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# Winter 2024-2025 Southern California Gas Reliability Assessment

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California Public  
Utilities Commission

# Presentation Outline

- Introduction
- Stochastic Daily Mass Balance Model
- Reliability Assessment: Assumptions and Inputs
- Reliability Assessment: Summary of Findings
- Questions

# Winter 2024-2025 Southern California Gas Reliability Assessment

Introduction

# Stochastic Daily Mass Balance Model Summary of Methodology

1. Calculate the standard deviation ( $\sigma$ ) from historical data and obtain the daily mean ( $\bar{X}$ ) from CGR forecasts.



2. Forecast daily demand for the study year using a known statistical distribution.



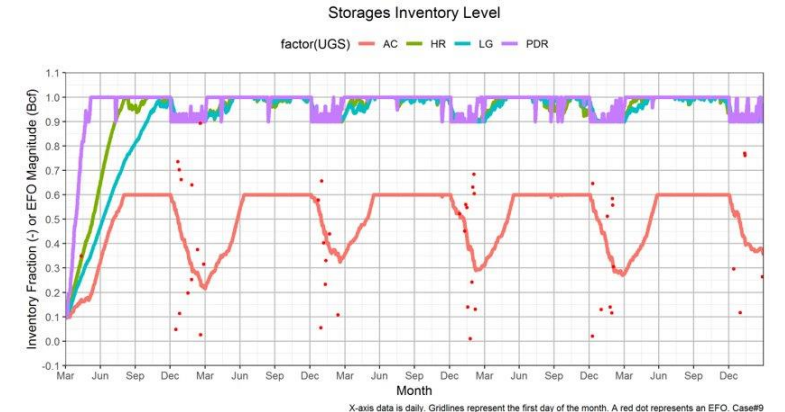
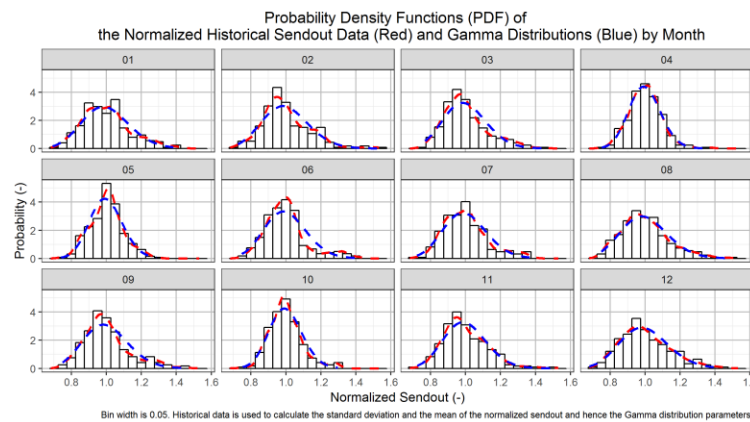
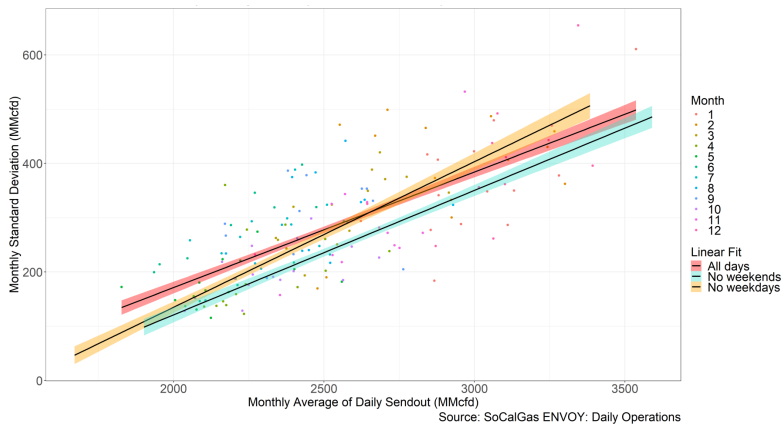
3. Determine gas supply assumptions.



4. Calculate daily excess or deficit, withdrawing or injecting as needed.



5. Track inventory levels over the whole study year.



# Stochastic Daily Mass Balance Model

## Unmodeled Risks

1. Noncore customers may not purchase all the capacity available to them at Aliso Canyon, reducing the total storage inventory level.
2. Out-of-state disruptions to supply, such as an outage on an interstate pipeline, would not be captured.
3. Additional unplanned intrastate transmission outages could result in lower flow rates and lower injection rates into storage.
4. High gas prices could cause gas customers to use withdrawals from storage to manage costs as well as reliability, leading to higher withdrawals than forecasted.
5. A successful run of this model is necessary to meet the reliability standards but is not sufficient since the model does not conserve energy or model sub-daily events (i.e. peak hourly demand).

# Winter 2024-2025 Southern California Gas Reliability Assessment

Reliability Assessment: Assumptions and Inputs

# Winter 2024-2025 Southern California Gas Reliability Assessment: Needed Inputs

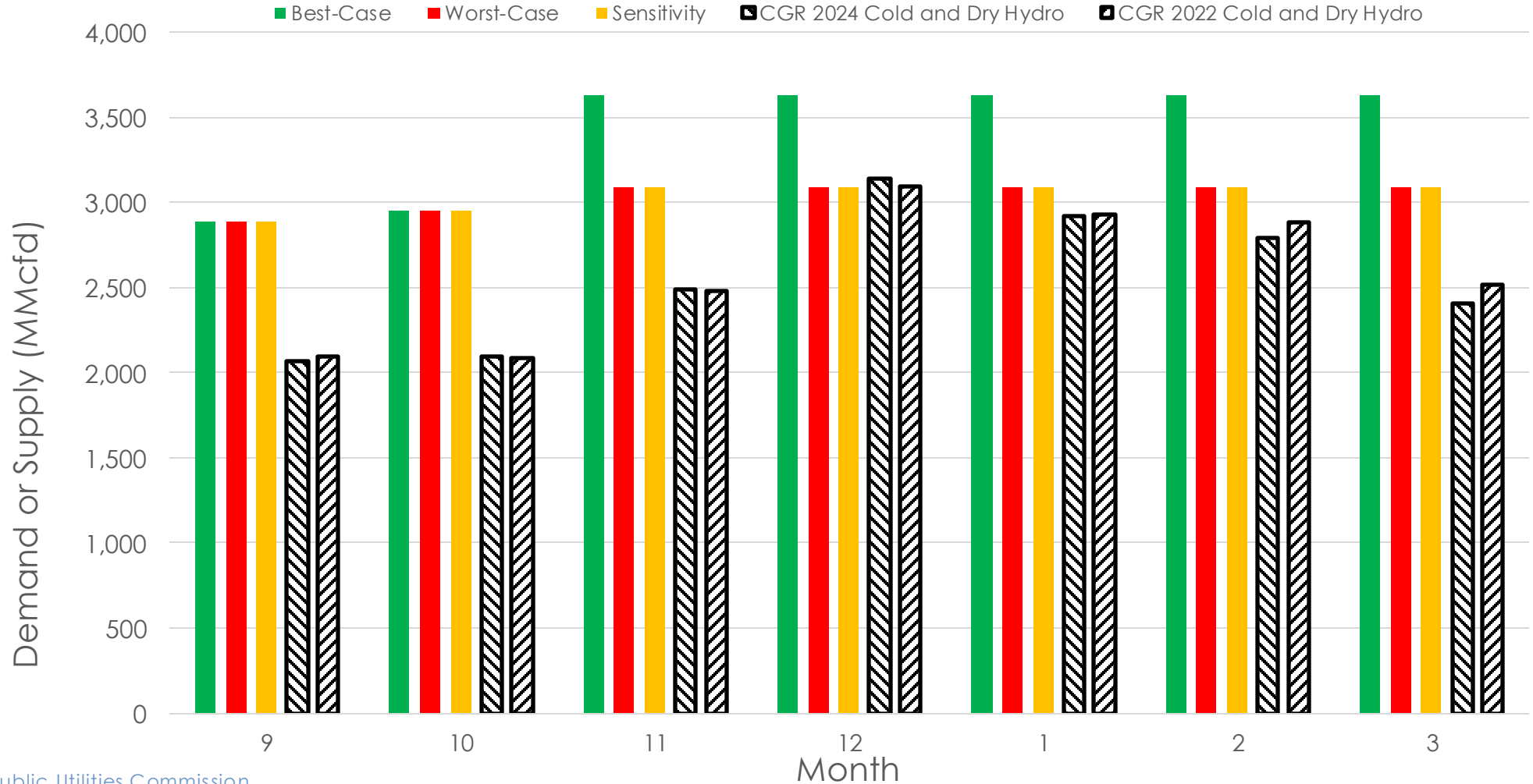
- Monthly means of gas requirements
  - California Gas Report 2024
- Withdrawal and injection curves
  - Forecasted monthly withdrawal and injection curves based on well availability and planned maintenance outages.
  - SoCalGas submitted these curves for the period from March to August.
- Initial inventory level
  - The initial or starting inventory level of all four storage fields was obtained from SoCalGas ENVOY on September 1, 2024.



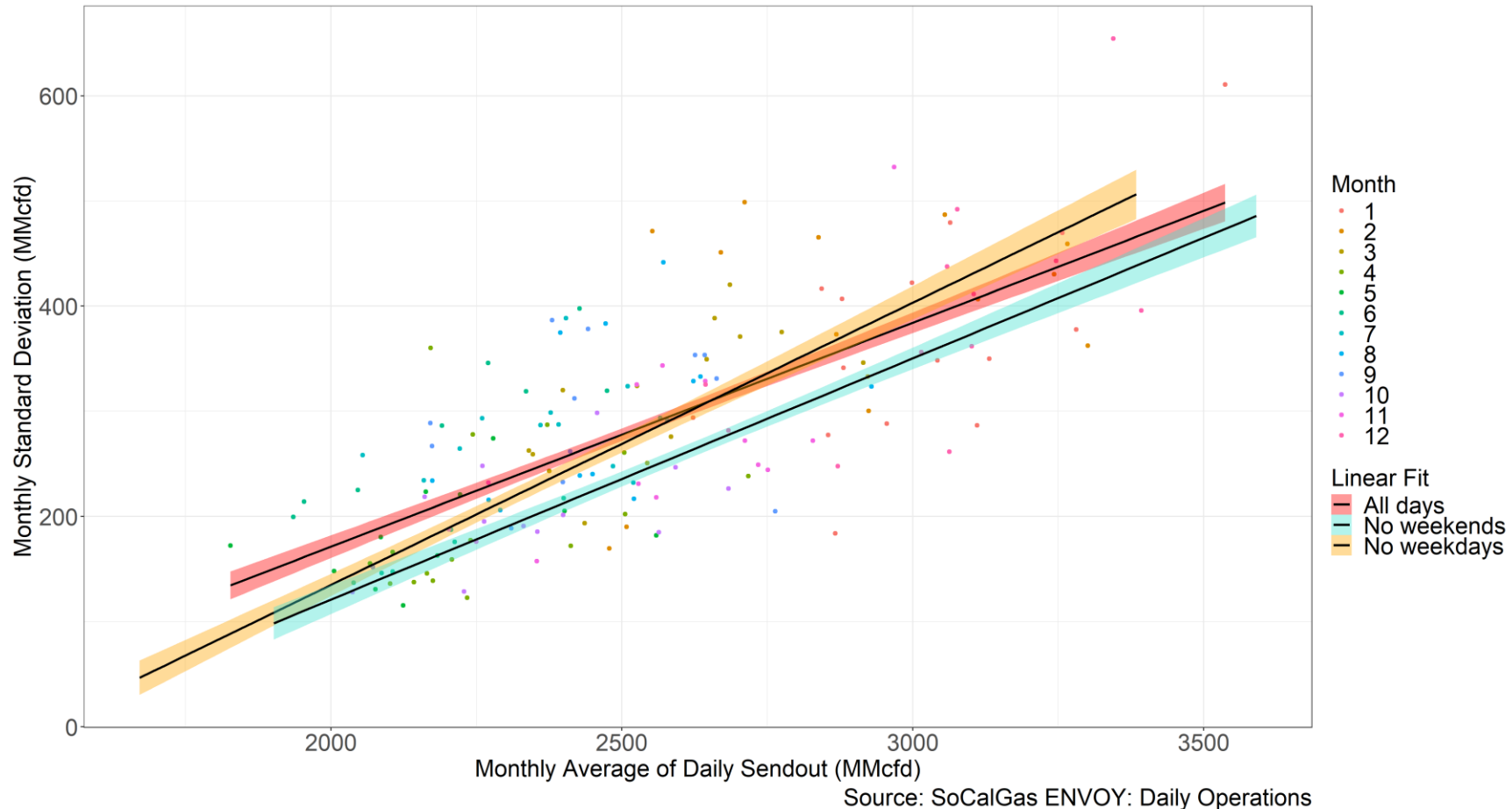
# Winter 2024-2025 Southern California Gas Reliability Assessment: Supply Assumptions

	System Receipt Capacity (MMcfd) for Scenario			2024-2025 Average Daily Demand (MMcfd) for	
	1	2	3	Cold Temp. Dry Hydro	Average Temp. Base Hydro
Month, Year					
September, 2024	2,890	2,890	2,890	2,072	2,060
October, 2024	2,955	2,955	2,955	2,100	2,081
November, 2024	3,630	3,090	3,090	2,489	2,411
December, 2024	3,630	3,090	3,090	3,139	2,974
January, 2025	3,630	3,090	3,090	2,924	2,771
February, 2025	3,630	3,090	3,090	2,792	2,659
March, 2025	3,630	3,090	3,090	2,410	2,328
Average Daily	2,890	2,890	2,890	2,072	2,060
	Total Available Supplies (Bcf)			Total Forecasted Demand (Bcf)	
September-March (Bcf)	3,428	3,042	3,042	2,561	2,328

# Winter 2024-2025 Southern California Gas Reliability Assessment: Supply Assumptions

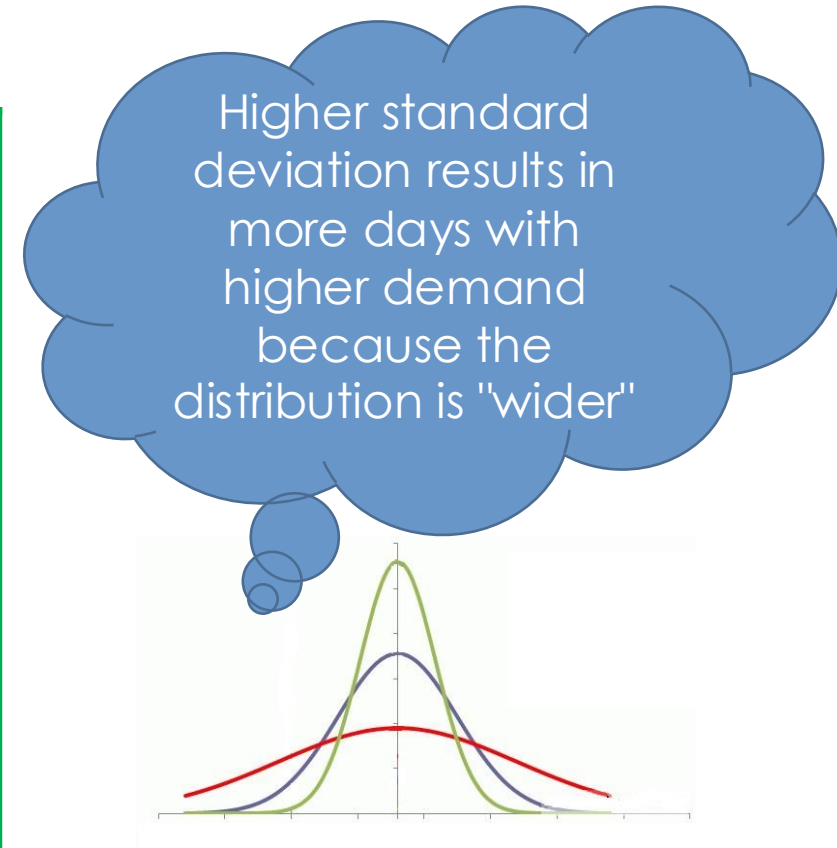


# Winter 2024-2025 Southern California Gas Reliability Assessment: Variability Assumptions



# Winter 2024-2025 Southern California Gas Reliability Assessment: Variability Assumption

	Expected Number of Days		
	Low SD	Normal SD	High SD
<b>Demand Range (Bcfd)</b>			
Higher than 4.618	Negligible	Negligible	0.35
4.0 to 4.6	0.05	0.91	2.96
3.5 to 4.0	3.15	7.68	11.23
2.5 to 3.5	104.47	96.68	90.2
Lower than 2.5	104.34	106.71	107.26
<b>Total</b>	<b>213</b>	<b>213</b>	<b>213</b>
<b>December days above 4,618 MMcfd</b>	<b>0</b>	<b>0</b>	<b>0.27</b>
<b>Total days above 4,618 MMcfd</b>	<b>0</b>	<b>0.03</b>	<b>0.35</b>



# Winter 2024-2025 Southern California Gas Reliability Assessment

Reliability Assessment: Summary of Findings

# Reliability Assessment: Summary of Findings

## Winter is reliable: no imbalance days

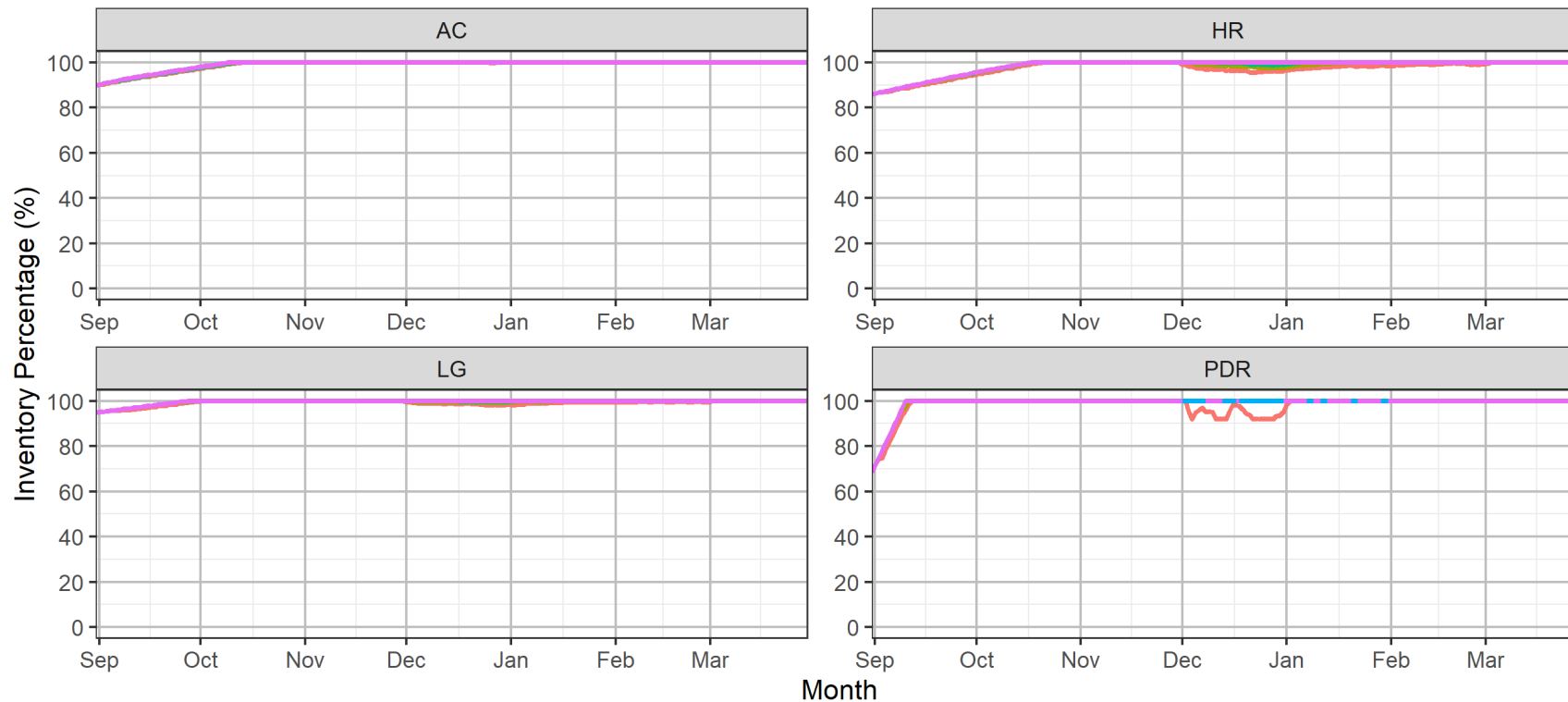
- No imbalance days for any of the three scenarios.
  - If held to the same standard as the electric reliability (1 event in 10 years), imbalance days should be less than  $0.06^+$  per study period.
- For the best-case and worst-case scenarios:
  - All non-Aliso storage fields are full by the end of October.
  - Aliso is also full by the end of October provided capacity is subscribed into (Unbundled Storage Program).

# Reliability Assessment: Summary of Findings

## Inventory Tracking for Scenario 1

Storages Inventory Percentage (%)

Quantile — q.05th — q.25th — q.50th — q.75th — q.95th



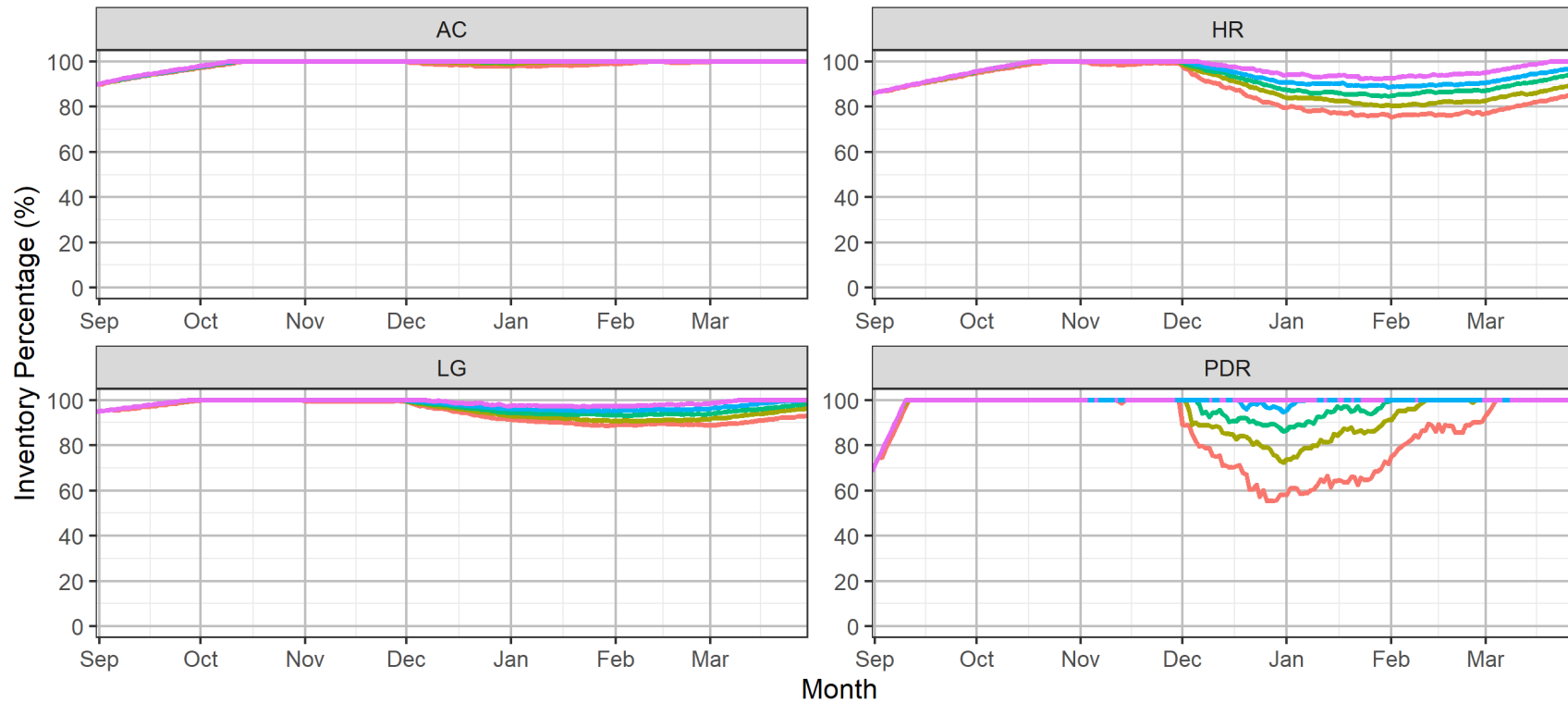
X-axis data is daily. Gridlines represent the first day of the month. Case#24250001

# Reliability Assessment: Summary of Findings

## Inventory Tracking for Scenario 2

Storages Inventory Percentage (%)

Quantile — q.05th — q.25th — q.50th — q.75th — q.95th



X-axis data is daily. Gridlines represent the first day of the month. Case#24250002

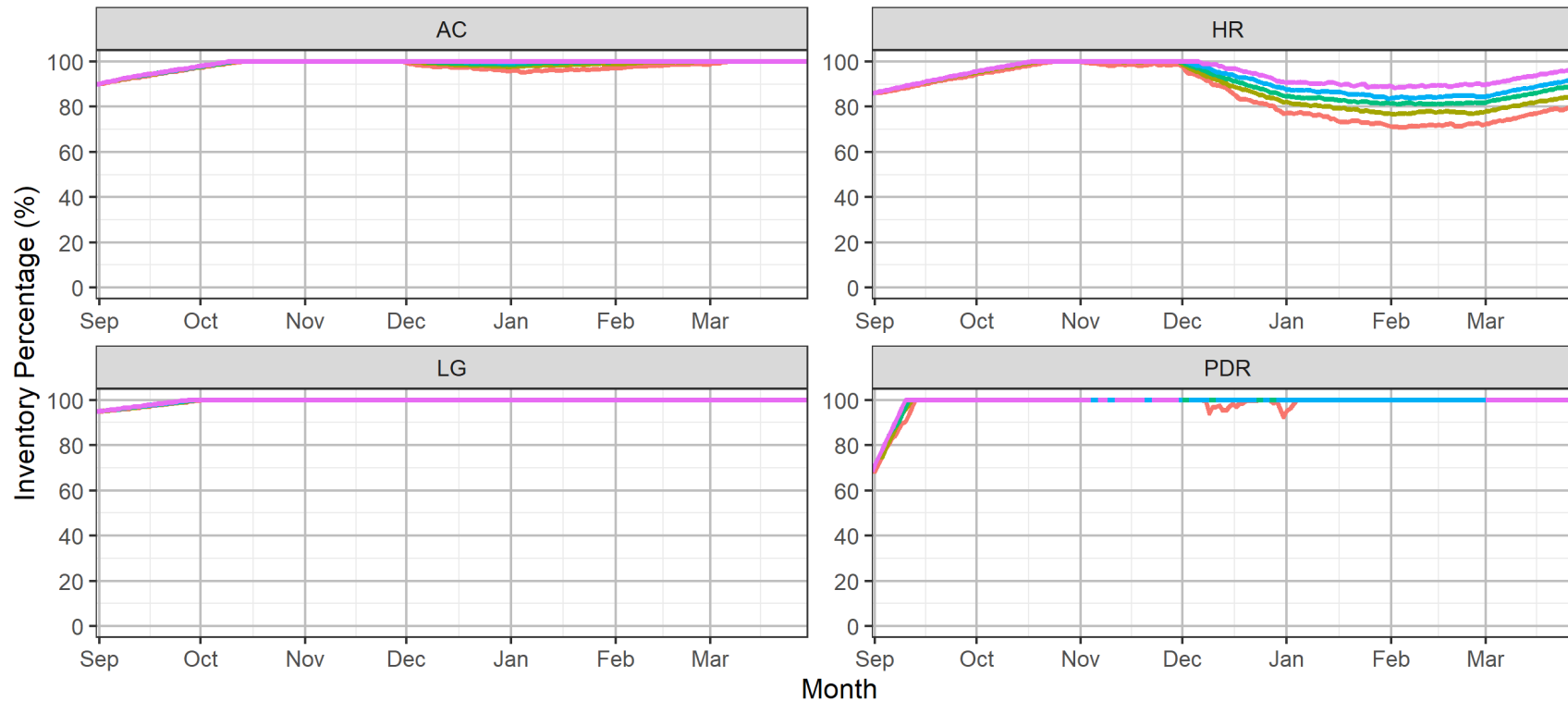


# Reliability Assessment: Summary of Findings

## Inventory Tracking for Scenario 3

Storages Inventory Percentage (%)

Quantile — q.05th — q.25th — q.50th — q.75th — q.95th



X-axis data is daily. Gridlines represent the first day of the month. Case#24250003

# Reliability Assessment: Summary of Findings

## Inventory Tracking for Scenario 3

	Month						
	9	10	11	12	1	2	3
Aliso Canyon	66.77	68.6	68.6	67.75	68.45	68.6	68.6
Honor Rancho	25.67	27.0	27.0	23.06	22.05	22.06	24.35
La Goleta	21.48	21.5	21.5	21.5	21.5	21.5	21.5
Playa del Rey	1.9	1.9	1.9	1.9	1.9	1.9	1.9
<b>Total</b>	<b>116</b>	<b>119</b>	<b>119</b>	<b>114</b>	<b>114</b>	<b>114</b>	<b>116</b>

	End of December Inventory Levels					EFO
	AC	HR	LG	PDR	Total	
	Bcf	Bcf	Bcf	Bcf	Bcf	#/day
Scenario 1	68.6	26.67	21.5	1.9	119	<1e-04
Scenario 2	68.38	23.76	20.34	1.67	114	<1e-04
Scenario 3	67.75	23.06	21.5	1.9	114	<1e-04

# Reliability Assessment: Summary of Findings

## EUV and EUS

- EUV (Expected Unserved Volume) is effectively zero for all three scenarios.
- EUS (Expected Unused Supplies) is the sum of supplies that couldn't be injected into storage due to injection limitations or inventory levels reaching their maximum allowed level, averaged over the study period.
- It could also be interpreted as additional supplies available at the border that never went into SoCalGas system.

Expected Unused Supplies (Bcf) for Scenarios 1-3

		Scenario		
		1	2	3
Month	September, 2024	15.3	15.0	15.1
	October, 2024	23.7	23.5	23.3
	November, 2024	34.0	18.1	18.0
	December, 2024	15.5	3.31	4.09
	January, 2025	21.8	5.37	5.68
	February, 2025	23.4	7.76	7.81
	March, 2025	37.8	18.3	18.7
<b>Total (Bcf)</b>		<b>171.51</b>	<b>91.35</b>	<b>92.65</b>

# Winter 2024-2025 Southern California Gas Reliability Assessment: Summary of Findings

- With the current natural gas assets and no withdrawal restrictions in place, the stochastic daily mass balance model predicts no curtailments or emergency flow orders in Winter 2024-2025.
- The model captures some details about the dynamics of SoCalGas natural gas system that couldn't otherwise be captured using monthly mass balance sheets or hourly transient analysis. Specifically, the model shows withdrawals that are occurring in months where the available supplies are higher than the demand even during the Summer.
- Scenario 3 shows that the predefined order of withdrawal and injection from the storage fields does not affect the amount of stored gas needed to meet the seasonal demand.

# Winter 2024-2025 Southern California Gas Reliability Assessment

Questions?