

*IEPR and Electricity & Natural
Gas Committees Workshop on
Natural Gas Activities*

Natural Gas Infrastructure



Presented by
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California Energy Commission
May 14, 2009

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Topics

- Pipeline and production supply
- Storage
- High demand cases
- Supply and demand balances
- Renewable resources
- New projects
- Summary



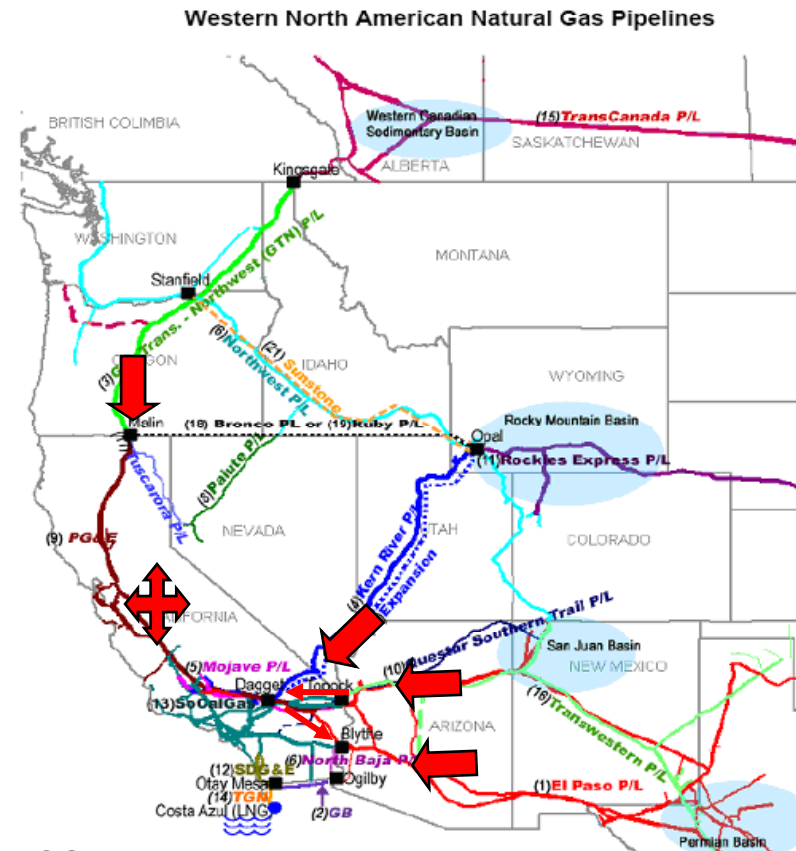
Limited Statewide Pipeline Supply

- Pipelines serve customers in and out of California
- Utilities have multiple receiving points that may exceed the pipeline delivery capacity
- One of the two will limit pipeline supply

Statewide Supply and Receiving Capacity – MMcfd



Supply Point	Delivery	Receipt	Peak/ Limited
Malin	2,100	1,850	1,850
Kern River	1,750	2,640	1,500
Topock	3,350	2,600	2,450
Ehrenberg	2,110	1,210	1,210
Calif. Prod	800	1,030	800
Total	10,110	9,330	7,810





Limits on Supply From Storage

- Winter short peak day demand
- Long-term high winter demand



California Storage Withdrawal – MMcfd

- May provide up to 4,675 MMcfd during peak day demand.
- Limited to 2,120 MMcfd for a prolonged high demand period

Storage	Peak Day	Limited Supply
PG&E	1,500	400
SoCal Gas	2,225	1,100
Lodi	500	300
Wild Goose	450	320
Storage Summary	4,675	2,120

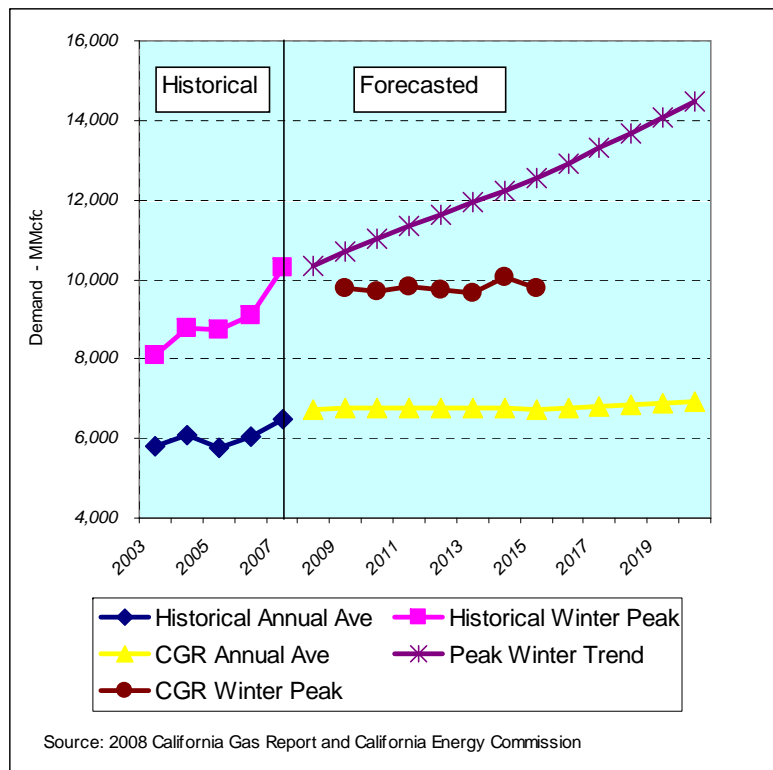
Statewide Winter Peak Day and Limited Supply Summary – MMcfd



Supply	Firm Delivery	Peak Supply	Limited Supply
Pipeline	9,310	7,010	7,010
Production	800	800	800
Storage	4,675	4,675	2,120
Total	14,785	12,485	9,930

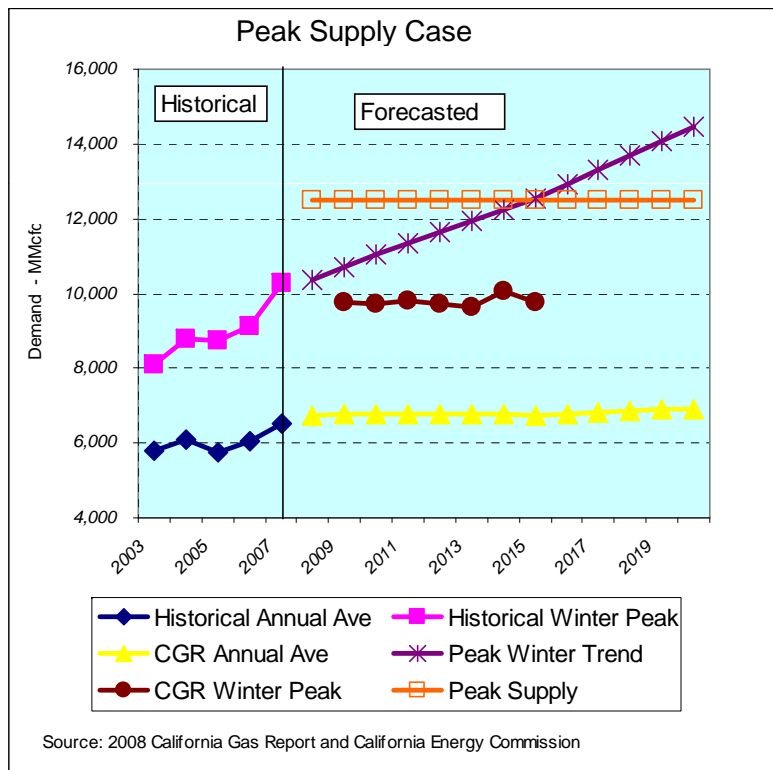
- Firm delivery capacity exceeds peak and limited supply
- Peak supply constrained by pipeline supply
- Limited supply restricted by both pipeline and storage

Statewide Peak versus Long-term Winter High Demand



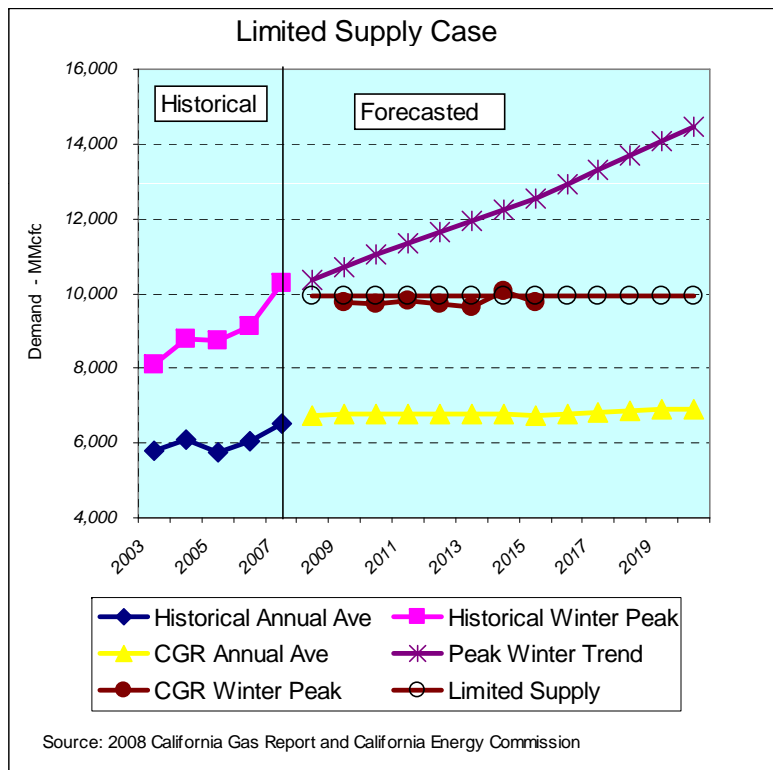
- Based on 2008 CGR for winter high demand day
- Historical winter high demand has been increasing
- Forecasted high winter demand is flat
- Historical peak trend has been extended into the future
- Depict winter long-term high demand too

Statewide Peak Supply and Winter Short-term Demand Balance – MMcfd



- The CGR Winter Peak is well below the 12,485 MMcfd peak supply
- The peak winter trend would be exceeded by 2016.

Statewide Limited Supply and Winter Long-term Demand Balance – MMcfd



- Limited supply is uncomfortably close to the forecasted winter peak demand
- Similar to 2000-01 Energy Crisis conditions
- New infrastructure needed immediately for forecasted historical trend



Renewable Resources

- CGR indicates summer short-term peak day decline of 1,400 MMcfd
- Renewable resources add uncertainty to natural gas infrastructure operations.
- Renewable generation technologies are not,
 - Dispatchable to follow load, and
 - May not be available to meet peak day requirements
- Options to supplement the renewable generation
- Gas utilities have a number of tools



Proposed Project Summary - MMcfd

Project	Peak Supply	Limited Supply
Pipeline		
GTN/PGE	150	150
Kern River	145	145
Otay Mesa	<u>400</u>	<u>400</u>
Pipe Summary	695	695
Storage		
Sacramento	200	90
Fresno	650	240
Lodi Expansion	<u>200</u>	<u>110</u>
Storage Sum	1,050	440
Project Summary	1,745	1,135
Grand Total	14,230	11,065

- Pacific Northwest
- Kern River
- LNG
- Storage
- Shale
- Pipelines flowing east from the Rockies



Summary

- Pipeline delivery and utility receiving capacities are different
- Pipeline supply must be reviewed on a statewide basis
- Storage needs must meet short and long-term high demand
- Winter short-term high demand and winter prolonged high demand



Summary - Continued

- Short-term winter peak and prolonged high winter demand provide different infrastructure needs
- Renewable resources add uncertainty to natural gas infrastructure operations
- New supply and storage projects would benefit California
- LNG's role in California's future is still uncertain



Issues and Questions for Consideration

- Could natural gas demand growth in upstream markets further limit California's supply access via existing infrastructure?
- Will winter and summer natural gas peak demand in the United States continue to grow at current rates?
- How could daily natural gas demand change as renewable technologies are added to the electric resource mix?
- Can both an Oregon LNG terminal and a Rockies pipeline that add natural gas supply into PG&E at Malin be constructed?
- What additional natural gas storage might be constructed or expanded in California?

Issues and Questions for Consideration

- Continued



- How much and for how long could Rockies natural gas be siphoned east of the Rockies?
- Could natural gas from the Rockies and the U.S. Southwest that currently flows to the Eastern U.S. be replaced by shale gas and therefore allow those sources to be available to California?
- What role would LNG from Costa Azul or from a new facility proposed off the southern California coast play in California's future natural gas supply mix?
- What additional pipelines bringing gas from the Rockies can be constructed to bring gas to the West Coast?



Questions