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Overview of Winter 2024-2025 California Gas Reliability Assessment

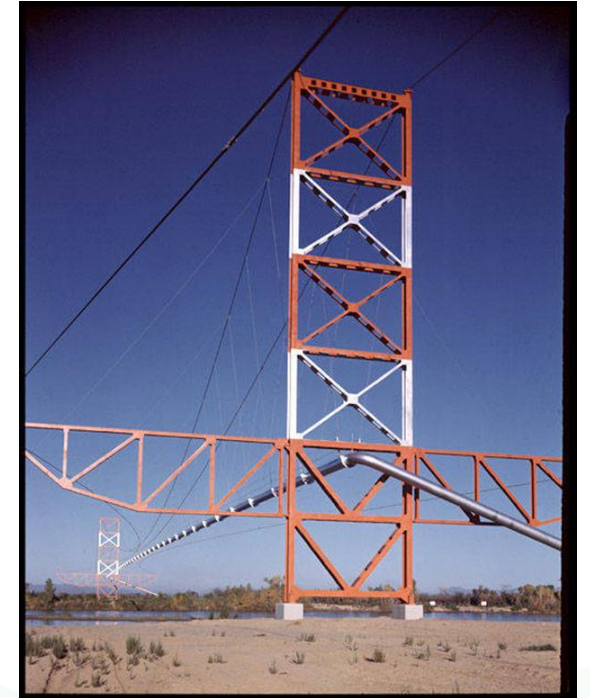
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October 30, 2024



Winter 2024-2025 Gas Reliability Assessment

- PG&E and SoCalGas
 - Curtailments to noncore customers
 - PG&E - First winter assessment
- Gas - electricity system connections
 - 37% of CA electricity supply
 - Noncore curtailment impacts electricity reliability
- Core customers curtailment - Last resort
- PG&E peak days- Independent Storage Providers (ISPs) storage withdrawals
- SoCalGas - Recent restoration of capacity



Source: Northern Arizona University



Winter 2024-2025 Gas Reliability Assessment (cont'd)

- Modeling inputs and analytical tools
- PG&E and SoCalGas (different systems)
- Caveats
 - Unexpected events
 - Where demand is distributed



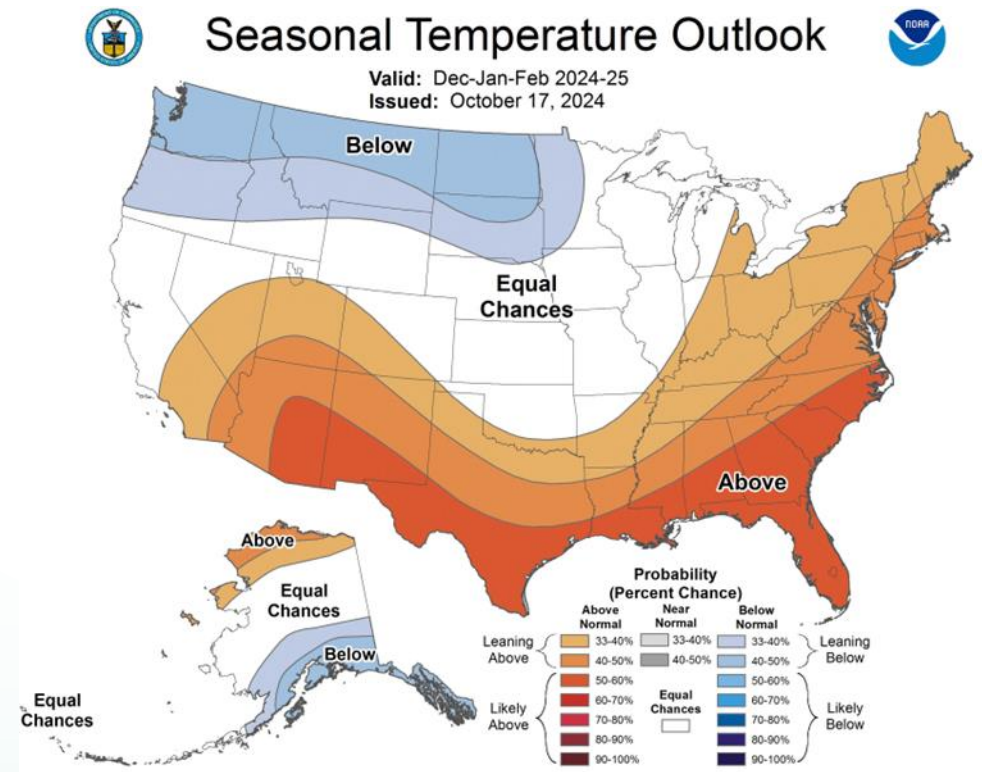
Source: City of Santa Clarita



2024-2025 National Weather Service Forecast

- La Nina conditions
- Above and below normal temperatures across California
- Above average temperatures for Southern California

Points to mild winter conditions



Source: National Weather Service



CEC Modeling Inputs & Analytical Tools

Modeling Inputs Prepared by CEC Staff	PG&E	SoCalGas
Winter peak day forecast	✓	✓
Forecasts for average and cold winter months	✓	✓
Estimated Pipeline Capacity	✓	✓
Estimated Storage Field Withdrawal Capability	✓	✓

CEC Analytical Tools	CEC Modeling Inputs Used	PG&E	SoCalGas
Gas balance models	Peak day forecasts; Monthly forecasts; Pipeline capacity; Storage withdrawal capacity	✓	✓
Steady State Analysis of Hydraulic Models- Overall Capacity	Peak day forecasts; Pipeline capacity; Storage withdrawal capacity	✓	✓
Unsteady State Analysis of Hydraulic Models- Intraday and Linepack Assessments	Peak day forecasts; Pipeline capacity; Storage withdrawal capacity		✓
Stochastic Analysis (Intraday)	Peak day forecasts	5	✓



PG&E Peak Days Gas Balance

Demand, Withdrawal, and Net Shortfall	Case 1: Cold Day Core + Noncore 1-in-10 (MMcfd)	Case 2: Abnormal Peak Day Plus 1-in-90 Core + Noncore 1-in-10 (MMcfd)
Demand		
Core	2,429	2,939
Noncore-NonEG	496	496
EG	1,157	1,157
Off System	+ <u>80</u>	+ <u>80</u>
Total Demand	4,162	4,672
Available Pipeline Capacity	- <u>2,927</u>	- <u>2,927</u>
Needed Withdrawal	1,235	1,745
Assumed Available Withdrawal (PG&E Storage)	- <u>794</u>	- <u>794</u>
Net Shortfall <i>(Does Not Include ISPs' Withdrawals)</i>	= <u>441</u>	= <u>951</u>



PG&E - Meeting Net Shortfall

ISPs

- Some data not public
- PG&E can procure ISP gas to meet reliability standards
- Transactions w/marketers may not prioritize reliability
- Redwood constraint
- Some ISP withdrawals can serve local transmission systems directly

Operational Flow Orders & Emergency Flow Orders - system imbalance





PG&E Hydraulic Model Analysis



Source: CEC

- CEC peak day forecasts - hydraulic models of PG&E's Redwood & Baja systems
- Withdrawals from ISPs can alleviate shortfalls



PG&E Conclusions

- Curtailments preventable
- EG demand forecast considerations
- Withdrawals from ISPs feasible
- Significant pipe inventory at PG&E



Source: CEC

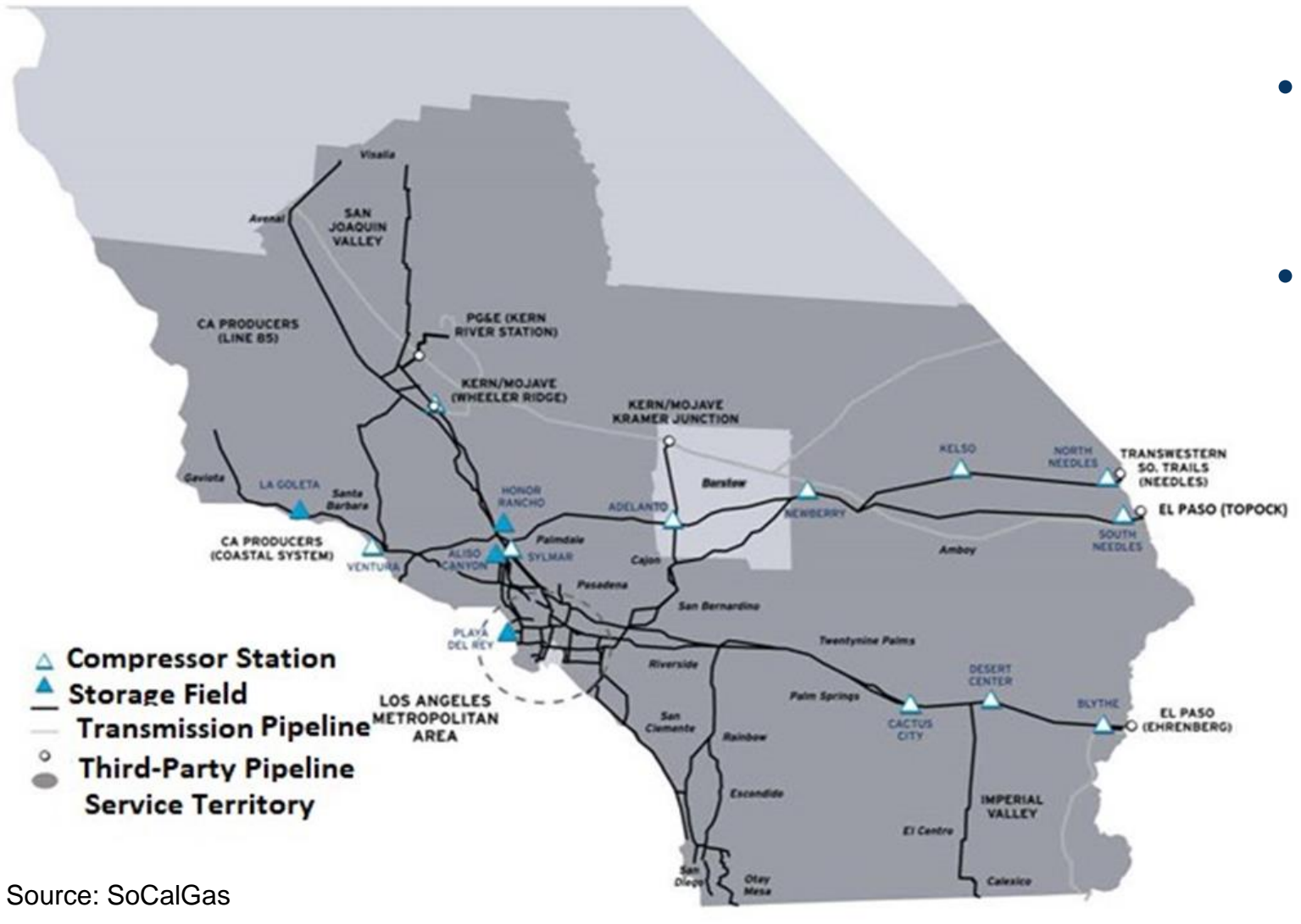


SoCal Gas Peak Days Gas Balance

Demand, Withdrawal, and Net Shortfall	Case 1: Cold Day Core + Noncore 1-in-10 (MMcfd)	Case 2: Extreme Peak Day Plus 1-in-35 Core + Noncore 1-in-10 (MMcfd)
Demand		
Core	2,834	2,987
Noncore-NonEG	595	595
EG	+ <u>1,080</u>	+ <u>1,080</u>
Total Demand	4,509	4,662
Available Pipeline Capacity	- <u>3,035</u>	- <u>3,035</u>
Needed Withdrawal	1,474	1,627
Assumed Available Withdrawal	- <u>1,900</u>	- <u>1,900</u>
Net Shortfall	= <u>0</u>	= <u>0</u>



SoCal Gas Hydraulic Model Analysis



- Incorporated CEC peak day forecasts
- Simulated operations across the entire gas day



SoCal Gas Conclusions

- SoCalGas can meet demands w/o curtailments
- Pipeline and storage withdrawal capacity restorations have helped



Source: CEC



Thank you!