**DATA REQUEST**

**SUBJECT: MARGINAL DISTRIBUTION DEMAND COSTS & LOAD GROWTH FORECASTS**

1. Please provide the underlying circuit and substation level load growth forecasts that were aggregated and then used in the workpaper “CH\_5\_WP#4\_Marg Dist Demand Costs\_Public” in the tabs “Marg F&LD Cost Cal” and “Marg Substation Cost Cal” to develop the cumulative load data used in the NERA regression.

**SDG&E Response:**

See excel spreadsheets “CONFIDENTIAL\_CircuitForecast\_2002\_2018.xlsx” and “CONFIDENTIAL\_SubstationForecast\_2002\_2018.xlsx”.

This response contains confidential information.

A. Please also describe how SDG&E conducted its circuit and substation level load forecasts. Provide any workpapers available underlying the circuit and substation level load forecasts. If multiple regression was used, provide the inputs and any summary statistics. Provide these forecasts at least for the last three GRCs.

**SDG&E Response:**

SDG&E’s load growth forecast begins with the most recent approved California Energy Commission (CEC) SDG&E Load Modifier Mid Baseline-Low-AAEE-AAPV CED 2017 forecast. Known new loads are deducted from the CEC system load growth forecast.[[1]](#footnote-2)[1] The resultant growth is distributed out by customer class (residential, industrial, and commercial) by their forecasted proportional annual energy consumption and is then allocated to SDG&E’s distribution feeders using geospatial analysis.

SDG&E uses the LoadSEER Geographical Information System (GIS) geo-spatial forecasting program, created by Integral Analytics. This program uses satellite imagery and proprietary data analytics to score each acre in SDG&E’s service territory for the likelihood of increased load by customer class. This GIS model also uses historical land aerial imagery to help determine expansion trends that have occurred within specific areas and takes this information into account for the acre scoring analysis. The spatial forecasting model is enhanced by utilizing an energy consumption model that is weather normalized and includes economic variables. After area scores are determined, the geospatial program then allocates the customer class load growth projections to each parcel and maps the load growth to feeders based on closest proximity. The output of the geo-spatial program is an annual SDG&E peak MW growth by feeder and by customer class for the next 10 years. This growth is then uploaded into the LoadSEER forecasting program which uses customer-class load shapes to turn the allocated customer class growth amount into a 576-hour[[2]](#footnote-3)[2] load shape that can then be applied to the feeder or bank load shape.

SDG&E uses a normalized and adversed 1 in 10-year (90th percentile of high loading) weather event forecast as the basis for making decisions regarding planned capital upgrades and permanent load transfers.

As an additional step to the forecast process, SDG&E’s electric distribution planning engineers validate and adjust historical peak loads for distribution substation transformer banks and feeders within their local areas to establish a starting point for distribution loading projections. The following guidelines for verifying and modifying historical loads are typically followed:

* Bank and feeder peak loads are obtained through either historical SCADA data, monthly recorded substation metering data, or cumulative AMI data in areas without metering. Peak demand (MW) for banks as well as maximum current loading (amps) for feeders are recorded along with peak date and time.
* SDG&E’s electric distribution planning engineers compare recorded peak load information with adjacent days’ peak load information to assess whether an unusually high or low load occurred during a planned or unplanned switching condition. Distribution Operations switching log information is reviewed to confirm the timing of the switching operations that create abnormal configurations and the feeders impacted.
* Peak loads on feeders coincident with temporary switched loads are adjusted because loading under temporary switching conditions is not relevant for forecasting normal peak loads and may lead to double-counting of loads. If a peak load is recorded after a newly executed permanent load transfer, then the previous historical loads will be automatically adjusted to maintain the present feeder configuration when analyzing historic load growth on the feeder.

Historical feeder peak loads are adjusted, if necessary, to account for the largest distributed generation facility served by a bank or feeder being offline at peak; also known as G-1 scenario planning. Multiple generators on the same feeder may be grouped into a G-1 scenario if they have a reasonable risk of all being off-line at the same time, such as hydro facilities on the same water source with multiple meters.

Separate from load growth, SDG&E has incorporated DER adoption into its distribution bank and feeder forecast assumptions. The starting point for developing these feeder level DER growth forecasts is the CEC’s California Energy Demand (CED) forecast that is completed at the system-wide level. This is normally accomplished for PV, energy efficiency, electric vehicles, energy storage, and load modifying demand response[[3]](#footnote-4)[3].

Staying consistent with the CED forecast, the system-wide incremental MW capacity by DER technology type is allocated to the feeders based on allocation methodologies specific to the DER types. Variables used to allocate incremental DER capacity geospatially include consumption by customer class, historical PV adoption by zip code, the s-curve trending model, weather zones, and many other factors specific for each type of DER.[[4]](#footnote-5)[4] Consistent with the Assigned Commissioner’s Ruling on the adoption of Distributed Energy Resources Growth Scenarios issued August 9, 2017, SDG&E’s Distribution System DER Growth Assumptions utilized 2017 IERP Mid Baseline Low AAEE.

B. Please explain whether the circuit and substation level load forecast data were weather-normalized.

**SDG&E Response:**

Yes, the circuit and substation level load forecast data are weather normalized.

C. Explain whether circuit and substation forecasted load typically were dominated by growth in particular areas (“load pockets”) on the distribution system?

**SDG&E Response:**

No, circuit and substation forecasts are not predominately dominated by “load pocket” growth. Although known load growth (“load pockets”) is factored into the circuit the load pertains to, it is not typically the dominant factor in the circuit and substation forecast.

D. Provide any capital expenditures budgets that were developed based on the circuit and substation level load forecasts requested above.

**SDG&E Response:**

Distribution capital expenditure budgets were developed and provided in testimony and workpapers in SDGE’s previous electric distribution capital GRC filings.

1. E. Based on prior emails with SDG&E witness Bill Saxe, the load data used for historic years is based off of historic forecast data. Please explain the reasons why SDG&E uses “forecasted” load data for historic years (pre-2018) rather than historic, actual load growth?
2. **SDG&E Response:**

The Distribution Resources Plan and Distribution Forecast Working Group performs analysis to maintain reliability of the distribution system by developing circuit and substation load forecasts to determine the capacity upgrades required on the distribution system. For this reason, the distribution loads used in the marginal distribution demand cost regression analysis are based on the forecasted loads because these are the loads used to determine the distribution costs needed for the capacity upgrades. Please note that the forecasted load data is based off of actual peak load data for prior years that has been normalized and adversed. For example, the 2018 Load Forecast would have the actual peak load data that has normalized and adversed for 2017 (previous “historic” year).

2. Please provide a manual or guide that describes each budget code provided and used in the SDG&E distribution plant forecast.

**SDG&E Response:**

SDG&E does not have a specific manual or guide that describes each distribution plant budget codes used in the SDG&E’s 2019 GRC Marginal Distribution Demand Costs Workpaper (“Ch\_5\_WP#4\_Marg Dist Demand Costs.xlsx”). The distribution plant budget codes in this 2019 GRC Phase 2 workpaper are from Alan Colton’s Revised Direct Testimony in SDG&E’s 2019 GRC Phase 1 proceeding (A.17-10-007). Below is a link to Alan Colton’s Revised Direct Testimony and Revised Capital Workpapers in the proceeding that provides the description of the budget codes you requested. In the testimony you will find the “Description” for each budget code listed in Section “a.” for each budget code identified. In the workpaper you will find the “Business Purpose”, “Physical Description”, and “Project Justification” for each budget code listed in the first sheet for each budget code identified.

<https://www.sdge.com/sites/default/files/regulatory/SDGE-14-CWP-R_M%2520Martinez%2520Electric%2520Distribution.pdf>

<https://www.sdge.com/sites/default/files/regulatory/SDG%2526E-14-R_Colton_Revised_Prepared_Direct_Testimony.pdf>

3. Please provide line item budget forecasts for each distribution plant forecast used in the last three GRC Phase II proceedings.

**SDG&E Response:**

The first attached file (Forecasted Electric Distribution Capital [2019 GRC Phase 2]) provides more details on the development of the electric distribution capital costs in the “Distrib Capital Forecast Data” tab of my 2019 GRC Phase 2 Marginal Distribution Demand Workpaper (“Ch\_5\_WP#4\_Marg Dist Demand Costs.xlsx”).



Regarding the budget forecasts for each distribution plant forecast used in the last three SDG&E GRC Phase 2 proceedings, below are the budget forecasts used in SDG&E’s 2016 GRC Phase 2 and 2012 GRC Phase 2 proceedings.



Unfortunately, SDG&E is unable to locate the budget forecast for the distribution plant forecast used in SDG&E’s 2008 GRC Phase 2. The attached file provides the forecasted distribution plant used in the 2008 GRC Phase 2 proceeding but does not provide the budget forecasts behind those plant amounts.



As requested in a July 25, 2019 email from CalPA, SDG&E provided the attached SDG&E’s 2008 GRC Phase 1 distribution capital spending workpapers (in an email on July 26, 2019) that provide the capital budget forecasts that would have been used in the SDG&E’s 2008 GRC Phase 2 proceeding.



1. [1] Known new distribution loads are deducted from the system-wide forecast so that they can be added back in as local new load adjustments while maintaining consistency with the CEC forecast in aggregate. [↑](#footnote-ref-2)
2. [2] This represents hourly loads for both a typical weekday and weekend day for each month [↑](#footnote-ref-3)
3. [3] Load Modifying Demand Response reshapes or reduces the net load curve as opposed to Supply Resource Demand Response which is integrated into the California Independent System Operator energy markets. [↑](#footnote-ref-4)
4. [4] SDG&E’s DER Growth Forecast Assumptions are subject to updating and revision on an annual basis in

   accordance with distribution planning criteria and guidance provided by the Commission. [↑](#footnote-ref-5)