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SOCALGAS LONG-TERM DEMAND FORECASTING METHODS AND RESULTS



Objectives For Today

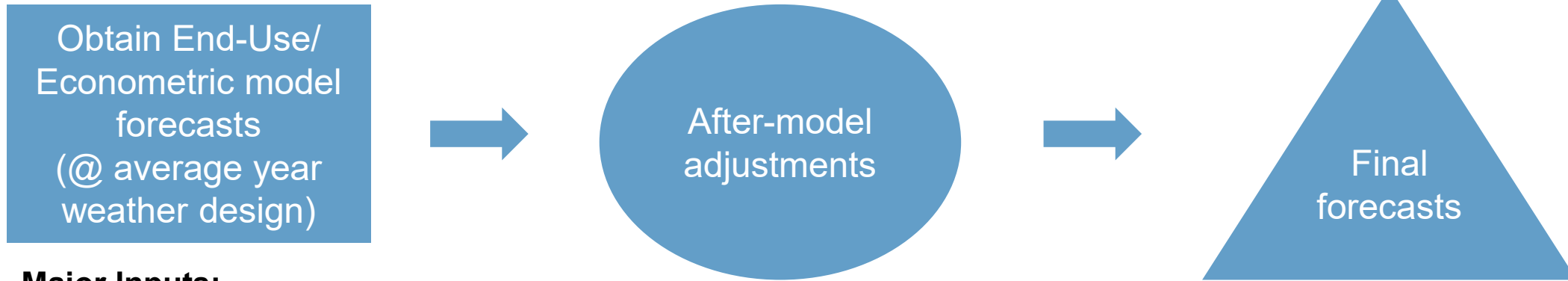
1. Discuss SoCalGas' current long-term demand forecasting models and major assumptions
 - a. Core forecast
 - b. Noncore Non-EG forecast
 - c. EG forecast
 - d. Weather design
 - e. Cold year demand
 - f. Peak day demand

2. Share some CGR 2020 forecasting results

Gas Demand Forecasting Models By Market Segment

Core/Noncore	Market segment	SoCalGas forecasting model
Core	Residential	End-Use model
	Core Commercial	End-Use model
	Core Industrial	End-Use model
	NGV, GAC, & GEN	Trend model
Noncore retail	Noncore Commercial	End-Use model
	Noncore Industrial	End-Use model
	Electric Generation	Plexos Production Cost Simulation model
	Small Cogeneration	Econometric model
	Refinery Industrial & Cogen	Econometric model
	EOR	Trend model
Wholesale & International	SDG&E	Depending on market segment
	Southwest Gas, City of Vernon, & Long Beach	Proprietary forecasts submitted to SoCalGas
	Ecogas	Trend model

Key Steps to Generate Average Year Demand Forecasts (Non-EG)



Major Inputs:

- Demographics
- Economic drivers
- Gas/electric prices
- Carbon prices
- Customer forecast
- Appliance saturations & UECs/EUIs
- Weather design
- Base year weather-adjusted throughput
- Etc.

Adjustments for:

- EE savings
- Climate change
- Core to noncore migration
- Etc.

- Projected *new housing* is the main driver of forecasted residential customer and demand growth.
- Projected *employment* by business type is the main driver of forecasted core and noncore commercial and industrial growth.

End Use Model

- End Use Models are very data-intensive models.
- End use models track the consumption of energy fuels (e.g., natural gas or electricity) by simulating customers' energy consumption into two key steps:
 1. Usage of energy by customers' various appliances
 2. Choices (when applicable) in the selection of:
 - a. End use appliances (e.g., space heating, water heating, clothes drying or cooking) from different fuel types (gas or electric), and
 - b. Various efficiency levels of appliances at customer premises
- As the simulation steps forward from one year to the next, it distinguishes, for each year, between new load added due to new meters (i.e., new customers) in addition to changes in load due to existing customers replacing worn-out appliances with newer (more energy efficient) appliances.
- Base year forecast is calibrated to base year historical weather-normalized consumption.

Noncore Econometric Models

- SoCalGas Refinery, Small Cogen, and Enhanced Oil Recovery (EOR) demands are forecasted using econometric models.
 - SoCalGas Refinery Industrial and Refinery Cogeneration — driven by gas and propane price
 - SoCalGas Small Cogeneration — driven by gas and electricity price
 - SoCalGas EOR — historical trend

Post-Model Adjustments

- Energy Efficiency (EE) Savings
 - Savings are for measures installed under SoCalGas' EE programs and Codes & Standards
 - Most of the EE savings are in the residential and core commercial and industrial sectors.
- Weather Design To Account For Global Warming
 - In the 2020 CGR, unlike prior CGR filings, we introduced a climate change warming trend that gradually reduces HDDs over the forecast period.
 - For the forecast period, projected annual HDDs were reduced by 4 HDDs each year for SoCalGas.

SoCalGas 1-in-35 Cold Year Demand Forecast

1-in-35 cold year demand for each HDD-sensitive market segment is based on:

- Average year demand
- Average year HDD design
- 1-in-35 cold year HDD design
- Demand sensitivity per HDD for each market segment
- Residential, Core Commercial, Core Industrial, SoCalGas Noncore Commercial are considered HDD-sensitive market segments.

For non-HDD-sensitive market segments, cold year demands are the same as average year demand.

Peak Day Demand

- SoCalGas 1-in-10 peak day temperature design: 42.2 Degrees Fahrenheit
 - Based on the annual coldest day HDDs of the last 70 years (1950-2019)
- SoCalGas 1-in-35 peak day temperature design: 40.5 Degrees Fahrenheit
- 1-in-10 and 1-in-35 core peak day demand are based on:
 - Peak day temperature design
 - Average year demand
 - 1-in-35 cold year demand
 - Average year & 1-in-35 cold year HDD design
 - Demand sensitivity per HDD for each market segment

EG Gas Demand Forecast

EG Gas Demand Forecast

- Software: PLEXOS from Energy Exemplar LLC
 - Zonal version
 - Western Electricity Coordinating Council (WECC)
 - 2 Canadian Provinces, 14 Western States, and Northern Baja Mexico
 - For 2020 CGR, database based on CEC's Spring 2020 database
- Major Database Input: Based on CEC Spring 2020 PLEXOS database
 - Electricity Demand Forecast
 - 3 Baseline Demand Scenarios (High, Mid, Low)
 - Additional achievable PV assumptions are included in the baseline demand scenarios
 - 5 additional achievable energy efficiency (AAEE) scenarios (high, mid-high, mid-mid, mid-low, low)
 - California Energy Demand 2019 Revised Forecast, 2020-2030 Managed Forecast: Mid Demand / Mid AAEE Case
 - California OTC Policy – Compliance Schedule Extension
 - Alamitos Generating Station (Alamitos) Units 3, 4, and 5 for three years until December 31, 2023
 - Huntington Beach Generating Station (Huntington Beach) Unit 2 for three years until December 31, 2023
 - Ormond Beach Generating Station (Ormond Beach) Units 1 and 2 for three years until December 31, 2023
 - Redondo Beach Generating Station (Redondo Beach) Units 5, 6, and 8 for one year until December 31, 2021

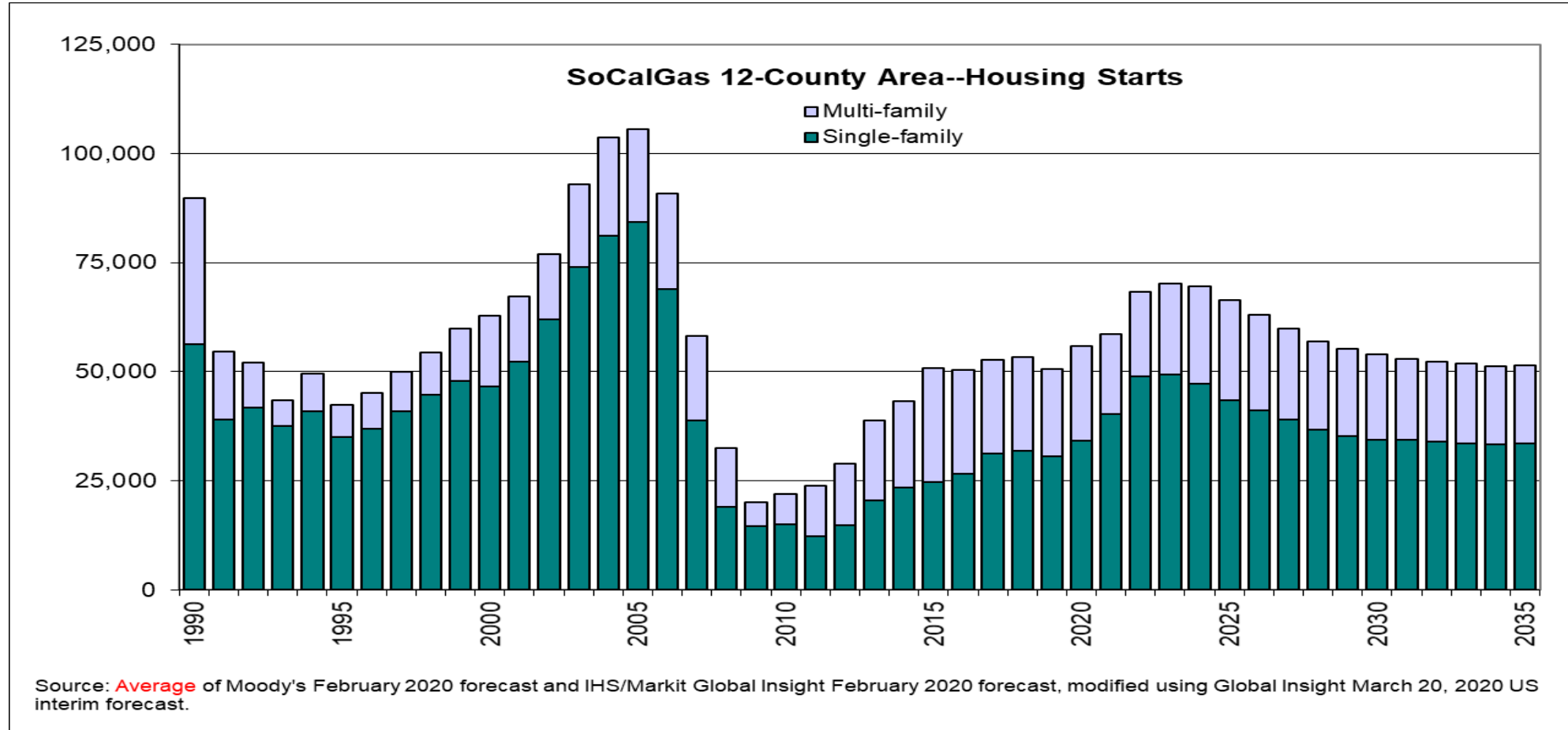
EG Gas Demand Forecast

- Major Database Input (continue)
 - Natural Gas Price Forecast
 - Market Price Referent Methodology
 - New Generating Resources
 - Thermal resources
 - Renewable resources – 60% RPS goal by 2030
 - Energy storage resources
 - Hydroelectric Generation Scenarios
 - Average year hydro scenario
 - 1-in-10 dry hydro scenario
 - Electric Transmission Capacity
 - Based on WECC Path Rating Catalog

Forecasts of Major Drivers

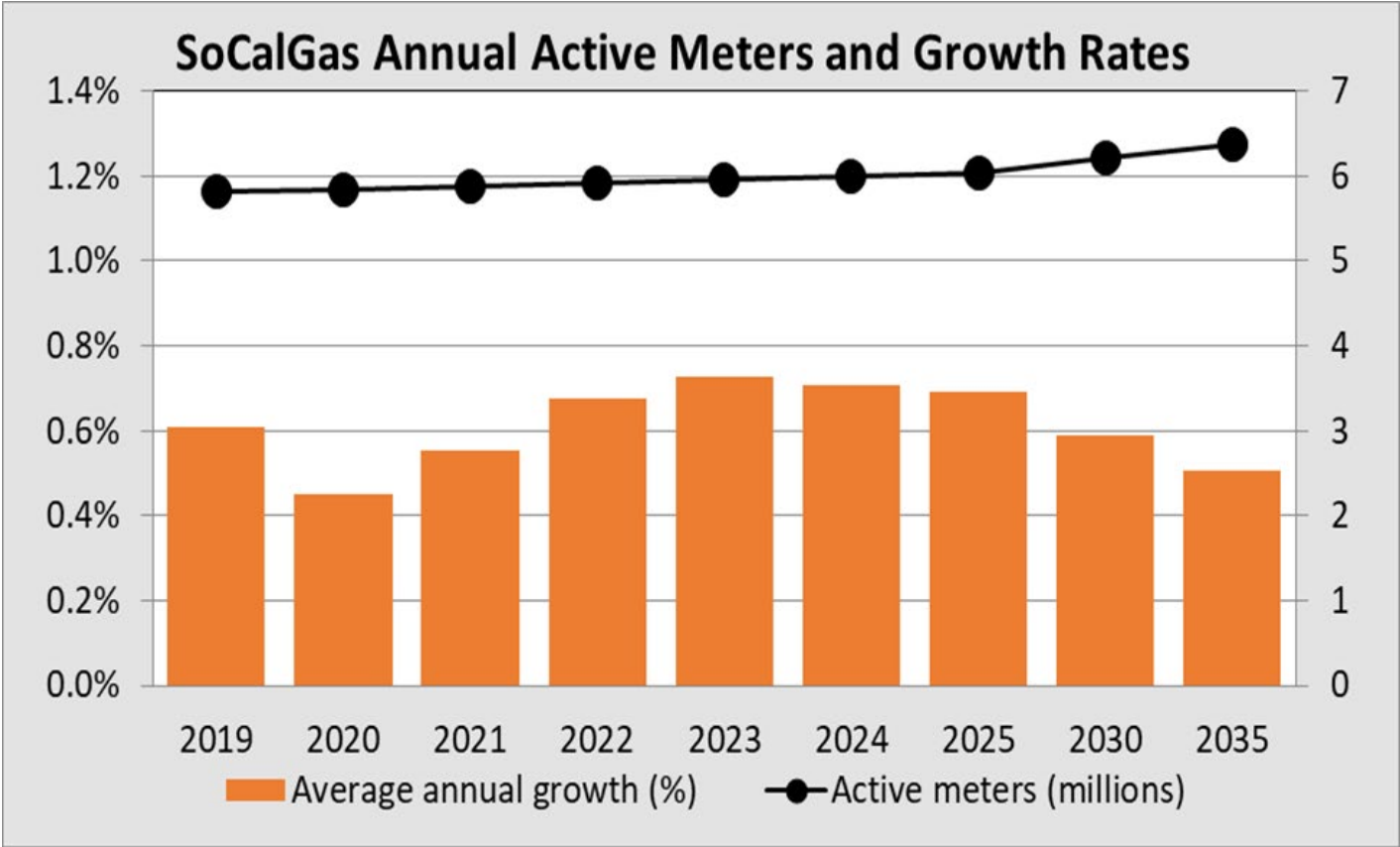
2020 CGR

Southern California New Home Building Slowing, but Record-Low Interest Rates Expected to Bring Strong Recovery



- Up from a low of 20,000 in 2009 to 51,000 in 2019 to forecasted 70,000 in 2023 and 51,000 in 2035.

SoCalGas Customers Projected to Grow at Annual Rate of 0.6% from 2019 to 2035



- Actual 2019 Active Meters totaled 5.812 million.

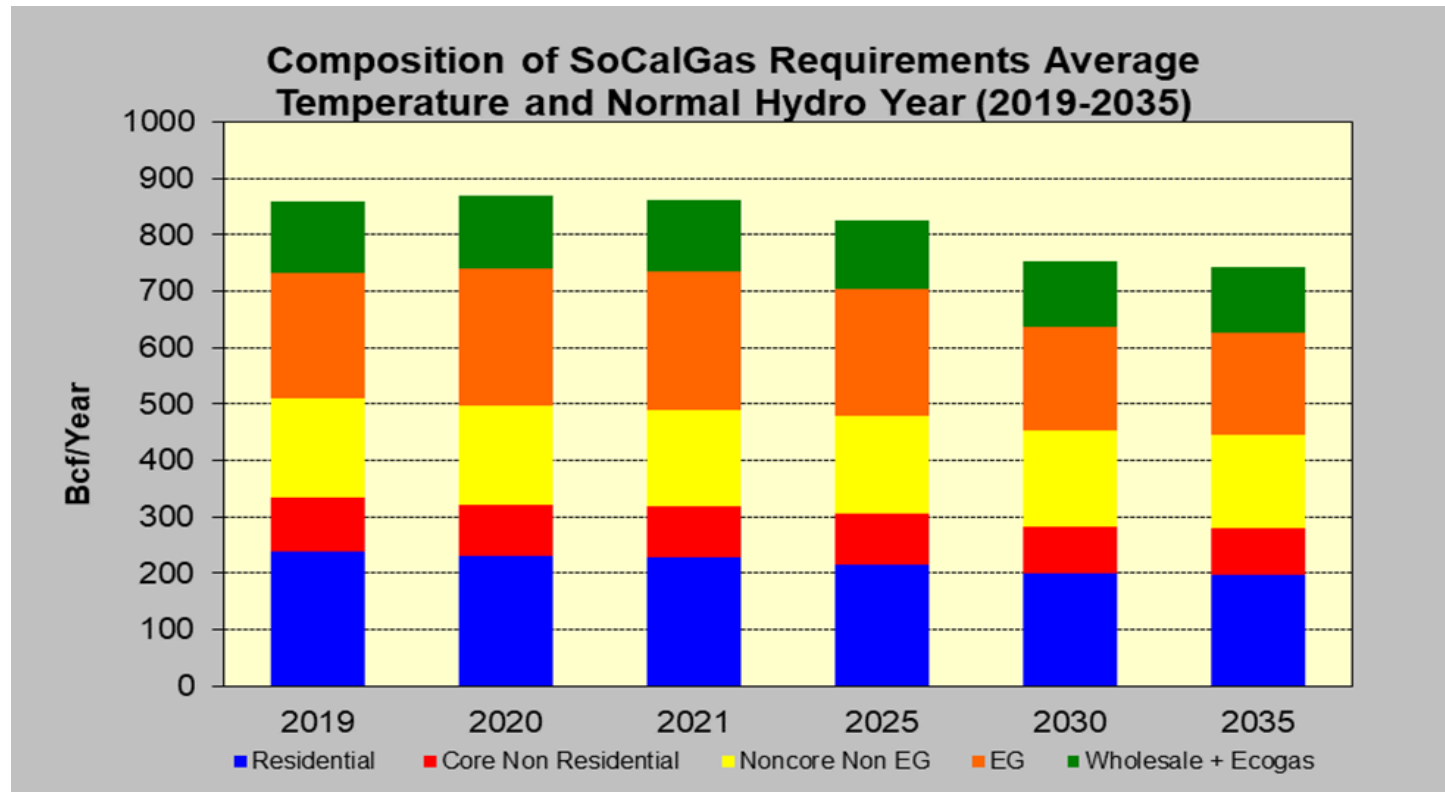
Major Legislation Affecting the Forecasts in CGR 2020

- California Senate Bill 100 became law in September 2018. It orders that eligible renewable energy and zero carbon resources supply 100 percent of all retail sales of electricity in California by 2045. It also calls for renewable energy to supply at least 50% of the state's retail electricity by 2026 and 60% by 2030. EG forecasts in 2020 CGR incorporate these targets.
- Energy Efficiency Programs: SB 350 passed in October 2015, with goals to double cumulative energy efficiency savings by 2030. These state EE projections are included in the CGR demand forecasts.
- Assembly Bill 3232, passed in September 2018, calls on state agencies by 2021 to develop plans and projections to reduce greenhouse gas emissions of California's residential and commercial buildings to 40 percent below 1990 levels by 2030. With no official projections yet available, AB 3232 effects are not in the 2020 CGR.

Demand Forecasting Results

2020 CGR

SoCalGas Demand Forecast Summary



- Total load is expected to fall from 858 Bcf in 2019 to 743 Bcf in 2035, declining an average of 0.9% per year. (For comparison, annual decline of 0.7% was forecasted in the 2018 CGR, and annual decline of 0.6% in the 2016 CGR.)
- Reductions from ambitious energy efficiency programs more than offset meter and employment growth.

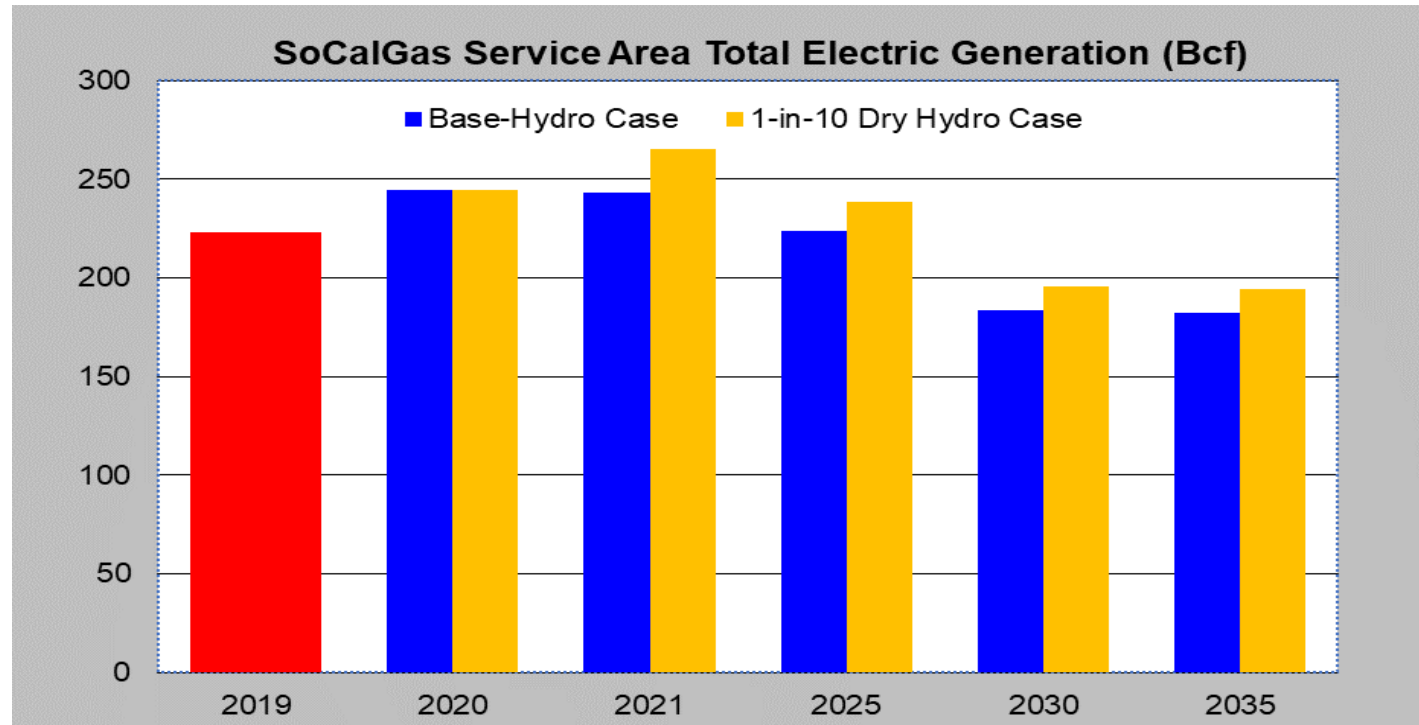
SoCalGas Demand Forecast By Customer Segment

- Annual residential gas demand declines 1.0% per year from 230 Bcf in 2020 to 198 Bcf in 2035. Declining use per meter more than offsets new meter growth.
- Since 2001, weather-normalized residential use per active meter has been dropping by 0.6% per year.
- Commercial gas demand is expected to fall an average of 1.1% per year, from 95 Bcf in 2020 to 81 Bcf in 2035.
- Industrial load expected to decline by 0.6% per annum from 163 Bcf in 2020 to 149 Bcf in 2035.

SoCalGas Demand Forecast By Customer Segment – Continued

- Wholesale load excluding SDG&E is expected to shrink slightly from 39 Bcf in 2019 to 38.6 Bcf in 2035.
- SDG&E's gas demand is forecasted to decrease an average of 0.6% per year from 86.3 Bcf in 2019 to 78 Bcf by 2035.
- NGV load should total 15.4 Bcf in 2020 and is expected to grow 1.4% per year to 19.0 Bcf by 2035 -- largely due to low-carbon government incentives and low natural gas prices relative to gasoline and diesel. Carbon-offsetting Renewable Natural Gas (RNG) already fuels nearly 80% of area NGV load.
- Annual enhanced oil recovery (EOR) steaming demand is forecasted to remain steady at about 11.8 Bcf throughout the forecast period.

SoCalGas Gas-Fired Electric Generation (Bcf)



- From 2019 to 2035, expected EG gas throughput declines an annual average of 1.3% for Base Hydro and 0.9% for Dry Hydro. EG gas demand is higher in dry years, as gas-fired EG compensates for less available west-coast hydropower.
- Factors: Declining statewide electricity demand, higher renewables assumptions, and more efficient gas-fired power plants.