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Application of Southern California Gas Company (U 904 G) and San Diego Gas & Electric Company (U 902 G) for Authority to Revise their Natural Gas Rates Effective January 1, 2017 in this Triennial Cost Allocation Proceeding Phase 2

A.15-07-____
(Filed July 8, 2015)

PREPARED DIRECT TESTIMONY OF

GREGORY TEPLOW

SOUTHERN CALIFORNIA GAS COMPANY

AND

SAN DIEGO GAS & ELECTRIC COMPANY

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

July 8, 2015

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PREPARED DIRECT TESTIMONY

OF GREGORY TEPLOW

I. PURPOSE

The purpose of my prepared direct testimony on behalf of Southern California Gas Company (SoCalGas) and San Diego Gas & Electric Company (SDG&E) is to: (1) present the weather design used in the forecasts of the weather-sensitive market segments, and (2) present the average temperature year, cold temperature year, peak day, and peak month gas demand forecasts for the Triennial Cost Allocation Proceeding (TCAP) period, years 2017 through 2019, for SoCalGas and SDG&E's residential market.

II. SOCALGAS WEATHER DESIGN

A. Introduction

This section discusses the temperature assumptions that underlie forecasts for gas demand for the weather-sensitive market segments of SoCalGas and presents the temperature design values for average year and cold year weather. This section also discusses the temperature design values used to forecast peak day gas demand for temperature-sensitive market segments.

B. SoCalGas Average Year and Cold Year Weather Design

The gas demand forecasts are prepared for two temperature designs—average and cold—to quantify changes in space heating demand due to weather. Temperature variations can cause significant changes in winter gas demand due to space heating, principally in the residential and commercial markets. SoCalGas uses the concept of a Heating-Degree-Day (HDD)[1] to measure

[1] For SoCalGas, daily values of system-wide average temperatures are calculated from a six-zone temperature monitoring procedure. From this daily system average temperature data, a corresponding daily value of Heating Degrees (HD) is computed from the formula, HD = max{0, 65-T}, where T is the daily system average temperature. For each calendar month, the accumulated number of HD is

the coldness of a month or year as a variable that correlates with the increased natural gas consumption typical in winter months. One HDD is accumulated, daily, for each degree that the daily average temperature is below 65 degrees Fahrenheit (°F). The largest demand increases due to lower temperatures generally occur in the month of December. Historical annual HDD are used to determine specific values of annual HDD to define Average Year and Cold Year temperature conditions. The Average Year HDD value used in this TCAP is the simple average of the calendar-year HDD totals for the 20-year period from 1995 through 2014, or 1,351 HDD. The Cold Year HDD design temperature conditions are based on a criterion that this particular HDD value would be exceeded with a one-chance-in-35 annual likelihood. Based on this criterion, the Cold Year HDD value is calculated as 2.025 standard deviations more than the Average Year HDD total. Because SoCalGas' service area experienced unprecedented warm weather during 2014, the standard deviation estimate for HDD based on the 20-year period 1995-2014 would have been excessively large. This historic warm year then would have caused an increased Cold Year HDD value through the resulting higher standard deviation estimate because outliers have much higher impacts on standard deviation estimates compared to the simple averages. Because the data shows that this particular period of warm weather does not indicate an increased likelihood of extreme cold weather, the standard deviation has been estimated based on the 20-year period 1994-2013.[2] The resulting Cold Year HDD value is 1,644 HDD. Resulting monthly rounded HDD values are shown in Table 1.[3]

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determined, upon which an annual total is calculated. Accumulated values of HD for a specified number of days (>1) are called Heating-Degree-Days (HDD).

[2] The standard deviation for SoCalGas' annual HDD data for the 20-year period 1994 through 2013 is 144.77 HDD.

[3] The monthly values for Average Year HDD were calculated as the simple average of the respective month's 20 years of observed monthly HDD. The monthly values for the Cold Year HDD were calculated by multiplying a proportion for each calendar month times the Cold Year HDD annual value.

Table 1
SoCalGas Heating Degree Days Weather Design

Month	Cold Year 1-in-35 design	Average Year 1-in-2 design[4]
January	331.6	272.5
February	286.6	235.5
March	219.6	180.5
April	156.5	128.6
May	57.1	47.0
June	15.9	13.1
July	2.6	2.1
August	2.3	1.9
September	5.2	4.3
October	45.0	37.0
November	167.7	137.8
December	353.9	290.8
	1,644	1,351

C. SoCalGas Peak Day Temperature Designs

SoCalGas plans and designs its system to provide continuous service to its core (retail and wholesale) customers under an extreme peak day event.[5] The extreme peak day design criteria are defined as a 1-in-35 annual event; this corresponds to a system average temperature of 40.0°F, or 25.0 HD, on a peak day. Although the gas demand for most of our noncore retail markets is not HDD-sensitive, the noncore commercial segment does exhibit a small but statistically significant HDD load sensitivity. For such SoCalGas noncore markets, we use a less

The proportion for each calendar month is simply that month's HDD total relative to the annual HDD total based on the Average Year data.

[4] SoCalGas also refers to the Average Year HDD data (monthly or annual) as a "1-in-2" design because the average or expected value has the characteristic that there is a 50% (*i.e.*, 1-in-2) chance of observing a larger value.

[5] The temperature SoCalGas uses to define a peak day is determined from analysis of annual minimums of SoCalGas' daily system-average temperatures in order to estimate a probability model for the annual minimum daily temperature. The extreme peak day temperature value is determined from a calculation using this estimated model such that the chance we would observe a lower value than this extreme peak day temperature is 1/35 or about 2.86%.

extreme, but more frequent, 1-in-10 annual likelihood peak day temperature of 41.8°F, or 23.2 HD.

III. SOCALGAS RESDENTIAL GAS DEMAND FORECASTS (2017 – 2019)

A. Introduction

SoCalGas is the principal distributor of natural gas in Southern California, providing retail and wholesale customers with procurement, transportation, and storage services. Among SoCalGas' customer groups, residential customers comprise the greatest number of customers and, within the core market, the bulk of demand for natural gas. The forecast of natural gas demand for these residential customers follows.

B. SoCalGas Forecasted Residential Customer Growth

Active residential meters averaged 5.4 million in 2014, an increase of about 0.61% from the 2013 average. SoCalGas uses econometric and statistical techniques to develop forecasts of residential meter counts. Based on the prepared direct testimony of Ms. Payan, during the TCAP period of 2017 through 2019, SoCalGas' active residential customer base is expected to grow at an average annual rate of 1.04%, reaching nearly 5.7 million active meters by 2019, as shown in Table 2. A small sector of the residential class, master meters (including sub-metered customers), is forecasted to decline at a steady 0.5% annual rate.[6]

Table 2

SoCalGas Active Residential Meters (annual averages)

	2017	2018	2019	3-Year Avg. 2017-2019
Residential	5,558,410	5,617,329	5,677,687	5,617,809

[6] This decline reflects the fact that no new master meters are being installed in SoCalGas' service territory. All units in new multi-family construction or conversions are now required to have individual meters.

C. SoCalGas Forecasted Annual Residential Gas Demand

Residential gas demand adjusted for temperature decreased to 249,509 Mdth in 2014 from 257,597 Mdth in 2013. Over the TCAP period, SoCalGas expects a slight reduction in gas demand for residential customers. Temperature-adjusted residential demand is projected to decline from 244,825 Mdth in 2017 to 242,115 Mdth in 2019, a decrease of about 2,710 Mdth or 0.55% per year. This forecast reflects the demand reductions from SoCalGas' Advanced Metering Initiative (AMI) described in Commission Decision (D.) 10-04-027, as well as the energy efficiency programs described in D.09-09-047. Table 3 provides the annual throughput forecasts for the residential market using the HDD conditions discussed in Section II.

Table 3

SoCalGas Residential Throughput (Mdth) Average and 1-in-35 Cold Temperature Year

		2017	2018	2019	3-Year Avg. 2017-2019
Residential	Average Temp Year	244,825	243,608	242,115	243,516
	1-in-35 Cold Temp Year	269,689	268,736	267,515	268,647

D. SoCalGas Residential Peak Day and Peak Month Demand

As discussed in Section II, the extreme peak day design criterion, which is defined as a 1-in-35 annual event, corresponds to a system average temperature of 40.0°F. For peak month planning, December demand is used because December has generally been the coldest month in SoCalGas' service territory based on more than 20 years of weather records. Tables 4 and 5 below show the forecasted residential peak day demand and cold design-temperature-year peak month demand.

Table 4

1-in-35 Annual Likelihood (40.0°F System Avg. Temperature)
Peak Day Demand in Mdth/day

	2017	2018	2019	3-Year Avg. 2017-2019
Residential	2,430	2,428	2,424	2,427

Table 5

Cold Design Temperature Year: Peak Month Demand (Mdth)

	2017	2018	2019	3-Year Avg. 2017-2019
Residential	40,407	40,264	40,081	40,250

IV. SDG&E WEATHER DESIGN

A. Introduction

This section discusses the temperature assumptions that underlie forecasts for gas demand for the core market segments of SDG&E and presents the temperature design values for average year and cold year weather. This section also discusses the temperature design values that are used to forecast peak day gas demand for temperature-sensitive market segments.

B. SDG&E's Average Year and Cold Year Weather Design

As with SoCalGas, core demand forecasts for SDG&E are prepared for two temperature designs —average and cold—to quantify changes in space heating demand due to weather. The largest demand variations due to temperature generally occur in the month of December. HDD for SDG&E are defined similarly as for SoCalGas but use a daily system-average temperature calculated from a weighted-average of three weather station locations in SDG&E's service territory. The Average Year total is the simple average of the annual (calendar year) HDD totals for the 20-year period from 1995 through 2014 and yields a value of 1,303 HDD. The Cold Year HDD total is based on a criterion that this particular HDD value would be exceeded with a one-

chance-in-35 annual likelihood. The Cold Year HDD value is approximately 2.025 standard deviations[7] *more* than the average year HDD value. As with SoCalGas, the period 1994-2013 was used to calculate the standard deviation of HDD. The resulting Cold Year HDD for SDG&E's service area is 1,615 HDD.

Assumed monthly HDD values[8] are shown in Table 6.

Table 6
SDG&E Heating Degree Days Weather Design

	Cold Year	Average Year
Month	1-in-35 design	1-in-2 design
January	320.7	258.7
February	283.6	228.8
March	233.8	188.6
April	166.0	133.9
May	67.2	54.2
June	17.0	13.7
July	1.0	0.8
August	0.1	0.1
September	1.4	1.1
October	35.2	28.4
November	153.7	124.0
December	335.4	270.6
	1,615	1,303

C. SDG&E's Peak Day Temperature Designs

SDG&E plans and designs its system to provide continuous service to its core customers under an extreme peak day event.[9] The extreme peak day design criterion is defined as a 1-in-35

[7] The standard deviation for SDG&E's annual HDD data for the 20-year period 1994 through 2013 is 153.92 HDD.

[8] The monthly values for Average Year HDD were calculated as the simple average of the respective month's 20 years of observed monthly HDD. The monthly values for the Cold Year HDD were calculated from multiplying a proportion for each calendar month times the Cold Year HDD annual value. The proportion for each calendar month is simply that month's HDD total relative to the annual HDD total based on the Average Year data.

[9] The temperature SDG&E uses to define a peak day is determined from our analysis of annual minimums of SDG&E's daily system-average temperatures in order to estimate a probability model for the annual minimum daily temperature. The extreme peak day temperature value is determined from a calculation using this estimated model such that the chance we would observe a lower value than this extreme peak day temperature is 1/35 or about 2.86%.

annual event; this corresponds to a system average temperature of 42.7°F Fahrenheit or 22.3 HD on a peak day.

V. SDG&E RESDENTIAL GAS DEMAND FORECASTS (2017 – 2019)

A. Introduction

SDG&E is a combined gas and electric distribution utility serving the population of San Diego and the southern portions of Orange County. For SDG&E, residential customers comprise the greatest number of customers and, within the core market, the bulk of demand for natural gas. The forecast of natural gas demand for these residential customers follows.

B. SGD&E Forecasted Residential Customer Growth

Active residential meters averaged 835,753 in 2014, an increase of about 0.52% from the 2013 average. Forecasts of residential meter counts for SDG&E are developed using the same econometric and statistical techniques described earlier for SoCalGas. Based on the prepared direct testimony of Ms. Payan, during the TCAP period, SDG&E's active residential customer base is expected to grow at an average annual rate of 1.51%, reaching nearly 898,000 active meters by 2019, as shown in Table 7.

Table 7

SDG&E Active Residential Meters (Annual Averages)

	2017	2018	2019	3-Year Avg. 2017-2019
Residential	871,364	884,559	897,948	884,624

C. SDG&E Forecasted Annual Residential Gas Demand

Residential gas demand adjusted for temperature decreased to 31,797 Mdth in 2014 from 33,302 Mdth in 2013. Over the TCAP period, SDG&E expects slight growth in gas demand for residential customers. Temperature-adjusted residential demand is projected to grow from 31,912 Mdth in 2017 to 32,069 Mdth in 2019, an increase of about 156 Mdth or 0.24% per year. This

forecast reflects the demand reductions from SDG&E's AMI described in D.10-04-027, as well as the energy efficiency programs described in D.09-09-047. Table 8 provides the annual throughput forecasts for the residential market using the HDD conditions discussed in Section IV.

Table 8

SDG&E Residential Throughput (Mdth) Average and 1-in-35 Cold Temperature Year

		2017	2018	2019	3-Year Avg. 2017-2019
Residential	Average Temp Year	31,912	32,014	32,069	31,998
	1-in-35 Cold Temp Year	35,283	35,435	35,542	35,420

D. SDG&E's Retail Peak Day and Peak Month Demand

As discussed in Section IV, the extreme peak day design criteria, which is defined as a 1-in-35 annual event, corresponds to a system average temperature of 42.7°F. For peak month planning, December demand is used, since December has generally been the coldest month in SDG&E's service territory based on more than 20 years of weather records. Tables 9 and 10 below show the forecasted retail core peak day demand and cold design-temperature-year peak month demand.

Table 9

1-in-35 Annual Likelihood (42.7°F System Avg. Temperature) Peak Day Demand in Mdth/day

	2017	2018	2019	3-Year Avg. 2017-2019
Residential	289	291	293	291

Table 10

Cold Design Temperature Year: Peak Month Demand (Mdth)

	2017	2018	2019	3-Year Avg. 2017-2019
Residential	5,133	5,155	5,171	5,153

This concludes my prepared direct testimony.

VI. QUALIFICATIONS

My name is Gregory Teplow. My business address is 555 West Fifth Street, Los Angeles, California, 90013-1011. I am employed by SoCalGas as a Senior Business Analyst. I am responsible for the preparation of natural gas demand forecasts for the residential markets of both SoCalGas and SDG&E. I have been in this position since May 2014.

I received a Bachelor's degree in Economics from Pomona College and a Master's Degree in Economics from the University of Washington. My employment outside of SoCalGas has been focused on data analysis. I worked for Countrywide Financial as an analyst examining employee compensation structures. I also worked as actuarial technician for Unitrin Specialty Lines Insurance (now Kemper Specialty) analyzing loss and severity data for the company's personal automobile insurance customers.