I.17-02-002 Phase 2: Further Hydraulic Modeling Explanation and Updates

Posted May 27, 2020

In response to comments and reply comments to the March 09, 2020 Administrative Law Judge (ALJ) Ruling in the Aliso Canyon investigation (I.17-02-002),[1] CPUC staff has prepared this document to provide clarifications on several hydraulic modeling assumptions and sensitivity cases. Consistent with the ALJ ruling, these assumptions and sensitivity cases are expected to be used for hydraulic modeling by CPUC staff and by Southern California Gas Company (SoCalGas), under the oversight of CPUC staff and Los Alamos National Laboratory, with the first set of results to be presented and discussed at a public workshop scheduled June 30, 2020.

Modeling 2021 Instead of 2020

In comments and reply comments, several parties suggested that the 2020 modeling scenarios should be replaced with 2021 scenarios. However, the difference in gas demand forecasts from 2020 to 2021 on a 1-in-10 winter peak design day is negligible. For example, the *2018 California Gas Report* shows a total gas demand of 4,987 MMcfd in 2020 and 4,950 MMcfd in 2021. This is a decrease of 37 MMcfd (0.74 percent) in total gas demand. This is due to a decrease of 12 MMcfd (0.63 percent) in electric generation (EG) and a decrease of 25 MMcfd (0.63 percent) in all other customer classes combined.[2]

The summer high sendout day decreases more substantially from 2020 to 2021 in the *2018 California Gas Report*—from 3,211 MMcfd in 2020 to 2,960 MMcfd in 2021—which corresponds to a decrease of 7.8 percent in total gas demand. This is due to a 12.6 percent decrease in EG and only a 0.6 percent decrease for all other customer classes combined.[3]

However, CPUC staff is using their own forecasts and hourly profiles to calculate EG demand. CPUC staff has completed these calculations based on SERVM Production Cost Modeling from the recently adopted Reference System Plan in the Integrated Resource Plan Proceeding,[4] rather than the *2018 California Gas Report* figures. As stated above, CPUC staff has determined that the change in gas demand for all other customer classes is negligible and does not warrant any changes to the Scenarios Framework (-0.63 percent for the 1-in-10 Winter peak and -0.6 percent for the summer high sendout day).[5] The table below summarizes the final EG and total demand numbers adopted or calculated by the CPUC. All demand shown is in MMcfd.

Sim.	Study Year	Design Day	EG Demand*		Total Demand	
			CPUC	SoCalGas	CPUC	SoCalGas
01+	2020	Winter peak (1-in-10)	811	922	4,876	4,987
02	2020	Summer high	1,030	1,797	2,557	3,324
03	2025	Winter peak (1-in-10)	900	859	4,760	4,719
04	2025	Summer high	1,110	1,423	2,619	2,932
05	2030	Winter peak (1-in-10)	1,123	820	4,822	4,519
06	2030	Summer high	1,180	1,381	2,675	2,876

*Does not include demand from Refinery Cogen Plants or Enhanced Oil Recovery Cogen Plants.
+Simulation 01 was performed using SoCalGas EG Demand while simulations 02-06 will use CPUC EG demand.

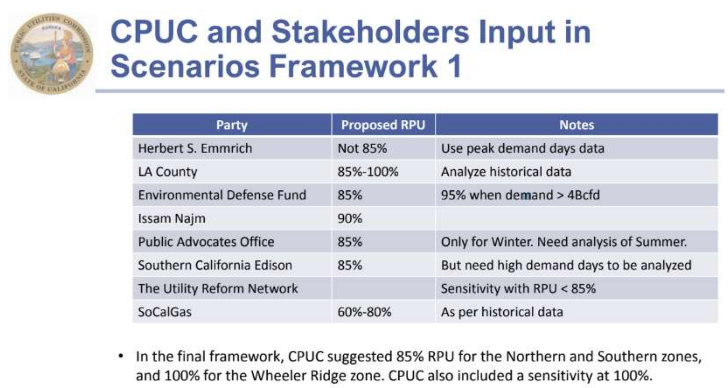
[1] The March 9, 2020 ruling can be found here: http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=328765817
[2] Page 97 of the California Gas Report 2018.
[3] Page 98 of the California Gas Report 2018.
[4] D.20-03-028 in R.16-02-007
[5] The Scenarios Framework can be found here: http://docs.cpuc.ca.gov/SearchRes.aspx?docformat=ALL&docid=254771612

Gas use for EG shown in the table above was derived from hourly fuel burn reports generated by the CPUC's own Production Cost Modeling using SERVM and based on the recently adopted Reference System Plan. The numbers shown do not represent the most extreme weather cases, but rather cases that render the winter and summer fuel burn within the 90th percentile of all possible 100 combinations, which result form simulating 20 weather years and five load forecast errors (zero, +/- 1%, and +/- 2.5%). The winter season is represented by the month of December, and the summer season is represented by the month of September. The results summarized in the table above correspond to weather year 2014 for the winter and weather year 2013 for the summer.

Gas demand for EG during the summer peak day decreases through the year 2030, while the winter peak day demand remains somewhat constant. This can be attributed to many of the changes that are anticipated in the EG fleet across the western U.S. in the coming years. Among these changes is California's increased reliance on generation located within CAISO as opposed to generation imported into California from other states, particularly during the winter. During the winter, reduced solar generation could result in more electricity generated by burning natural gas, particularly in the evening. Furthermore, states within the western U.S. are increasingly using more renewable energy themselves, leaving less energy to potentially be imported into the CAISO grid. Summer gas use for EG reflects a significant decrease due to California's investments in renewable resources, most notably heavy investments in solar generation.

Receipt Point Utilization (RPU)

Based on the first Aliso Canyon Workshop held in June 2019, CPUC staff summarized stakeholders' input for RPU, which varied between 60 to 100 percent. During the workshop, staff also presented analysis which showed that, historically, RPU tended to be considerably lower than average on high sendout days. For example, on high sendout days, RPU was as low as 39 percent in 2013, 60 percent in 2015, and 82 percent in 2017, see slides 28 and 30 here. In addition, CPUC staff notes that RPU on high demand days has shifted upwards since the Aliso Canyon leak and the subsequent restrictions on its use.


CPUC and Stakeholders Input in Scenarios Framework 1

Party	Proposed RPU	Notes
Herbert S. Emmrich	Not 85%	Use peak demand days data
LA County	85%-100%	Analyze historical data
Environmental Defense Fund	85%	95% when demand > 4Bcfd
Issam Najm	90%	
Public Advocates Office	85%	Only for Winter. Need analysis of Summer.
Southern California Edison	85%	But need high demand days to be analyzed
The Utility Reform Network		Sensitivity with RPU < 85%
SoCalGas	60%-80%	As per historical data

- In the final framework, CPUC suggested 85% RPU for the Northern and Southern zones, and 100% for the Wheeler Ridge zone. CPUC also included a sensitivity at 100%.

No new findings have warranted updating the analysis shown in the first workshop. Staff is still utilizing an 85% RPU for the Northern and Southern Zones and 100% for the Wheeler Ridge Zone of their nominal capacities (totaling approximately 3,565 MMcfd). This translates to approximately 3,145 MMcfd of maximum available supplies (excluding anticipated California production of 70 MMcfd and storage withdrawals). CPUC staff will also lower the upper bound of the sensitivity analysis on RPU to 95 percent instead of 100 percent, since the latter requires "perfect" forecasting and fuel burn.

Plausible Unplanned Outages

CPUC staff had planned to perform a probabilistic analysis on the outages of the SoCalGas pipeline network. The analysis would have looked at different component types (e.g. valve, regulator, pipeline, compressor, or storage) and calculated a "plausible" reduction in flow rate due to that outage. The analysis would have given more weight to outages that last longer. Staff would have included outages that have an occurrence probability above a certain threshold in the hydraulic modeling. To achieve that, staff issued Data Request #4. However, the response received had several issues that could not be easily rectified, such as:

a) The definition of *planned* and *unplanned* outages outlined by SoCalGas differs from conventional use of the terms *planned* and *unplanned*, especially in comparison to the use of planned and unplanned outages in the electric sector. The term *unplanned outage* is used for maintenance work that could not be posted on Envoy three days prior to its start date, while a *planned outage* is maintenance work that could be posted on Envoy three days or more before its start date (e.g. underground storage shut-in).[6]

b) In response to CPUC Staff's Data Request #4, SoCalGas included a third outage category, "Force Majeure." While this would be the intuitive definition of an unplanned outages, there were only 387 records of Force Majeure. Furthermore, only 70 records belonged to pipeline outages (namely on L1011, L2000, L2001, L235-2, L4000 and a few others). Such a small number of records over 10 years prevents the probabilistic analysis. Note that L235-2 was out of service for approximately two years before returning to service at reduced operating pressure, and Line 4000 was briefly out of service and has since been operating at reduced pressure for a very long period, which would render them the most likely candidates in such analysis.
c) There were 158 records of outages listed as type N/A, which must be discarded and thereby reducing the total number of useful records.
d) Unplanned Outages may have been a "Force Majeure," but this would require significant manual labor to determine the correct categorization. A description of at least 900 outages must be interpreted by an operations engineer familiar with the network, then a decision needs to be made whether this outage was in fact "Unplanned" in the usual sense (i.e. "Force Majeure").

In light of the above, CPUC staff will no longer perform a probabilistic approach and will use following set of outages for simulations S02 and S03: L3000, L235-2, and L4000 operating at reduced pressures, but not entirely out of service. This set of outages reduces the Northern Zone capacity by 102 MMcfd since the nominal capacity of the Northern Zone is 1,590 MMcfd and is assumed to operate at 85 percent utilization (1352 MMcfd). In addition, since the seasonal peak gas demand forecasts do not vary substantially throughout the 3 study years, CPUC staff notes that some simulations may be redundant and would not provide additional information. As the results of simulations S01-S03 become available, CPUC staff may elect to add or remove outages from simulations S04-S06. Parties and stakeholders will be informed of these decisions.

[6] Envoy is SoCalGas' electronic bulletin system and can be accessed here: https://scgenvoy.sempra.com/