N.J. No. 16 Gas Tariff Sheets Nos. 45, 46, and 47 in clean and redlined form (Attachment 4) to become effective on October 1, 2019.

e. Typical Residential Gas Bill Impacts associated with the proposed WNC (Attachment 5).

**COMMUNICATIONS**

Communications and correspondence related to the Petition should be sent as follows:

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## CONCLUSION AND REQUESTS FOR APPROVAL

For all the foregoing reasons, PSE&G respectfully requests that the Board retain jurisdiction of this matter and review and expeditiously issue an order approving this Petition, specifically:

1. Approving the Company's request to return to the applicable customer classes $(8,251,009) in excess revenues, which will be refunded over the 2019-2020 Winter Period.

2. Finding that the proposed rates and charges set forth in the proposed tariff for Gas Service, Public Service Electric and Gas Company, B.P.U.N.J. No. 16, Gas Service, referred to herein and as set forth in Attachment 4, are just and reasonable.

3. Authorizing PSE&G to implement the rates proposed herein on or about October 1, 2019.

Respectfully submitted,

PUBLIC SERVICE ELECTRIC AND GAS COMPANY

Matthew M. Weissman, Esq.
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DATED: June 26, 2019
Newark, New Jersey

STATE OF NEW JERSEY )
COUNTY OF ESSEX )

I, Michael P. McFadden, of full age, being duly sworn according to law, on his oath deposes and says:

1. I am Manager of Revenue Requirements of PSEG Services Corporation.

2. I have read the annexed Petition, and the matters contained therein are true to the best of my knowledge and belief.

BY _____
Michael P. McFadden

Sworn to and Subscribed to
Before me this 26th day of
June 2019

MICHELE D. FALCAO
Notary Public, State of New Jersey
My Commission Expires
November 14, 2021

**ATTACHMENT 1**

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY**
**DIRECT TESTIMONY**
**OF**
**STEPHEN A. WRESCHNIG**
**MANAGER, ELECTRIC AND GAS SALES**
**AND REVENUE FORECASTING**

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

A. My name is Stephen A. Wreschnig. My business address is 80 Park Plaza, T-8, Newark, New Jersey 07102.

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

A. I am the Manager - Electric and Gas Sales and Revenue Forecasting for PSEG Services Corporation, a subsidiary of Public Service Enterprise Group Incorporated ("PSEG"). In this capacity, my major responsibility is the supervision of the development of the electric and gas sales and revenue forecasts for PSE&G.

**Q. Please summarize your professional experience in the utility industry.**

A. Prior to my association with PSEG, I held the position of Manager, Forecasting & Economic Analysis at Duquesne Light Company from 1999 to 2007. From 1997 until 1999 I was a Director with PNR & Associates, which later merged with INDETEC International, a consulting firm specializing in providing market research and forecasting for the utility industry. Prior to this experience, I served in various forecasting functions at Duquesne Light,

Wisconsin Electric Power Company, and the Wisconsin Division of State Energy.

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

A. I received a Master of Science degree in Economics from the University of Wisconsin-Madison. My undergraduate degree is a B.A. in Economics from Michigan State University.

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

A. The purpose of my testimony is to discuss the calculation of the margin revenues subject to the Weather Normalization Charge (WNC) from the 2018-2019 Winter Period (i.e., the eight consecutive calendar months from October of one calendar year through May of the following calendar year). In addition, I describe the sales forecast of balancing therms that is used in the determination of the WNC. Finally, I describe the development of the proposed monthly degree day consumption factors and the normal weather data to be used for the 2019-2020 Winter Period.

**Q. Does your testimony include any schedules?**

A. Yes. My testimony includes schedules that were prepared by me or under my direction and supervision. The schedules are as follows:

(1) Schedule SAW-WNC-1 shows the true-up calculation for the residential coefficients to account for the difference between the actual and the

projected number of customers on which the coefficients embodied in the tariff were based.

(2) Schedule SAW-WNC-2 compares the actual calendar month degree days for the 2018-2019 Winter Period to the normal calendar month degree days. It also presents the calculation of the deficiency in WNC margin revenues for the 2018/2019 Winter Period.

(3) Schedule SAW-WNC-3 presents the calculation of the average daily usage of gas for the June 2019-September 2019 period used in the calculation of forecasted balancing therms.

(4) Schedule SAW-WNC-4 summarizes the gas calendar-month sales forecast for the proposed October 2019 – May 2020 recovery period and presents the calculation of the balancing therms.

(5) Schedule SAW-WNC-5 shows the calculation of the Residential Service (RSG) rate-specific balancing therm share of delivered sales for the October 2019-September 2020 period.

(6) Schedule SAW-WNC-6 summarizes, for comparison purposes, the gas calendar-month sales forecast for the previously defined five month recovery period, November 2018 – March 2019, and presents the calculation of the balancing therms. This schedule is for illustrative purposes only.

(7) Schedule SAW-WNC-7 shows, for comparison purposes, the calculation of the Residential Service (RSG) rate-specific balancing therm share of delivered sales for the October 2019-September 2020 period based on the previously defined five month recovery period. This schedule is for illustrative purposes only.

(8) Schedule SAW-WNC-8 presents the development of the proposed WNC monthly Degree Day Consumption Factors to be used for the

2019-2020 Winter Period. In previous years this was presented in Schedule SAW-WNC-6.

(9) Schedule SAW-WNC-9 contains the updated base level of normal degree days for the 2019-2020 Winter Period based on the 20 year period ending December 2018. In previous years this was presented in Schedule SAW-WNC-7.

(10) Schedule SAW-WNC-10 contains the the Gas Sales Forecast Model Documentation. In previous years this was presented in Schedule SAW- WNC-8.

**Q. Please describe the Weather Normalization Charge.**

A. The Company's WNC is a rate mechanism that, in general, mitigates the financial effect of variations from the normal weather on which base rates are set, on both the Company and its customers receiving service under the RSG, General Service (GSG), and the Large Volume Service (LVG) rate schedules. Variances in actual degree days from normal for each day are measured and accumulated over the calendar-month for each month in the Winter Period. These monthly variances are adjusted for a degree day deadband which is ½ percent of the normal calendar-month degree days. The resulting cumulative degree day variance, along with the trued-up degree day consumption factors, determines, along with any prior WNC balances, the adjustment to customers' bills in the following Winter Period. This adjustment is either a surcharge to collect a revenue deficiency as a result of warmer than normal weather or a

credit to customers to refund the excess revenues collected as a result of colder than normal weather.

**Q. How are the trued-up monthly degree day consumption factors developed?**

A. The monthly degree day consumption factors for the RSG Heating customers and for the RSG Non-Heating customers are based on regression models of use per customer. The consumption factor for these two customer groups are, as a result, calculated by multiplying the consumption factor per customer by the forecasted number of customers in each month. The trued-up consumption factors for these two groups are the consumption factors embodied in the tariff adjusted to reflect the actual number of customers during the months of the 2018-2019 Winter Period. The trued-up monthly degree day consumption factors are calculated, as Schedule SAW-WNC-1 shows, by multiplying the RSG Heating and the RSG Non-Heating degree day consumption factors by the ratio of the actual number of customers to the forecasted number of customers that were incorporated into the original calculation.

**Q. Are the degree day consumption factors for Residential Service the only consumption factors that are trued-up?**

A. Yes they are.

**Q. What is the result of the comparison of the actual heating degree days experienced in the most recent winter 2018-2019 Winter Period and the normal calendar-month heating degree days?**

A. For the 2018-2019 Winter Period, the actual heating degree days were 127.75 more than the normal heating degree days. The WNC requires that the heating degree day monthly variances must be adjusted for the ½ percent deadband in which the WNC is operable. After this adjustment, the cumulative actual heating degree days were 125.04 more than normal. See Schedule SAW-WNC-2.

**Q. What is the impact of the deadband adjusted heating degree variance on margin revenues?**

A. The 125.04 heating degree days increase from the normal degree day total results in a margin revenue surplus of $8,341,123. The calculations of the heating degree day variance and the margin revenue impact are set forth on Schedule SAW-WNC-2.

**Q. What is the methodology used to project firm gas sales for the recovery year in order to derive the Company's WNC rates?**

A. The forecast and the methodology used to project firm gas sales for the recovery year in order to derive the Company's WNC rates is the same as the sales forecast which supports PSE&G's Basic Gas Supply Service (BGSS) filing of June 1, 2019. A summary of the forecast of normalized gas sales for

the eight month period of October 2019 through May 2020 is set forth on Schedule SAW-WNC-4.

**Q. How was the sales forecast summarized in Schedule SAW-WNC-4 developed?**

A. The sales forecast summarized in Schedule SAW-WNC-4 is for firm sales by customer class and rate. This forecast was developed from a set of econometric models in which the customer-class, rate specific sales, or sales per customer in the case of the residential models, were regressed on a set of variables including those that captured both weather and economic factors that influence sales. The estimated models are then used to forecast consumption under normal weather conditions with projected levels of economic and demographic activity. The forecast is then adjusted for the estimated impacts of energy efficiency measures not captured in the econometric models. The forecast models and the methodology employed are described in detail in Schedule SAW-WNC-10 of my testimony.

**Q. How is the forecast of balancing therms developed?**

A. The projected balancing therms are calculated by subtracting the projected class and rate-specific average daily usage during the billing months of June 2019 through September 2019 from the total delivered calendar-month sales for the months of November 2019 through May 2020. The projected average

daily use is derived from the billing-month forecast described above divided by the average number of days in the billing-month. This calculation is shown in Schedule SAW-WNC-3. This average use is then multiplied by the number of days in the calendar-month and subtracted from the total projected calendar-month sales. This calculation is shown in Schedule SAW-WNC-4.

**Q. What percentage of the RSG total delivered sales is the forecasted balancing therms that is to be used in the calculation of the RSG 3.0% Rate Cap Limit for the 2019-2020 Winter Period?**

A. The projected balancing therms are estimated to be 72.91 percent of RSG delivered sales. See Schedule SAW-WNC-5.

**Q. How does the calculation of the balancing therms differ from the calculation used in previous Weather Normalization Charge filings?**

A. In previous filings, the balancing therms were calculated for the months of November through the following March. As part of the Company's 2019/2020 Annual BGSS Commodity Charge filing, the Company requested a change in the balancing period from the five billing months of November to March to the eight billing months of October to May to improve the rate design by better aligning the periods when balancing revenues are collected and the balancing costs are incurred.

**Q. What is the impact of the change in the balancing period on the Weather Normalization Charge?**

A. As can be seen by comparing Schedule SAW-WNC-4 to Schedule SAW-WNC-6 there is an increase in the number of balancing therms by about 217 million therms as a result of adding the additional three months. A comparison of Schedules SAW-WNC-5 to SAW-WNC-7 shows that, for rate RSG, the balancing therms increase from 64.03 percent of RSG delivered sales to 72.91 percent of delivered sales. However, since the calculation of the margin revenue deficiency/surplus is independent of the balancing period, the impact is only to collect or refund the identical total margin revenues over three additional months at a lower rate per therm. This is discussed in more detail in the testimony of Mr. Stephen Swetz.

**Q. How are the updated monthly degree day consumption factors developed?**

A. Schedule SAW-WNC-8 shows the calculation of the new monthly degree day consumption factors to be utilized in the 2019-2020 Winter Period. The calculation is based on the estimated coefficients from the models, as described above. The impact of the monthly degree days is the sum of the coefficient on the heating degree day variable and the product of the coefficient and the value of the economic/demographic variable of any variable and or variables that are interactive with heating degree days, such as the price-heating degree day interactive variable, to arrive at the total therm per heating degree day estimate.

In the case of the residential rates, this is multiplied by the projected number of customers since the models, and as a result the coefficients, are based on sales per customer – not on total customers.

**Q. Have the base level of normal degree days for the defined Winter Period months been updated?**

A. Yes, the base level of normal degree days for the defined winter period months for the 2019-2020 Winter Period have been calculated based on the 20-year period ending December 2018 and are shown in Schedule SAW-WNC-9.

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

A. Yes, it does.

**SCHEDULE SAW-WNC-1**

## Calculation of the Customer True-Up to the RSG-Residential Degree Day Consumption Factors

| | RSG-Residential Heating | | | | | RSG-Residential Non-Heating | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| | | | (2) / (1) | | (4) x (3) | | | (7) / (6) | | (9) x (8) |
| | Customers | | | Consumption | Trued-Up Consumption | Customers | | | Consumption | Trued-Up Consumption |
| Month | Forecast | Actual | Adjustment | Factor | Factor | Forecast | Actual | Adjustment | Factor | Factor |
| Oct-18 | 1,376,185 | 1,392,451 | 1.0118196 | 112,333 | 113,661 | 291,037 | 291,836 | 1.0027454 | 2,969 | 2,977 |
| Nov-18 | 1,385,127 | 1,395,977 | 1.0078332 | 204,207 | 205,807 | 293,127 | 293,237 | 1.0003753 | 8,296 | 8,299 |
| Dec-18 | 1,390,628 | 1,408,562 | 1.0128963 | 247,265 | 250,454 | 291,347 | 278,800 | 0.9569345 | 10,926 | 10,455 |
| Jan-19 | 1,383,680 | 1,431,928 | 1.0348693 | 262,255 | 271,400 | 291,037 | 253,675 | 0.8716246 | 11,336 | 9,881 |
| Feb-19 | 1,383,547 | 1,436,733 | 1.0384418 | 272,434 | 282,907 | 289,325 | 247,701 | 0.8561341 | 11,252 | 9,633 |
| Mar-19 | 1,389,582 | 1,443,504 | 1.0388045 | 271,030 | 281,547 | 290,803 | 243,207 | 0.8363291 | 12,060 | 10,086 |
| Apr-19 | 1,389,020 | 1,448,557 | 1.0428626 | 246,404 | 256,966 | 289,734 | 242,638 | 0.8374509 | 12,334 | 10,329 |
| May-19 | 1,388,120 | 1,447,737 | 1.0429480 | 169,357 | 176,631 | 288,549 | 241,615 | 0.8373448 | 9,897 | 8,287 |

**SCHEDULE SAW-WNC-2**

# Margin Revenue Deficiency/Surplus Calculation 2018-2019 Winter Period

**Degree Day Consumption Factors**

| | RSG-Residential | | Commercial | | | Industrial | | | Heating Degree Days | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | GSG | | LVG | GSG | | LVG | | | | |
| **Month** | **Heating** | **Non-Heating** | **Heating** | **Non-Heating** | | **Heating** | **Non-Heating** | | **Normal** | **Actual** | **Deadband** | **Variance** |
| Oct-18 | 113,661 | 2,977 | 21,899 | 1,382 | 79,478 | 551 | - | 6,733 | 240.16 | 287.50 | 1.20 | -46.14 |
| Nov-18 | 205,807 | 8,299 | 28,876 | 2,623 | 79,478 | 1,079 | 118 | 6,733 | 510.58 | 627.94 | 2.55 | -114.81 |
| Dec-18 | 250,454 | 10,455 | 36,712 | 3,518 | 79,478 | 1,372 | 185 | 6,733 | 823.87 | 786.25 | 4.12 | 33.50 |
| Jan-19 | 271,400 | 9,881 | 41,391 | 3,791 | 79,926 | 1,965 | 215 | 6,746 | 989.26 | 1010.33 | 4.95 | -16.12 |
| Feb-19 | 282,907 | 9,633 | 45,573 | 3,897 | 79,926 | 1,589 | 225 | 6,746 | 836.38 | 814.25 | 4.18 | 17.95 |
| Mar-19 | 281,547 | 10,086 | 47,137 | 3,978 | 79,926 | 2,105 | 237 | 6,746 | 685.38 | 733.60 | 3.43 | -44.79 |
| Apr-19 | 256,966 | 10,329 | 41,131 | 4,066 | 79,926 | 1,338 | 212 | 6,746 | 350.33 | 302.33 | 1.75 | 46.25 |
| May-19 | 176,631 | 8,287 | 29,934 | 4,128 | 79,926 | 733 | 173 | 6,746 | 125.95 | 127.46 | 0.63 | -0.88 |
| **Total** | | | | | | | | | 4,561.91 | 4,689.66 | 22.81 | (125.04) |

**Therm Deficiency/(Surplus) -** HDD Variance x Degree Day Consumption Factors

| | RSG-Residential | | Commercial | | | Industrial | | | Margin Revenue Factors | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | GSG | | LVG | GSG | | LVG | | | |
| **Month** | **Heating** | **Non-Heating** | **Heating** | **Non-Heating** | | **Heating** | **Non-Heating** | | **RSG** | **GSG** | **LVG** |
| Oct-18 | (5,244,319) | (137,359) | (1,010,420) | (63,765) | (3,667,115) | (25,423) | - | (310,661) | $ 0.300406 | $ 0.247120 | $ 0.039778 |
| Nov-18 | (23,628,702) | (952,808) | (3,315,254) | (301,147) | (9,124,869) | (123,880) | (13,548) | (773,016) | $ 0.333771 | $ 0.274089 | $ 0.041470 |
| Dec-18 | 8,390,209 | 350,243 | 1,229,852 | 117,853 | 2,662,513 | 45,962 | 6,198 | 225,556 | $ 0.333771 | $ 0.274089 | $ 0.041470 |
| Jan-19 | (4,374,968) | (159,282) | (667,223) | (61,111) | (1,288,407) | (31,676) | (3,466) | (108,746) | $ 0.345322 | $ 0.280009 | $ 0.041697 |
| Feb-19 | 5,078,181 | 172,912 | 818,035 | 69,951 | 1,434,672 | 28,523 | 4,039 | 121,091 | $ 0.345322 | $ 0.280009 | $ 0.041697 |
| Mar-19 | (12,610,490) | (451,752) | (2,111,266) | (178,175) | (3,579,886) | (94,283) | (10,615) | (302,153) | $ 0.345322 | $ 0.280009 | $ 0.041697 |
| Apr-19 | 11,884,678 | 477,716 | 1,902,309 | 188,053 | 3,696,578 | 61,883 | 9,805 | 312,003 | $ 0.345322 | $ 0.280009 | $ 0.041697 |
| May-19 | (155,435) | (7,293) | (26,342) | (3,633) | (70,335) | (645) | (152) | (5,936) | $ 0.345322 | $ 0.280009 | $ 0.041697 |
| Total | (20,660,846) | (707,622) | (3,180,308) | (231,974) | (9,936,849) | (139,540) | (7,740) | (841,863) | | | |

**Margin Revenue Deficiency/(Surplus)** - Therm Deficiency/(Surplus) x Margin Revenue Factors

| | RSG-Residential | | Commercial | | | Industrial | | | Rate Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | GSG | | LVG | GSG | | LVG | | | | |
| **Month** | **Heating** | **Non-Heating** | **Heating** | **Non-Heating** | | **Heating** | **Non-Heating** | | **RSG** | **GSG** | **LVG** | **Total** |
| Oct-18 | $ (1,575,425) | $ (41,263) | $ (249,695) | $ (15,758) | $ (145,870) | $ (6,283) | $ - | $ (12,357) | $ (1,616,688) | $ (271,735) | $ (158,228) | $ (2,046,651) |
| Nov-18 | $ (7,886,575) | $ (318,020) | $ (908,675) | $ (82,541) | $ (378,408) | $ (33,954) | $ (3,713) | $ (32,057) | $ (8,204,595) | $ (1,028,883) | $ (410,465) | $ (9,643,943) |
| Dec-18 | $ 2,800,408 | $ 116,901 | $ 337,089 | $ 32,302 | $ 110,414 | $ 12,598 | $ 1,699 | $ 9,354 | $ 2,917,309 | $ 383,687 | $ 119,768 | $ 3,420,765 |
| Jan-19 | $ (1,510,773) | $ (55,003) | $ (186,828) | $ (17,112) | $ (53,723) | $ (8,870) | $ (970) | $ (4,534) | $ (1,565,776) | $ (213,780) | $ (58,257) | $ (1,837,813) |
| Feb-19 | $ 1,753,607 | $ 59,710 | $ 229,057 | $ 19,587 | $ 59,822 | $ 7,987 | $ 1,131 | $ 5,049 | $ 1,813,318 | $ 257,762 | $ 64,871 | $ 2,135,950 |
| Mar-19 | $ (4,354,680) | $ (156,000) | $ (591,174) | $ (49,890) | $ (149,270) | $ (26,400) | $ (2,972) | $ (12,599) | $ (4,510,680) | $ (670,436) | $ (161,869) | $ (5,342,985) |
| Apr-19 | $ 4,104,041 | $ 164,966 | $ 532,664 | $ 52,656 | $ 154,136 | $ 17,328 | $ 2,745 | $ 13,010 | $ 4,269,007 | $ 605,393 | $ 167,146 | $ 5,041,545 |
| May-19 | $ (53,675) | $ (2,518) | $ (7,376) | $ (1,017) | $ (2,933) | $ (181) | $ (43) | $ (248) | $ (56,194) | $ (8,616) | $ (3,180) | $ (67,990) |
| **Total** | $ (6,723,071) | $ (231,228) | $ (844,938) | $ (61,772) | $ (405,833) | $ (37,775) | $ (2,124) | $ (34,383) | $ (6,954,299) | $ (946,609) | $ (440,215) | $ (8,341,123) |

**SCHEDULE SAW-WNC-3**

# Calculation of Forecasted June 2019-September 2019 Average Daily Usage

| Class | Rate | Group | Billed Therm Sales | | | | | Therms per Day |
|---|---|---|---|---|---|---|---|---|
| | | | June-19 | July-19 | August-19 | September-19 | Total | |
| **Residential** | **RSG** | **Heating** | 37,295,553 | 30,198,546 | 26,813,524 | 30,308,459 | 124,616,082 | 1,026,653 |
| | | **Non-Heating** | 3,647,963 | 3,156,963 | 2,746,122 | 2,966,533 | 12,517,581 | 103,126 |
| **Commercial** | **GSG** | **Heating** | 6,028,467 | 5,169,831 | 4,960,098 | 5,390,725 | 21,549,121 | 177,533 |
| | | **Non-Heating** | 2,278,889 | 1,951,208 | 1,858,172 | 1,915,095 | 8,003,364 | 65,936 |
| | **LVG** | | 23,243,208 | 19,863,085 | 20,336,825 | 21,626,676 | 85,069,794 | 700,850 |
| **Industrial** | **GSG** | **Heating** | 172,823 | 115,581 | 115,497 | 108,568 | 512,469 | 4,222 |
| | | **Non-Heating** | 66,190 | 46,374 | 48,084 | 49,746 | 210,394 | 1,733 |
| | **LVG** | | 3,497,004 | 3,326,496 | 3,610,311 | 3,209,146 | 13,642,957 | 112,398 |
| **Average Billing-Month Days** | | | 30.38 | 30.76 | 29.52 | 30.71 | 121.3810 | |

**SCHEDULE SAW-WNC-4**

## Balancing Therm Use Calculation, October 2019 - May 2020
**(therms)**

| Class | Rate | Group | Category | October-19 | November-19 | December-19 | January-20 | February-20 | March-20 | April-20 | May-20 | October-19 September-20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential** | **RSG** | **Heating** | **Delivered Sales** | 63,516,269 | 151,718,152 | 213,967,092 | 273,778,586 | 243,672,014 | 190,313,099 | 105,658,235 | 52,539,586 | 1,415,713,578 |
| | | | less: **Jun-Sep Ave x Days** | 31,826,243 | 30,799,590 | 31,826,243 | 31,826,243 | 29,772,937 | 31,826,243 | 30,799,590 | 31,826,243 | |
| | | | equals: **Balancing Use** | 31,690,026 | 120,918,562 | 182,140,849 | 241,952,343 | 213,899,077 | 158,486,856 | 74,858,645 | 20,713,343 | 1,044,659,701 |
| | | **Non-Heating** | **Delivered Sales** | 3,975,311 | 8,605,611 | 13,058,117 | 15,942,154 | 14,148,980 | 11,429,198 | 7,631,969 | 4,368,933 | 91,236,788 |
| | | | less: **Jun-Sep Ave x Days** | 3,196,906 | 3,093,780 | 3,196,906 | 3,196,906 | 2,990,654 | 3,196,906 | 3,093,780 | 3,196,906 | |
| | | | equals: **Balancing Use** | 778,405 | 5,511,831 | 9,861,211 | 12,745,248 | 11,158,326 | 8,232,292 | 4,538,189 | 1,172,027 | 53,997,529 |
| **Commercial** | **GSG** | **Heating** | **Delivered Sales** | 9,161,109 | 21,405,136 | 37,919,269 | 50,350,972 | 43,159,871 | 32,916,173 | 18,199,858 | 8,054,778 | 241,735,595 |
| | | | less: **Jun-Sep Ave x Days** | 5,503,523 | 5,325,990 | 5,503,523 | 5,503,523 | 5,148,457 | 5,503,523 | 5,325,990 | 5,503,523 | |
| | | | equals: **Balancing Use** | 3,657,586 | 16,079,146 | 32,415,746 | 44,847,449 | 38,011,414 | 27,412,650 | 12,873,868 | 2,551,255 | 177,849,114 |
| | | **Non-Heating** | **Delivered Sales** | 2,302,261 | 3,582,616 | 5,050,011 | 6,184,612 | 5,630,133 | 4,768,049 | 3,349,603 | 2,396,404 | 41,189,729 |
| | | | less: **Jun-Sep Ave x Days** | 2,044,016 | 1,978,080 | 2,044,016 | 2,044,016 | 1,912,144 | 2,044,016 | 1,978,080 | 2,044,016 | |
| | | | equals: **Balancing Use** | 258,245 | 1,604,536 | 3,005,995 | 4,140,596 | 3,717,989 | 2,724,033 | 1,371,523 | 352,388 | 17,175,305 |
| | **LVG** | | **Delivered Sales** | 41,147,599 | 53,122,388 | 86,618,226 | 109,111,410 | 97,790,511 | 87,515,531 | 55,575,354 | 25,842,230 | 641,742,267 |
| | | | less: **Jun-Sep Ave x Days** | 21,726,350 | 21,025,500 | 21,726,350 | 21,726,350 | 20,324,650 | 21,726,350 | 21,025,500 | 21,726,350 | |
| | | | equals: **Balancing Use** | 19,421,249 | 32,096,888 | 64,891,876 | 87,385,060 | 77,465,861 | 65,789,181 | 34,549,854 | 4,115,880 | 385,715,849 |
| **Industrial** | **GSG** | **Heating** | **Delivered Sales** | 250,637 | 823,340 | 1,545,865 | 2,052,695 | 1,771,707 | 1,296,481 | 735,646 | 93,846 | 9,053,281 |
| | | | less: **Jun-Sep Ave x Days** | 130,882 | 126,660 | 130,882 | 130,882 | 122,438 | 130,882 | 126,660 | 130,882 | |
| | | | equals: **Balancing Use** | 119,755 | 696,680 | 1,414,983 | 1,921,813 | 1,649,269 | 1,165,599 | 608,986 | (37,036) | 7,540,049 |
| | | **Non-Heating** | **Delivered Sales** | 37,988 | 153,507 | 237,718 | 302,077 | 271,229 | 199,879 | 163,896 | 66,211 | 1,633,764 |
| | | | less: **Jun-Sep Ave x Days** | 53,723 | 51,990 | 53,723 | 53,723 | 50,257 | 53,723 | 51,990 | 53,723 | |
| | | | equals: **Balancing Use** | (15,735) | 101,517 | 183,995 | 248,354 | 220,972 | 146,156 | 111,906 | 12,488 | 1,009,653 |
| | **LVG** | | **Delivered Sales** | 4,547,402 | 6,636,672 | 7,698,988 | 10,340,263 | 11,371,766 | 8,943,330 | 5,462,369 | 3,467,814 | 72,183,774 |
| | | | less: **Jun-Sep Ave x Days** | 3,484,338 | 3,371,940 | 3,484,338 | 3,484,338 | 3,259,542 | 3,484,338 | 3,371,940 | 3,484,338 | |
| | | | equals: **Balancing Use** | 1,063,064 | 3,264,732 | 4,214,650 | 6,855,925 | 8,112,224 | 5,458,992 | 2,090,429 | (16,524) | 31,043,492 |
| **Total** | | | **Delivered Sales** | 124,938,576 | 246,047,422 | 366,095,286 | 468,062,769 | 417,816,211 | 337,381,740 | 196,776,930 | 96,829,802 | 2,514,488,776 |
| | | | less: **Jun-Sep Ave x Days** | 67,965,981 | 65,773,530 | 67,965,981 | 67,965,981 | 63,581,079 | 67,965,981 | 65,773,530 | 67,965,981 | - |
| | | | equals: **Balancing Use** | 56,972,595 | 180,273,892 | 298,129,305 | 400,096,788 | 354,235,132 | 269,415,759 | 131,003,400 | 28,863,821 | 1,718,990,692 |

**SCHEDULE SAW-WNC-5**

## RSG Balancing Therm Share of Delivered Sales Calculation, October 2019-September 2020
**(therms)**

| Rate | Class | Group | Category | October-19 | November-19 | December-19 | January-20 | February-20 | March-20 | April-20 | May-20 | June-20 | July-20 | August-20 | September-20 | Total | Balancing Delivered (percent) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RSG | Residential | Heating | Balancing Use | 31,690,026 | 120,918,562 | 182,140,849 | 241,952,343 | 213,899,077 | 158,486,856 | 74,858,645 | 20,713,343 | - | - | - | - | 1,044,659,701 | |
| | | | Delivered Sales | 63,516,269 | 151,718,152 | 213,967,092 | 273,778,586 | 243,672,014 | 190,313,099 | 105,658,235 | 52,539,586 | 30,163,480 | 31,325,321 | 27,837,779 | 31,223,965 | 1,415,713,578 | |
| | | Non-Heating | Balancing Use | 778,405 | 5,511,831 | 9,861,211 | 12,745,248 | 11,158,326 | 8,232,292 | 4,538,189 | 1,172,027 | - | - | - | - | 53,997,529 | |
| | | | Delivered Sales | 3,975,311 | 8,605,611 | 13,058,117 | 15,942,154 | 14,148,980 | 11,429,198 | 7,631,969 | 4,368,933 | 3,088,865 | 3,274,504 | 2,771,272 | 2,941,875 | 91,236,789 | |
| | | Total | Balancing Use | 32,468,431 | 126,430,393 | 192,002,060 | 254,697,591 | 225,057,403 | 166,719,148 | 79,396,834 | 21,885,370 | - | - | - | - | 1,098,657,230 | 72.91% |
| | | | Delivered Sales | 67,491,580 | 160,323,763 | 227,025,209 | 289,720,740 | 257,820,994 | 201,742,297 | 113,290,204 | 56,908,519 | 33,252,345 | 34,599,825 | 30,609,051 | 34,165,840 | 1,506,950,367 | |

**SCHEDULE SAW-WNC-6**

# Legacy Calculation
## Balancing Therm Use Calculation, November 2019 - March 2020
### (therms)

| Class | Rate | Group | Category | November-19 | December-19 | January-20 | February-20 | March-20 | October-19 September-20 |
|---|---|---|---|---|---|---|---|---|---|
| **Residential** | **RSG** | **Heating** | **Delivered Sales** | 151,718,152 | 213,967,092 | 273,778,586 | 243,672,014 | 190,313,099 | 1,415,713,578 |
| | | | less: **Jun-Sep Ave x Days** | 30,799,590 | 31,826,243 | 31,826,243 | 29,772,937 | 31,826,243 | |
| | | | equals: **Balancing Use** | 120,918,562 | 182,140,849 | 241,952,343 | 213,899,077 | 158,486,856 | 917,397,687 |
| | | **Non-Heating** | **Delivered Sales** | 8,605,611 | 13,058,117 | 15,942,154 | 14,148,980 | 11,429,198 | 91,236,788 |
| | | | less: **Jun-Sep Ave x Days** | 3,093,780 | 3,196,906 | 3,196,906 | 2,990,654 | 3,196,906 | |
| | | | equals: **Balancing Use** | 5,511,831 | 9,861,211 | 12,745,248 | 11,158,326 | 8,232,292 | 47,508,908 |
| **Commercial** | **GSG** | **Heating** | **Delivered Sales** | 21,405,136 | 37,919,269 | 50,350,972 | 43,159,871 | 32,916,173 | 241,735,595 |
| | | | less: **Jun-Sep Ave x Days** | 5,325,990 | 5,503,523 | 5,503,523 | 5,148,457 | 5,503,523 | |
| | | | equals: **Balancing Use** | 16,079,146 | 32,415,746 | 44,847,449 | 38,011,414 | 27,412,650 | 158,766,405 |
| | | **Non-Heating** | **Delivered Sales** | 3,582,616 | 5,050,011 | 6,184,612 | 5,630,133 | 4,768,049 | 41,189,729 |
| | | | less: **Jun-Sep Ave x Days** | 1,978,080 | 2,044,016 | 2,044,016 | 1,912,144 | 2,044,016 | |
| | | | equals: **Balancing Use** | 1,604,536 | 3,005,995 | 4,140,596 | 3,717,989 | 2,724,033 | 15,193,149 |
| | **LVG** | | **Delivered Sales** | 53,122,388 | 86,618,226 | 109,111,410 | 97,790,511 | 87,515,531 | 641,742,267 |
| | | | less: **Jun-Sep Ave x Days** | 21,025,500 | 21,726,350 | 21,726,350 | 20,324,650 | 21,726,350 | |
| | | | equals: **Balancing Use** | 32,096,888 | 64,891,876 | 87,385,060 | 77,465,861 | 65,789,181 | 327,628,866 |
| **Industrial** | **GSG** | **Heating** | **Delivered Sales** | 823,340 | 1,545,865 | 2,052,695 | 1,771,707 | 1,296,481 | 9,053,281 |
| | | | less: **Jun-Sep Ave x Days** | 126,660 | 130,882 | 130,882 | 122,438 | 130,882 | |
| | | | equals: **Balancing Use** | 696,680 | 1,414,983 | 1,921,813 | 1,649,269 | 1,165,599 | 6,848,344 |
| | | **Non-Heating** | **Delivered Sales** | 153,507 | 237,718 | 302,077 | 271,229 | 199,879 | 1,633,764 |
| | | | less: **Jun-Sep Ave x Days** | 51,990 | 53,723 | 53,723 | 50,257 | 53,723 | |
| | | | equals: **Balancing Use** | 101,517 | 183,995 | 248,354 | 220,972 | 146,156 | 900,994 |
| | **LVG** | | **Delivered Sales** | 6,636,672 | 7,698,988 | 10,340,263 | 11,371,766 | 8,943,330 | 72,183,774 |
| | | | less: **Jun-Sep Ave x Days** | 3,371,940 | 3,484,338 | 3,484,338 | 3,259,542 | 3,484,338 | |
| | | | equals: **Balancing Use** | 3,264,732 | 4,214,650 | 6,855,925 | 8,112,224 | 5,458,992 | 27,906,523 |
| **Total** | | | **Delivered Sales** | 246,047,422 | 366,095,286 | 468,062,769 | 417,816,211 | 337,381,740 | 2,514,488,776 |
| | | | less: **Jun-Sep Ave x Days** | 65,773,530 | 67,965,981 | 67,965,981 | 63,581,079 | 67,965,981 | - |
| | | | equals: **Balancing Use** | 180,273,892 | 298,129,305 | 400,096,788 | 354,235,132 | 269,415,759 | 1,502,150,876 |

**SCHEDULE SAW-WNC-7**

## Legacy Calculation
## RSG Balancing Therm Share of Delivered Sales Calculation, October 2019-September 2020
**(therms)**

| Rate | Class | Group | Category | October-19 | November-19 | December-19 | January-20 | February-20 | March-20 | April-20 | May-20 | June-20 | July-20 | August-20 | September-20 | Total | Balancing Delivered (percent) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RSG | Residential | Heating | Balancing Use | - | 120,918,562 | 182,140,849 | 241,952,343 | 213,899,077 | 158,486,856 | - | - | - | - | - | - | 917,397,687 | |
| | | | Delivered Sales | 63,516,269 | 151,718,152 | 213,967,092 | 273,778,586 | 243,672,014 | 190,313,099 | 105,658,235 | 52,539,586 | 30,163,480 | 31,325,321 | 27,837,779 | 31,223,965 | 1,415,713,578 | |
| | | Non-Heating | Balancing Use | - | 5,511,831 | 9,861,211 | 12,745,248 | 11,158,326 | 8,232,292 | - | - | - | - | - | - | 47,508,908 | |
| | | | Delivered Sales | 3,975,311 | 8,605,611 | 13,058,117 | 15,942,154 | 14,148,980 | 11,429,198 | 7,631,969 | 4,368,933 | 3,088,865 | 3,274,504 | 2,771,272 | 2,941,875 | 91,236,789 | |
| | | Total | Balancing Use | - | 126,430,393 | 192,002,060 | 254,697,591 | 225,057,403 | 166,719,148 | - | - | - | - | - | - | 964,906,595 | 64.03% |
| | | | Delivered Sales | 67,491,580 | 160,323,763 | 227,025,209 | 289,720,740 | 257,820,994 | 201,742,297 | 113,290,204 | 56,908,519 | 33,252,345 | 34,599,825 | 30,609,051 | 34,165,840 | 1,506,950,367 | |

## Degree Day Consumption Factor Calculation

### RSG Heating

| Month | HDD | Post-2008 | HDDxWage Coefficient | HDD x Price Coefficient | Value | | Customers | Degree Day Consumption Factor |
|---|---|---|---|---|---|---|---|---|
| | | | | | Real Price | Wage | | |
| Oct-19 | | (0.0064) | 0.001334 | | 0.7069 | 83.7740 | 1,401,976 | 147,748 |
| Nov-19 | | (0.0064) | 0.002056 | | 0.7069 | 83.7740 | 1,408,138 | 233,569 |
| Dec-19 | 0.1691 | (0.0064) | | | 0.7069 | 83.7740 | 1,404,673 | 228,514 |
| Jan-20 | 0.19448 | (0.0064) | | | 0.7139 | 87.4811 | 1,405,467 | 264,384 |
| Feb-20 | 0.20185 | (0.0064) | | (0.0038) | 0.7139 | 87.4811 | 1,401,019 | 270,093 |
| Mar-20 | 0.20141 | (0.0064) | | (0.0038) | 0.7139 | 87.4811 | 1,412,662 | 271,716 |
| Apr-20 | 0.18424 | (0.0064) | | | 0.7139 | 87.4811 | 1,414,721 | 251,638 |
| May-20 | 0.13503 | (0.0064) | | | 0.7139 | 87.4811 | 1,415,262 | 182,090 |

### RSG Non-Heating

| HDD | HDD x Price Coefficient | Value | | Customers | Degree Day Consumption Factor |
|---|---|---|---|---|---|
| | | Real Price | Wage | | |
| 0.0119 | - | 0.7899 | | 291,241 | 3,466 |
| 0.0398 | (0.0123) | 0.7899 | | 293,051 | 8,816 |
| 0.0527 | (0.0169) | 0.7899 | | 289,859 | 11,406 |
| 0.0564 | (0.0190) | 0.7946 | | 291,201 | 12,027 |
| 0.0561 | (0.0187) | 0.7946 | | 289,235 | 11,928 |
| 0.0577 | (0.0187) | 0.7946 | | 290,415 | 12,442 |
| 0.0578 | (0.0172) | 0.7946 | | 289,214 | 12,764 |
| 0.0370 | - | 0.7946 | | 289,375 | 10,707 |

| | Commercial GSG Heating | | | | | | Commercial GSG Non-Heating | |
|---|---|---|---|---|---|---|---|---|
| | | HDDxPrice | | HDDxHouseholds | | Degree Day Consumption | | Degree Day Consumption |
| Month | HDD | Coefficient | Value | Coefficient | Value | Factor | HDD | Factor |
| Oct-19 | | | | 4.7532 | 3,361 | 15,975 | 836 | 836 |
| Nov-19 | | (15,737) | 0.8624 | 12.3183 | 3,361 | 27,829 | 2,529 | 2,529 |
| Dec-19 | | (11,068) | 0.8624 | 17.4386 | 3,361 | 49,065 | 3,510 | 3,510 |
| Jan-20 | | (14,217) | 0.8445 | 22.0926 | 3,385 | 62,788 | 3,779 | 3,779 |
| Feb-20 | | (11,336) | 0.8445 | 18.8626 | 3,385 | 54,286 | 3,903 | 3,903 |
| Mar-20 | | (16,106) | 0.8445 | 20.3050 | 3,385 | 55,140 | 3,962 | 3,962 |
| Apr-20 | | (11,855) | 0.8445 | 19.3349 | 3,385 | 55,446 | 3,984 | 3,984 |
| May-20 | | (21,865) | 0.8445 | 9.2318 | 3,385 | 12,789 | 3,864 | 3,864 |

## Industrial GSG Heating

| Month | HDDxMfg Coefficient | HDDxMfg Value | Degree Day Consumption Factor |
|---|---|---|---|
| Oct-19 | 2.28 | 244.415 | 557 |
| Nov-19 | 4.51 | 244.415 | 1103 |
| Dec-19 | 5.70 | 244.415 | 1393 |
| Jan-20 | 8.03 | 239.934 | 1927 |
| Feb-20 | 6.52 | 239.934 | 1564 |
| Mar-20 | 8.72 | 239.934 | 2092 |
| Apr-20 | 5.66 | 239.934 | 1358 |
| May-20 | 3.05 | 239.934 | 732 |

## Industrial GSG Non-Heating

| HDDxMfg Coefficient | HDDxMfg Value | Degree Day Consumption Factor |
|---|---|---|
| 0.00 | 244 | 0 |
| 0.52 | 244 | 127 |
| 0.79 | 244 | 193 |
| 0.92 | 240 | 221 |
| 0.96 | 240 | 230 |
| 0.99 | 240 | 238 |
| 0.94 | 240 | 226 |
| 0.49 | 240 | 118 |

## Commercial LVG

| Month | HDDxCust | | HDDxPrice | | Degree Day Consumption Factor |
|---|---|---|---|---|---|
| | Coefficient | Value | Coefficient | Value | |
| Oct-19 | 25.0964 | 3385.47 | (3,610.13) | 0.8624 | 81,850 |
| Nov-19 | 25.0964 | 3385.47 | (3,610.13) | 0.8624 | 81,850 |
| Dec-19 | 25.0964 | 3385.47 | (3,610.13) | 0.8624 | 81,850 |
| Jan-20 | 25.0964 | 3405.67 | (3,610.13) | 0.8445 | 82,421 |
| Feb-20 | 25.0964 | 3405.67 | (3,610.13) | 0.8445 | 82,421 |
| Mar-20 | 25.0964 | 3405.67 | (3,610.13) | 0.8445 | 82,421 |
| Apr-20 | 25.0964 | 3405.67 | (3,610.13) | 0.8445 | 82,421 |
| May-20 | 25.0964 | 3405.67 | (3,610.13) | 0.8445 | 82,421 |

## Industrial LVG

| | HDDxMfg | | HDDxPrice | | Degree Day Consumption Factor |
|---|---|---|---|---|---|
| | Coefficient | Value | Coefficient | Value | |
| | 27.9752 | 244.42 | (206.86) | 0.67 | 6,700 |
| | 27.9752 | 244.42 | (206.86) | 0.67 | 6,700 |
| | 27.9752 | 244.42 | (206.86) | 0.67 | 6,700 |
| | 27.9752 | 239.93 | (206.86) | 0.64 | 6,580 |
| | 27.9752 | 239.93 | (206.86) | 0.64 | 6,580 |
| | 27.9752 | 239.93 | (206.86) | 0.64 | 6,580 |
| | 27.9752 | 239.93 | (206.86) | 0.64 | 6,580 |
| | 27.9752 | 239.93 | (206.86) | 0.64 | 6,580 |

**SCHEDULE SAW-WNC-9**

**Normal Monthly Weather**
**(1999-2018 Average)**

| Calendar Month | Degree Days |
|---|---|
| October-19 | 243.01 |
| November-19 | 516.21 |
| December-19 | 827.33 |
| January-20 | 1,002.61 |
| February-20 | 858.04 |
| March-20 | 691.71 |
| April-20 | 357.63 |
| May-20 | 123.71 |

# Natural Gas Sales Forecast - 2019

**Public Service Electric & Gas Company**

**Finance Department**

**Electric and Gas Sales and Revenue Forecasting Group**

**September 2018**

# Contents

# Introduction

The natural gas sales forecast has a key role in both the operating and financial planning processes of Public Service Electric & Gas (PSE&G).

The volumetric and maximum day sendout projections are used in the development of strategies for optimal gas procurement by PSE&G's BGSS supplier.

The sales forecast also serves as the basis for the natural gas revenue forecast that is a key parameter in PSE&G's financial planning process. This includes not only the budgeting process but also the regulatory process.

The purpose of this document is to describe the current forecast methodology, forecast assumptions, and the 2019 gas sales forecast. The first section describes the econometric sales models. A discussion of the forecast assumptions used to develop the sales forecast follows. Section III describes the maximum daily send-out projection. An appendix contains more detailed information on the billing period to calendar month conversion, and forecast tables.

# I Model Specification and Estimation

**Residential Model**

Residential gas sales are determined by the number of residential customers and the amount of gas that each of these customers uses. As a result, the modeling of residential sales is disaggregated into two components: the projection of the number of customers and the estimate of what, on average, each of these customers will use. While the projection of the number of residential natural gas customers can be based on historical trends and expected residential construction activity in the service area, the models utilized to develop the average use forecast are more complicated and are described below.

The demand for energy is a derived demand from the demand for the services that the energy provides. In the case of gas in the residential sector, this is a demand for the three main end-uses of gas: space heating, water heating, and cooking. Standard microeconomic theory suggests that the demand for these gas-fueled end-uses is a function of the real, i.e. inflation adjusted, price of gas, and the income of the household. In addition, since space heating and, to a lesser extent, water heating is affected by the weather; weather also needs to be included in the model specification, i.e.

THERM/CUST = *f*(PRICEGAS, INCOME, WEATHER) [1]

where:

| | |
|---|---|
| THERM/CUST | = Average gas sales per customer, |
| PRICEGAS | = Real price of gas, |
| INCOME | = Measure of customer income, |
| WEATHER | = Billing-month weather. |

While information on individual appliance ownership and consumption is not available, PSE&G does segregate its Residential customer data into those customers that have gas space heating and those that do not. As a result, separate models estimating the average gas sales for space heating customers and non-space heating customers were developed.

Weather is incorporated into the models using billing-month heating degree days (HDD). To allow for the possibility of month-specific response to weather, the heating degree data was multiplied by monthly binary variables to produce month-specific HDD independent variables.

The real price of gas was defined as the annual average revenue per therm divided by the Consumers' Price Index –All Urban Consumers. However, the extreme seasonality of monthly gas consumption made the utilization of this variable directly in a linear specification impractical because it is unrealistic to

expect that a change in price would have the same impact, measured in therms, in January, a high consumption month, as in July where consumption can be only one-tenth the January volume. As a result, this variable was incorporated as an interactive variable with HDD to create the effect that a change in price will affect the magnitude of the response to weather, i.e. a small response in the summer months and a much larger response during the space heating season.

Income is defined as the total real wages and salary disbursements for New Jersey from the U.S. Department of Commerce, Bureau of Economic Analysis. This is a narrower measure than personal income, omitting for example dividends, interest and rental income, and, as a result, is assumed to more accurately reflect the economic well-being of the majority of our customers. The incorporation of this variable directly into a linear specification suffers from the same drawback as that of the price. As a result, this variable was also incorporated into the specification as an interactive variable with HDD. In the models the economic variables were lagged one year to account for the delay in the impact that these variables have on consumer behavior.

As a result, the final functional form of the model that was estimated is:

$$THERM/CUST_t = f(\overline{MONTH}xHDD_t \times PRICEGAS_{a-1}, \overline{MONTH}xHDD_t \times INCOME_{a-1}, \overline{MONTH}xHDD_t) \quad [2]$$

where:

| | |
|---|---|
| THERM/CUST | = Average gas sales per customer, |
| PRICEGAS | = Real price of gas, |
| INCOME | = Real Wage and Salary Disbursements, |
| $\underline{HDD}$ | = Heating degree days, |
| $\overline{MONTH}$ | = Vector of binary variables for each heating month, |
| t | = Billing-month, |
| a | = Year associated with billing-month, t. |

The models were estimated using monthly data from the 2006-2017 period (excluding data from 2009 due to distortions resulting from the implementation of a new billing system.)The results of the OLS estimation procedure are summarized in Table 1 and Figures 1 and 2.

As Figures 1 and 2 illustrate, the high values of the coefficients of determination of both the model for gas space heating customers and the model of those customers without gas heating explain an extremely high proportion of the variation from the mean values. The estimates of the individual coefficients of the RSG model estimations are what one would expect given the characteristics of residential natural gas consumption. The key predictor of gas sales to this sector is weather with the weather having a greater impact on those customers with gas space heating than those without. Price is a factor for residential customers during the winter months but, it's impact is relatively small.

**Figure 1**
**RSG Space Heating Model**
**Actual vs. Fitted Values**

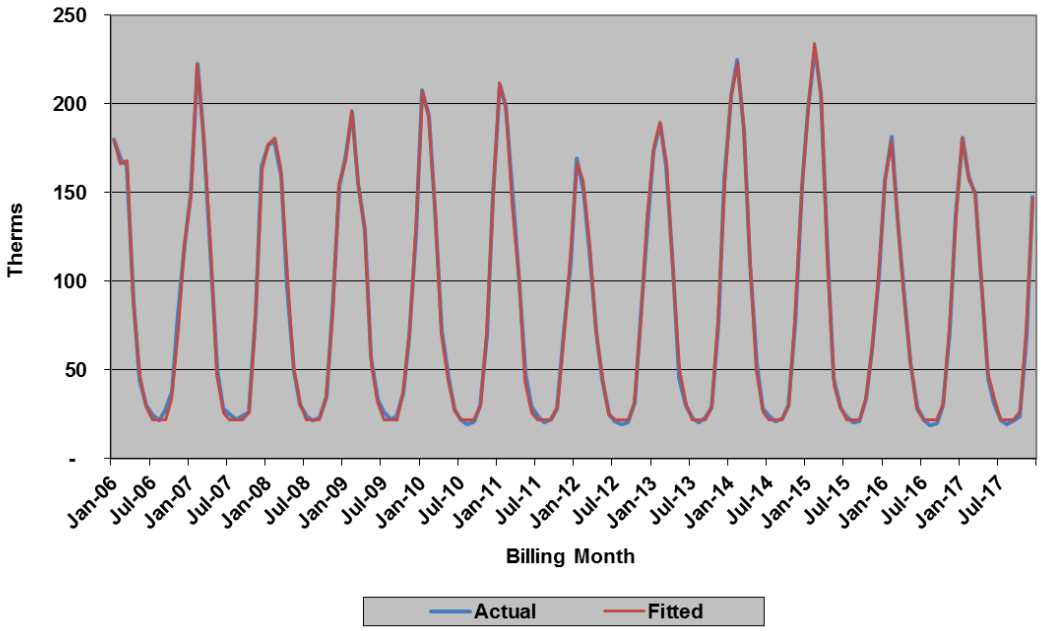
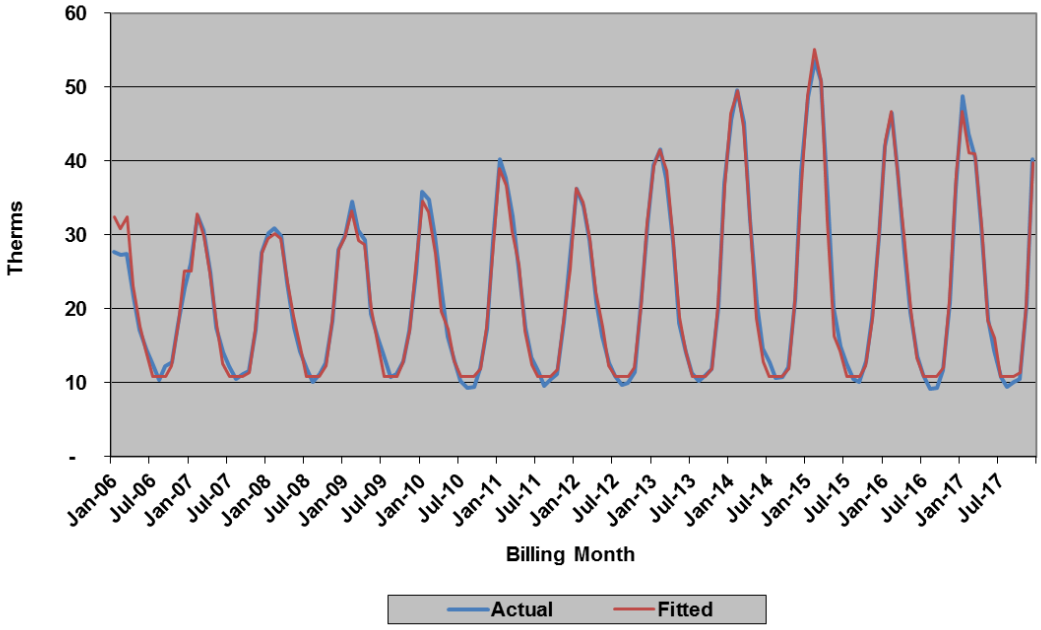



**Figure 2**
**RSG Non-Space Heating Model**
**Actual vs. Fitted Values**



The price elasticity estimates were estimated to be -0.0049 and -0.22 for space heating and non-space heating customers, respectively and consistent with lower gas prices and the lack of a surge in consumption in response to them. The non-space heating elasticity is the result of a similar therm impact of price but, measured over a much smaller base usage. Income was found to have an effect on gas consumption by space heating customers in the fall. This is consistent with income changes resulting affecting when space heating equipment is turned on. The economic downturn appeared to result in a delay in turning on this equipment in the fall reducing use.

**Table 1**

## Estimated Coefficients of the Residential Models

**(standard errors in parentheses)**

| | | JAN | FEB | MAR | APR | MAY | JUNE | OCT | NOV | DEC | R2 | DW | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **HEATING** | | | | | | | | | | | | |
| | **HDD** | 0.19448<br>(0.008) | 0.20185<br>(0.007) | 0.20141<br>(0.007) | 0.18424<br>(0.010) | 0.13503<br>(0.005) | 0.16139<br>(0.021) | | | 0.16905<br>(0.001) | 0.998 | 1.321 | 132 |
| **FEB -MAR** | **PRICE x HDD** | | -0.00378<br>(0.002) | | | | | | | | | | |
| | **WAGE x HDD** | | | | | | | 0.00133<br>(0.000) | 0.00206<br>(0.000) | | | | |
| | **I-POWER** | -0.00637<br>(0.001) | | | | | | | | | | | |
| | **NON-HEATING** | | | | | | | | | | | | |
| | **HDD** | 0.05637<br>(0.002) | 0.05606<br>(0.002) | 0.05771<br>(0.002) | 0.05781<br>(0.003) | 0.03701<br>(0.002) | 0.07371<br>(0.011) | 0.01189<br>(0.005) | 0.03976<br>(0.004) | 0.05275<br>(0.002) | 0.988 | 1.037 | 132 |
| | **PRICE x HDD** | -0.01898<br>(0.001) | -0.01867<br>(0.001) | -0.01869<br>(0.001) | -0.01719<br>(0.002) | | | | -0.01232<br>(0.003) | -0.01693<br>(0.001) | | | |

The second key element of the residential forecast, as noted above, is the projection of the number of residential natural gas customers. This forecast is based on historical trends between customer growth and residential construction activity in the service area and is discussed in the Forecast Assumptions section.

**Commercial**

The demand for natural gas by the non-residential sector, as with any other factor of production, is a function of the input's price, the price of substitutes (if any) and the level of production. This implies that gas sales to the commercial sector is a function of the real price of gas and the level of "output" of the commercial sector in PSE&G's service territory, i.e. Again, since gas is primarily used for space and/or water heating, weather needs to be included in the specification resulting in the following:

THERMS = *f*(PRICEGAS, OUTPUT, HDD) [3]

where:

| | |
|---|---|
| THERMS | = Gas Sales, |
| PRICEGAS | = Real price of gas, |
| OUTPUT | = Commercial sector output, |
| HDD | = Heating degree days. |

The problem with this specification is that there is not a good measure of output for the local commercial sector. However, if it is assumed that the demand for local commercial output is a function of the local economic and demographic factors, i.e., how many households there are (HSH) and how much money do they have to spend (INCOME), commercial output can then be defined as:

OUTPUT = *f*(INCOME, HSH) [4]

Substituting [4] into [3] yields:

THERMS = *f*(PRICEGAS, INCOME, HSH, HDD) [5]

This model was estimated for customers in the commercial sector using monthly billing data from the 2005-2017 period (again, excluding 2009). The firm delivery customers in this class whose usage does not exceed 300 Dth are served under rate GSG. These customers are further disaggregated into those with gas space heat and those that heat with other fuels. These two groups of customers are modeled separately. The larger commercial customers are served under rate LVG. These are also modeled separately.

Historical annual household estimates for New Jersey is available from the U.S. Bureau of the Census. As with the residential models, the strong seasonality associated with commercial gas sales dictates that the economic/demographic variables can be used in the model directly but, need to be used as interactive variables with HDD. In addition, in the models the economic variables were lagged one year to account for the delay in the impact that these variables have

on consumer behavior. As a result, the functional form that was estimated for each of the three groups of commercial customers is[1]:

$$\begin{aligned} THERMS_t = f(&\overline{MONTH} \times HDD_t \times PRICEGAS_{a-1}, \\ &\overline{MONTH} \times HDD_t \times INCOME_{a-1}, \\ &\overline{MONTH} \times HDD_t \times HSH_{a-1,}\, HDD_t) \end{aligned} \quad [6]$$

where:

| | |
|---|---|
| THERMS | = Gas sales, |
| PRICEGAS | = Real price of gas, |
| INCOME | = Real Wage and Salary Disbursements, |
| HDD | = Heating degree days, |
| $\overline{MONTH}$ | = Vector of binary variables for each heating month, |
| t | = Billing-month, |
| a | = Year associated with billing-month, t. |

The results of the OLS estimation procedure, summarized in Figures 3-5, show that the commercial models also fit the historical data well.

The estimated coefficients of the three commercial models indicate that while the small commercial space heating are sensitive to price, with an estimated elasticity of -0.23 the non-space heating customers are not and the large LVG, customers are sensitive to price, with an estimated elasticity of -0.01. In addition, while the coefficients on households, the economic indicator in the models, are highly statistically significant, this does not imply large sales increases given the anticipated slow growth in the number of households.

[1] It was not necessary to incorporate month-specific HDD specification since the LVG sales are less sensitive to the weather.

**Figure 3**
## GSG Commercial Space Heating Model
### Actual vs. Fitted Values

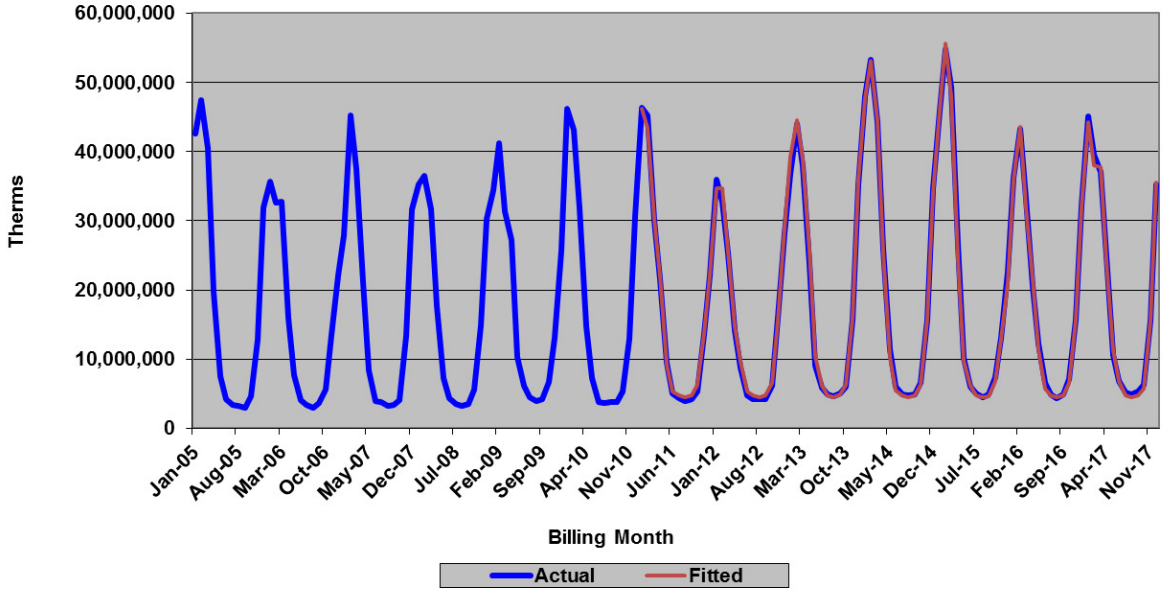



**Figure 4**
## GSG Commercial Non-Space Heating Model
### Actual vs. Fitted Values

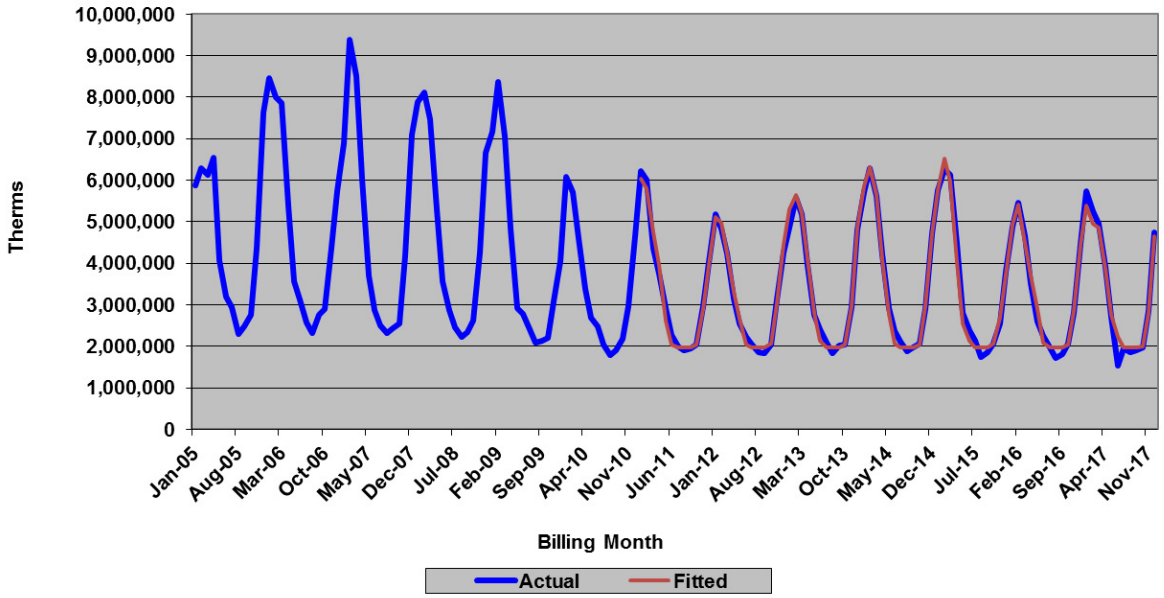


**Figure 5**
## LVG Commercial Model
### Actual vs. Fitted Values

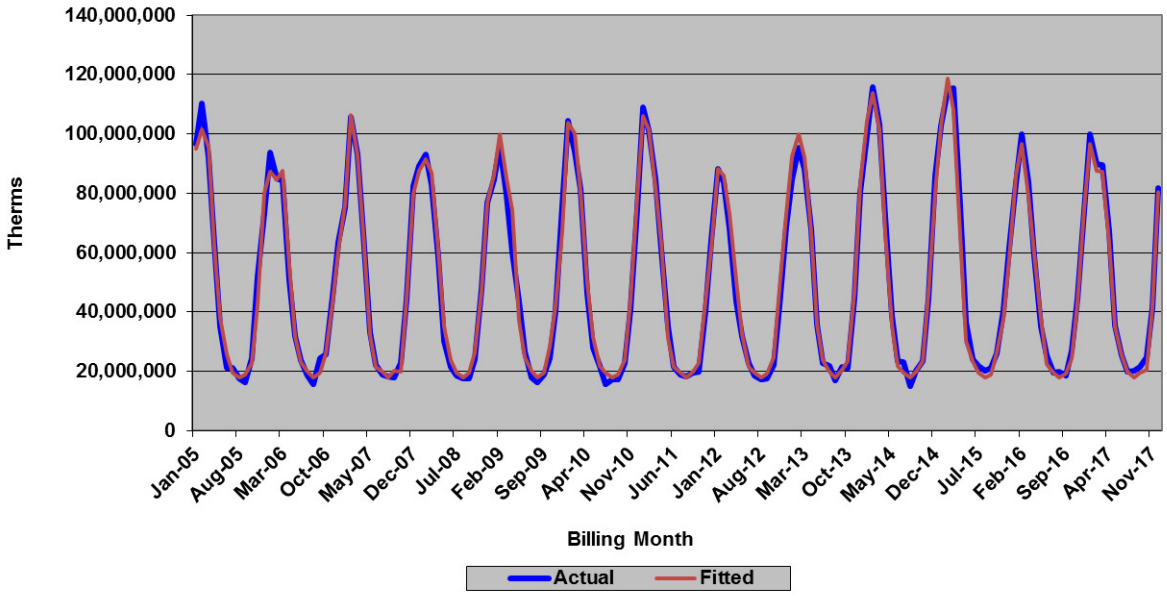



**Table 2**

## Estimated Coefficients of the GSG Commercial Gas Sales Models
### (standard errors in parentheses)

| | JAN | FEB | MAR | APR | MAY | JUN | SEP | OCT | NOV | DEC | R2 | DW | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HEATING** | | | | | | | | | | | | | |
| **PRICE x HDD** | -14217 | -11336 | -16106 | -11855 | -21865 | | | | -15737 | -11068 | 0.997 | 1.536 | 84 |
| | (3,144) | (3,066) | (3,682) | (5,519) | (20,481) | | | | (7,460) | (3,995) | | | |
| **CUST x HDD** | 22.09 | 18.86 | 20.30 | 19.33 | 9.23 | 9.56 | 3.59 | 4.75 | 12.32 | 17.44 | | | |
| | (1.97) | (1.42) | (1.29) | (1.91) | (4.58) | (6.60) | (18.63) | (5.04) | (4.02) | (1.21) | | | |
| **NON-HEATING** | | | | | | | | | | | | | |
| **HDD** | 3779 | 3903 | 3962 | 3984 | 3864 | 3533 | | 836 | 2529 | 3510 | 0.985 | 1.443 | 84 |
| | (86) | (84) | (103) | (168) | (406) | (1,862) | | (846) | (221) | (115) | | | |

**Table 3**

# Estimated Coefficients of the LVG Commercial Gas Sales Models

**(standard errors in parentheses)**

| HDD x PRICE | HDD x CUST | R2 | DW | n |
|---|---|---|---|---|
| -3610.13 | 25.10 | 0.989 | 1.632 | 144 |
| (1,801) | (1) | | | |

**Industrial**

While gas sales to the commercial sector are correlated with commercial output because output tends to be correlated with commercial space-heated floor space, sales to the PSE&G rate GSG and rate LVG gas customers in the industrial sector are not correlated with the industrial output because gas, for the most part, is not used for process heat. It is used to heat employee workspaces and the number of employees has been declining while industrial output has been increasing. Therefore, rather than used the traditional function for the demand for a factor of production such as [3], the following specification is used:

$$THERMS = f(PRICEGAS, EMP, HDD) \quad [7]$$

where:

EMP = Manufacturing employment.

Since gas is used primarily for space heating the economic variables need to be used as interactive variables with HDD to account for the extreme seasonality of the data. As a result, the functional forma that was estimated is:

$$THERMS_t = f(HDD_t \times PRICEGAS_{a-1}, HDD_t \times EMP_{a-1}, HDD_t) \quad [8]$$

where:

| | |
|---|---|
| THERMS | = Gas sales, |
| PRICEGAS | = Real price of gas, |
| HDD | = Heating degree days, |
| t | = Billing-month, |
| a | = Year associated with billing-month, t. |

The results of the OLS estimation procedure, summarized in Figures 6-8, show that the industrial models for customers in the two space heating segments fit the historical data well. The data for industrial GSG non-heating customers, however, seems to indicate the presence of out of period adjustments in the billing data which the model doesn't, and can't be expected to, account for. These were addressed with binary variables.

Like the small and medium commercial models, the estimated coefficients of the three industrial models indicate that sensitivity to price is small. The small industrial customers, rate GSG did not show any statistically significant response to price while rate LVG sensitive to price, with an estimated elasticity of -0.01. Small response of the industrial sector to gas prices is attributed to the fact that gas, since it is not used for process heat, is a relatively small proportion of the total costs of production.

**Figure 6**
**GSG Industrial Space Heating Model**
**Actual vs. Fitted Values**

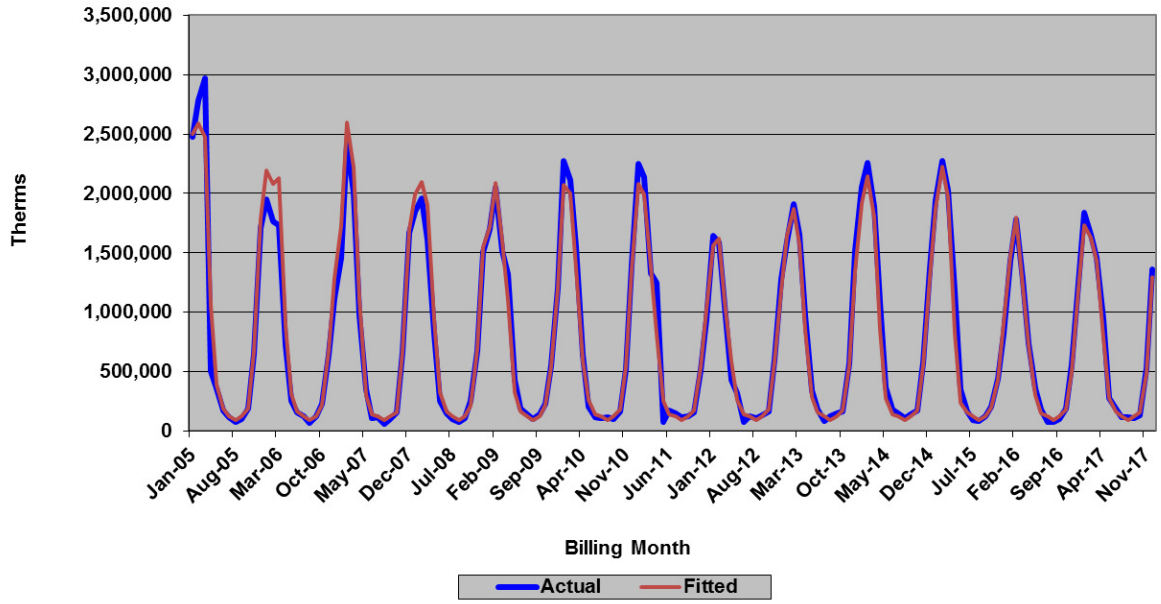


**Figure 7**
## GSG Industrial Non-Space Heating Model
### Actual vs. Fitted Values

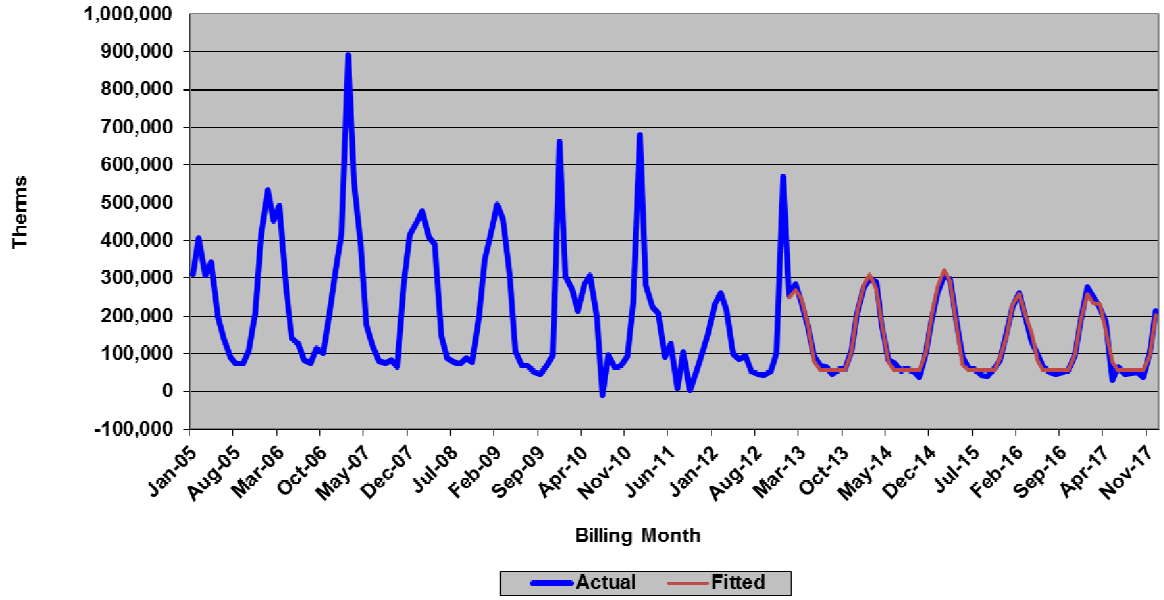



**Figure 8**
## LVG Industrial Heating Model
### Actual vs. Fitted Values

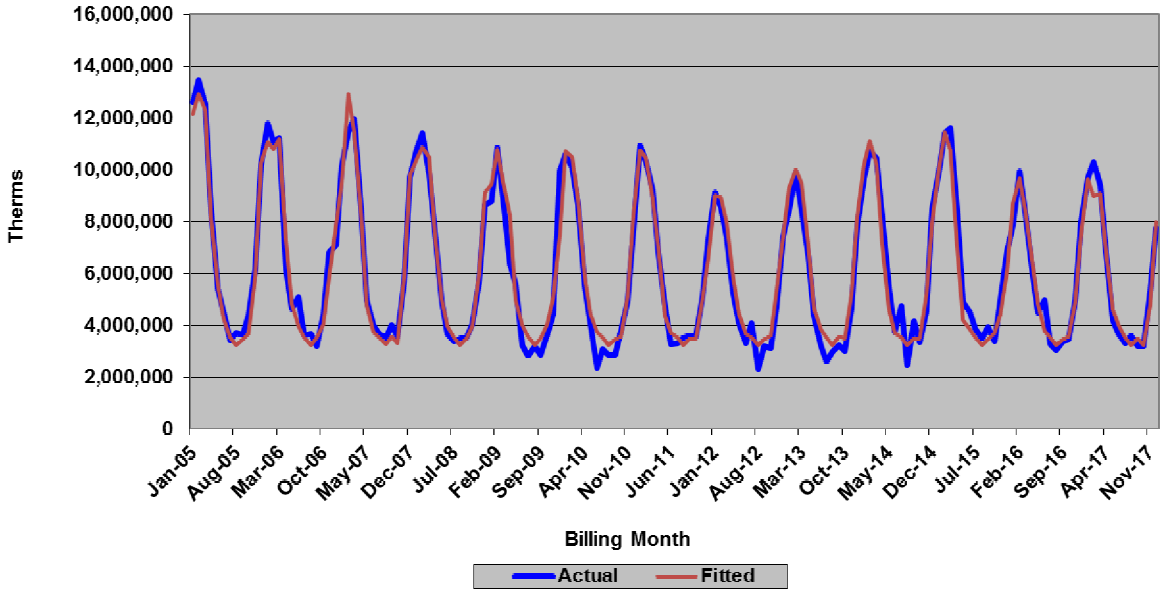


**Table 4**

# Estimated Coefficients of the GSG Industrial Gas Sales Models

**(standard errors in parentheses)**

| | JAN | FEB | MAR | APR | MAY | JUN | OCT | NOV | DEC | R2 | DW | n |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **HEATING** | | | | | | | | | | | | |
| **EMP x HDD** | 8.03 | 6.52 | 8.72 | 5.66 | 3.05 | 2.41 | 2.28 | 4.51 | 5.70 | 0.975 | 1.481 | 144 |
| | (1.06) | (0.79) | (0.77) | (0.34) | (0.79) | (3.24) | (1.61) | (0.43) | (0.87) | | | |
| **NON-HEATING** | | | | | | | | | | | | |
| **EMP x HDD** | 0.92 | 0.96 | 0.99 | 0.94 | 0.49 | | | 0.52 | 0.79 | 0.980 | 2.258 | 60 |
| | (0.03) | (0.03) | (0.03) | (0.05) | (0.13) | | | (0.08) | (0.04) | | | |

**Table 5**

# Estimated Coefficients of the LVG Industrial Gas Sales Models

**(standard errors in parentheses)**

| HDD x PRICE | HDD x EMP | R2 | DW | n |
|---|---|---|---|---|
| -206.86 | 27.98 | 0.968 | 1.732 | 144 |
| (639.21) | (3.84) | | | |

# II Forecast Assumptions

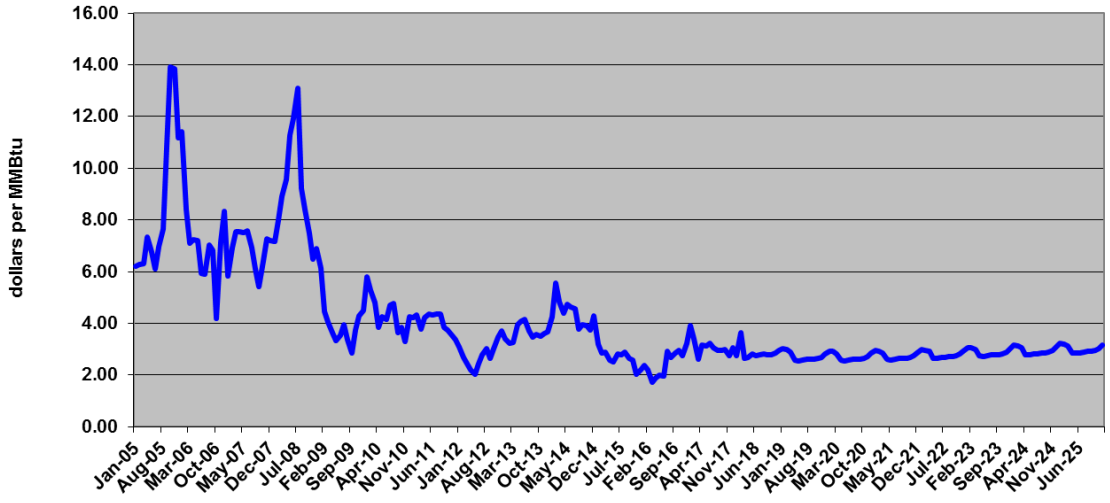
The models described above, in concert with assumptions about future prices and local economic and demographic parameters, were utilized to produce a forecast of billed natural gas delivered sales by rate for the residential, commercial, and industrial customer classes. The assumptions and the forecasts are described in more detail below.

**Natural Gas Prices**

The main driver of retail natural gas prices is the wholesale cost of gas which changes monthly. While these costs are passed through to commercial and industrial customers on monthly basis, the gas cost under- or over-collection of the residential customers is addressed in October where the rate is adjusted to collect or return the imbalance over the following twelve months. For the purpose of the forecast, the wholesale natural gas price was assumed to follow the NYMEX future prices as of April 30, 2018. As figure 9 shows, the wholesale price of gas is projected to stay relatively stable during the 2016-2025 periods.

**Figure 9**

**NYMEX Natural Gas Futures Prices, April 30, 2018**
**($/MMBtu)**



This price projection was used in the ER&T Gas cost model which generated commodity gas costs by rate. The residential costs, along with the actual imbalance in the residential gas supply cost and the revenue collection to offset this cost was utilized in the Cognos residential model to produce a stream of residential prices assuming that every October the imbalance was trued-up over the following 12 months. These projected commodity costs, combined with delivery tariff assumptions results in projected retail prices that are summarized below.

**Table 6**
## Historic and Projected Retail Gas Prices
**(dollars per therm)**

| | | | Commercial | | | Industrial | | |
|---|---|---|---|---|---|---|---|---|
| | RSG | | GSG | | LVG | GSG | | LVG |
| Year | Heating | Non-Heating | Heating | Non-Heating | | Heating | Non-Heating | |
| 2006 | 1.39 | 1.58 | 1.41 | 1.30 | 1.23 | 1.43 | 1.33 | 1.22 |
| 2007 | 1.35 | 1.54 | 1.31 | 1.27 | 1.17 | 1.32 | 1.24 | 1.13 |
| 2008 | 1.40 | 1.57 | 1.42 | 1.42 | 1.29 | 1.41 | 1.40 | 1.25 |
| 2009 | 1.40 | 1.56 | 1.09 | 1.05 | 0.94 | 1.09 | 1.06 | 0.92 |
| 2010 | 1.24 | 1.43 | 1.10 | 1.07 | 0.97 | 1.11 | 1.06 | 0.92 |
| 2011 | 1.09 | 1.26 | 1.06 | 1.04 | 0.92 | 1.05 | 1.05 | 0.87 |
| 2012 | 1.00 | 1.18 | 0.95 | 0.93 | 0.80 | 0.95 | 0.98 | 0.75 |
| 2013 | 0.94 | 1.09 | 1.00 | 0.99 | 0.84 | 1.00 | 1.01 | 0.80 |
| 2014 | 0.80 | 0.94 | 1.06 | 1.04 | 0.91 | 1.10 | 1.08 | 0.90 |
| 2015 | 0.64 | 0.80 | 0.86 | 0.85 | 0.74 | 0.86 | 0.88 | 0.74 |
| 2016 | 0.71 | 0.87 | 0.83 | 0.83 | 0.69 | 0.83 | 0.86 | 0.70 |
| 2017 | 0.77 | 0.91 | 0.95 | 0.95 | 0.79 | 0.95 | 0.98 | 0.80 |
| 2018 | 0.73 | 0.81 | 0.89 | 0.88 | 0.73 | 0.89 | 0.91 | 0.68 |
| 2019 | 0.75 | 0.84 | 0.89 | 0.88 | 0.72 | 0.89 | 0.91 | 0.67 |
| 2020 | 0.77 | 0.85 | 0.90 | 0.89 | 0.73 | 0.90 | 0.92 | 0.68 |
| 2021 | 0.77 | 0.85 | 0.90 | 0.89 | 0.73 | 0.90 | 0.92 | 0.68 |
| 2022 | 0.76 | 0.85 | 0.91 | 0.90 | 0.74 | 0.92 | 0.93 | 0.69 |
| 2023 | 0.76 | 0.85 | 0.91 | 0.90 | 0.73 | 0.91 | 0.92 | 0.69 |
| 2024 | 0.76 | 0.85 | 0.91 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |
| 2025 | 0.76 | 0.84 | 0.90 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |
| 2026 | 0.76 | 0.84 | 0.90 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |
| 2027 | 0.76 | 0.84 | 0.90 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |
| 2028 | 0.76 | 0.84 | 0.90 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |
| 2029 | 0.76 | 0.84 | 0.90 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |
| 2030 | 0.76 | 0.84 | 0.90 | 0.89 | 0.73 | 0.91 | 0.92 | 0.68 |

### Economic Projections

Economic and demographic forecast assumptions for the nation and New Jersey are from Moody's Economy March 2018 forecast. This forecast assumes that, nationally, the economy continues to recover at a slow but steady rate. This national forecast is expected to be reflected in New Jersey's economic outlook that is also expected to be at a slow pace. The forecast is summarized in Table 7.

Weather during the forecast period is assumed to be "normal" as defined by the average daily weather during the twenty-year period ending December 31, 2017.

## Table 7

# National and New Jersey Economic Forecast Assumptions

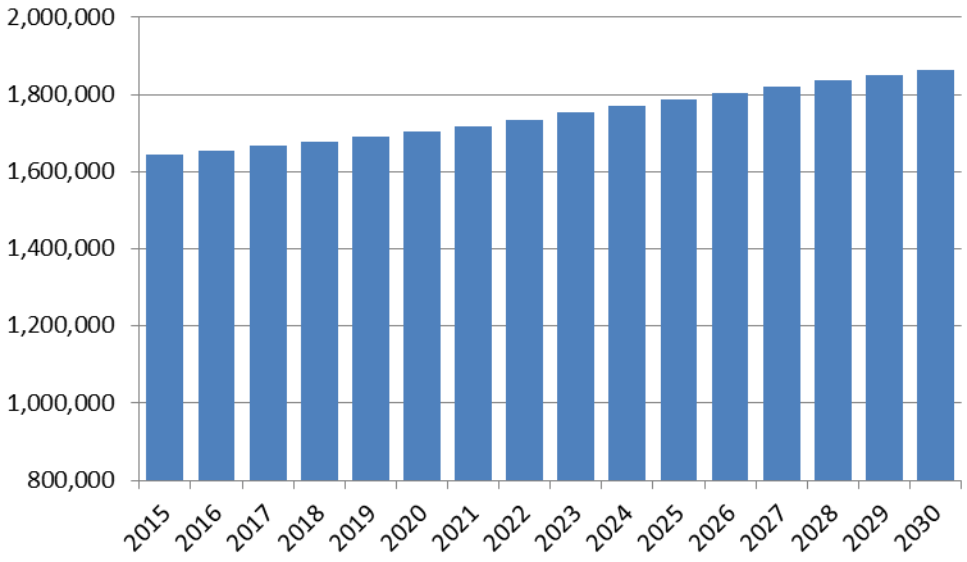
| | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **United States** | | | | | | | | | | | | | |
| Gross Domestic Product, (Bil. USD, SAAR) | 16,692 | 17,428 | 18,121 | 18,625 | 19,386 | 20,409 | 21,529 | 22,167 | 23,214 | 24,338 | 25,385 | 26,433 | 27,459 |
| Industrial Production: Total, (Index 2012=100, SA) | 102 | 105 | 104 | 103 | 105 | 108 | 110 | 111 | 113 | 115 | 117 | 118 | 120 |
| Income: Personal - Total, (Bil. Ch. 2009 USD, SAAR) | 13,087 | 13,575 | 14,206 | 14,377 | 14,582 | 14,915 | 15,257 | 15,503 | 15,756 | 16,101 | 16,419 | 16,739 | 17,072 |
| Employment: Total Nonagricultural, (Mil. #, SA) | 136 | 139 | 142 | 144 | 147 | 149 | 151 | 151 | 151 | 153 | 154 | 155 | 156 |
| Household Survey: Unemployment Rate, (%, SA) | 7.4 | 6.2 | 5.3 | 4.9 | 4.4 | 3.8 | 3.5 | 4.2 | 4.9 | 5.0 | 5.0 | 5.1 | 5.2 |
| CPI: Urban Consumer - All Items, (Index 1982-84=100, SA) | 233 | 237 | 237 | 240 | 245 | 252 | 258 | 265 | 271 | 277 | 283 | 289 | 296 |
| Interest Rates: 3-Month Treasury Bills EBY, (% p.a., NSA) | 0.1 | 0.0 | 0.1 | 0.3 | 0.9 | 1.9 | 3.3 | 3.5 | 3.2 | 2.7 | 2.8 | 3.0 | 3.3 |
| Fannie Mae: FHA/VA 30-Year Mortgage Rate - Fixed, (%, NSA) | 4.2 | 4.4 | 4.2 | 4.2 | 4.5 | 5.1 | 5.8 | 5.8 | 5.8 | 6.0 | 5.9 | 6.0 | 6.1 |
| **New Jersey** | | | | | | | | | | | | | |
| Real Personal Income, (Mil. 09$, SAAR) | 459,412 | 471,224 | 491,609 | 496,286 | 499,693 | 508,409 | 516,273 | 521,020 | 528,488 | 539,324 | 548,546 | 558,247 | 568,299 |
| Employment: Total Nonagricultural, (Ths., SA) | 3,936 | 3,968 | 4,012 | 4,073 | 4,129 | 4,184 | 4,219 | 4,221 | 4,224 | 4,258 | 4,282 | 4,304 | 4,324 |
| Employment: Total Manufacturing, (Ths., SA) | 239 | 239 | 239 | 242 | 245 | 247 | 244 | 240 | 235 | 233 | 229 | 225 | 222 |
| Employment: Total Non-Manufacturing, (Ths., SA) | 3,697 | 3,729 | 3,773 | 3,831 | 3,884 | 3,938 | 3,975 | 3,981 | 3,989 | 4,026 | 4,053 | 4,079 | 4,103 |
| Labor: Unemployment Rate, (%, SA) | 8.2 | 6.7 | 5.8 | 5.0 | 4.6 | 4.6 | 4.5 | 5.2 | 5.9 | 5.9 | 6.0 | 6.0 | 6.0 |
| Population: Total, (Ths.) | 8,915 | 8,943 | 8,961 | 8,980 | 9,007 | 9,031 | 9,037 | 9,037 | 9,036 | 9,041 | 9,046 | 9,053 | 9,059 |
| Households: Total, (Ths.) | 3,277 | 3,298 | 3,313 | 3,329 | 3,341 | 3,361 | 3,385 | 3,406 | 3,424 | 3,444 | 3,464 | 3,483 | 3,502 |
| Housing Starts: Single-family, (#, SAAR) | 10,744 | 10,299 | 10,718 | 10,748 | 10,762 | 11,654 | 13,739 | 13,655 | 16,137 | 17,285 | 16,936 | 16,919 | 16,711 |

**Customer Forecasts**

The number of residential customers with and without natural gas space heat is based on historical trends and expected residential construction activity in the service area. Residential non-heating customers have been steadily declining at an average annual rate of 0.8 percent and this is expected to continue. Furthermore it is assumed that these customers are converting to gas heat. The number of gas heating customers is also expected to increase as new residential construction occurs. The number of gas customers is assumed to reflect the current decline seen in new single family housing construction. As a result, as the figure below shows, the number of residential customers is expected to remain relatively stable.

**Figure 10**

**Annual Gas Residential Customers**




**BGSS Share**

The share of delivered sales that are BGSS supplied is assumed to follow recent trends where therm shares have stabilized at their current levels across the broad range of customer classes.

# III Maximum Daily Sendout Forecast

## Introduction

Distribution facilities are designed to meet the estimated maximum hour demand on a day with a mean temperature of 0°F and an assumed average wind velocity of 15 m.p.h. with Newark Airport as the measuring base. Gas supplies are designed to meet the estimated maximum daily as well as maximum hourly demand. The maximum daily sendout forecast process consists of:

- Estimating the relationship between weather and firm daily sendout,
- Extrapolating that relationship to determine the current level of daily sendout at 0 degrees if no day that cold appeared in the model estimation data,
- Forecasting future maximum daily sendout levels based on the current estimated level

The remainder of this section describes each of these steps in turn.

## Daily Firm Sendout Model Estimation

There are two major issues in modeling maximum firm daily sendout. First, the diversity of the customer base needs to be controlled for. Second, the model has to be designed to be extrapolated rather than interpolated. Each of these issues is discussed below.

The firm sendout number accounts for gas deliveries to a diverse set of customers ranging from residential homes to large industrial sites. Since sales to different types of customers respond to weather differently, customer mix must be controlled for in any modeling effort. In addition, the behavior of this diverse group of customers will change differently over time as prices and other economic parameters change over time. As a result, these changes also need to be accounted for. Unfortunately, the firm sendout number is not available by rate. As a result, the only way to control for changes in customer mix and changes in the behavior over time by these customers is to limit the time period of data that is used in the model estimation.

The second issue, of extrapolation, is addressed in a similar way. The relationship between sendout and weather is fairly linear. In reality, it is probably not perfectly linear. This is not an issue when estimating a model and using the results to interpolate values with the range of the estimation data. However, when extrapolating the data outside the range of the estimation data the

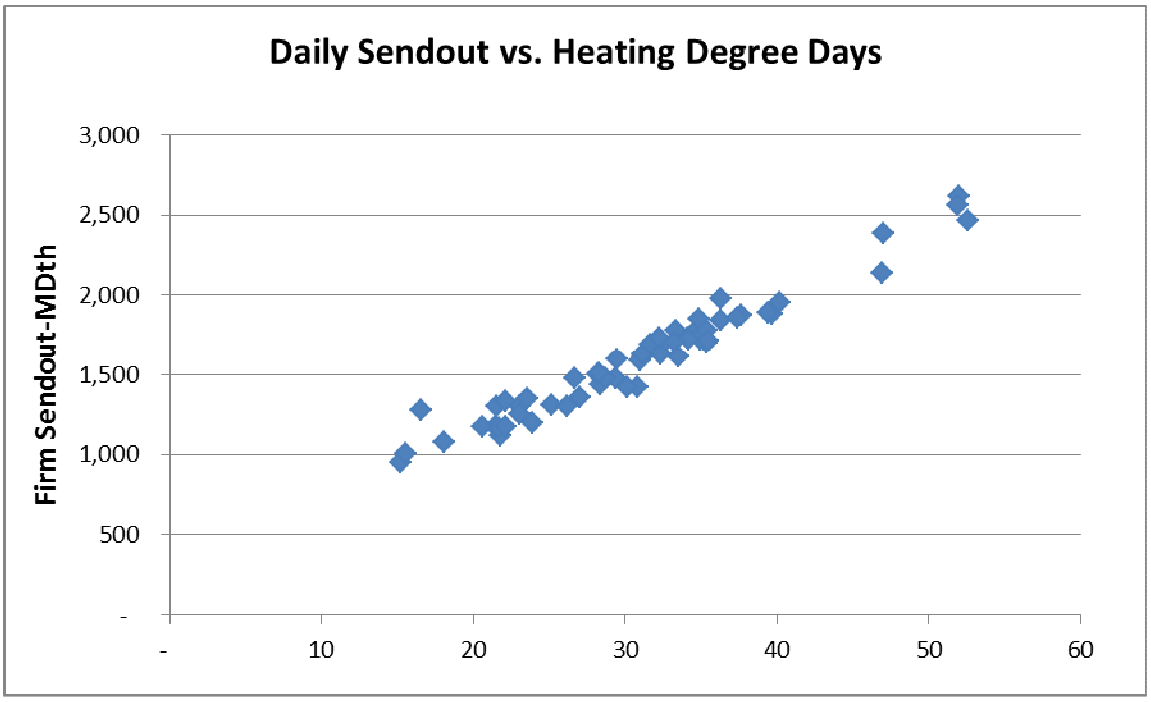
imprecision increases. The way to minimize this imprecision is to limit the observations to the lower temperature data so as to get a linear estimation of that portion of a non-linear curve that is closest to the ultimate extrapolation value.

To address both of these forecasting issues, the data used in estimating the relationship between daily sendout and weather was limited to the January and February during the most recent year available, 2019. Customer class mix will not change significantly in this short period and it contains the two coldest months when the maximum sendout would most likely occur. Analysis of the data for these two months indicates two things.

First, the data confirms the general responsiveness of firm sendout to the weather, as Figure 11 shows. Second, the relationship appears linear

**Figure 11**

**January & February 2019**



To refine the impact of the day-type on sendout, the regression model from previous years was enhanced to allow for not only an intercept change from the day-type but, also a HDD response change.

The regression model that modeled daily sendout, SENDOUT, is specified as:

$$SENDOUT_t = f(HDD_t, WEEKDAY_t, HOLIDAY_t, SNOW_t) \quad [9]$$

Where:

| | | |
|---|---|---|
| HDD | = | Heating degree days on gas day t, |
| WEEKDAY | = | Interactive variable that takes the value of HDD on weekdays, otherwise 0, |
| HOLIDAY | = | Interactive variable that takes the value of HDD on Sundays or Holidays, otherwise 0, |
| SNOW | = | Binary variable that takes the value of 1 when reported snowstorm accumulation in any portion of the service area is 6 inches or more, 0 otherwise. |

The estimation results are shown in Table 8 and Figure 12 below.

**Table 8**

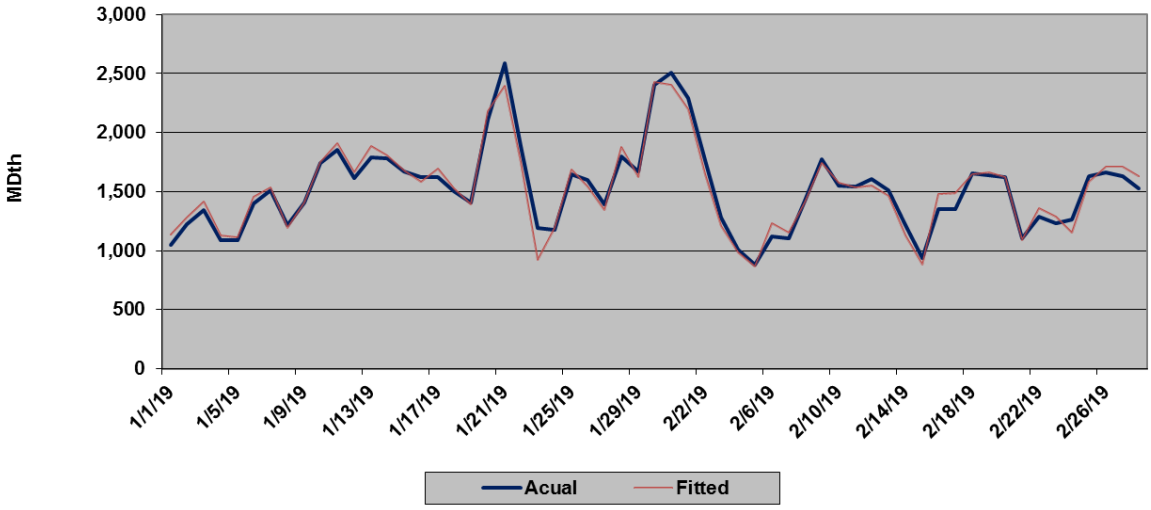
## Estimated Coefficients of the Daily Sendout Model

**(standard errors in parentheses)**

| Intercept | HDD | HOLIDAY | WEEKDAY | R2 | DW | n |
|---|---|---|---|---|---|---|
| 228.00 | 40.59 | 1.06 | 1.26 | 0.954 | 1.235 | 59 |
| (39.99) | (1.55) | (1.16) | (.99) | | | |

**Figure 12**

## Daily Sendout Model
### Actual vs. Fitted Values




The estimated coefficients of the model suggest that the estimated maximum daily peak would occur on a Wednesday. The model predicts that the maximum peak daily sendout would be 2,427.1 MDth.

# A. Calendar-Month Sales Calculation

## Introduction

Utilities have traditionally had a disconnection in the timing of their revenues and their costs. Revenues from retail sales are a revenue stream from meter readings and the resulting bills to their customers that occur on a daily basis throughout the month. The bills issued from meter reads in the current month's meter reading schedule are all recorded as billing-month revenue. Billing-month revenue will include revenue from electricity or gas delivered during the previous month while excluding deliveries of electricity or gas delivered during the current month that occurred after the meters were read. Expenses, on the other hand, such as wages, fuel, depreciation, etc., have been recorded on a calendar-month basis. This inconsistency in the revenue and expense streams can be tolerated if there are no major changes in the revenue and/or expense streams. If major changes are occurring, such as a rapid increase in fossil fuel prices or a high seasonality in sales, a comparison of the billing-month revenue and the calendar-month expenses can give a false view of a utility's financials. To remedy this situation, the sales and revenue accrual calculation, the estimation of calendar-month sales and revenue from billed sales and revenue and the estimation of unbilled sales and revenue was developed.

Section II will discuss how, in theory, the billed sales and the unbilled estimates are used to calculate calendar-month sales using a simple example and introduce the notation that will serve as the basis of the analysis. A description of the theory's specific application to PSE&G's meter reading schedule, that can have a single billing month encompass up to four calendar-months, follows.

Section III will describe the implementation of the estimation of the calendar-month sales and revenue process at PSE&G.

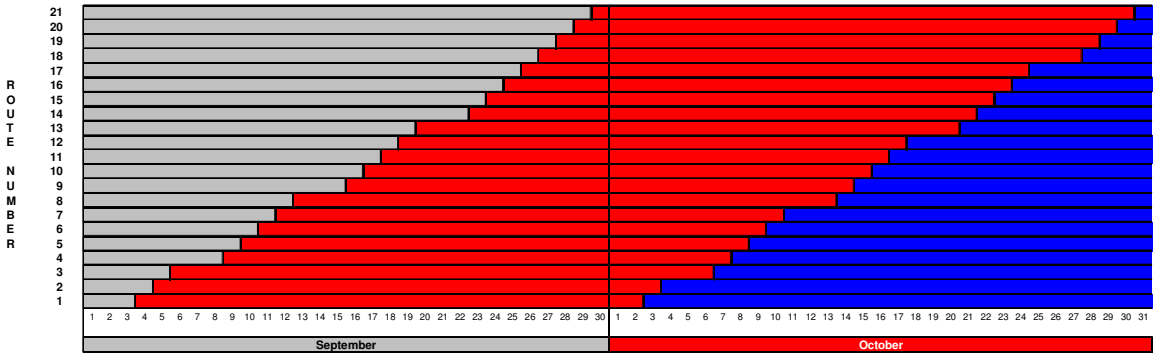
## The Unbilled and Calendar-Month Estimation

### A Simple Example

Utilities generally read all of their meters every month on 21 workdays. Figure 1, below shows a hypothetical October billing-month (in red) as determined by the September and October meter reading schedules. In the chart, each row represents a Route Number or a group of meters that are always read on the same day (although the day when they are all read may vary from month to month). The bottom row is red on all the days after the September read date, September 3rd until the October read date, October 2nd. If it is assumed that the customers' meters are read at noon, the October bill to these customers will reflect 28.5 days of service in September and only 1.5 days in October[2]. The second row from the bottom represents Route 2 whose customers' meters were read on September 4th and October 3rd. The October bill to these customers will reflect 27.5 days of service in September and only 2.5 days in October. This continues until the top row, Route 21, that had meter reading days of September 29th and October 30th. The October bills to these customers represent only 1.5 days of September service and 29.5 days of October service.

**Figure 1**

**Hypothetical October 2008 Billing-Month**




From the red portion of the diagram, it can be seen that the October billing-month consists of September sales that are billed in October that, to facilitate discussion, will be referred to as SEP B> OCT and October sales that are billed in October i.e., OCT B> OCT. The calendar-month sales are defined as the red and blue rectangle defined by the month of October and the 21 read-cycles. This consists of OCT B> OCT sales and the October unbilled sales, OCT B> NOV, the October sales that will be billed in November.

[2] Or, more realistically, if the meter reads for all the Route 1 customers are evenly distributed throughout an 8:00 AM to 4:00 PM workday, the reads, on average, would represent a half day's sales on the read day.

The relationship between billed, unbilled, and calendar-month sales can be derived from these identities from the steps below.

$$\text{October Calendar} = \boxed{\text{OCT B> OCT}} + \boxed{\text{OCT B> NOV}} = \boxed{\begin{matrix}\text{OCT B> OCT}\\ \text{OCT B> NOV}\end{matrix}} \qquad [1]$$

Adding and subtracting $\boxed{\text{SEP B> OCT}}$ to the r.h.s. of [1] yields:

$$\text{October Calendar} = \boxed{\begin{matrix}\text{OCT B> OCT}\\ \text{OCT B> NOV}\end{matrix}} + \boxed{\text{SEP B> OCT}} - \boxed{\text{SEP B> OCT}} \qquad [2]$$

Rearranging the r.h.s. of [2] yields:

$$\text{October Calendar} = \boxed{\begin{matrix}\text{OCT B> OCT}\\ \text{SEP B> OCT}\end{matrix}} + \boxed{\text{OCT B> NOV}} - \boxed{\text{SEP B> OCT}} \qquad [3]$$

Substituting [1] into the l.h.s. of [3] yields:

$$\boxed{\begin{matrix}\text{OCT B> OCT}\\ \text{OCT B> NOV}\end{matrix}} = \boxed{\begin{matrix}\text{OCT B> OCT}\\ \text{SEP B> OCT}\end{matrix}} + \boxed{\text{OCT B> NOV}} - \boxed{\text{SEP B> OCT}} \qquad [4]$$

This is the familiar:

$$\text{October Calendar} = \text{October Billed} + \text{October Unbilled} - \text{September Unbilled}^{3} \qquad [5]$$

This formula for the accrual of calendar-month sales and revenues is preferred to any direct estimation of calendar-month sales because any error in the unbilled estimate is
"reversed out" in the following month. The advantage of this is that, as the calendar time period extends, the potential error resulting from unbilled estimates is reduced. This can be seen by summing up [5] over the 2008 calendar-year as:

$$\text{Calendar-Year 2008} = \sum_{i=\text{JAN08}}^{\text{DEC08}} \text{Billed}_i + \sum_{i=\text{JAN08}}^{\text{DEC08}} \text{Unbilled}_i - \sum_{i=\text{DEC07}}^{\text{NOV08}} \text{Unbilled}_i \qquad [6]$$

[3] The difference between the current month's unbilled and the previous month's is often referred to as
the "net unbilled".

Where:

$Billed_i$ = Billing-month sales in month i,

$Unbilled_i$ = Unbilled sales in month i.

That simplifies to:

$$\text{Calendar-Year 2008} = \sum_{i=JAN08}^{DEC08} Billed_i + Unbilled_{DEC08} - Unbilled_{DEC07} \qquad [7]$$

The key result from [7] is that the annual calendar-year sales are the annual billed sales, a very large real number, and the difference between two monthly unbilled estimates. Since the error that can be expected in the difference between the two monthly unbilled estimates can be assumed to be quite small compared to the annual billed total, the calendar-year estimate, as a result, can be expected to be very accurate.

The same general results described in this simple example apply to PSE&G's more complicated meter reading schedule that is described below.

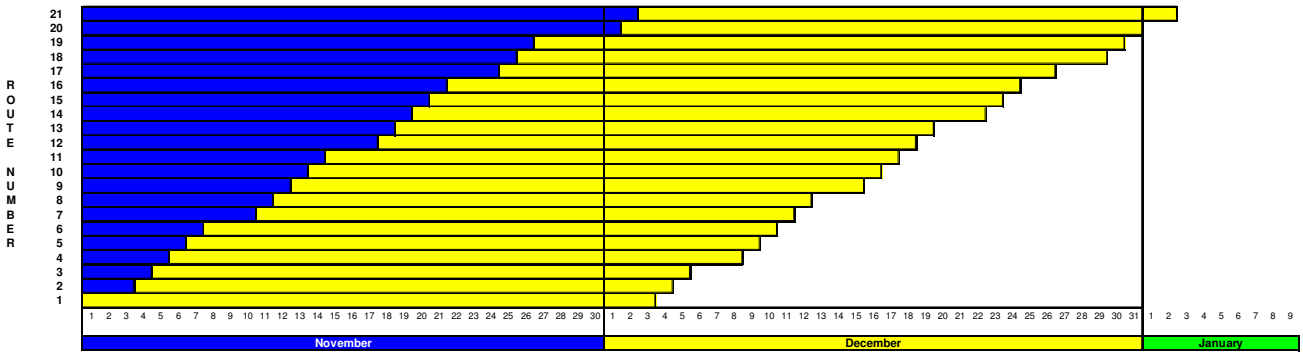
**A More General Example**

Unlike the hypothetical October billing-month, discussed above, that spanned two months, September and October, the PSE&G billing-month can encompass as many as four months. For example, the December 2008 PSE&G billing month, illustrated in Figure 2. has meter reading dates ranging from October 31st to January 2nd. As a result, it spans four months, October, November, December, and January[4].

[4] This is the original PSE&G December 2008 meter reading schedule. It has since been "compressed" to accommodate the implementation of iPower, the new billing and customer information system.

**Figure 2**

**PSE&G December 2008 Billing-Month**




Therefore, to develop a general algorithm applicable to PSE&G, the definition of billed, unbilled, and calendar sales must be expanded to include the potential of having sales from two additional calendar months reflected in a billing-month. December 2008 billing month, for example, is defined as:

$$\text{December Billed} = \boxed{\begin{matrix}\text{OCT B> DEC}\\ \text{NOV B> DEC}\\ \text{DEC B> DEC}\\ \text{JAN B> DEC}\end{matrix}} \qquad [8]$$

Given the additional components of the billed, $\boxed{\text{OCT B> DEC}}$, i.e. the "under billed" sales, and $\boxed{\text{JAN B> DEC}}$, the "excess billed" sales, the addition of the current unbilled and subtraction of the previous month's unbilled to the December billed, as defined in the simple example above, will overstate December calendar-month sales by the sum of under billed and excess billed sales. As a result, the December unbilled needs to be redefined as:

$$\text{December Unbilled} = \boxed{\begin{matrix}\text{DEC B> JAN}\\ \text{DEC B> FEB}\end{matrix}} + \boxed{\text{NOV B> JAN}} - \boxed{\text{JAN B> DEC}} \qquad [9]$$

$$\text{December Unbilled} = \text{December Unbilled} + \text{January Underbilled} - \text{December Excess Billed} \qquad [10]$$

December calendar can then be defined as December billed plus the new

December unbilled less the equivalent November unbilled or:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DEC B> OCT<br>DEC B> NOV<br>DEC B> DEC<br>DEC B> JAN | = | OCT B> DEC<br>NOV B> DEC<br>DEC B> DEC<br>JAN B> DEC | | | | | |
| | + | DEC B> JAN<br>DEC B> FEB | + | NOV B> JAN | - | JAN B> DEC | |
| | - | NOV B> DEC<br>NOV B> JAN | - | OCT B> DEC | + | DEC B> NOV | [11] |

or, in words:

| | | |
|---|---|---|
| December Calendar | = December Billed<br>+ December Unbilled<br>- November Unbilled | [12] |

This is the general formula that is used to calculate unbilled sales at PSE&G.

## The PSE&G Gas Calendar-Month Estimation

The estimation of calendar-month gas sales at PSE&G is based on the notion that gas sales can be divided into two components: a weather sensitive component and a non-weather sensitive component. The weather sensitive component is affected by the winter weather as measured by heating degree days (HDD). The non-weather component is simply a function of the number of days in the sales period. As a result, sales during the unbilled periods can be estimated based on the HDD and number of days during the unbilled periods and the estimates of the weather-sensitive sales per HDD and non-weather sensitive sales per day.

The estimate of the weather-sensitive sales per HDD for each rate, the HDD coefficient, is the sum of the coefficients associated with its model's independent variables that have a HDD component divided by the number of days in the billing period. In the case of RSG that, unlike the other rates, is modeled on a use per customer basis, this result is multiplied by the number of customers.

The estimate of the non-weather sensitive sales per day for each rate, the base coefficient, is the value of the model equation with all of the coefficients associated with HDD set to zero and divided by the number of days in the billing period. As in the case of the HDD coefficient, the RSG result is multiplied by the number of customers.

Given the structure of the models, these coefficients will vary by month and by year. The current estimates for 2008 and 2009 are shown in Table 1 below.[5]

**Table 1**

### Unbilled Weather and Base Coefficients, 2008-2009

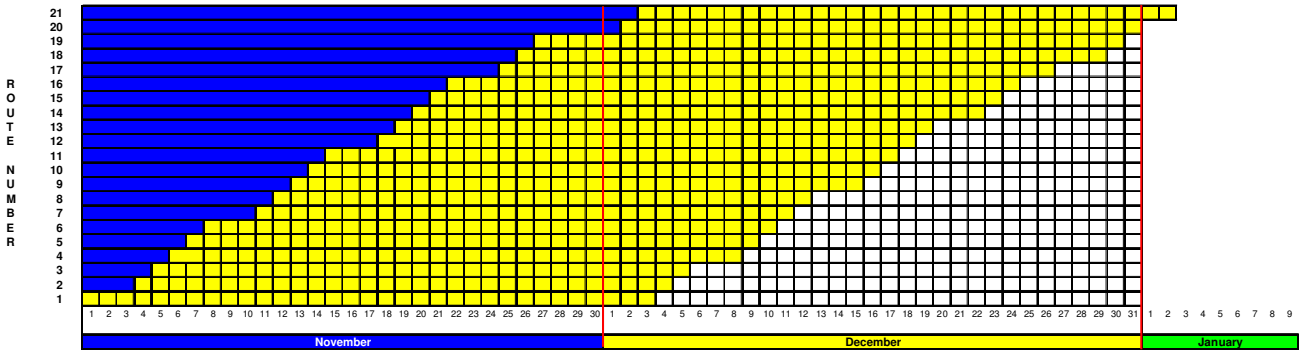
| | RSG | | | | GSG-Commercial | | | | GSG-Industrial | | | | LVG - Non Vehicle | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Billing | Heating | | Non-heating | | Heating | | Non-heating | | Heating | | Non-heating | | Commercial | | Industrial | |
| Month | Base | HDD | Base | HDD | Base | HDD | Base | HDD | Base | HDD | Base | HDD | Base | HDD | Base | HDD |
| Jan-08 | 1,477,624 | 246,082 | 218,393 | 4,689 | 56,941 | 45,607 | 168,133 | 3,942 | (15,873) | 3,333 | 2,978 | 501 | 1,047,971 | 79,608 | 145,023 | 8,767 |
| Feb-08 | 1,554,914 | 253,674 | 234,372 | 4,811 | 69,746 | 45,607 | 175,674 | 3,942 | (15,256) | 3,333 | 3,786 | 501 | 1,172,070 | 79,608 | 167,056 | 8,767 |
| Mar-08 | 1,343,904 | 249,936 | 236,373 | 4,737 | 25,553 | 45,607 | 158,654 | 3,942 | (16,832) | 3,333 | 2,893 | 501 | 1,053,237 | 79,608 | 138,433 | 8,767 |
| Apr-08 | 1,337,980 | 248,305 | 190,526 | 4,692 | 13,895 | 45,607 | 150,129 | 3,942 | (15,769) | 3,333 | 5,681 | 501 | 1,076,058 | 79,608 | 159,387 | 8,767 |
| May-08 | 1,267,108 | 251,443 | 164,912 | 4,741 | 146,976 | 45,607 | 117,463 | 3,942 | 332 | 3,333 | 4,166 | 501 | 838,647 | 79,608 | 137,277 | 8,767 |
| Jun-08 | 1,086,639 | 250,233 | 135,407 | 4,714 | 126,187 | 45,607 | 95,849 | 3,942 | 2,561 | 3,333 | 3,704 | 501 | 708,324 | 79,608 | 129,981 | 8,767 |
| Jul-08 | 984,641 | 248,954 | 116,905 | 4,704 | 135,270 | 45,607 | 94,660 | 3,942 | 3,907 | 3,333 | 2,680 | 501 | 610,707 | 79,608 | 119,171 | 8,767 |
| Aug-08 | 912,999 | 249,456 | 104,709 | 4,666 | 103,926 | 45,607 | 80,601 | 3,942 | 2,045 | 3,333 | 2,578 | 501 | 613,535 | 79,608 | 119,770 | 8,767 |
| Sep-08 | 940,487 | 252,748 | 111,693 | 4,746 | 108,515 | 45,607 | 84,252 | 3,942 | 2,953 | 3,333 | 2,730 | 501 | 581,470 | 79,608 | 129,852 | 8,767 |
| Oct-08 | 809,244 | 249,439 | 113,383 | 4,671 | 115,541 | 45,607 | 90,002 | 3,942 | 3,184 | 3,333 | 1,932 | 501 | 728,815 | 79,608 | 116,580 | 8,767 |
| Nov-08 | 1,076,293 | 250,792 | 138,927 | 4,687 | (9,962) | 45,607 | 107,114 | 3,942 | (7,929) | 3,333 | 5,262 | 501 | 769,823 | 79,608 | 112,495 | 8,767 |
| Dec-08 | 1,191,333 | 252,604 | 187,367 | 4,690 | (9,608) | 45,607 | 130,211 | 3,942 | (18,805) | 3,333 | 2,214 | 501 | 902,036 | 79,608 | 120,543 | 8,767 |
| Jan-09 | 1,481,212 | 248,163 | 214,955 | 4,643 | 56,601 | 45,745 | 153,926 | 3,711 | (15,827) | 3,259 | 2,952 | 490 | 1,041,705 | 79,850 | 144,156 | 8,190 |
| Feb-09 | 1,548,542 | 252,236 | 228,920 | 4,692 | 69,856 | 45,745 | 171,980 | 3,711 | (15,254) | 3,259 | 3,796 | 490 | 1,173,921 | 79,850 | 167,320 | 8,190 |
| Mar-09 | 1,393,454 | 253,517 | 239,084 | 4,687 | 26,121 | 45,745 | 168,175 | 3,711 | (17,054) | 3,259 | 2,980 | 490 | 1,076,642 | 79,850 | 141,509 | 8,190 |
| Apr-09 | 1,331,091 | 250,149 | 185,138 | 4,617 | 13,721 | 45,745 | 148,255 | 3,711 | (15,497) | 3,259 | 5,622 | 490 | 1,062,628 | 79,850 | 157,398 | 8,190 |
| May-09 | 1,266,433 | 253,309 | 160,992 | 4,665 | 145,815 | 45,745 | 116,535 | 3,711 | 352 | 3,259 | 4,136 | 490 | 832,022 | 79,850 | 136,193 | 8,190 |
| Jun-09 | 1,094,707 | 252,091 | 133,240 | 4,638 | 126,187 | 45,745 | 95,849 | 3,711 | 2,565 | 3,259 | 3,704 | 490 | 708,324 | 79,850 | 129,981 | 8,190 |
| Jul-09 | 987,359 | 250,802 | 114,502 | 4,629 | 134,644 | 45,745 | 94,222 | 3,711 | 3,889 | 3,259 | 2,668 | 490 | 607,880 | 79,850 | 118,620 | 8,190 |
| Aug-09 | 925,740 | 251,308 | 103,701 | 4,591 | 104,600 | 45,745 | 81,124 | 3,711 | 2,058 | 3,259 | 2,595 | 490 | 617,512 | 79,850 | 120,546 | 8,190 |
| Sep-09 | 953,382 | 254,625 | 110,592 | 4,670 | 109,193 | 45,745 | 84,778 | 3,711 | 2,971 | 3,259 | 2,747 | 490 | 585,098 | 79,850 | 130,662 | 8,190 |
| Oct-09 | 808,699 | 251,291 | 110,672 | 4,596 | 114,612 | 45,745 | 89,279 | 3,711 | 3,169 | 3,259 | 1,918 | 490 | 722,957 | 79,850 | 115,643 | 8,190 |
| Nov-09 | 1,077,388 | 252,654 | 135,835 | 4,612 | (9,899) | 45,745 | 106,433 | 3,711 | (7,834) | 3,259 | 5,235 | 490 | 764,927 | 79,850 | 111,779 | 8,190 |
| Dec-09 | 1,203,734 | 254,479 | 184,915 | 4,615 | (9,637) | 45,745 | 130,597 | 3,711 | (18,750) | 3,259 | 2,238 | 490 | 904,708 | 79,850 | 120,900 | 8,190 |

[5] While the coefficient is called the "base" coefficient, it really does not measure base use per day. Rather it is the intercept term in a simple regression. As a result, it can be negative reflecting the intercept of a regression that is outside of the relevant range.

The billed, unbilled, excess billed, and underbilled days and heating degree days are derived from the meter reading schedule and daily weather data. The measure used is the Average Route Days (ARD). The ARD are defined as the number of days across all routes for a given period divided by 21, the total number of routes. This concept is illustrated in Figure 3, a slightly different version of the December 2008 billing-month, shown below.

**Figure 3**

**PSE&G December 2008 Billing-Month**




Each square represents an ARD.[6] The total yellow blocks in each row represent the number of days in that particular route during the December billing-month. The sum of all the yellow blocks, 677, divided by 21 represent the average number of days in the December billing-month, i.e., the average number of days across the 21 routes or 32.24.

The number of excess billed days, JAN B> DEC , is:

$$1.5 \text{ (January } 1^{st} \text{ and half of January } 2^{nd}) \ / \ 21 = 0.07 \qquad [13]$$

HDD for each period are a weighted sum of the daily HDD where the weight is the ARD associated with that day. For example, from the diagram it can be seen that on December 21st, the sales to 8 routes, routes 14-21, will be in the

[6] Well, not exactly. Remember that it is assumed that the meters are read at noon. As a result the last yellow block to the right of each row counts as a half day. On the other hand, the last blue block on the right of each row also counts as a half day in the December billing-month so, the math works for the billing-month but, the half needs to be taken into account when discussing portions of the unbilled and billed periods. For a clearer discussion, however, the half days will be, for the most part, ignored.

December billing-month while sales to the first thirteen routes will be in the January billing-month. As a result , 8/21 or 38 percent of the HDD on December 20th will be assigned to the December billing month and 62 percent will be assigned to the January billing month.

HDD for underbilled and excess billed periods are assigned in a similar manner.

From Table 2 below that shows the normal monthly billed an unbilled HDD and days by type, it can be seen that underbilled days and HDD occur rarely while excess billed days are quite common.

**Table 2**

## Billed and Unbilled Days and Weather 2008-2009

| Billing Month | Heating Degree Days | | | | Days | | | |
|---|---|---|---|---|---|---|---|---|
| | Billed | Unbilled | Excess Billed | Under Billed | Billed | Unbilled | Excess Billed | Under Billed |
| Jan-08 | 795.06 | 322.08 | 0.59 | - | 31.67 | 12.76 | 0.02 | 0.00 |
| Feb-08 | 786.44 | 283.76 | 5.90 | - | 30.19 | 11.83 | 0.29 | 0.00 |
| Mar-08 | 643.82 | 187.74 | 2.62 | - | 30.67 | 12.10 | 0.21 | 0.00 |
| Apr-08 | 360.41 | 73.05 | 0.20 | - | 30.14 | 11.83 | 0.10 | 0.00 |
| May-08 | 108.21 | 13.78 | 0.05 | - | 29.90 | 13.05 | 0.21 | 0.00 |
| Jun-08 | 15.47 | 0.14 | - | - | 30.33 | 12.60 | 0.10 | 0.00 |
| Jul-08 | 0.14 | - | - | - | 30.71 | 12.81 | 0.02 | 0.00 |
| Aug-08 | 0.01 | 0.03 | - | - | 29.57 | 14.29 | 0.07 | 0.00 |
| Sep-08 | 1.87 | 7.02 | 0.04 | - | 30.71 | 13.52 | 0.02 | 0.00 |
| Oct-08 | 60.34 | 87.80 | - | - | 29.38 | 15.12 | 0.00 | 0.00 |
| Nov-08 | 255.88 | 213.78 | 1.65 | - | 29.76 | 15.43 | 0.10 | 0.00 |
| Dec-08 | 578.34 | 338.40 | 1.75 | 0.17 | 32.24 | 14.19 | 0.07 | 0.02 |
| Jan-09 | 797.36 | 361.02 | 1.75 | - | 31.86 | 13.33 | 0.07 | 0.00 |
| Feb-09 | 786.19 | 277.80 | 7.41 | - | 30.14 | 11.48 | 0.36 | 0.00 |
| Mar-09 | 634.56 | 188.08 | 1.17 | - | 30.00 | 12.21 | 0.10 | 0.00 |
| Apr-09 | 361.92 | 73.58 | 0.46 | - | 30.52 | 11.79 | 0.19 | 0.00 |
| May-09 | 108.91 | 13.36 | 0.05 | - | 30.14 | 12.67 | 0.21 | 0.00 |
| Jun-09 | 15.07 | 0.12 | - | - | 30.33 | 12.21 | 0.10 | 0.00 |
| Jul-09 | 0.12 | - | - | - | 30.86 | 12.38 | 0.12 | 0.00 |
| Aug-09 | 0.01 | 0.03 | - | - | 29.38 | 13.90 | 0.02 | 0.00 |
| Sep-09 | 1.97 | 6.92 | 0.04 | - | 30.52 | 13.38 | 0.02 | 0.00 |
| Oct-09 | 61.71 | 86.34 | - | - | 29.62 | 14.74 | 0.00 | 0.00 |
| Nov-09 | 261.34 | 207.03 | 1.65 | - | 29.95 | 14.88 | 0.10 | 0.00 |
| Dec-09 | 582.57 | 329.38 | 3.90 | - | 32.14 | 13.81 | 0.17 | 0.00 |

On a monthly basis, the necessary coefficient, weather, and day data are transmitted to PSE&G accounting services each month. They are used to calculate the actual current month unbilled sales, UnbilledTherms, using:

UnbilledTherms = UnbilledDays x BASECoef + UnbilledHDD x HDDCoef [14]

Where:

UnbilledDays = the number of route days in the unbilled period as defined by [9],

Unbilled HDD = the number of HDD in the unbilled period as defined by [9],

BASECoef = the Base coefficient,

HDDCoef = the HDD coefficient.

The results of this calculation, with the previous month's unbilled results, are used to calculate calendar-month sales.

Unbilled, and as a consequence, calendar-month revenue is calculated by pricing the unbilled therms at the projected tariff rates. Adding the net unbilled revenue to the billing-month revenues results in the estimate of calendar-month revenue.

# B. Summary Tables

## Delivered Gas Sales As Billed
## 2015-2026
## (MDth)

| Class | Rate | Category | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential | RSG | Heating | 143,469 | 125,945 | 130,512 | 138,465 | 140,248 | 141,925 | 143,902 | 145,449 | 147,650 | 149,371 | 151,934 | 154,639 |
| | | Non-Heating | 9,598 | 8,549 | 8,860 | 8,983 | 9,162 | 9,083 | 9,031 | 8,982 | 8,953 | 8,916 | 8,886 | 8,852 |
| | Total | | 153,067 | 134,494 | 139,371 | 147,447 | 149,410 | 151,007 | 152,934 | 154,431 | 156,602 | 158,286 | 160,820 | 163,491 |
| Commercial | GSG | Heating | 24,044 | 21,075 | 22,541 | 23,239 | 23,894 | 24,154 | 24,247 | 24,185 | 24,126 | 24,045 | 24,110 | 24,476 |
| | | Non-Heating | 4,193 | 3,819 | 3,939 | 4,109 | 4,108 | 4,109 | 4,111 | 4,106 | 4,106 | 4,106 | 4,108 | 4,106 |
| | | Total | 28,237 | 24,894 | 26,480 | 27,348 | 28,002 | 28,264 | 28,358 | 28,291 | 28,232 | 28,150 | 28,218 | 28,582 |
| | LVG | | 65,580 | 58,437 | 61,091 | 63,422 | 63,794 | 64,052 | 64,284 | 64,326 | 64,436 | 64,388 | 64,582 | 64,830 |
| | TSG | Firm | 1,066 | 945 | 941 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 |
| | | Non-Firm | 17,324 | 16,683 | 10,062 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 |
| | | Total | 18,390 | 17,628 | 11,003 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 |
| | CIG | | 3,724 | 3,242 | 3,595 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 |
| | CSG | | 15,922 | 16,728 | 16,341 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 |
| | Total | | 131,852 | 120,930 | 118,510 | 122,360 | 123,387 | 123,906 | 124,233 | 124,208 | 124,259 | 124,128 | 124,391 | 125,002 |
| Industrial | GSG | Heating | 969 | 803 | 871 | 922 | 914 | 901 | 888 | 878 | 868 | 857 | 847 | 836 |
| | | Non-Heating | 164 | 148 | 153 | 165 | 164 | 163 | 161 | 160 | 158 | 157 | 156 | 154 |
| | | Total | 1,133 | 950 | 1,025 | 1,087 | 1,078 | 1,063 | 1,049 | 1,038 | 1,027 | 1,014 | 1,003 | 990 |
| | LVG | | 7,731 | 6,788 | 7,043 | 7,256 | 7,241 | 7,183 | 7,130 | 7,091 | 7,049 | 6,999 | 6,961 | 6,914 |
| | TSG | Firm | 1,522 | 1,415 | 1,511 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 |
| | | Non-Firm | 19,899 | 20,937 | 17,374 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 |
| | | Total | 21,421 | 22,351 | 18,886 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 |
| | CIG | | 1,119 | 688 | 564 | 934 | 934 | 934 | 934 | 934 | 934 | 934 | 934 | 934 |
| | CSG | | 125,946 | 113,324 | 83,737 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 |
| | Contract | | 36,053 | 25,237 | 8,822 | - | - | - | - | - | - | - | - | - |
| | Total | | 193,403 | 169,339 | 120,075 | 113,174 | 113,150 | 113,076 | 113,010 | 112,960 | 112,906 | 112,843 | 112,794 | 112,735 |
| Lighting | SLG | | 68 | 64 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 |
| Total | | | 478,391 | 424,827 | 378,023 | 383,047 | 386,013 | 388,056 | 390,242 | 391,664 | 393,834 | 395,323 | 398,071 | 401,294 |

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSG | 29,370 | 25,844 | 27,505 | 28,435 | 29,081 | 29,327 | 29,408 | 29,329 | 29,259 | 29,164 | 29,220 | 29,572 |
| LVG | 73,311 | 65,225 | 68,134 | 70,678 | 71,036 | 71,235 | 71,414 | 71,417 | 71,486 | 71,386 | 71,543 | 71,744 |
| TSG | 2,587 | 2,359 | 2,452 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 |
| | 37,223 | 37,620 | 27,437 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 |

# Supplied Gas Sales As Billed
# 2015-2026
# (MDth)

| Class | Rate | Category | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential** | RSG | Heating | 134,729 | 119,460 | 124,075 | 132,289 | 133,994 | 135,595 | 137,486 | 138,966 | 141,069 | 142,713 | 145,163 | 147,749 |
| | | Non-Heating | 8,995 | 8,064 | 8,362 | 8,520 | 8,691 | 8,616 | 8,567 | 8,520 | 8,492 | 8,457 | 8,430 | 8,397 |
| | Total | | 143,724 | 127,524 | 132,437 | 140,810 | 142,684 | 144,210 | 146,053 | 147,486 | 149,561 | 151,170 | 153,593 | 156,146 |
| **Commercial** | GSG | Heating | 18,565 | 16,082 | 17,387 | 17,888 | 18,397 | 18,598 | 18,672 | 18,626 | 18,582 | 18,521 | 18,573 | 18,856 |
| | | Non-Heating | 3,035 | 2,757 | 2,965 | 2,998 | 2,998 | 2,998 | 3,000 | 2,996 | 2,996 | 2,996 | 2,997 | 2,996 |
| | | Total | 21,600 | 18,839 | 20,352 | 20,887 | 21,395 | 21,596 | 21,671 | 21,622 | 21,578 | 21,516 | 21,570 | 21,852 |
| | LVG | | 27,301 | 21,264 | 24,578 | 23,867 | 25,629 | 24,119 | 24,213 | 25,857 | 24,277 | 25,899 | 24,343 | 26,086 |
| | TSG | Firm | - | - | - | - | - | - | - | - | - | - | - | - |
| | | Non-Firm | 919 | 723 | 942 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 |
| | | Total | 919 | 723 | 942 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 |
| | CIG | | 3,724 | 3,242 | 3,595 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 |
| | CSG | | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total | | 53,544 | 44,068 | 49,467 | 49,816 | 52,086 | 50,777 | 50,947 | 52,540 | 50,917 | 52,477 | 50,975 | 53,001 |
| **Industrial** | GSG | Heating | 778 | 639 | 689 | 727 | 721 | 711 | 701 | 693 | 685 | 676 | 668 | 659 |
| | | Non-Heating | 123 | 108 | 113 | 124 | 123 | 122 | 120 | 119 | 118 | 117 | 116 | 115 |
| | | Total | 902 | 747 | 802 | 851 | 844 | 832 | 821 | 812 | 803 | 793 | 785 | 775 |
| | LVG | | 2,013 | 1,637 | 1,864 | 1,975 | 1,971 | 1,954 | 1,937 | 1,925 | 1,911 | 1,897 | 1,885 | 1,871 |
| | TSG | Firm | - | - | - | - | - | - | - | - | - | - | - | - |
| | | Non-Firm | 55 | 151 | 108 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| | | Total | 55 | 151 | 108 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| | CIG | | 1,119 | 688 | 564 | 934 | 934 | 934 | 934 | 934 | 934 | 934 | 934 | 934 |
| | CSG | | - | - | - | - | - | - | - | - | - | - | - | - |
| | Contract | | 2,590 | 2,114 | 1,301 | - | - | - | - | - | - | - | - | - |
| | Total | | 6,679 | 5,337 | 4,638 | 3,874 | 3,862 | 3,833 | 3,806 | 3,784 | 3,762 | 3,738 | 3,717 | 3,693 |
| **Lighting** | SLG | | 28 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| **Total** | | | 203,975 | 176,956 | 186,568 | 194,525 | 198,658 | 198,846 | 200,831 | 203,837 | 204,266 | 207,411 | 208,311 | 212,865 |

# Supplied Share of Delivered Gas Sales As Billed
# 2015-2026
# (percent)

| Class | Rate | Category | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential | RSG | Heating | 94% | 95% | 95% | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% |
| | | Non-Heating | 94% | 94% | 94% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | Total | | 94% | 95% | 95% | 95% | 95% | 95% | 96% | 96% | 96% | 96% | 96% | 96% |
| Commercial | GSG | Heating | 77% | 76% | 77% | 77% | 77% | 77% | 77% | 77% | 77% | 77% | 77% | 77% |
| | | Non-Heating | 72% | 72% | 75% | 73% | 73% | 73% | 73% | 73% | 73% | 73% | 73% | 73% |
| | | Total | 76% | 76% | 77% | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% |
| | LVG | | 42% | 36% | 40% | 38% | 40% | 38% | 38% | 40% | 38% | 40% | 38% | 40% |
| | TSG | Firm | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Non-Firm | 5% | 4% | 9% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | | Total | 5% | 4% | 9% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | CIG | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | CSG | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Total | | 41% | 36% | 42% | 41% | 42% | 41% | 41% | 42% | 41% | 42% | 41% | 42% |
| Industrial | GSG | Heating | 80% | 80% | 79% | 79% | 79% | 79% | 79% | 79% | 79% | 79% | 79% | 79% |
| | | Non-Heating | 75% | 73% | 74% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | | Total | 80% | 79% | 78% | 78% | 78% | 78% | 78% | 78% | 78% | 78% | 78% | 78% |
| | LVG | | 26% | 24% | 26% | 27% | 27% | 27% | 27% | 27% | 27% | 27% | 27% | 27% |
| | TSG | Firm | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Non-Firm | 0% | 1% | 1% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| | | Total | 0% | 1% | 1% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| | CIG | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | CSG | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Contract | | 7% | 8% | 15% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Total | | 3% | 3% | 4% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Lighting | SLG | | 41% | 41% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% |
| Total | | | 43% | 42% | 49% | 51% | 51% | 51% | 51% | 52% | 52% | 52% | 52% | 53% |

# Delivered Gas Sales Calendar-Year 2015-2026 (MDth)

| Class | Rate | Category | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential | RSG | Heating | 140,336 | 130,626 | 131,801 | 135,538 | 140,049 | 142,449 | 143,574 | 145,361 | 147,396 | 149,997 | 151,693 | 154,398 |
| | | Non-Heating | 9,413 | 8,788 | 8,866 | 8,828 | 9,160 | 9,104 | 9,004 | 8,971 | 8,932 | 8,942 | 8,866 | 8,832 |
| | Total | | 149,749 | 139,414 | 140,667 | 144,366 | 149,209 | 151,553 | 152,578 | 154,332 | 156,328 | 158,939 | 160,559 | 163,231 |
| Commercial | GSG | Heating | 23,418 | 21,873 | 22,771 | 22,856 | 23,896 | 24,248 | 24,182 | 24,157 | 24,063 | 24,139 | 24,056 | 24,436 |
| | | Non-Heating | 4,114 | 3,914 | 4,040 | 4,074 | 4,101 | 4,119 | 4,102 | 4,102 | 4,099 | 4,116 | 4,100 | 4,098 |
| | | Total | 27,532 | 25,786 | 26,811 | 26,930 | 27,997 | 28,367 | 28,283 | 28,259 | 28,162 | 28,255 | 28,156 | 28,534 |
| | LVG | | 63,808 | 60,401 | 61,513 | 62,504 | 63,706 | 64,254 | 64,132 | 64,265 | 64,308 | 64,596 | 64,458 | 64,708 |
| | TSG | Firm | 1,038 | 958 | 951 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 | 1,088 |
| | | Non-Firm | 14,957 | 15,183 | 9,668 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 | 12,880 |
| | | Total | 15,995 | 16,141 | 10,618 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 | 13,967 |
| | CIG | | 3,651 | 3,166 | 3,408 | 4,333 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 |
| | CSG | | 11,685 | 13,634 | 8,509 | 14,221 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 | 13,236 |
| | Total | | 122,671 | 119,128 | 110,859 | 121,955 | 123,293 | 124,211 | 124,006 | 124,114 | 124,060 | 124,441 | 124,205 | 124,833 |
| Industrial | GSG | Heating | 952 | 823 | 875 | 914 | 912 | 903 | 885 | 877 | 865 | 859 | 844 | 833 |
| | | Non-Heating | 144 | 152 | 155 | 164 | 164 | 163 | 161 | 159 | 158 | 157 | 155 | 154 |
| | | Total | 1,096 | 975 | 1,030 | 1,078 | 1,076 | 1,066 | 1,045 | 1,036 | 1,023 | 1,017 | 999 | 987 |
| | LVG | | 7,526 | 6,995 | 7,093 | 7,154 | 7,228 | 7,196 | 7,110 | 7,082 | 7,034 | 7,013 | 6,946 | 6,899 |
| | TSG | Firm | 1,505 | 1,393 | 1,574 | 1,609 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 | 1,547 |
| | | Non-Firm | 19,620 | 21,872 | 15,878 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 | 5,994 |
| | | Total | 21,125 | 23,265 | 17,451 | 7,604 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 | 7,542 |
| | CIG | | 1,164 | 687 | 557 | 940 | 934 | 934 | 934 | 934 | 934 | 934 | 934 | 934 |
| | CSG | | 118,452 | 108,304 | 72,331 | 96,012 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 | 96,355 |
| | Contract | | 35,878 | 25,913 | 6,342 | - | - | - | - | - | - | - | - | - |
| | Total | | 185,242 | 166,140 | 104,804 | 112,787 | 113,134 | 113,091 | 112,986 | 112,949 | 112,888 | 112,859 | 112,776 | 112,717 |
| Lighting | SLG | | 68 | 64 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 |
| Total | | | 457,730 | 424,746 | 356,396 | 379,175 | 385,703 | 388,921 | 389,636 | 391,461 | 393,342 | 396,305 | 397,606 | 400,846 |

| | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GSG | 28,628 | 26,762 | 27,841 | 28,008 | 29,073 | 29,433 | 29,328 | 29,295 | 29,185 | 29,272 | 29,156 | 29,521 |
| LVG | 71,334 | 67,396 | 68,606 | 69,658 | 70,934 | 71,449 | 71,242 | 71,347 | 71,342 | 71,608 | 71,404 | 71,607 |
| TSG | 2,543 | 2,351 | 2,524 | 2,697 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 | 2,635 |
| | 34,578 | 37,055 | 25,545 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 | 18,874 |
| CIG | 4,815 | 3,853 | 3,965 | 5,273 | 5,321 | 5,321 | 5,321 | 5,321 | 5,321 | 5,321 | 5,321 | 5,321 |
| CSG | 130,137 | 121,938 | 80,840 | 110,233 | 109,590 | 109,590 | 109,590 | 109,590 | 109,590 | 109,590 | 109,590 | 109,590 |
| Contract | 35,878 | 25,913 | 6,342 | - | - | - | - | - | - | - | - | - |

# Supplied Gas Sales Calendar-Year 2015-2026 (MDth)

| Class | Rate | Category | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential | RSG | Heating | 132,140 | 124,069 | 125,315 | 129,087 | 133,803 | 136,096 | 137,172 | 138,882 | 140,826 | 143,311 | 144,933 | 147,519 |
| | | Non-Heating | 8,837 | 8,297 | 8,365 | 8,345 | 8,689 | 8,635 | 8,541 | 8,510 | 8,473 | 8,483 | 8,410 | 8,378 |
| | Total | | 140,977 | 132,367 | 133,680 | 137,432 | 142,493 | 144,731 | 145,714 | 147,392 | 149,300 | 151,793 | 153,344 | 155,897 |
| Commercial | GSG | Heating | 18,146 | 16,764 | 17,569 | 17,423 | 18,398 | 18,670 | 18,621 | 18,604 | 18,533 | 18,594 | 18,531 | 18,826 |
| | | Non-Heating | 2,995 | 2,833 | 2,976 | 2,947 | 2,993 | 3,006 | 2,993 | 2,993 | 2,991 | 3,003 | 2,992 | 2,990 |
| | | Total | 21,142 | 19,597 | 20,545 | 20,370 | 21,391 | 21,676 | 21,614 | 21,597 | 21,524 | 21,597 | 21,523 | 21,816 |
| | LVG | | 26,549 | 21,882 | 24,708 | 23,475 | 25,594 | 24,200 | 24,152 | 25,832 | 24,225 | 25,983 | 24,293 | 26,037 |
| | TSG | Firm | - | - | - | - | - | - | - | - | - | - | - | - |
| | | Non-Firm | 910 | 789 | 892 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 |
| | | Total | 910 | 789 | 892 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 | 675 |
| | CIG | | 3,651 | 3,166 | 3,408 | 4,333 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 | 4,387 |
| | CSG | | - | - | - | - | - | - | - | - | - | - | - | - |
| | Total | | 52,251 | 45,434 | 49,553 | 48,852 | 52,047 | 50,939 | 50,828 | 52,491 | 50,810 | 52,642 | 50,878 | 52,915 |
| Industrial | GSG | Heating | 768 | 656 | 692 | 718 | 719 | 712 | 698 | 692 | 683 | 678 | 666 | 657 |
| | | Non-Heating | 108 | 112 | 115 | 121 | 123 | 122 | 120 | 119 | 118 | 118 | 116 | 115 |
| | | Total | 875 | 768 | 806 | 840 | 842 | 834 | 818 | 811 | 801 | 796 | 782 | 772 |
| | LVG | | 1,928 | 1,677 | 1,877 | 1,972 | 1,967 | 1,957 | 1,931 | 1,922 | 1,907 | 1,901 | 1,881 | 1,866 |
| | TSG | Firm | - | - | - | - | - | - | - | - | - | - | - | - |
| | | Non-Firm | 55 | 196 | 59 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| | | Total | 55 | 196 | 59 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 | 113 |
| | CIG | | 1,164 | 687 | 557 | 940 | 934 | 934 | 934 | 934 | 934 | 934 | 934 | 934 |
| | CSG | | - | - | - | - | - | - | - | - | - | - | - | - |
| | Contract | | 2,712 | 2,585 | 759 | - | - | - | - | - | - | - | - | - |
| | Total | | 6,735 | 5,913 | 4,058 | 3,865 | 3,856 | 3,839 | 3,797 | 3,780 | 3,755 | 3,744 | 3,710 | 3,686 |
| Lighting | SLG | | 28 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| Total | | | 199,992 | 183,740 | 187,316 | 190,175 | 198,421 | 199,534 | 200,363 | 203,689 | 203,891 | 208,205 | 207,957 | 212,524 |

# Supplied Share of Delivered Gas Sales Calendar Year 2015-2026 (percent)

| Class | Rate | Category | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Residential | RSG | Heating | 94% | 95% | 95% | 95% | 96% | 96% | 96% | 96% | 96% | 96% | 96% | 96% |
| | | Non-Heating | 94% | 94% | 94% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% | 95% |
| | Total | | 94% | 95% | 95% | 95% | 95% | 95% | 96% | 96% | 96% | 96% | 96% | 96% |
| Commercial | GSG | Heating | 77% | 77% | 77% | 76% | 77% | 77% | 77% | 77% | 77% | 77% | 77% | 77% |
| | | Non-Heating | 73% | 72% | 74% | 72% | 73% | 73% | 73% | 73% | 73% | 73% | 73% | 73% |
| | | Total | 77% | 76% | 77% | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% |
| | LVG | | 42% | 36% | 40% | 38% | 40% | 38% | 38% | 40% | 38% | 40% | 38% | 40% |
| | TSG | Firm | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Non-Firm | 6% | 5% | 9% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | | Total | 6% | 5% | 8% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% | 5% |
| | CIG | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | CSG | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Total | | 43% | 38% | 45% | 40% | 42% | 41% | 41% | 42% | 41% | 42% | 41% | 42% |
| Industrial | GSG | Heating | 81% | 80% | 79% | 79% | 79% | 79% | 79% | 79% | 79% | 79% | 79% | 79% |
| | | Non-Heating | 75% | 74% | 74% | 74% | 75% | 75% | 75% | 75% | 75% | 75% | 75% | 75% |
| | | Total | 80% | 79% | 78% | 78% | 78% | 78% | 78% | 78% | 78% | 78% | 78% | 78% |
| | LVG | | 26% | 24% | 26% | 28% | 27% | 27% | 27% | 27% | 27% | 27% | 27% | 27% |
| | TSG | Firm | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | | Non-Firm | 0% | 1% | 0% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| | | Total | 0% | 1% | 0% | 1% | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| | CIG | | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| | CSG | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Contract | | 8% | 10% | 12% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| | Total | | 4% | 4% | 4% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% | 3% |
| Lighting | SLG | | 41% | 41% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% | 39% |
| Total | | | 44% | 43% | 53% | 50% | 51% | 51% | 51% | 52% | 52% | 53% | 52% | 53% |

**ATTACHMENT 2**

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY**
**DIRECT TESTIMONY**
**OF**
**DONNA M. POWELL**
**ASSISTANT CONTROLLER - PSE&G**

**Q. Please state your name and address for the record.**

A. My name is Donna M. Powell. My business address is 80 Park Plaza, Newark, New Jersey, 07102.

**Q. In what capacity are you employed?**

A. I am employed by PSEG Services Corporation (PSEG Services), a subsidiary of Public Service Enterprise Group Incorporated (PSEG), as Assistant Controller-PSE&G. I am responsible for all accounting matters for PSE&G.

**Q. Please describe your employment experience and educational background.**

A. I hold a B.S in Accounting from Villanova University and I am a Certified Public Accountant. I have been employed by PSEG Services since 2012, serving as Assistant Controller-PSE&G. In my role as Assistant Controller – PSE&G, I am responsible for all accounting matters for PSE&G and I direct the utility accounting functions including regulatory compliance thereon. I have previously testified before the BPU on behalf of PSE&G.

Prior to joining PSEG, I was employed by New Jersey American Water Company from 2007 to 2012 as Vice-President of Finance where I was responsible for all of the financial aspects of that company, including business

planning, regulatory strategy and rate support, and all financial, statutory and management reporting. From 1998 to 2007, I worked in various financial capacities at Pepco Holdings, Inc. (formerly Conectiv, Inc. and Atlantic City Electric Company), including testifying before the New Jersey Board of Public Utilities in 1998 in support of Atlantic City Electric Company's request for stranded cost recovery as a result of deregulation. I also worked for nine years with Deloitte & Touche in various capacities from entry level auditor through Senior Manager, where, in that role, I worked primarily in the utility sector and was a designated utility industry accounting and auditing expert.

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

A. The purpose of this testimony is to describe the Weather Normalization Charge (WNC) to be implemented by PSE&G for the Annual Period (October 1, 2019 to September 30, 2020) and refunded to customers taking service on the Company's Residential Service (RSG), General Service (GSG) and Large Volume Service (LVG) rate schedules during the Winter Period of October 1, 2019 through May 31, 2020. As part of this discussion, I will describe the calculation of the WNC made in accordance with the WNC Tariff and which supports the request by PSE&G to return $(8,251,009) in excess revenues that will be refunded over the 2019-2020 Winter Period. The total excess of

$(8,251,009) is comprised of two components:

- $(8,341,123) of margin revenue excess resulting from the 2018-2019 Winter Period, net of
- $90,114 which represents the remaining under-collection from the 2017-2018 Winter Period approved for collection over the 2018-2019 Winter Period.

**Q. Please describe the schedules you are sponsoring for this proceeding.**

A. I am sponsoring the following Schedules:

- Schedule DMP-WNC-1: 2018-2019 Winter Period Weather Normalization Calculation;
- Schedules DMP-WNC-2a and DMP-WNC-2b: (*Reserved for Future Use).* Schedules DMP-WNC-2a and DMP-WNC-2b are not included herein and are reserved for future use for the Weather Normalization Earnings Test and the Supporting Schedule of Gas Jurisdictional Net Income, respectively. These schedules are only applicable when a margin revenue deficiency has resulted from the Winter Period. The 2018-2019 Winter Period resulted in a margin revenue excess of $(8,341,123) to be refunded to customers, therefore these schedules are not applicable;

- Schedule DMP-WNC-3: Collection Schedule for the 2017-2018 WNC margin revenue deficiency (under collection) during the 2018-2019 Winter Period; and
- Schedule DMP-WNC-4: Summary Schedule of WNC Calculation for the Annual Period October 1, 2018 to September 30, 2019.

**Q. Has PSE&G provided an earnings test as part of this Petition?**

A. No. The purpose of the earnings test is to ensure that the WNC does not permit the Company to recover any portion of a margin revenue deficiency that would cause the gas utility to earn in excess of its allowed rate of return on common equity for the Annual Period.

The test of earnings described in PSE&G's WNC Tariff is unnecessary when the calculated margin revenues for the Annual Period result in an excess to be refunded to the customers, as is the case for the 2018-2019 Winter Period.

**Q. Please describe the Weather Normalization Charge.**

A. The Company's WNC is a rate mechanism that, in general, mitigates the financial effect of variations from the normal weather on which base rates are set, on both the Company and its customers receiving service under the RSG, GSG, and LVG rate schedules. Variances in actual degree days from normal for each day are measured and accumulated over the calendar-month for each month in the Winter Period. These monthly variances are adjusted for a degree

day dead band which is ½% of the normal calendar-month degree days. The resulting cumulative degree day variance, along with the trued-up degree day consumption factors, determines, along with any prior WNC balances, the adjustment to customers' bills in the following Winter Period. This adjustment is either a surcharge to collect a revenue deficiency as a result of warmer than normal weather or a credit to customers to refund the excess revenues collected as a result of colder than normal weather.

In accordance with B.P.U.N.J. No. 16 Gas Tariff Sheets Nos. 45, 46, 47 (WNC Tariff), the Company has updated the number of base RSG customers and therms per degree day by rate class, and calculated the margin revenue used in determining the (excess) or deficient margin revenues for the 2018-2019 Winter Period.

**Q. How is the 2018-2019 WNC excess calculated?**

A. In accordance with the WNC Tariff, the Company has calculated the level by which margin revenues differed from what would have resulted if normal weather occurred for the 2018-2019 Winter Period. The normalized degree day variance produced a margin revenue excess of $(8,341,123) during the 2018-2019 Winter Period due to overall colder than normal weather. This calculation is set forth on Schedule DMP-WNC-1.

There are three (3) steps to this process as shown in Schedule DMP-WNC-1. These are:

- Step 1: Determination of the degree day variance after the ½% dead band adjustment.
- Step 2: Determination of the normalized volumes by rate class, by multiplying the (excess)/deficient degree day variance by the trued-up consumption factors to determine the (excess)/deficient volumes.
- Step 3: Calculation of the Margin Revenue Deferral prior to application of the earnings test, by multiplying the (excess)/deficient volumes by the Margin Revenue Factor in effect for each of the rate classes, for each month from October through May.

In addition, if the calculation above results in a margin revenue deficiency, which it does not in this case, the Company would apply the WNC Earnings Test.

**Q. Are there any other adjustments necessary for the calculation of the 2018-2019 WNC deferral and recovery request?**

A. Yes, PSE&G has made one other adjustment to the 2018-2019 Winter Period margin revenue excess in order to calculate the amount to be refunded to customers over the 2019-2020 Winter Period.

**Q. Please describe the adjustment required to calculate the total 2018-2019 WNC.**

A. In Docket No. GR18060675, the Board approved the collection of $14,297,150 to be recovered over the 2018-2019 Winter Period. The Company collected $14,207,036 of that amount resulting in a balance of $90,114 to be carried over and collected from customers over the 2019-2020 Winter Period. Please refer to DMP-WNC-3 for a schedule of the monthly collection of the prior years' WNC deficiency margin during the 2018-2019 Period. This remaining deficiency will partially offset the 2018-2019 revenue margin excess of $(8,341,123). Therefore, the net total to be refunded to customers during the 2019-2020 Winter Period amounts to $(8,251,009), which is the net of $(8,341,123) and $90,114. This calculation is summarized on DMP-WNC-4.

**Q. Please summarize the results of your calculations and adjustments.**

A. Based on the Board-approved method for calculating the WNC, the Company respectfully requests approval to refund $(8,251,009), which will be returned to customers over the 2019-2020 Winter Period. The specific rate impacts and calculations relative to the 2019-2020 Winter Period will be discussed in the testimony of Stephen Swetz.

**Q. Does this conclude your testimony in this matter?**

A. Yes.

# PSE&G

## Weather Normalization

### 2018-2019 Winter Period

### Step 1: Determine the degree day variance from the dead band.

| | Normal Degree Days | 0.50% Dead Band | Dead Band Low End | Dead Band High End | Actual Degree Days | Normalization Amount (1) |
|---|---|---|---|---|---|---|
| October | 240 | 1 | 239 | 241 | 288 | (46) |
| November | 511 | 3 | 508 | 513 | 628 | (115) |
| December | 824 | 4 | 820 | 828 | 786 | 34 |
| January | 989 | 5 | 984 | 994 | 1,010 | (16) |
| February | 836 | 4 | 832 | 841 | 814 | 18 |
| March | 685 | 3 | 682 | 689 | 734 | (45) |
| April | 350 | 2 | 349 | 352 | 302 | 46 |
| May | 126 | 1 | 125 | 127 | 127 | (1) |

### Step 2: Determine the normalized volumes by rate class.

| | Therms Per Degree Day (2) | | | Normalization Volumes (3) | | |
|---|---|---|---|---|---|---|
| | RSG | GSG | LVG | RSG | GSG | LVG |
| October | 116,638 | 23,832 | 86,211 | (5,381,677) | (1,099,608) | (3,977,776) |
| November | 214,106 | 32,696 | 86,211 | (24,581,510) | (3,753,828) | (9,897,885) |
| December | 260,909 | 41,787 | 86,211 | 8,740,452 | 1,399,865 | 2,888,069 |
| January | 281,281 | 47,362 | 86,672 | (4,534,250) | (763,475) | (1,397,153) |
| February | 292,540 | 51,284 | 86,672 | 5,251,093 | 920,548 | 1,555,762 |
| March | 291,633 | 53,457 | 86,672 | (13,062,242) | (2,394,339) | (3,882,039) |
| April | 267,295 | 46,747 | 86,672 | 12,362,394 | 2,162,049 | 4,008,580 |
| May | 184,918 | 34,968 | 86,672 | (162,728) | (30,772) | (76,271) |

### Step 3: Calculate the margin revenue to be deferred.

| | Margin Revenue Deferral (4) and (5) | | | |
|---|---|---|---|---|
| **Margin Revenue Factor:** | | | | |
| **January 2019- May2019** | **0.34532** | **0.28001** | **0.04170** | |
| **November 2018- December 2018** | **0.33377** | **0.27409** | **0.04147** | |
| **October 2018** | **0.30041** | **0.24712** | **0.03978** | **Total** |
| October | $ (1,616,688) | $ (271,735) | $ (158,228) | $ (2,046,651) |
| November | $ (8,204,595) | $ (1,028,883) | $ (410,465) | $ (9,643,943) |
| December | $ 2,917,309 | $ 383,687 | $ 119,768 | $ 3,420,765 |
| January | $ (1,565,776) | $ (213,780) | $ (58,257) | $ (1,837,813) |
| February | $ 1,813,318 | $ 257,762 | $ 64,871 | $ 2,135,950 |
| March | $ (4,510,680) | $ (670,436) | $ (161,869) | $ (5,342,985) |
| April | $ 4,269,007 | $ 605,393 | $ 167,146 | $ 5,041,545 |
| May | $ (56,194) | $ (8,616) | $ (3,180) | $ (67,990) |
| Winter Period Total | $ (6,954,299) | $ (946,609) | $ (440,215) | $ (8,341,123) |

### Step 3: Calculate the margin revenue to be deferred.

Recovery of any amount that would cause the company to earn in excess of the allowed ROE (9.6%) is prohibited.

***(1) Amount above or below the Dead Band***
***(2) Consumption factors to be true-up at the end of the Winter Period for actual # of customers.***
***(3) Normalization degree days x Therms Per Degree Day***
***(4) Normalization Volumes x Margin Revenue Factor***

Not Applicable

# PSE&G

## Collection Schedule for Prior Years' Winter Period Undercollections

**For the Winter Period effective October 1, 2018 to May 31, 2019**

| | | | | |
|---|---|---|---|---|
| **Under-collected beginning balance** | **(a)** | $ | 14,297,150 | |
| ***Amounts refunded to/(collected from) customers per month:*** | | | | |
| Oct-18 | | $ | 41,642 | |
| Nov-18 | | $ | (889,900) | |
| Dec-18 | | $ | (2,962,254) | |
| Jan-19 | | $ | (3,376,041) | |
| Feb-19 | | $ | (3,814,906) | |
| Mar-19 | | $ | (3,186,135) | |
| Apr-19 | | $ | (33,579) | |
| May-19 | | $ | 14,136 | |
| | **(b)** | $ | (14,207,036) | |
| **Remaining amount to be collected from customers** | | $ | 90,114 | ***(a) plus (b)*** |

# PSE&G

## Weather Normalization Summary Schedule

**Annual Period October 1, 2018 to September 30, 2019**

| | | | **Schedule Reference** |
|---|---|---|---|
| 2018-2019 Winter Period Total WNC Revenue Excess | $ (8,341,123) | ***(a)*** | **DMP-WNC-1** |
| Remaining balance from the 2017-2018 WNC, to be collected during 2019-2020 Winter Period | $90,114 | ***( b)*** | **DMP-WNC-3** |
| . | | | |
| Total WNC Balance to be refunded to customers | $ (8,251,009) | ***( c)*** | ***(a) + (b)*** |

**ATTACHMENT 3**

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY**
**DIRECT TESTIMONY**
**OF**
**STEPHEN SWETZ**
**SENIOR DIRECTOR - CORPORATE RATES AND REVENUES REQUIREMENTS**

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

A. My name is Stephen Swetz. My business address is 80 Park Plaza, T-8, Newark, New Jersey 07102.

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

A. I am the Senior Director - Corporate Rates and Revenues Requirements, PSEG Services Corporation. My credentials are set forth in the attached Schedule SS-WNC-1.

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

A. The purpose of my testimony is to discuss Public Service Electric and Gas Company's (PSE&G, the Company) derivation of the Weather Normalization Charge (WNC) to be applied during the Winter Period of October 1, 2019 through May 31, 2020 to the Company's Residential Service (RSG), General Service (GSG) and Large Volume Service (LVG) rate schedules.

**Q. Does your testimony include any schedules?**

A. Yes. My testimony includes Schedule SS-WNC-1, which contains my qualifications. Schedule SS-WNC-2 and SS-WNC-2a detail the calculation of

the 3% WNC rate cap limit based upon the RSG total per therm rate based on balancing therms over an 8 month period as proposed in the Company's pending Basic Gas Supply Service ("BGSS") filing. In addition, I have provided the calculation for the 5 month period used in prior years for illustrative purposes only.

**Q. Please describe the WNC mechanism.**

A. As set forth in the Testimony of PSE&G Witness Stephen A. Wreschnig, the Company's WNC is a rate mechanism that, in general, mitigates the financial effect of variations from the normal weather on which rates are set on both the Company and its customers in RSG, GSG and LVG Rate Schedules. Variances in actual degree days from normal for each day are accumulated for each month of the Winter Period (October through May). These variances are adjusted for a degree day dead band, which is 1/2% of the normal calendar month degree days. The resulting cumulative degree day variance, along with the trued-up Degree Day Consumption Factors and Margin Revenue Factors, determine the Margin Revenue Deferral. This Margin Revenue Deferral is either a charge to collect a revenue deficiency as a result of warmer than normal weather or a credit to customers to refund the excess revenues collected as a result of colder than normal weather.

As shown in Donna M. Powell's Testimony, Schedule DMP-WNC-1, the Margin Revenue calculation indicates a margin excess for the 2018-2019 Winter Period of ($8,341,123).

**Q. Are there any other calculations necessary for the determination of the 2019-2020 WNC recovery request?**

A. Yes. As shown in Donna M. Powell's Testimony, Schedule DMP-WNC-3 and Schedule DMP-WNC-4, the margin excess from this 2018-2019 Winter Period is offset by a remaining under-collection from the 2017-2018 Winter Period of $90,114. This is comprised of a carryover deficiency of $14,297,150 as of September 30, 2018 and amounts refunded or collected from customers over the 2018-2019 Winter Period of ($14,207,036). The total WNC balance to be collected after these adjustments is $90,114 as shown in Schedule DMP-WNC-3.

**Q. Are there any changes in this filing compared to prior WNC proceedings?**

A. Yes. In its pending BGSS filing submitted on June 1, 2019 in Docket No. GR19060699, the Company seeks approval to modify the timeframe in which its balancing costs are collected from firm customers through the Balancing Charge. Currently, balancing costs are collected over a five month period in the billing months of November through March. The Company is proposing to to refund the current WNC overcollection balance over the upcoming eight month period (October to May).

**Q. Are there any other limitations on setting the WNC?**

A. As stated in Section II of the Company's proposed WNC Tariff Sheet 47 (Attachment 4), "the Weather Normalization Charge will at no time exceed three (3%) percent of the then applicable RSG total per therm rate, including BGSS - RSG charges and 72.91% of the Balancing Charge." Only 72.91% of the Balancing Charge is used because balancing therms compose only 72.91% of the total annual therms of the RSG rate class, as shown on Schedule SAW-WNC-5. For illustrative purposes, Schedule SAW-WNC-7 shows the corresponding Balancing Charge percentage of 64.03% for the five month period (November to March) applied to the higher 5 month WNC rate to calculate the RSG total per therm rate. As a result of both this year's excess deferral and the addition of the remaining balance from the 2018-2019 WNC, there is no 3% cap application since the result is a rate lower than the proposed WNC rate for either percentage as shown in Schedules SS-WNC-2 and SS-WNC-2a.

**Q. How is the 3% WNC rate cap limit calculated?**

A. As shown in Schedule SS-WNC-2, the total per therm rate after applying the effective annualized balancing charge equates to $0.765387 (with SUT) per therm. The 3% rate cap limit results in a WNC of $0.022962 per therm with SUT ($0.021535 per therm without SUT). As a result of this year's excess deferral and the addition of the remaining balance from the 2017-2018 WNC,

there is no 3% cap application since the result is a rate lower than the proposed WNC, of ($0.005118) with SUT per therm (($0.004800) per therm without SUT).

**Q. Please show the WNC calculation.**

A. The WNC calculation is shown below:

| | | Schedule SAW-WNC-4 | Schedule SAW-WNC-6 |
|---|---|---|---|
| | **Forecasted Balancing Therms** | **8 Mth Calculation** | **5 Mth Calculation** |
| 1 | Recovery Request for 2019-2020 Winter Period (Schedule DMP-WNC-4) | $ (8,251,009) | $ (8,251,009) |
| 2 | Forecasted Balancing Therms | 1,718,990,692 | 1,502,150,876 |
| 3=1/2 | Weather Normalization Charge (per Balancing Therm) | ($0.004800) | ($0.005493) |
| 4=3*1.06625 | Weather Normalization Charge (Including Sales and Use Tax (SUT) | ($0.005118) | ($0.005857) |

**Q. What is PSE&G's proposal to implement the WNC for the 2019-2020 annual period?**

A. As a result of these calculations, PSE&G proposes a WNC of ($0.005118) with SUT per therm (($0.004800) per therm without SUT) per balancing therm using an eight month period applicable to Rate Schedules RSG, GSG and LVG for the 2019-2020 Winter period.

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

A. Yes.

# CREDENTIALS
# OF
# STEPHEN SWETZ
# SR. DIRECTOR-CORPORATE RATES AND REVENUE REQUIREMENTS

My name is Stephen Swetz and I am employed by PSEG Services Corporation. I am the Sr. Director - Corporate Rates and Revenue Requirements where my main responsibility is to contribute to the development and implementation of electric and gas rates for Public Service Electric and Gas Company (PSE&G, the Company).

## WORK EXPERIENCE

I have over 30 years of experience in Rates, Financial Analysis and Operations for three Fortune 500 companies. Since 1991, I have worked in various positions within PSEG. I have spent most of my career contributing to the development and implementation of PSE&G electric and gas rates, revenue requirements, pricing and corporate planning with over 20 years of direct experience in Northeastern retail and wholesale electric and gas markets.

As Sr. Director of the Corporate Rates and Revenue Requirements department, I have submitted pre-filed direct cost recovery testimony as well as oral testimony to the New Jersey Board of Public Utilities and the New Jersey Office of Administrative Law for base rate cases, as well as a number of clauses including infrastructure investments, renewable energy, and energy efficiency programs. A list of my prior testimonies can be found on pages 3 and 4 of this document. I have also

contributed to other filings including unbundling electric rates and Off-Tariff Rate Agreements. I have had a leadership role in various economic analyses, asset valuations, rate design, pricing efforts and cost of service studies.

I am an active member of the American Gas Association's Rate and Strategic Issues Committee, the Edison Electric Institute's Rates and Regulatory Affairs Committee and the New Jersey Utility Association (NJUA) Finance and Regulatory Committee.

**EDUCATIONAL BACKGROUND**

I hold a B.S. in Mechanical Engineering from Worcester Polytechnic Institute and an MBA from Fairleigh Dickinson University.

LIST OF PRIOR TESTIMONIES

| Company | Utility | Docket | Testimony | Date | Case / Topic |
|---|---|---|---|---|---|
| Public Service Electric & Gas Company | E | ER19060741 | written | Jun-19 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | EO18060629 - GO18060630 | oral | Jun-19 | Energy Strong II / Revenue Requirements & Rate Design |
| Public Service Electric & Gas Company | G | GR19060698 | written | May-19 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E | ER19040523 | written | May-19 | Non-Utility Generation Charge (NGC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | EO18101113 - GO18101112 | oral | May-19 | Clean Energy Future - Energy Efficiency Program Approval |
| Public Service Electric & Gas Company | E/G | EO18101113 - GO18101112 | written | Dec-18 | Clean Energy Future - Energy Efficiency Program Approval |
| Public Service Electric & Gas Company | E/G | GR18121258 | written | Nov-18 | Remediation Adjustment Charge-RAC 26 |
| Public Service Electric & Gas Company | G | GR18070831 | written | Jul-18 | Gas System Modernization Program (GSMP) - Third Roll-In |
| Public Service Electric & Gas Company | E/G | ER18070688 - GR18070689 | written | Jun-18 | Green Programs Recovery Charge (GPRC)-Including CA, DR, EEE, EEE Ext, S4All, S4AEXT, S4AEXT II, SLII, SLIII / Cost Recovery |
| Public Service Electric & Gas Company | E | ER18060681 | written | Jun-18 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR18060675 | written | Jun-18 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | E/G | EO18060629 - GO18060630 | written | Jun-18 | Energy Strong II / Revenue Requirements & Rate Design |
| Public Service Electric & Gas Company | G | GR18060605 | written | Jun-18 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER18040358 - GR18040359 | written | Mar-18 | Energy Strong / Revenue Requirements & Rate Design - Eighth Roll-in |
| Public Service Electric & Gas Company | E/G | ER18030231 | written | Mar-18 | Tax Cuts and Job Acts of 2017 |
| Public Service Electric & Gas Company | E/G | GR18020093 | written | Feb-18 | Remediation Adjustment Charge-RAC 25 |
| Public Service Electric & Gas Company | E/G | ER18010029 and GR18010030 | written | Jan-18 | Base Rate Proceeding / Cost of Service & Rate Design |
| Public Service Electric & Gas Company | E | ER17101027 | written | Sep-17 | Energy Strong / Revenue Requirements & Rate Design - Seventh Roll-in |
| Public Service Electric & Gas Company | G | GR17070776 | written | Jul-17 | Gas System Modernization Program II (GSMP II) |
| Public Service Electric & Gas Company | G | GR17070775 | written | Jul-17 | Gas System Modernization Program (GSMP) - Second Roll-In |
| Public Service Electric & Gas Company | G | GR17060720 | written | Jul-17 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER17070724 - GR17070725 | written | Jul-17 | Green Programs Recovery Charge (GPRC)-Including CA, DR, EEE, EEE Ext, S4All, S4AEXT, S4AEXT II, SLII, SLIII / Cost Recovery |
| Public Service Electric & Gas Company | E | ER17070723 | written | Jul-17 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR17060593 | written | Jun-17 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER17030324 - GR17030325 | written | Mar-17 | Energy Strong / Revenue Requirements & Rate Design - Sixth Roll-in |
| Public Service Electric & Gas Company | E/G | EO14080897 | written | Mar-17 | Energy Efficiency 2017 Program |
| Public Service Electric & Gas Company | E | ER17020136 | written | Feb-17 | Societal Benefits Charge (SBC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | GR16111064 | written | Nov-16 | Remediation Adjustment Charge-RAC 24 |
| Public Service Electric & Gas Company | E | ER16090918 | written | Sep-16 | Energy Strong / Revenue Requirements & Rate Design - Fifth Roll-in |
| Public Service Electric & Gas Company | E | EO16080788 | written | Aug-16 | Construction of Mason St Substation |
| Public Service Electric & Gas Company | E | ER16080785 | written | Aug-16 | Non-Utility Generation Charge (NGC) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR16070711 | written | Jul-16 | Gas System Modernization Program (GSMP) - First Roll-In |
| Public Service Electric & Gas Company | G | GR16070617 | written | Jul-16 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER16070613 - GR16070614 | written | Jul-16 | Green Programs Recovery Charge (GPRC)-Including CA, DR, EEE, EEE Ext, S4All, S4AEXT, SLII, SLIII / Cost Recovery |
| Public Service Electric & Gas Company | E | ER16070616 | written | Jul-16 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR16060484 | written | Jun-16 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E | EO16050412 | written | May-16 | Solar 4 All Extension II (S4Allext II) / Revenue Requirements & Rate Design |
| Public Service Electric & Gas Company | E/G | ER16030272 - GR16030273 | written | Mar-16 | Energy Strong / Revenue Requirements & Rate Design - Fourth Roll-in |
| Public Service Electric & Gas Company | E/G | GR15111294 | written | Nov-15 | Remediation Adjustment Charge-RAC 23 |
| Public Service Electric & Gas Company | E | ER15101180 | written | Sep-15 | Energy Strong / Revenue Requirements & Rate Design - Third Roll-in |
| Public Service Electric & Gas Company | E/G | ER15070757-GR15070758 | written | Jul-15 | Green Programs Recovery Charge (GPRC)-Including CA, DR, EEE, EEE Ext, S4All, S4AEXT, SLII, SLIII / Cost Recovery |
| Public Service Electric & Gas Company | E | ER15060754 | written | Jul-15 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR15060748 | written | Jul-15 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | G | GR15060646 | written | Jun-15 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER15050558 | written | May-15 | Societal Benefits Charge (SBC) / Cost Recovery |
| Public Service Electric & Gas Company | E | ER15050558 | written | May-15 | Non-Utility Generation Charge (NGC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER15030389-GR15030390 | written | Mar-15 | Energy Strong / Revenue Requirements & Rate Design - Second Roll-in |
| Public Service Electric & Gas Company | G | GR15030272 | written | Feb-15 | Gas System Modernization Program (GSMP) |
| Public Service Electric & Gas Company | E/G | GR14121411 | written | Dec-14 | Remediation Adjustment Charge-RAC 22 |
| Public Service Electric & Gas Company | E/G | ER14091074 | written | Sep-14 | Energy Strong / Revenue Requirements & Rate Design - First Roll-in |
| Public Service Electric & Gas Company | E/G | EO14080897 | written | Aug-14 | EEE Ext II |
| Public Service Electric & Gas Company | G | ER14070656 | written | Jul-14 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER14070651-GR14070652 | written | Jul-14 | Green Programs Recovery Charge (GPRC)-Including CA, DR, EEE, EEE Ext, S4All, S4AEXT, SLII, SLIII / Cost Recovery |
| Public Service Electric & Gas Company | E | ER14070650 | written | Jul-14 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR14050511 | written | May-14 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | GR14040375 | written | Apr-14 | Remediation Adjustment Charge-RAC 21 |
| Public Service Electric & Gas Company | E/G | ER13070603-GR13070604 | written | Jun-13 | Green Programs Recovery Charge (GPRC)-Including DR, EEE, EEE Ext, CA, S4All, SLII / Cost Recovery |
| Public Service Electric & Gas Company | E | ER13070605 | written | Jul-13 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR13070615 | written | Jun-13 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | G | GR13060445 | written | May-13 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | EO13020155-GO13020156 | written/oral | Mar-13 | Energy Strong / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | G | GO12030188 | written/oral | Mar-13 | Appliance Service / Tariff Support |
| Public Service Electric & Gas Company | E | ER12070599 | written | Jul-12 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER12070606-GR12070605 | written | Jul-12 | RGGI Recovery Charges (RRC)-Including DR, EEE, EEE Ext, CA, S4All, SLII / Cost Recovery |

LIST OF PRIOR TESTIMONIES

| Company | Utility | Docket | Testimony | Date | Case / Topic |
|---|---|---|---|---|---|
| Public Service Electric & Gas Company | E | ER19060741 | written | Jun-19 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | EO18060629 - GO18060630 | oral | Jun-19 | Energy Strong II / Revenue Requirements & Rate Design |
| Public Service Electric & Gas Company | E | EO12080721 | written/oral | Jul-12 | Solar Loan III (SLIII) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E | EO12080721 | written/oral | Jul-12 | Solar 4 All Extension(S4Allext) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | G | GR12060489 | written | Jun-12 | Margin Adjustment Charge (MAC) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR12060583 | written | Jun-12 | Weather Normalization Charge / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER12030207 | written | Mar-12 | Societal Benefits Charge (SBC) / Cost Recovery |
| Public Service Electric & Gas Company | E | ER12030207 | written | Mar-12 | Non-Utility Generation Charge (NGC) / Cost Recovery |
| Public Service Electric & Gas Company | G | GR11060338 | written | Jun-11 | Margin Adjustment Charge (MAC) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | G | GR11060395 | written | Jun-11 | Weather Normalization Charge / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E | EO11010030 | written | Jan-11 | Economic Energy Efficiency Extension (EEEext) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E/G | ER10100737 | written | Oct-10 | RGGI Recovery Charges (RRC)-Including DR, EEE, CA, S4All, SLII / Cost Recovery |
| Public Service Electric & Gas Company | E/G | ER10080550 | written | Aug-10 | Societal Benefits Charge (SBC) / Cost Recovery |
| Public Service Electric & Gas Company | E | ER10080550 | written | Aug-10 | Non-Utility Generation Charge (NGC) / Cost Recovery |
| Public Service Electric & Gas Company | E/G | GR09050422 | written/oral | Mar-10 | Base Rate Proceeding / Cost of Service & Rate Design |
| Public Service Electric & Gas Company | E | ER10030220 | written | Mar-10 | Solar Pilot Recovery Charge (SPRC-Solar Loan I) / Cost Recovery |
| Public Service Electric & Gas Company | E | EO09030249 | written | Mar-09 | Solar Loan II(SLII) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E/G | EO09010056 | written | Feb-09 | Economic Energy Efficiency(EEE) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E | EO09020125 | written | Feb-09 | Solar 4 All (S4All) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E | EO08080544 | written | Aug-08 | Demand Response (DR) / Revenue Requirements & Rate Design - Program Approval |
| Public Service Electric & Gas Company | E/G | ER10100737 | written | Jun-08 | Carbon Abatement (CA) / Revenue Requirements & Rate Design - Program Approval |

**Schedule SS-WNC-2**

**Weather Normailzation Clause**
**2018-2019 WNC Rate Cap Calculation (8 month balancing)**

| **Residential Service (RSG)** | | **Service Chg with SUT** | **Per Therm Charges as of 6/01/19 with SUT** |
|---|---|---|---|
| Service Charge | | $8.62 | |
| Distribution Charge | | | $0.368200 |
| Societal Benefits Charge (SBC) | | | $0.048753 |
| Green Programs Recovery Charge (GPRC) | | | $0.005346 |
| Margin Adjustment Charge (MAC) | | | -$0.006758 |
| Tax Adjustment Credit (TAC) | | | -$0.074183 |
| Captial Adjustment Charge (CAC) | | | |
| Service Charge | | $0.00 | |
| Distribution Charge | | | $0.000000 |
| Margin Adjustment Charge (MAC) | | | $0.000000 |
| BGSS-RSG | | | $0.349059 |
| | Subtotal | $8.62 | $0.690417 |
| (1) Effective Annualize Balancing Charge | | | $0.074970 |
| Total per therm rate | | | $0.765387 |
| Weather Normalization Charge Cap % | | | 3.00% |
| Weather Normalization Charge Cap with SUT | | | $0.022962 |
| Weather Normalization Charge Cap without SUT | | | $0.021535 |
| Total Forecasted Balancing Therms Per 2019 Schedule SAW-WNC-4 | | | 1,718,990,692 |
| Amount allowed to recover in 2019-2020 Winter Period based on 3% WNC Rate Cap and Forecasted Balancing Therms | | | $37.018.465 |

| (1) **Balancing Charge Ratio From 2019 SAW-WNC-5** | **Balancing Charge w SUT** | **Effective Annualized Balancing Charge** |
|---|---|---|
| 72.91% | $0.102825 | $0.074970 |

**Schedule SS-WNC-2a**

**Weather Normailzation Clause**
**2018-2019 WNC Rate Cap Calculation (5 month balancing)**

| **Residential Service (RSG)** | | **Service Chg with SUT** | **Per Therm Charges as of 6/01/19 with SUT** |
|---|---|---|---|
| Service Charge | | $8.62 | |
| Distribution Charge | | | $0.368200 |
| Societal Benefits Charge (SBC) | | | $0.048753 |
| Green Programs Recovery Charge (GPRC) | | | $0.005346 |
| Margin Adjustment Charge (MAC) | | | -$0.006758 |
| Tax Adjustment Credit (TAC) | | | -$0.074183 |
| Captial Adjustment Charge (CAC) | | | |
| Service Charge | | $0.00 | |
| Distribution Charge | | | $0.000000 |
| Margin Adjustment Charge (MAC) | | | $0.000000 |
| BGSS-RSG | | | $0.349059 |
| | Subtotal | $8.62 | $0.690417 |
| (1) Effective Annualize Balancing Charge | | | $0.065839 |
| Total per therm rate | | | $0.756256 |
| Weather Normalization Charge Cap % | | | 3.00% |
| Weather Normalization Charge Cap with SUT | | | $0.022688 |
| Weather Normalization Charge Cap without SUT | | | $0.021278 |
| Total Forecasted Balancing Therms Per 2019 Schedule SAW-WNC-6 | | | 1,502,150,876 |
| Amount allowed to recover in 2019-2020 Winter Period based on 3% WNC Rate Cap and Forecasted Balancing Therms | | | $31.962.766 |

| (1) **Balancing Charge Ratio From 2019 SAW-WNC-7** | **Balancing Charge w SUT** | **Effective Annualized Balancing Charge** |
|---|---|---|
| 64.03% | $0.102825 | $0.065839 |

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY** **XXX Revised Sheet No. 45**
**Superseding**
**B.P.U.N.J. No. 16 GAS** **XXX Revised Sheet No. 45**

## WEATHER NORMALIZATION CHARGE

### CHARGE APPLICABLE TO RATE SCHEDULES RSG, GSG, LVG (Per Balancing Therm)

| | Weather Normalization Charge | Weather Normalization Charge including SUT |
|---|---|---|
| October 1, ~~2018~~ 2019 through May 31, ~~2019~~2020 | (\$0.~~009676~~004800) | (\$0.~~010317~~005118) |
| June 1, ~~2019~~ 2020 through September 30, ~~2019~~2020 | \$0.000000 | \$0.000000 |

**Weather Normalization Charge**

This charge shall be applicable to the rate schedules listed above. The weather normalization charge applied in each Winter Period shall be based on the differences between actual and normal weather during the preceding winter period. The weather normalization charge shall be determined as follows:

**I. DEFINITION OF TERMS AS USED HEREIN**

**1. Degree Days (DD)**
- the difference between 65ºF and the mean daily temperature for the day. The mean daily temperature is the simple average of the 24 hourly temperature observations for a day.

**2. Actual Calendar Month Degree Days**
- the accumulation of the actual Degree Days for each day of a calendar month.

**3. Normal Calendar Month Degree Days**
- the level of calendar month degree days to which this clause applies.

The normal calendar month Degree Days used in this clause will be the twenty-year average of the National Oceanic and Atmospheric Administration (NOAA) First Order Weather Observation Station at the Newark airport and will be updated annually in the Weather Normalization Clause (WNC) proceeding. The base level of normal degree days for the defined winter period months for the ~~2018~~2019-~~2019~~ 2020 Winter Period are set forth in the table below:

| | **Normal Degree Days** |
|---|---|
| Oct - ~~18~~19 | ~~240.16~~243.01 |
| Nov - ~~18~~19 | ~~510.58~~516.21 |
| Dec - ~~18~~19 | ~~823.87~~827.33 |
| Jan - ~~19~~20 | ~~989.26~~1,002.61 |
| Feb - ~~19~~20 | ~~836.38~~858.04 |
| Mar - ~~19~~20 | ~~685.38~~691.71 |
| Apr - ~~19~~20 | ~~350.33~~357.63 |
| May - ~~19~~20 | ~~125.95~~123.71 |

**4. Winter Period**
- shall be the eight consecutive calendar months from October of one calendar year through May of the following calendar year.

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY** **XXX Revised Sheet No. 46**
**Superseding**
**B.P.U.N.J. No. 16 GAS** **XXX Revised Sheet No. 46**

## WEATHER NORMALIZATION CHARGE
## (Continued)

**5. Degree Day Dead Band**
- shall be one-half (1/2 %) percent of the sum of the cumulative Normal Calendar Month Degree Days for the Winter Period and shall be allocated to each winter month in the same proportion as the ratio of the normal degree days for that month to the total normal degree days.

**6. Degree Day Consumption Factors**
- the use per degree day component of the gas sales equations by month used in forecasting firm gas sales for the applicable rate schedules. These factors will be updated annually in the WNC proceeding. Degree day Consumption Factors for the ~~2018~~2019 ~~2019~~ 2020 Winter Period are set forth below and presented as therms per degree day:

| | RSG-Residential | | Commercial | | | Industrial | | |
|---|---|---|---|---|---|---|---|---|
| Month | | | GSG | | LVG | GSG | | LVG |
| | Heating | Non-Heating | Heating | Non-Heating | | Heating | Non-Heating | |
| Oct.-~~18~~19 | 147,748<br>~~112,333~~ | 3,466<br>~~2,969~~ | 15,975<br>~~21,899~~ | 836<br>~~1,382~~ | 81,850<br>~~79,478~~ | 557<br>~~551~~ | -<br>~~-~~ | 6,700<br>~~6,733~~ |
| Nov.-~~18~~19 | 233,569<br>~~204,207~~ | 8,816<br>~~8,296~~ | 27,829<br>~~28,876~~ | 2,529<br>~~2,623~~ | 81,850<br>~~79,478~~ | 1,103<br>~~1,079~~ | 127<br>~~118~~ | 6,700<br>~~6,733~~ |
| Dec.-~~18~~19 | 228,514<br>~~247,265~~ | 11,406<br>~~10,926~~ | 49,065<br>~~36,712~~ | 3,510<br>~~3,518~~ | 81,850<br>~~79,478~~ | 1,393<br>~~1,372~~ | 193<br>~~185~~ | 6,700<br>~~6,733~~ |
| Jan.-~~19~~20 | 264,384<br>~~262,255~~ | 12,027<br>~~11,336~~ | 62,788<br>~~41,391~~ | 3,779<br>~~3,791~~ | 82,421<br>~~79,926~~ | 1,927<br>~~1,965~~ | 221<br>~~215~~ | 6,580<br>~~6,746~~ |
| Feb.-~~19~~20 | 270,093<br>~~272,434~~ | 11,928<br>~~11,252~~ | 54,286<br>~~45,573~~ | 3,903<br>~~3,897~~ | 82,421<br>~~79,926~~ | 1,564<br>~~1,589~~ | 230<br>~~225~~ | 6,580<br>~~6,746~~ |
| Mar.-~~19~~20 | 271,716<br>~~271,030~~ | 12,442<br>~~12,060~~ | 55,140<br>~~47,137~~ | 3,962<br>~~3,978~~ | 82,421<br>~~79,926~~ | 2,092<br>~~2,105~~ | 238<br>~~237~~ | 6,580<br>~~6,746~~ |
| Apr.-~~19~~20 | 251,638<br>~~246,404~~ | 12,764<br>~~12,334~~ | 55,446<br>~~41,131~~ | 3,984<br>~~4,066~~ | 82,421<br>~~79,926~~ | 1,358<br>~~1,338~~ | 226<br>~~212~~ | 6,580<br>~~6,746~~ |
| May-~~19~~20 | 182,090<br>~~169,357~~ | 10,707<br>~~9,897~~ | 12,789<br>~~29,934~~ | 3,864<br>~~4,128~~ | 82,421<br>~~79,926~~ | 732<br>~~733~~ | 118<br>~~173~~ | 6,580<br>~~6,746~~ |

The consumption factors established in advance of each Winter Period shall be based on the forecast number of customers by rate schedule. These factors shall be trued-up at the end of the Winter Period for which the factors apply in order to reflect the actual average number of customers by rate schedule.

**7. Margin Revenue Factor**
- the weighted average of the Distribution Charges as quoted in the individual rate schedules to which this clause applies net of applicable taxes. The weighted average shall be determined by multiplying the margin revenue component of the Distribution Charges of each rate schedule to which this clause applies by each rate schedule's percentage of total consumption of all the rate schedules to which this clause applies for the winter period and summing this result for all the rate schedules to which this clause applies. The Margin Revenue Factors shall be redetermined each time new base rates are put into effect.

Margin Revenue Factors:

| | |
|---|---|
| Rate Schedule RSG | $0.345322 |
| Rate Schedule GSG | $0.280009 |
| Rate Schedule LVG | $0.041697 |

**8. Annual Period**
- shall be the 12 consecutive months from October 1 of one calendar year through September 30 of the following calendar year.

**9. Average 13 Month Common Equity Balance**
- shall be calculated by adding the Net Gas Utility Plant in Service (Gas Plant in Service, excluding plant held for future use and excluding plant for which the Company receives recovery from clause mechanisms that provide for a return on investment outside of base rates, less Accumulated Depreciation Reserve) less Accumulated Deferred Income Taxes plus working capital associated with Materials and Supplies Inventory and Prepayments at the beginning of the Annual Period (i.e., October 1) and the month ending balances for each of the twelve months in the Annual Period divided by thirteen (13), and multiplying by 54% (the equity percentage of the Company's capital structure).

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY** **XXX Revised Sheet No. 47**
**Superseding**
**B.P.U.N.J. No. 16 GAS** **XXX Revised Sheet No. 47**

## WEATHER NORMALIZATION CHARGE (Continued)

### II. DETERMINATION OF THE WEATHER NORMALIZATION RATE

At the end of the Winter Period during the Annual Period, a calculation shall be made that determines for all months of the Winter Period the level by which margin revenues differed from what would have resulted if normal weather (as determined by reference to the Degree Day Dead Band) occurred. This calculation is made by multiplying the monthly Degree Day Consumption Factor by the difference between Normal Calendar Month Degree Days as adjusted for the Degree Day Dead Band, and Actual Calendar Month Degree Days and, in turn, multiplying the result by the Margin Revenue Factor. To the extent the Actual Calendar Month Degree Days exceeds Normal Calendar Month Degree Days as adjusted for the Degree Day Dead Band, an excess of margin revenues exist. To the extent Actual Calendar Month Degree Days were less than Normal Calendar Month Degree Days as adjusted for the Degree Day Dead Band, a deficiency of marginal revenue exists. The sum of the monthly calculations represents the total revenue excess or deficiency for the Winter Period. If, at the end of the Winter Period of the Annual Period, the degree day variation from normal weather is less than the Degree Day Dead Band, the weather normalization clause will not be in effect.

The WNC shall not operate to permit the Company to recover any portion of a margin revenue deficiency that will cause the Gas Utility to earn in excess of its allowed rate of return on common equity of 9.6% for the Annual Period; any portion which is not recovered shall not be deferred. For purposes of this section, the Gas Utility's rate of return on common equity shall be calculated by dividing the Gas Utility's regulated jurisdictional net income for the Annual Period by the Gas Utility's average 13 month common equity balance for such Annual Period. The Gas Utility's regulated jurisdictional net income shall be calculated by subtracting from total net income of the Gas Utility net income derived from clause mechanisms, currently the Green Programs Recovery Charge, that provide for a return on investment outside of base rates.

The total WNC balance at September 30 of the Annual Period shall be divided by the estimated applicable balancing therm sales from the rate schedules subject to this clause for the Annual Period over which this rate will be in effect, multiplied by a factor to adjust for increases in taxes and assessments. The product of this calculation shall be the Weather Normalization Charge. However, the Weather Normalization Charge will at no time exceed three (3%) percent of the then applicable RSG total per therm rate, including RSG-BGSS charges and ~~64.56~~72.91~~-~~% of the Balancing Charge. To the extent that the effect of this rate cap precludes the Company from fully recovering the WNC balance for the Annual Period, the unrecovered balance will be added to the WNC balance used to calculate the weather normalization rate for the next Winter Period. The Weather Normalization Charge, so calculated, will be in effect for the immediately following Annual Period.

### III. TRACKING THE OPERATION OF THE WEATHER NORMALIZATION CLAUSE

The revenues billed, or credits applied, net of taxes and assessments, through the application of the Weather Normalization Charge shall be accumulated for each month of the Winter Period when this charge is in effect and applied against the margin revenue excess or deficiency from the immediately preceding Winter Period and any cumulative balances remaining from prior Winter Periods.

The annual filing for the adjustment to the weather normalization charge will be filed by July 1 of each year.

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY** **XXX Revised Sheet No. 45**
**Superseding**
**B.P.U.N.J. No. 16 GAS** **XXX Revised Sheet No. 45**

## WEATHER NORMALIZATION CHARGE

### CHARGE APPLICABLE TO RATE SCHEDULES RSG, GSG, LVG (Per Balancing Therm)

| | Weather Normalization Charge | Weather Normalization Charge including SUT |
|---|---|---|
| October 1, 2019 through May 31, 2020 | ($0.004800) | ($0.005118) |
| June 1, 2020 through September 30, 2020 | $0.000000 | $0.000000 |

**Weather Normalization Charge**

This charge shall be applicable to the rate schedules listed above. The weather normalization charge applied in each Winter Period shall be based on the differences between actual and normal weather during the preceding winter period. The weather normalization charge shall be determined as follows:

**I. DEFINITION OF TERMS AS USED HEREIN**

**1. Degree Days (DD)**
- the difference between 65°F and the mean daily temperature for the day. The mean daily temperature is the simple average of the 24 hourly temperature observations for a day.

**2. Actual Calendar Month Degree Days**
- the accumulation of the actual Degree Days for each day of a calendar month.

**3. Normal Calendar Month Degree Days**
- the level of calendar month degree days to which this clause applies.

The normal calendar month Degree Days used in this clause will be the twenty-year average of the National Oceanic and Atmospheric Administration (NOAA) First Order Weather Observation Station at the Newark airport and will be updated annually in the Weather Normalization Clause (WNC) proceeding. The base level of normal degree days for the defined winter period months for the 2019-2020 Winter Period are set forth in the table below:

| | Normal Degree Days |
|---|---|
| Oct - 19 | 243.01 |
| Nov - 19 | 516.21 |
| Dec - 19 | 827.33 |
| Jan - 20 | 1,002.61 |
| Feb - 20 | 858.04 |
| Mar - 20 | 691.71 |
| Apr - 20 | 357.63 |
| May - 20 | 123.71 |

**4. Winter Period**
- shall be the eight consecutive calendar months from October of one calendar year through May of the following calendar year.

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY** **XXX Revised Sheet No. 46**
**Superseding**
**B.P.U.N.J. No. 16 GAS** **XXX Revised Sheet No. 46**

## WEATHER NORMALIZATION CHARGE (Continued)

**5. Degree Day Dead Band**
- shall be one-half (1/2 %) percent of the sum of the cumulative Normal Calendar Month Degree Days for the Winter Period and shall be allocated to each winter month in the same proportion as the ratio of the normal degree days for that month to the total normal degree days.

**6. Degree Day Consumption Factors**
- the use per degree day component of the gas sales equations by month used in forecasting firm gas sales for the applicable rate schedules. These factors will be updated annually in the WNC proceeding. Degree day Consumption Factors for the 2019-2020 Winter Period are set forth below and presented as therms per degree day:

| | RSG-Residential | | Commercial | | | Industrial | | |
|---|---|---|---|---|---|---|---|---|
| Month | | | GSG | | LVG | GSG | | LVG |
| | Heating | Non-Heating | Heating | Non-Heating | | Heating | Non-Heating | |
| Oct.-19 | 147,748 | 3,466 | 15,975 | 836 | 81,850 | 557 | - | 6,700 |
| Nov.-19 | 233,569 | 8,816 | 27,829 | 2,529 | 81,850 | 1,103 | 127 | 6,700 |
| Dec.-19 | 228,514 | 11,406 | 49,065 | 3,510 | 81,850 | 1,393 | 193 | 6,700 |
| Jan.-20 | 264,384 | 12,027 | 62,788 | 3,779 | 82,421 | 1,927 | 221 | 6,580 |
| Feb.-20 | 270,093 | 11,928 | 54,286 | 3,903 | 82,421 | 1,564 | 230 | 6,580 |
| Mar.-20 | 271,716 | 12,442 | 55,140 | 3,962 | 82,421 | 2,092 | 238 | 6,580 |
| Apr.-20 | 251,638 | 12,764 | 55,446 | 3,984 | 82,421 | 1,358 | 226 | 6,580 |
| May-20 | 182,090 | 10,707 | 12,789 | 3,864 | 82,421 | 732 | 118 | 6,580 |

The consumption factors established in advance of each Winter Period shall be based on the forecast number of customers by rate schedule. These factors shall be trued-up at the end of the Winter Period for which the factors apply in order to reflect the actual average number of customers by rate schedule.

**7. Margin Revenue Factor**
- the weighted average of the Distribution Charges as quoted in the individual rate schedules to which this clause applies net of applicable taxes. The weighted average shall be determined by multiplying the margin revenue component of the Distribution Charges of each rate schedule to which this clause applies by each rate schedule's percentage of total consumption of all the rate schedules to which this clause applies for the winter period and summing this result for all the rate schedules to which this clause applies. The Margin Revenue Factors shall be redetermined each time new base rates are put into effect.

Margin Revenue Factors:

| | |
|---|---|
| Rate Schedule RSG | $0.345322 |
| Rate Schedule GSG | $0.280009 |
| Rate Schedule LVG | $0.041697 |

**8. Annual Period**
- shall be the 12 consecutive months from October 1 of one calendar year through September 30 of the following calendar year.

**9. Average 13 Month Common Equity Balance**
- shall be calculated by adding the Net Gas Utility Plant in Service (Gas Plant in Service, excluding plant held for future use and excluding plant for which the Company receives recovery from clause mechanisms that provide for a return on investment outside of base rates, less Accumulated Depreciation Reserve) less Accumulated Deferred Income Taxes plus working capital associated with Materials and Supplies Inventory and Prepayments at the beginning of the Annual Period (i.e., October 1) and the month ending balances for each of the twelve months in the Annual Period divided by thirteen (13), and multiplying by 54% (the equity percentage of the Company's capital structure).

**PUBLIC SERVICE ELECTRIC AND GAS COMPANY** **XXX Revised Sheet No. 47**
**Superseding**
**B.P.U.N.J. No. 16 GAS** **XXX Revised Sheet No. 47**

## WEATHER NORMALIZATION CHARGE (Continued)

### II. DETERMINATION OF THE WEATHER NORMALIZATION RATE

At the end of the Winter Period during the Annual Period, a calculation shall be made that determines for all months of the Winter Period the level by which margin revenues differed from what would have resulted if normal weather (as determined by reference to the Degree Day Dead Band) occurred. This calculation is made by multiplying the monthly Degree Day Consumption Factor by the difference between Normal Calendar Month Degree Days as adjusted for the Degree Day Dead Band, and Actual Calendar Month Degree Days and, in turn, multiplying the result by the Margin Revenue Factor. To the extent the Actual Calendar Month Degree Days exceeds Normal Calendar Month Degree Days as adjusted for the Degree Day Dead Band, an excess of margin revenues exist. To the extent Actual Calendar Month Degree Days were less than Normal Calendar Month Degree Days as adjusted for the Degree Day Dead Band, a deficiency of marginal revenue exists. The sum of the monthly calculations represents the total revenue excess or deficiency for the Winter Period. If, at the end of the Winter Period of the Annual Period, the degree day variation from normal weather is less than the Degree Day Dead Band, the weather normalization clause will not be in effect.

The WNC shall not operate to permit the Company to recover any portion of a margin revenue deficiency that will cause the Gas Utility to earn in excess of its allowed rate of return on common equity of 9.6% for the Annual Period; any portion which is not recovered shall not be deferred. For purposes of this section, the Gas Utility's rate of return on common equity shall be calculated by dividing the Gas Utility's regulated jurisdictional net income for the Annual Period by the Gas Utility's average 13 month common equity balance for such Annual Period. The Gas Utility's regulated jurisdictional net income shall be calculated by subtracting from total net income of the Gas Utility net income derived from clause mechanisms, currently the Green Programs Recovery Charge, that provide for a return on investment outside of base rates.

The total WNC balance at September 30 of the Annual Period shall be divided by the estimated applicable balancing therm sales from the rate schedules subject to this clause for the Annual Period over which this rate will be in effect, multiplied by a factor to adjust for increases in taxes and assessments. The product of this calculation shall be the Weather Normalization Charge. However, the Weather Normalization Charge will at no time exceed three (3%) percent of the then applicable RSG total per therm rate, including RSG-BGSS charges and 72.91% of the Balancing Charge. To the extent that the effect of this rate cap precludes the Company from fully recovering the WNC balance for the Annual Period, the unrecovered balance will be added to the WNC balance used to calculate the weather normalization rate for the next Winter Period. The Weather Normalization Charge, so calculated, will be in effect for the immediately following Annual Period.

### III. TRACKING THE OPERATION OF THE WEATHER NORMALIZATION CLAUSE

The revenues billed, or credits applied, net of taxes and assessments, through the application of the Weather Normalization Charge shall be accumulated for each month of the Winter Period when this charge is in effect and applied against the margin revenue excess or deficiency from the immediately preceding Winter Period and any cumulative balances remaining from prior Winter Periods.

The annual filing for the adjustment to the weather normalization charge will be filed by July 1 of each year.

# TYPICAL RESIDENTIAL GAS BILL IMPACTS

The effect of the proposed changes in the Weather Normalization Charge (WNC) on typical residential gas bills, if approved by the Board, is illustrated below:

| Residential Gas Service | | | | | |
|---|---|---|---|---|---|
| If Your Monthly Winter Therm Use Is: | And Your Annual Therm Use Is: | Then Your Present Annual Bill (1) Would Be: | And Your Proposed Annual Bill (2) Would Be: | Your Annual Bill Change Would Be: | And Your Percent Change Would Be: |
| 25 | 170 | $229.77 | $228.50 | ($1.27) | (0.55)% |
| 50 | 340 | 356.00 | 353.52 | (2.48) | (0.70) |
| 100 | 610 | 566.34 | 560.46 | (5.88) | (1.04) |
| 159 | 1,000 | 861.59 | 851.71 | (9.88) | (1.15) |
| 172 | 1,040 | 893.03 | 882.95 | (10.08) | (1.13) |
| 200 | 1,210 | 1,021.76 | 1,010.11 | (11.65) | (1.14) |
| 300 | 1,816 | 1,481.74 | 1,464.25 | (17.49) | (1.18) |

(1) Based upon Delivery Rates and Basic Gas Supply Service (BGSS-RSG) charges in effect June 1, 2019 (with WNC set at the rate that was in effect for the 2018-2019 Annual Period) and assumes that the customer receives commodity service from Public Service.
(2) Same as (1) except includes the proposed Weather Normalization Charge proposed to be in effect for the 2019-2020 Annual Period.

| Residential Gas Service | | | | | |
|---|---|---|---|---|---|
| If Your Annual Therm Use Is: | And Your Monthly Winter Therm Use Is: | Then Your Present Monthly Winter Bill (3) Would Be: | And Your Proposed Monthly Winter Bill (4) Would Be: | Your Monthly Winter Bill Change Would Be: | And Your Percent Change Would Be: |
| 170 | 25 | $27.93 | $27.65 | ($0.28) | (1.00)% |
| 340 | 50 | 47.21 | 46.66 | (0.55) | (1.17) |
| 610 | 100 | 87.05 | 85.77 | (1.28) | (1.47) |
| 1,040 | 172 | 143.56 | 141.35 | (2.21) | (1.54) |
| 1,210 | 200 | 165.48 | 162.92 | (2.56) | (1.55) |
| 1,816 | 300 | 243.92 | 240.08 | (3.84) | (1.57) |

(3) Based upon Delivery Rates and Basic Gas Supply Service (BGSS-RSG) charges in effect June 1, 2019 (with WNC set at the rate that was in effect for the 2018-2019 Annual Period) and assumes that the customer receives commodity service from Public Service.
(4) Same as (3) except includes proposed Weather Normalization Charge proposed to be in effect for the 2019-2020 Annual Period.