**QUESTION 4.1:**

The following questions are addressed to the Direct Testimony of Jeff Huang:

Regarding the statement at page 3: “In this forecast, energy storage resources consistent with the Commission’s Storage Decision (D.) 13-10-040 were added in the SDG&E and SCE service area. Installed storage capacity data is based on the mid scenario from the Commission’s 2014 Long Term Procurement Plan Standard Planning Assumptions. This forecast includes a statewide installed capacity of 190 MW by 2017 and is increased to 390 MW by 2019.”

4.1.1. How much energy storage capacity is assumed to be added to SCE’s service area during each year of the TCAP period?

4.1.2. How much energy storage capacity is assumed to be added to SDG&E’s service area during each year of the TCAP period?

4.1.3. Is any energy storage capacity assumed to be added to SCE’s service area prior to the TCAP period? If so, please state how much.

4.1.4. Is any energy storage capacity assumed to be added to SDG&E’s service area prior to the TCAP period? If so, please state how much.

4.1.5. If the energy storage resources are used in the simulation to provide capacity, please state percentage of useable storage capacity that is assumed referring to the cumulative level of storage capacity identified in the responses to Q.3.1.1-Q.3.1.4 for each year of the TCAP period. (In other words, since storage is drained over the course of its use, does SoCalGas count the storage capacity at 100% of the maximum capability?)

4.1.6. If the energy storage resources are used in the simulation to provide energy, state the amount of energy assumed to be provided by storage and state the percentage load factor assumed each year referring to the percentage of useable cumulative storage capacity identified in the responses to Q.3.1.1-Q.3.1.4 for each year of the TCAP period.

4.1.7. If the energy storage resources are used in the simulation to provide ancillary services, please describe the ancillary services that SoCalGas assumes is provided by storage and state the amount of those ancillary services provided by storage for each year.

**RESPONSE 4.1.1 and 4.1.2:**

The annual newenergy storage capacity in megawatts (MW) for SCE and SDG&E service areas are shown in the following table.

|  |  |  |
| --- | --- | --- |
| Year | SCE (MW) | SDG&E (MW) |
| 2017 | 50 | 50 |
| 2018 | 100 | 50 |
| 2019 | 150 | 50 |

**RESPONSE 4.1.3:**

No.

**RESPONSE 4.1.4:**

Yes. The 40-MW Lake Hodges Pumped Storage Project was completed in year 2012. It is not included in the quantities shown in Response 4.1.1.

**RESPONSE 4.1.5:**

Each energy storage resource is modeled similar to a 50-MW pump storage project with 80% cycle efficiency. For example, for this resource to generate 50-MWh energy, the system must provide 62.5-MWh energy to charge it. When it is fully charged, it can provide energy at maximum capacity for up to 4 hours continuously or in hourly increment. It has the flexibility to operate at lower capacity for longer period of time. The operation of the energy storage resource is based on the economic dispatch within the model run.

**RESPONSE 4.1.6:**

See Response 4.1.5.

**RESPONSE 4.1.7:**

No ancillary services for energy storage resources were modeled.

**QUESTION 4.2:**

What is the GHG price forecast for each year of the TCAP forecast?

**RESPONSE 4.2:**

**GHG Compliance Costs**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | *2017* | *2018* | | *2019* |
| Nominal $/ Short Ton of CO2 | 13.61 | | 14.14 | 14.64 |

**QUESTION 4.3:**

Please provide forecasted large EG usage (combined UEG, EWG, large cogen) for each day of the TCAP forecast period separately for SoCalGas and SDG&E.

**RESPONSE 4.3:**

No such forecast is available; development of our TCAP proposals requires an annual forecast, but not a daily forecast.

**QUESTION 4.4:**

How did SoCalGas determine which day was the “coincidental peak day of the combined SoCalGas and SDG&E system from the production cost model run for the month of December”?

**RESPONSE 4.4:**

Coincidental peak day is the December day with the highest expected combined daily gas throughput of SDG&E UEG/EWG, SoCalGas UEG/EWG, and SoCalGas Large Cogen. December was selected since this is the month that the core customer gas demand is likely to peak.

**QUESTION 4.5:**

The following questions are addressed to the Direct Testimony of Bruce Wetzel:

With respect to Table 1 on page 2, please provide the recorded meter counts for each customer class shown for the years 2010-2014.

**RESPONSE 4.5:**

**BMW Table 1 Format**

**SoCalGas Active Meters (annual averages)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  |  | **2010** | **2011** | **2012** | **2013** | **2014** |
| **Core** | |  |  |  |  |  | |
|  | **Total Core** | 5,516,114 | 5,548,639 | 5,575,834 | 5,605,597 | 5,638,148 | |
| **Noncore** | |  |  |  |  |  | |
|  | Noncore C&I | 637 | 629 | 633 | 618 | 606 | |
|  | Electric Generation | 197 | 233 | 255 | 281 | 282 | |
|  | EOR 1/ | 31 | 32 | 34 | 34 | 33 | |
|  | **Total Retail Noncore** | 865 | 894 | 922 | 933 | 921 | |
| **Wholesale and International** | | 5 | 5 | 5 | 5 | 5 | |
| **System Total Active Meters** | | 5,516,984 | 5,549,538 | 5,576,761 | 5,606,535 | 5,639,074 | |

Notes:

1/ The EOR customer count of 33 for year 2014 is a corrected value from the value (29) that is reported in our gas demand forecast (Testimony & Work Papers); a mistake was found in referencing the source used for the EOR customer count data reported per the original filing July 2015.

**QUESTION 4.6:**

With respect to the statement at pages 70-71 of Wetzel Workpapers: “Energy savings goals that were authorized by the CPUC in decision D.04-09-060 and expected load leaving for service by the City of Vernon were subtracted from the model forecast to arrive at final demand forecast for the commercial and industrial markets.”

4.6.1. Has SoCalGas measured the energy savings that have been accomplished by its programs authorized in D.04-09-060 using a control group of non-participating customers and a sample size sufficient to provide the resulting measured savings at least a 90 percent confidence interval?

4.6.2. If the answer to Q.4.6.1 is “yes,” please provide a copy of the study measuring the energy savings.

4.6.3. If the answer to Q.4.6.1 is “no,” please explain why SoCalGas has not measured the energy savings associated with these programs.

4.6.4. How much load has left each year for service by the City of Vernon during the years prior to 2015?

4.6.5. How much load is projected to leave for service by the City of Vernon during the each year of the period 2015-2019?

**RESPONSE 4.6:**

4.6.1. No. SoCalGas does not use a control group of non-participating customers and a sample size for measured energy savings. Measurement of actual energy savings is conducted by Commission staff. For more information about the how energy savings are measured and verified, refer to the CPUC Energy Efficiency Evaluation, Measurement, and Verification web site at <http://www.cpuc.ca.gov/General.aspx?id=5399>.

4.6.2. N/A.

4.6.3. SoCalGas’ measured energy savings are calculated from approved ex-ante work papers reviewed and approved by Commission staff. The method of using a control group is limited to behavior-typed energy efficiency programs, which SoCalGas does not currently offer.

4.6.4:

2012 = 168,238 therms,

2013 = 464,849 therms,

2014 = 2,361,902 therms

4.6.5:

2015-2019 = 1,426,064 therms/year

**QUESTION 4.7:**

With respect to the statement at page 71 of Wetzel Workpapers: “Based on annual data (2008 through 2014) for net movement of customers from core (G-10) to noncore (G-30) service, we expect an average of 4,582,050 Therms of accumulated load from net customer migration from core to noncore through 2020. This load would be split at 36% commercial and 64% industrial and be assumed to occur evenly throughout the year (i.e., the monthly value is 1/12 of the annual amount).”

4.7.1. Has SoCalGas observed a constant amount of customer movement from the core to the noncore during the period 2008-2014?

4.7.2. Has SoCalGas used an average of this customer movement to forecast the customer movement through 2020?

4.7.3. If the answer to the previous question is “no,” please state the equation that SoCalGas has used to extend the trend line for 2008-2014 through 2020.

4.7.4. Has the rate of movement been at all cyclical in nature either within a year’s time or between years?

4.7.5. If the answer to the previous question is “yes,” please describe how the trends have proven to be cyclical.

**RESPONSE 4.7:**

4.7.1: No, we have not observed a constant amount of load migration.

4.7.2: No.

4.7.3: SoCalGas used the EXCEL TREND function to do a calculation. The formula that was used was “=TREND(C4:C10)” where the cell array “C4:C11” refers to the column-C, row#4-#10 of the table below. The TREND function formula above calculates the value 4,582,050 Therms. The historical annual data for 2008 through 2014 show 4 years where the load is between 2.4 MMTh and 5.5 MMTh while there are three years, 2011-2013, where the load is 11.7 MMTh or greater. The year 2014 value of 4,223,679 Therms suggested that the net Core to Noncore (C2Nc) migration had returned to a level for which our calculated value of 4,582,050 Therms is a reasonable value. We used this value as our forecast.

Col A                    Col-B                 Col-C

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Year #** | **Year** | **TCAP Net C2NC (Historical Data-Therms)** |
| row#4 | 7 | 2008 | 2,396,889 |
| row#5 | 6 | 2009 | 5,473,200 |
| row#6 | 5 | 2010 | 4,706,904 |
| row#7 | 4 | 2011 | 11,766,314 |
| row#8 | 3 | 2012 | 19,548,088 |
| row#9 | 2 | 2013 | 18,018,711 |
| row#10 | 1 | 2014 | 4,223,679 |

4.7.4: No, we have not observed a cyclical rate of movement. There was a significant increase in the 2011 thru 2013 period as noted above.

4.7.5: N/A

**QUESTION 4.8:**

Regarding the price elasticity and employment elasticity figures shown on page 95 of Wetzel Workpapers:

4.8.1. Did SoCalGas derive these elasticity figures?

4.8.2. If SoCalGas derived these figures, please provide a detailed description of the study

that SoCalGas conducted.

4.8.3. If the answer to Q.4.8.1 is “no,” is SoCalGas relying upon outside studies as a basis for these figures?

4.8.4. If the answer to the previous question is “yes,” please identify the studies relied upon and provide a citation to the portion of the study providing the elasticities.

**RESPONSE 4.8:**

4.8.1. Yes, SoCalGas derived these elasticity figures.

4.8.2. Gas price elasticities used in the noncore Industrial end-use models were calculated from historical consumption data for this market segment. Statistical regression methods (Ordinary Least Squares) were used to do the estimation. For each of the industrial sectors, analyses were conducted by each relevant business type; these individual gas price elasticity estimates were then aggregated by calculating a consumption-weighted average value for noncore industrial sector.

The attached “.pdf” file provides the results for the noncore industrial (non-refinery) segment by business type:



The attached EXCEL workbook file has separate worksheet tabs that provide the summaries of the estimated gas price elasticities and the respective consumption-weighted calculations. This EXCEL workbook provides two examples for how the regressions were done:



An overall employment elasticity was used for the noncore C&I in each respective end-use model. The value used was +0.474 and was calculated from the data analysis performed for a prior SoCalGas regulatory filing (the filing was for SoCalGas’ 2005 BCAP which was initially filed, but then withdrawn).

Below is a copy of the documentation provided as work papers for the intended witness for the noncore C&I markets in SoCalGas’ 2005 BCAP. The employment elasticity value that was estimated is shown on the 20th page of this attachment file. It is the “Parameter Estimate” for the “Variable” named LEMP; the value calculated is shown there as “0.474177”



4.8.3. N/A

4.8.4. N/A

**QUESTION 4.9:**

Regarding the shares of gas and electric by end use, relative efficiency of gas vs electric, and the age of equipment shown in Wetzel Workpapers at pages 91-94:

4.9.1. Is SoCalGas assuming that equipment stock is being replaced for at least a portion of the businesses included in the forecast under Rule 38?

4.9.2. If the answer to Q4.9.1 is “yes,” please state what the assumptions are for equipment replacement noting whether equipment is assumed to trend toward increased gas penetration or decreased gas penetration and by how much.

4.9.3. With respect to the response to the previous question, are different rates assumed for each of the business types listed or does SoCalGas assume a constant rate for all business types?

4.9.4. If the answer to Q4.9.1 is “yes,” please state whether the equipment stock is assumed to increase in efficiency and by how much.

4.9.5. With respect to the response to the previous question, are different rates assumed for each of the business types listed or does SoCalGas assume a constant rate for all business types?

4.9.6. Are the answers to Q.4.9.1 through Q.4.9.5 based on SoCalGas’ actual experience with noncore Commercial & Industrial customer projects under Rule 38?

4.9.7. If the answer to the previous question is “no,” please describe exactly what information the answers to Q.4.9.1 through Q.4.9.5 are based upon.

**RESPONSE 4.9:**

4.9.1. Implicitly, the answer is yes; however, it’s important to understand that for this g-30 industrial market, the Rule-38 applicable load is subtracted from the specific end-use model load forecast. Any Rule-38 customers are considered as part of the overall aggregate of customers’ load and characteristics considered in the end-use model calculations.

4.9.2. Assumptions for the equipment replacement decision are part of the data inputs as well as the methodology used to simulate this decision. For a forecast year, the existing equipment from the prior year either remains in operation or is deemed to require replacement. For equipment to be replaced, there is a fuel choice (either natural gas or electricity) followed by an efficiency choice (going forward, only improved efficiencies are considered available). As to which fuel may be “preferred,” this is an outcome that reflects a weighing of equipment purchase cost levels against the expected lifetime operating (i.e., fuel) costs of using the equipment at an expected usage level. Therefore, the gas penetration is dependent upon relative total costs between gas/electric options for each end-use.

4.9.3. The term “rates” used in this part of the question was not used in the previous question and it is not clear what the reference to “different rates” means. If by “rates” the questioner means “rates of equipment replacement”, then the various business types have different sets of end-use equipment types, and these different equipment types have different rates for replacement of equipment that wears out at the end of its useful life. Also, for a specific end-use equipment type (e.g., a space heater or a water heater), it is possible for the rate of replacement to differ across business types. Penetration of gas equipment is dependent upon relative total costs between gas/electric options for each end-use.

4.9.4. Generally, when equipment faces its replacement decision, as long as the fuel being used is the same, it will be replaced with no lower level of efficiency than previously was assumed, therefore equipment stock efficiency improves each year. The change in efficiency that is realized is not readily determined and is embedded in the details of the specific end-use model simulation results.

4.9.5. See response to 4.9.3 above.

4.9.6. No.

4.9.7. The responses are based on our understanding of how the noncore industrial end-use model code works.