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Chapter: 4

PREPARED DIRECT TESTIMONY OF
JEFF HUANG
ON BEHALF OF SOUTHERN CALIFORNIA GAS COMPANY
AND SAN DIEGO GAS & ELECTRIC COMPANY

(LARGE EG/COGEN FORECAST)

July 2018

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1 **CHAPTER 4**

2 **PREPARED DIRECT TESTIMONY OF JEFF HUANG**

3 **(LARGE EG/COGEN FORECAST)**

4 **I. PURPOSE**

5 The purpose of my direct testimony is to present a portion of the forecast of natural gas
6 demand for electric generation (EG) customers for the Triennial Cost Allocation Proceeding
7 (TCAP) period (2020 - 2022) for Southern California Gas Company (SoCalGas) and San Diego
8 Gas & Electric Company (SDG&E). My testimony covers the portion of the EG market
9 comprised of: (1) utility electric generation (UEG) customers; Southern California Edison
10 Company (SCE); SDG&E; the cities of Anaheim, Burbank, Colton, Corona, Glendale, Pasadena,
11 Riverside, and Vernon; the Los Angeles Department of Water and Power (LADWP); and the
12 Imperial Irrigation District (IID); (2) exempt wholesale generation (EWG) customers; and
13 (3) SoCalGas and SDG&E large cogeneration customers with generating capacity greater than
14 20 megawatts (MW).¹

15 **II. EG FORECAST METHODOLOGY**

16 Due to the complex interaction of the electric supply and electric demand components,
17 the EG natural gas demand forecast of the UEG, EWG, and large cogeneration customers is
18 based on an analysis of the operation of power plants in the Western United States electric
19 market using a production cost model. This method was used in the most recent Triennial Cost
20 Allocation Proceeding (TCAP), A.15-07-014, as well as in the 2018 California Gas Report. This
21 forecast uses the Market Analytics model (Model) developed by the software provider ABB

¹ The forecast of the natural gas demand for the remainder of the EG market (small EG customers) is covered in Chapter 5 (Guo).

1 Enterprise Software. The Model evaluates, in detail, the least-cost dispatch of the electricity
2 supply to meet system demand on an hourly basis and provides results of generation unit output,
3 including fuel burn. The major inputs used in the Model are discussed below.

4 **A. Electricity Demand**

5 The electric demand forecast for California used in the Model is from the California
6 Energy Commission's (CEC) California Energy Demand Forecast, 2018 – 2030 Revised
7 Forecast, dated January 2018.² This energy demand forecast was developed as part of the CEC's
8 Integrated Energy Policy Report process. The mid energy demand forecast with mid Additional
9 Achievable Energy Efficiency (AAEE) and mid Additional Achievable Photovoltaic (AAPV)
10 scenario was selected as the energy demand forecast. For the remainder of the Western
11 Electricity Coordinating Council (WECC), I used the electric demand forecasts within the ABB
12 Enterprise Software database.³ ABB Enterprise Software develops these forecasts by collecting
13 data from various sources including demand forecasts filed by utilities with the Federal Energy
14 Regulatory Commission (FERC).

15 **B. Availability of Hydroelectricity**

16 Limited multi-year water storage in California and the Pacific Northwest (PNW) makes
17 annual hydroelectric generation dependent on each year's snowpack run-off. In the last 20 years,
18 hydro run-off (from rainfall and snowpack) has varied from 57% to 148% of the 20-year average
19 hydro condition. This can cause substantial swings in EG gas throughput volumes. Because the
20 hydroelectric generation exhibits a year-to-year random variability, the forecast assumes that the

² The CEC report can be found at http://www.energy.ca.gov/2017_energypolicy/documents/#demand

³ The Model covers the entire WECC region: 14 western states, 2 Canadian provinces, and Northern Baja Mexico. The power simulation encompasses the entire WECC footprint. ABB Enterprise Software provided data for all the states and provinces. I updated the electricity demand for California only, with CEC's electricity demand forecast.

1 availability of hydroelectricity generation in California and the PNW will be equal to the 20-year
2 average, based on data provided by ABB Enterprise Software.

3 **C. Generation Capacity**

4 The generator operating characteristics used in the Model are based on values provided
5 by ABB Enterprise Software. ABB Enterprise Software develops these from regulatory
6 proceedings and filings (*e.g.*, CEC's Electricity Report and FERC forms). In addition to existing
7 generation capacity, plants under construction were added to the electricity supply mix.

8 In the SoCalGas service area, the forecast assumes the repowering of AES's Alamos
9 Power Plant (currently 2011 MW) from old steam plants into a 640 MW combined cycle unit by
10 the third quarter, 2020.⁴ In addition, the forecast also assumes the repowering of AES's
11 Huntington Beach Power Plant (currently 904 MW) from old steam plants into a 640 MW
12 combined cycle unit by the second quarter, 2021.⁵

13 In the SDG&E service area, the forecast includes the Carlsbad Energy Center peaking
14 plant (500 MW), with an expected summer 2018 in-service date.⁶ The Carlsbad Energy Center
15 peaking plant in-service date coincides with the retirement of the existing Encina Power Plant
16 (964 MW) due to once-through cooling regulations.

17 In this forecast, energy storage resources consistent with the Commission's Storage
18 Decision (D.) 13-10-040 were added in the SDG&E and SCE service area. Installed storage
19 capacity data is based on the mid scenario from the Commission's 2014 Long Term Procurement
20 Plan Standard Planning Assumptions. This forecast includes a statewide installed capacity of
21 740 MW by 2020 and is increased to 1,040 MW by 2022.

⁴ See California Energy Commission Order No.17-0412-3.

⁵ See California Energy Commission Order No.17-0412-2.

⁶ See California Energy Commission Order No.15-0730-5.

1 California has adopted an aggressive Renewables Portfolio Standard (RPS), requiring
2 IOUs, electric service providers, and community choice aggregators to increase procurement
3 from eligible renewable energy resources to 33% of total procurement by 2020, and to 50% of
4 total procurement by 2030.⁷ While California is on track to meet the standard⁸, there are
5 uncertainties as to how much renewable power will be added specifically during the TCAP
6 period. For this forecast, SoCalGas and SDG&E assume the state of California will reach 33%
7 RPS by 2020 and assume that RPS levels will increase linearly until the state reaches 37% RPS
8 by 2022.

9 **D. Electric Transmission**

10 The addition of large transmission projects, especially ones that interconnect Southern
11 California with other regions and states, can have an impact on UEG and EWG demand in the
12 service territories of both SoCalGas and SDG&E. There is no new major transmission line
13 added in this forecast as there are no known projects expected to come online during the TCAP
14 period.

15 **E. Greenhouse Gas (GHG) Cap-and-Trade Program Costs**

16 In response to Assembly Bill 32, the California Air Resources Board (ARB) implemented
17 a Cap-and-Trade program for GHG emissions beginning in 2013. The forecast of natural gas
18 demand for UEG and EWG customers assumes GHG compliance costs based on recent futures
19 market prices of \$16-23 per metric ton of carbon dioxide-equivalent (MTCO₂e).

⁷ See D.12-06-038.

⁸ http://www.energy.ca.gov/renewables/tracking_progress/documents/renewable.pdf

1 **III. UEG, EWG, AND LARGE COGENERATION FORECAST**

2 The UEG, EWG, and SoCalGas large cogeneration forecast, based on the above-
3 discussed assumptions for the years 2020 through 2022, is shown in Table 1.

4

Table 1
Annual EG and Large Cogeneration Forecast (MMDth)

<i>Year</i>	<i>SDG&E</i>	<i>SoCalGas</i>	<i>Total</i>
2020	44	212	256
2021	44	208	252
2022	43	207	250
Average	44	209	253

5 **IV. WINTER PEAK FORECAST**

6 To establish the marginal demand measures presented in Chapter 5(Guo), a winter peak
7 day forecast was developed for UEG, EWG, and large cogeneration natural gas demand. The
8 winter peak demand is the coincidental peak day of the total SoCalGas and SDG&E system. The
9 result is shown in Table 2.

10

Table 2
Winter Coincidental Peak Day Demand (MDth/day)

<i>Year</i>	<i>SDG&E</i>	<i>SoCalGas</i>	<i>Total</i>
2020	171	702	873
2021	155	716	871
2022	160	696	857

11
12 This concludes my prepared direct testimony.

1 **V. QUALIFICATIONS**

2 My name is Jeff Huang. My business address is 555 West Fifth Street, Los Angeles,
3 California, 90013. I am employed by SoCalGas as a Senior Resource Planner in the Trans &
4 Storage Strategy Group. My responsibilities include the development of natural gas demand
5 forecasts for EGs in the service areas of both SoCalGas and SDG&E and evaluating various EG
6 related projects.

7 I have a Master of Science degree in Electrical Engineering from University of Southern
8 California. I am a registered Professional Engineer in California. I have been employed by
9 SoCalGas since 1999.

10 I have previously submitted testimony before the Commission.