

DOCKETED

| | |
|-------------------------|---|
| Docket Number: | 23-IEPR-02 |
| Project Title: | Electricity Resource Plans |
| TN #: | 250919-1 |
| Document Title: | SDGE 2023 IEPR Demand Forecast Form 4 PUBLIC 7 3 2023 |
| Description: | Form 4: Demand Forecast Methods and Models |
| Filer: | Jenny Norin |
| Organization: | San Diego Gas & Electric Company |
| Submitter Role: | Applicant |
| Submission Date: | 7/3/2023 12:05:48 PM |
| Docketed Date: | 7/3/2023 |

Form 4: Demand Forecast Methods and Models

Presented below is a summary of the methodology underlying the long-term forecast of electric energy for the San Diego Gas & Electric Company (“SDG&E”) service territory for the years 2023-2034¹.

SDG&E uses a combination of econometric and statistically adjusted end-use models (“SAE”) to develop forecasts of electric customers, sales, system energy requirements and system peak demand. In general, the forecasting models integrate input assumptions regarding demographic and macroeconomic concepts, weather, energy prices, building and appliance standards and saturations, energy efficiency programs, building electrification, and other factors affecting electricity consumption, such as new or changing technologies. Additionally, adjustments are made for electric vehicles, and behind the meter solar and battery storage.

Electricity consumption is modeled in the following sectors and categories: Residential, Small/Medium/Large Commercial combined, Agriculture and Water Pumping, and Street Lighting.

The residential class electric sales are modeled as the product of per-customer-usage and the number of customers. Usage per customer is modeled using the residential SAE model and incorporates equipment efficiency and saturation trends along with billing days, real electric prices, weather, seasonal and real personal income to forecast energy sales. Residential sales are adjusted to account for energy efficiency & standards impacts, building electrification, electric vehicle load, and self-served load (like solar and battery storage).

¹ SDG&E’s 2023 and 2024 Forecast were submitted in CPUC’s 2023 ERRR Forecast Application (approved & in Electric Rates) and CPUC’s 2024 ERRR Forecast Application (currently pending). The same forecasts are being used for years 2023 & 2024 in this 2023 IEPR filing.

Combined Small/Medium/Large non-residential electric sales are modeled as the product of per-customer-usage and the number of customers. Usage per customer is modeled using the commercial SAE model and incorporates equipment efficiency and saturation trends along with billing days, real electric prices, weather, seasonal and economic employment conditions to forecast energy sales. Combined Small/Medium/Large commercial sales are adjusted to account for energy efficiency & standards impacts, electric vehicle load, and self-served load (from both solar and non-solar).

Agriculture class electric sale is forecasted as an individual sector based primarily on customer counts and recent energy usage trends. An econometric model was used to forecast the agriculture class on a usage per customer basis using an estimation period of 2015 through 2022. The model was fitted using monthly binary variables and historical rain data. Solar was included for the estimation of agriculture consumption and was later subtracted off forecast to determine reported sales.

Street lighting class electric sale is forecasted as an individual sector based primarily on customer counts and recent energy usage trends. A three-year average (2020-2022) usage per customer was applied to forecasted customers to come up with a lighting sales forecast.

The hourly forecast is based on individual forecasts by sector for all LSEs in SDG&E service territory and is calibrated to the resulting control totals from the sector sales forecasts. Hourly loads provide an 8760 (8784 leap year) shape to the forecast period and incorporates hourly PV generation, charging and discharging battery storage, and electric vehicle charging.

The energy forecast is disaggregated into bundled service, direct access service, and CCA service. The amount of direct access load in the forecast is limited to an authorized cap of 3,942

GWh, as per an April 2019 CPUC draft decision (R.19-03-009) in a rulemaking proceeding to implement California Senate Bill 237 (SB 237).

The economic assumptions are based on a blend of the latest available forecasts from Global Insight, Inc. (April 2023 Regional forecast for San Diego) and Moody's Economy.com (April 2023 Regional Forecast for San Diego). Numerical values for key assumptions are presented in IEPR Form 2.1.

SDG&E uses various weather concepts in the sales forecast development process, including heating-degree days, cooling-degree days and relative humidity. The three weather stations that represent SDG&E's service area are Lindbergh Field, Marine Corps Air Station (MCAS) and El Cajon. Peak weather scenarios were developed from statistical analysis of historical weather data for the last 10 years.

Electric Vehicle Forecast:

The electric vehicle forecast is based off historical EV on-road registrations as provided by IHS/Polk data and internal growth forecast estimates that considered the CEC's 2022 AATE 3 EV adoption scenario. SDG&E has transportation electrification projects in progress and planned for the future that will increase EV adoption in the forecast horizon. SDG&E used the CEC CEDU 2022 hourly forecast for SDG&E EV load as the basis for the EV charging profile. SDG&E also developed assumptions for daily EV consumption, charging sites (residential/public charging), and future car stock to obtain a forecast for EV charging load. The charging profile was applied to resulting load to develop an hourly EV load forecast.

PV Self-Served Load:

Over the past 10 years, SDG&E has experienced exponentially increasing solar installation, with year-over-year growth reaching as high as 50 percent. SDG&E believes the

California Energy Commission (CEC) has accurately accounted for this trend in its PV forecast. SDG&E has adopted the CEC CEDU 2022 Planning Scenario for the 2023 IEPR installed PV capacity forecast. SDG&E has a representative sample of solar generation meters which are used to derive hourly capacity factors. These historical capacity factors were used to create an average shape and applied to the CEC PV forecast to obtain estimates of PV generation.

Battery Storage:

Battery storage is still in its early stages of adoption in SDG&E service territory. SDG&E has reviewed Bloomberg's 2021 Long-Term Energy Storage Outlook to obtain an understanding of installed capacity projection. Bloomberg forecasted statewide installed capacity of battery storage out to 2050. SDG&E also reviewed the CEC CEDU 2022 installed capacity forecast. SDG&E's forecast assumptions align with the battery storage installed capacity and charge/discharge profile from the CEC CEDU 2022 hourly forecast for SDG&E service territory. This profile was applied to the installed capacity forecast to obtain an hourly battery storage forecast.

Non-PV Self-Served Load:

SDG&E witnessed rapid growth in non-PV self-served load from the early 1980s through the mid-2000s. From 2007 to 2013, SDG&E saw relatively constant non-PV self-served load. A structural shift occurred in 2014, and there was a significant decrease in non-PV installed capacity within the SDG&E service territory, as well as a noticeable decrease in self-served load. The forecast anticipates that no major non-PV projects will be added to the system within the forecast period and has therefore determined that non-PV self-served load will see no growth over the next 10 years.

Demand-Side Methodology

Committed and uncommitted energy efficiencies and standards are incorporated into the inputs of the sector forecast models. Efficiencies and standards are reflected in model parameters such as residential unit-energy-consumption (UEC) and commercial energy-use-intensities (EUI). Efficiencies and standards included in the models for years subsequent to 2022 were developed by analyzing the Energy Efficiency Potential and Goals Study 2021 and Beyond as prepared for the CPUC and by incorporating efficiencies from standards, behavioral programs, equipment, and naturally occurring market adoption (NOMAD) and end-of-use decay for measures.

Building Electrification

SDG&E has reviewed and included policies that align with CARB's 2022 State Strategy for the State Implementation Plan. Beginning in 2030, the concept for zero-emission standards for these appliances would mean that a person or business purchases a new space or water heater (whether for new construction or to replace in existing buildings), they would only be able to purchase electric units. This potential regulation would not limit use or repair of existing fossil gas space or water heaters and therefore gas appliances could remain in operation after 2030.