Application of SAN DIEGO GAS & ELECTRIC COMPANY (U 902 E) For Authority To Update Marginal Costs, Cost Allocation, And Electric Rate Design.

Application: 15-04-012
Exhibit No.: SDG&E-17

PREPARED REBUTAL TESTIMONY OF

LESLIE WILLOUGHBY

ON BEHALF OF SAN DIEGO GAS & ELECTRIC COMPANY

CHAPTER 7

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

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PREPARED TESTIMONY OF

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(CHAPTER 7)

I. OVERVIEW AND PURPOSE

The purpose of my rebuttal testimony is: (1) to respond to the testimony submitted by Utility Consumers Action Network ("UCAN") witness William Perea Marcus regarding San Diego Gas & Electric Company's ("SDG&E's") development of its Effective Demand Factors ("EDFs")[1] in support of the distribution revenue allocation factors presented in the rebuttal testimony of William Saxe (Chapter 5) and (2) to propose updated EDFs for use in SDG&E's rebuttal testimony. Specifically, my rebuttal testimony will address:

- The EDF methodology used in SDG&E's 2016 GRC Phase 2 direct testimony; and
- The EDF corrections and adjusted methodology proposed in SDG&E's 2016 GRC Phase 2 rebuttal testimony.

II. EDF METHODOLGY USED IN 2016 GRC PHASE 2 DIRECT TESTIMONY

Based on questions raised by Mr. Marcus about the EDFs used in SDG&E's 2016 GRC Phase 2 direct testimony,[2] SDG&E identified three issues with the EDF methodology it had used in its direct testimony that should be corrected: (1) SDG&E's original EDF methodology developed circuit and substation peaks that differed from the actual circuit and substation peaks that SDG&E's Electric Distribution Planning department had identified; (2) certain residential customers were over represented in SDG&E's original EDF methodology; and (3) SDG&E's EDF methodology relied on class peak demands instead of

[1] UCAN's July 5, 2016 testimony (at pp. 33-39) and its July 29, 2016 supplemental testimony.
[2] UCAN Supplemental Testimony of William Perea Marcus, pp. 1-4.

customer-specific, non-coincident demands. These issues are discussed in more detail below.

A. Discrepancies in Circuit and Substation Peaks

For the 2012 and 2013 EDF study (which SDG&E used for its direct testimony), all available hourly smart-meter data was used to determine the circuit and substation peaks. All customers were mapped to their respective transformer, circuit, and substation. Customers' hourly energy was then summed for each circuit and subsequently summed for each substation to identify the annual peak hours and dates. The actual circuit and substation demand peaks identified by SDG&E's Electric Distribution Planning department, however, were not used in SDG&E's determination of EDFs and thus differed from the smart-meter-generated peaks used to develop the EDFs for direct testimony.

B. Over Representation of Certain Residential Customers

All available individual-metered, 15-minute smart-meter data was utilized for both non-residential and residential customers in estimating the 2012 and 2013 EDFs. While there are no known issues with the non-residential 15-minute smart-meter data, SDG&E's Electric Load Analysis group learned that it had included more of certain groups of residential customers than it should have included in its analysis to estimate the residential contribution that is coincident with circuit and substation peaks. This resulted in an unrepresentative set of EDF factors for residential customers. In 2012 and 2013, all Net Energy Metered ("NEM") residential customers, as well as all medical baseline customers, had 15-minute smart-meter data,[3] but in 2012 and 2013, NEM and medical baseline customers comprised a very small percentage of the total residential class (i.e., less than 4%

[3] In order to prevent smart meter remote disconnects for its medical baseline customers, SDG&E implemented a smart meter program ID that included 15-minute data.

in 2012 and less than 5% in 2013). Thus, NEM and medical baseline customers were statistically "over represented" in SDG&E's residential EDFs. Instead of using all of the 100,000-plus residential meters with 15-minute data, SDG&E should have used only a stratified random sample of 8,300 15-minute smart meters.[4]

C. Class Peak Demands Versus Customer-Specific, Non-Coincident Demands

The third issue with the EDFs used in SDG&E's direct testimony involved using class peak demands for non-coincident demands instead of customer-specific, non-coincident demands, which impacted the accuracy of SDG&E's proposed EDFs. This issue was identified when reviewing the application of distribution line losses that were being applied in the EDF study for my rebuttal.

III. CORRECTIONS MADE TO EDF METHODOLGY

Each of the EDF issues that were identified by UCAN and discussed above have necessitated updates to SDG&E's EDF study and the resulting EDFs used in the development of the distribution revenue allocations addressed in the rebuttal testimony of William Saxe.[5] In UCAN's supplemental testimony, UCAN updated the EDFs based on the load research data that SDG&E had provided UCAN for the residential and Medium/Large

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[4] UCAN also argued that: "There is an inordinate amount of master-metered load in this residential class data. Somewhere between 28 and 33% of the load in SDG&E's residential class data is master-metered (depending on the year and whether circuits or substations are considered). In the real world, master metered customers are less than 2% of SDG&E's non-coincident residential demand." See UCAN's July 5 testimony at p. 36. SDG&E does not agree with UCAN's description. SDG&E has less than 3% of its residential electric customers on master meters (see, e.g., SDG&E's Report of Customers, Sales and Revenues by Rate Schedules – December 2015) and the residential sample used in the original EDF analysis did not contain master meter residential customer data.

[5] SDG&E Rebuttal Testimony of William Saxe, Chapter 5, Section IV.

Commercial and Industrial ("M/L C&I") customer classes.[6] However, UCAN's suggested EDFs should not be adopted because, as explained below, SDG&E has performed a more comprehensive and updated EDF analysis for this rebuttal.

For the EDFs used in this rebuttal, SDG&E used all available 2015 circuit and substation peak data provided by SDG&E's Electric Distribution Planning department rather than estimating the peak based on aggregated hourly customer smart-meter data. Peaks were identified by utilizing SDG&E's Supervisor Control and Data Acquisition system ("SCADA"). The peak data is comprised of fifteen one-minute reads and the highest and lowest one-minute reads are thrown out and the remaining thirteen one-minute reads are averaged to arrive at a "smoothed" 15-minute peak load. This is done to eliminate spikes and dips in the real-time data. The data is then analyzed by SDG&E's electric distribution planning engineers to determine if switching occurred in the field that produced an inaccurate peak due to the circuit operating in an abnormal condition.

The EDFs are then calculated for each circuit[7] and substation[8] by customer class. Although SDG&E utilized SCADA data to estimate its circuit and substations peaks, smart-meter data was utilized for estimating the non-residential customer contributions to those peaks. SDG&E's Electric Load Analysis group utilized validated[9] 15-minute interval data for the calendar year 2015 with the exception of lighting. All validated non-residential data

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[6] UCAN Supplemental Testimony of William Perea Marcus, pp. 2-6.

[7] Circuit: Connected underground or overhead electric distribution facilities that carry electricity from substations to customers and that each have a unique identifier.

[8] Substation: A substation is an electric equipment facility that converts power from transmission voltages to distribution voltages, or in general from higher voltages to lower voltages.

[9] 15-Minute Validation Process: Compare the net (delivered channel – received channel if net meter) sum of the non-estimated intervals to the billing record net kWh. If the absolute percent difference of the net sum of the non-estimated intervals compared with the billing net kWh is <= 5% or the absolute difference is <= 5 kWh, then a service point passes validation and is added to the validated 15-minute interval table.

was used for this study. Lighting loads were estimated and the associated residential peak loads were derived. All meters were linked with the appropriate circuits and substations using a cross-reference table developed from SDG&E's engineering data warehouse. Distribution line losses are included in the circuit substation demands; therefore those losses need to be accounted for (removed) from the delivered demand values. SDG&E's Distribution Loss Factors were applied to the peak MW demands based on the date and time of each circuit and substation peak. Those losses were then subtracted from the circuit and substation peak MWs to derive the delivered peak MWs to the meter. Table LW-1 provides a comparison of the updated EDFs for all customer classes based on 2015 data under the new methodology compared to the original EDFs used in the direct testimony, which was based on 2012 and 2013 data. SDG&E updated the study year to 2015 because it is more recent and therefore more reflective of its system conditions. The next sections will specifically address the process that was used to obtain EDFs for each class.

TABLE LW-1:

Class	Substation EDF Ratios		Circuit EDF Ratios	
	Original 2012 and 2013 (Direct)	Updated 2015 (Rebuttal)	Original 2012 and 2013 (Direct)	Updated 2015 (Rebuttal)
Residential	52.16%	**28.24%**	54.96%	**35.93%**
SmlCom	61.65%	**44.69%**	65.14%	**44.32%**
M/L C&I	64.81%	**68.41%**	72.06%	**72.35%**
Agriculture	35.87%	**29.58%**	35.25%	**36.72%**
Street Lighting	44.56%	**40.35%**	29.15%	**45.76%**

A. Small Commercial, M/L C&I and Agricultural Customers

This section describes how EDFs were calculated for the Small Commercial, M/L C&I and Agricultural classes.

1) The date and time of each circuit's peak was obtained from SDG&E's Electric Distribution Planning department.

2) The contribution to circuit peak and non-coincident peak demands for each small commercial, M/L C&I and agricultural customer for each circuit is calculated as follows:

   a. The customer contribution to peak demand, i.e. the 15-minute energy demanded (multiplied by four for each customer) at the date and time of each circuit's peak.

   b. The non-coincident peak demand, i.e. the customer's maximum 15-minute annual kilowatt demand (multiplied by four).

3) Given that smart meter interval data is not 100% complete[10] for all non-residential customers for inclusion in the EDF study, each of the circuits must have at least 75% of the non-residential smart meter net energy[11] by rate group.[12] Approximately 97% of the non-residential smart meter data was used in the EDF analysis.

4) The calculation of the EDF is the ratio of the sum of customer demand contribution at the time of circuit peak to the sum of the annual non-coincident peak demand by customer class for the circuit.

5) This process was repeated at the substation level to obtain substation-level EDFs for each class. Like the circuit-level analysis, SCADA data for SDG&E's substations

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[10] Not all smart-meter data passes the Electric Load Analysis group's data validation, which is why the 75% net energy criteria is being applied.

[11] The application of this criteria resulted in approximately 2% of SDG&E"s non-residential load being excluded from the EDF calculations. An additional 1% of non-residential data was "missing" or not available.

[12] A "rate group" is a group of similar rate schedules, e.g., rate schedules AD, ADCP2, AD-LE, AD-TBS02, AD-TBSPC and ADCP2-TBSPC are included in rate group "AD." Rate groups are then associated to the broader rate classes shown in my rebuttal.

was obtained from SDG&E's Electric Distribution Planning department and used to determine the date and time of the substations' peak loads.

B. Lighting Class

The majority of SDG&E's street lighting customers are not metered. The contribution to circuit and substation peaks for the lighting class was calculated based on the occurrence of circuit and substation peaks. The non-coincident peak demand was estimated to be "1" for the entire year. The EDF is then calculated using a "1" if the circuit and substation peak is at dusk or after, and a zero contribution if the circuit and substation peak is during the daylight hours. The lighting class EDF is calculated by averaging the lighting EDFs across available circuits and substations.

C. Residential Customers

Over 90% of SDG&E's residential customers do not have 15-minute smart meter data to estimate demand.[13] Therefore, SDG&E requires an alternative methodology for determining the residential contribution to circuit and substation peaks. Since most of SDG&E's residential customers have hourly interval meters, for this rebuttal testimony, SDG&E derived its residential demand contribution at the time of circuit and substation peaks and utilized its non-coincident load factors developed in its annual load studies along with the appropriate residential annual consumption.[14] The demand contribution for the residential class is calculated as the circuit and substation demands adjusted for distribution losses minus the demand contribution value of all small commercial, M/L C&I, agricultural classes.

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[13] Residential NEM, time-of-use ("TOU") and medical baseline customers have 15-minute smart data. The load research sample has approximately 8,300 with 15-minute data.

[14] The residential annual energy from the consumption table includes all customers: low income, solar, non-solar electric vehicle and medical baseline customers.

UCAN states in its opening testimony that "[s]ome of the problems may be coming from the non-real customer data (based on five year load factors) that are used when 15-minute data are not available."[15] Contrary to UCAN's assertion, load factors calculated as a result of SDG&E's load studies are not based on "non-real customer data" but on a smart-meter sample of ***real*** customers' 15-minute data. SDG&E's stratified random sample of 8,300 residential customers is more than adequate for estimating residential class peaks, contributions to system peak and individual non-coincident peak loads (all of which are used to calculate accurate load factors). Unlike hourly smart meter data, load research samples utilize 15-minute data and have been used successfully to develop rate schedule and class load factors for many years. Load research samples have been fundamental for developing utility marginal cost, cost of service and rate design studies. In fact, over the span of 8 years and across different SDG&E residential samples, the residential non-coincident load factor has been stable: 11.2% to 10.4%. SDG&E used the most recent 5-year average non-coincident load factor of 10.6% for its estimation of total residential non-coincident demand.

In UCAN's direct testimony, Mr. Marcus essentially states that if there is not enough 15-minute interval data, hourly smart-meter data could be used to calculate EDFs.[16] For this rebuttal, SDG&E conducted an additional and separate analysis using residential hourly smart-meter data to estimate residential demand at circuit and substation peak times and to calculate the non-coincident peak. SDG&E compared the results of this second approach with the results of SDG&E's updated EDF study presented in this rebuttal. This hourly approach yielded a residential EDF of 36.17% for substation compared to 28.24% derived from SDG&E's updated study, and a residential circuit EDF of 36.96% compared to 35.93%

[15] UCAN's July 5, 2016 testimony at pp. 36.
[16] Id.

derived from SDG&E's updated study. The circuit-level EDFs are very similar, whereas the substation EDFs have larger differences. SDG&E believes that UCAN's suggestion to use hourly EDFs for the residential class could be studied further for potential use in SDG&E's next GRC Phase 2 proceeding.

IV. SUMMARY AND CONCLUSION

This rebuttal testimony is in response to UCAN's testimony submitted on July 5, 2016 and July 29, 2016 regarding the development of EDFs used in SDG&E's distribution revenue allocation. In responding to data requests from UCAN, SDG&E found errors in its input data set. Corrections were made and updated EDFs are presented in this rebuttal testimony. The updated residential EDFs are calculated by subtracting all non-residential loads from the circuit and substation peaks. The updated EDFs consider the class demand contributions to circuit and substation peaks. SDG&E believes that this updated methodology accurately reflects the class demands when circuits and substation are at their peak conditions. SDG&E requests that the Commission approve the use of the updated EDFs presented in Table LW-1 in the calculation of SDG&E's proposed distribution revenue allocations, addressed in the rebuttal testimony of William Saxe.[17]

This concludes my rebuttal testimony.

[17] SDG&E Rebuttal Testimony of William Saxe, Chapter 5, Section IV.