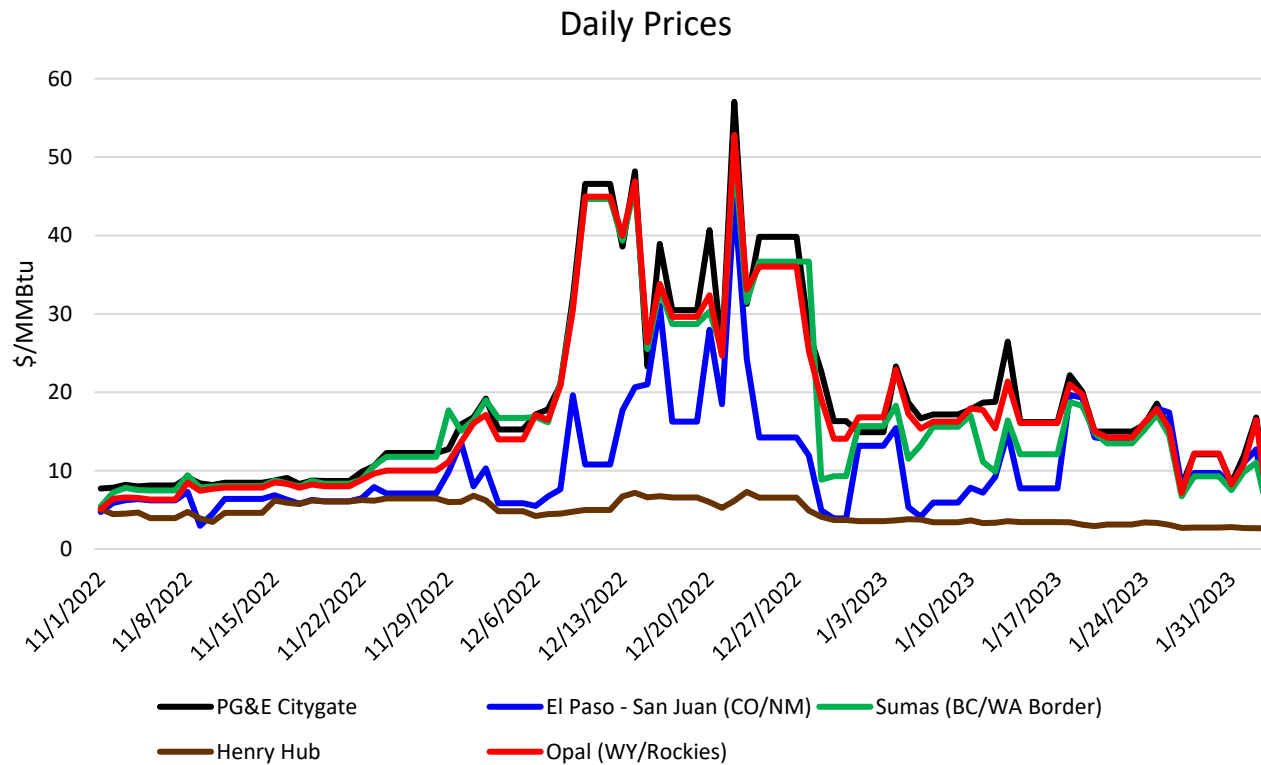


En Banc
on Current Gas Market Conditions and
Impacts of Gas Prices on Electricity

February 7, 2023

Prices Across The West Have Increased This Winter

- Prices in Washington, Oregon, Colorado/New Mexico, Wyoming and California rose dramatically starting in November.
- National benchmark prices (U.S. Henry Hub) remained at modest levels through winter.



Source: PG&E and Gas Daily

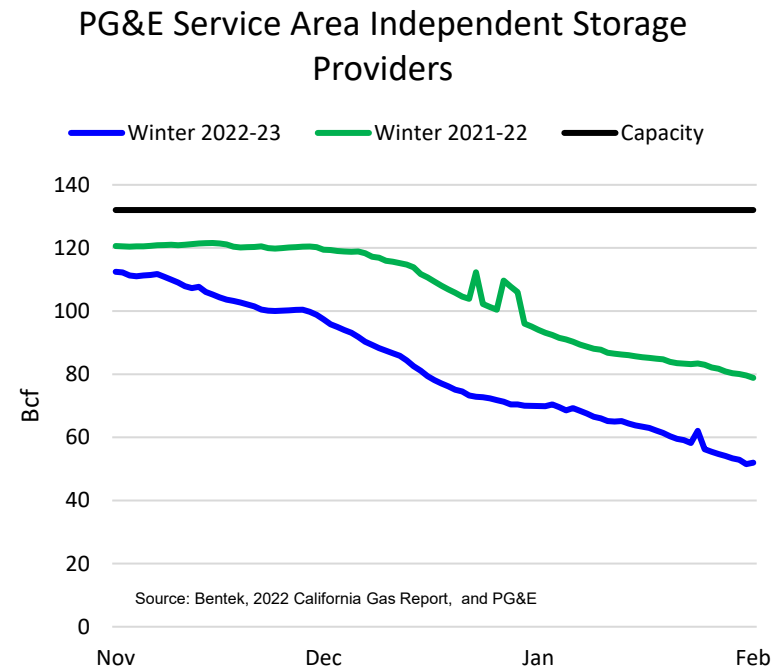
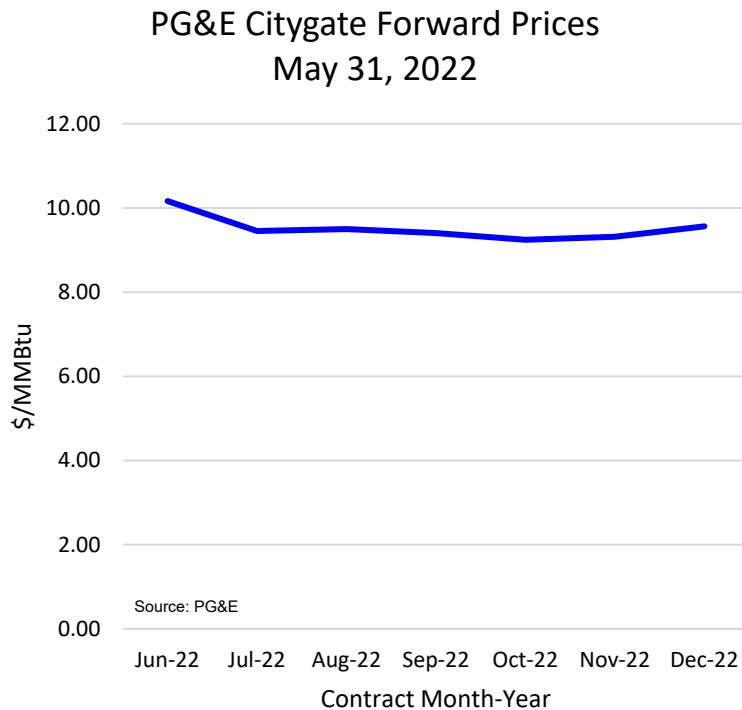
Extreme Winter Gas Prices Driven By Market Forces

- A cold and early start to winter increased gas and electric demand.
- The prolong drought has increased gas generation demand across Western markets.
- Lower than normal west coast gas storage inventories created a supply constraint.
- Interstate pipeline constraints have limited deliverability to California.

Price Driver	This Winter (Nov-Jan)	Last Winter (Nov-Jan)	Cumulative Change (Bcf)	Percent Change
PG&E Core Gas Demand (MMcf/d)	1,327	1,200	14	+13%
PG&E Electric Gen Gas Demand (MMcf/d)	780	654	11	+19%
Pacific Region (CA, OR, WA) Inventory Dec 1 (Bcf, Energy Information Administration)	217	266	-49	-18%
El Paso Pipeline Delivery Capacity Constraints (MMcf/d available to Southern California)	3,500	4,100	-27	-15%

Northern California Storage Facilities Began Winter - Nov 1 - With Available Space

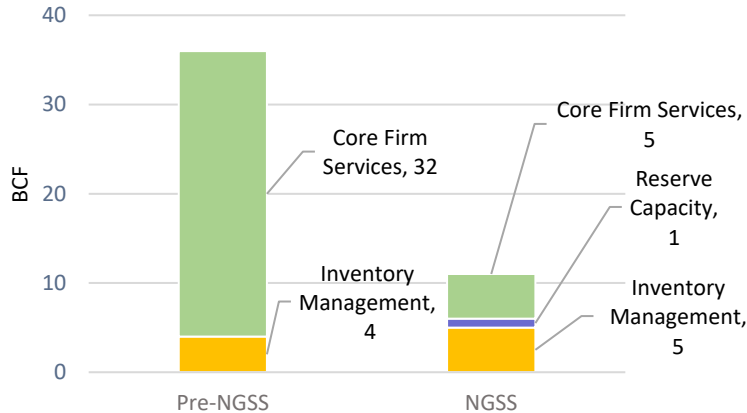
- PG&E's gas procurement groups entered this winter with more than 90% of contracted capacity filled.
- Forward prices in Jun-Dec 2022 provided little incentive for merchants to inject gas into storage.



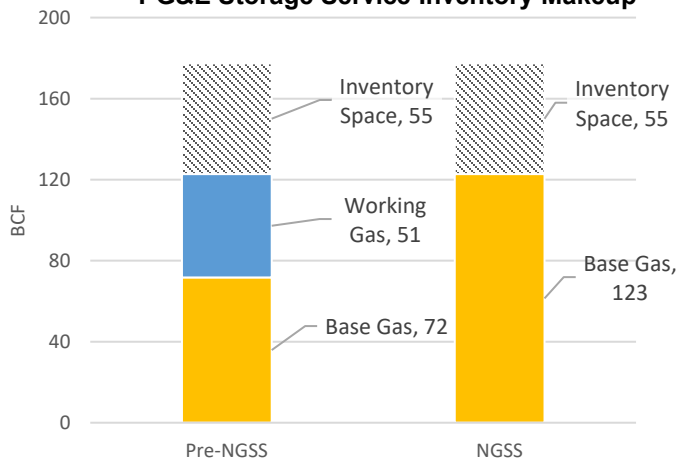
Reclassification of Base Gas

as part of the Natural Gas Storage Strategy (NGSS)

PG&E's Storage Service Offerings



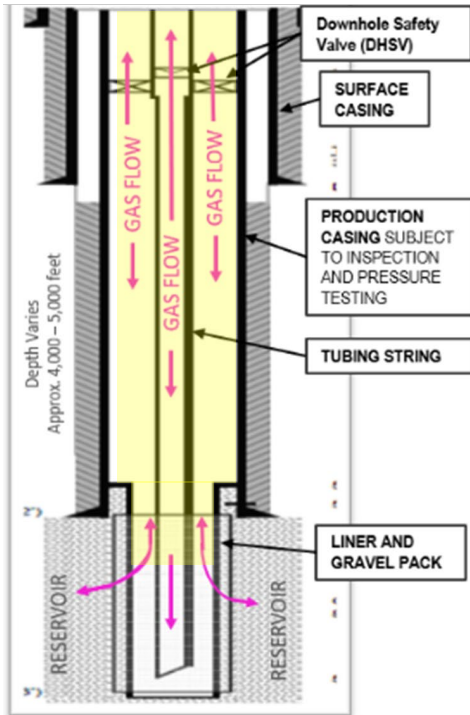
PG&E Storage Service Inventory Makeup



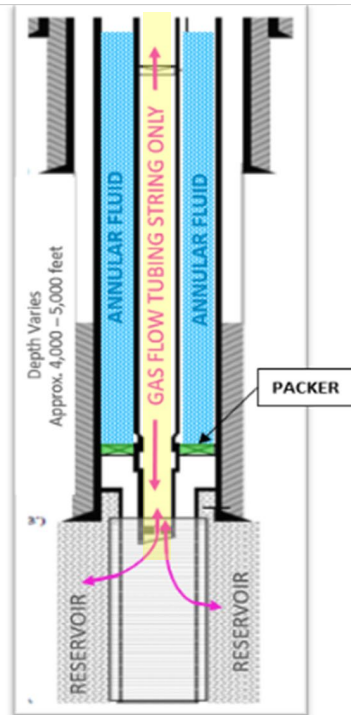
- The 2019 Gas Transmission and Storage rate case adopted the **Natural Gas Storage Strategy and redefined PG&E's storage service offerings**
- The 51 BCF of working gas was reclassified to base gas to align with these new firm services and **there was no need to backfill or replace the supply** as it was an accounting adjustment as a part of the NGSS implementation.
- This **reclassified gas was not removed** and thus had no impact on the total gas in storage (Base + Working gas), nor did it impact withdrawal capacity.
- **Working natural gas inventory was effectively acting as base gas even before the reclassification** formalized the change. In fact, over the last 10-year period there were only two times that any of the 51 BCF was utilized for as-available service prior to the reclassification.
- PG&E's ability to meet NGSS obligations is dependent on (1) sufficient base gas inventory and (2) well withdrawal capacity. **Both of these were met this winter.**
- **Future well withdrawal capacity is at risk** due to the approvals pending with CalGEM.

CalGEM Regulations Impact to Storage Operations

Historic Well Construction



Converted/Retrofit Well Construction



Well construction requirements reduce individual well capacity by restricting the flow area (highlighted in yellow).

Well Construction Requirements:

- Well withdrawal capacity **is and will continue to be impacted** by CalGEM regulations.
 - Applies to all California operators.
 - Construction standard requirement of dual barrier construction conversion to be implemented 2019-2025.
 - On average PG&E sees an average 40% reduction in well capacity with conversion.
 - Loss impact has compounded year over year with phased implementation and has been amplified with adjacent well outage introduced by performing inspections.
- PG&E has maintained **deliverability obligations** as the implementation and inspection frequency has been phased.

CalGEM Regulations Impact to Storage Operations

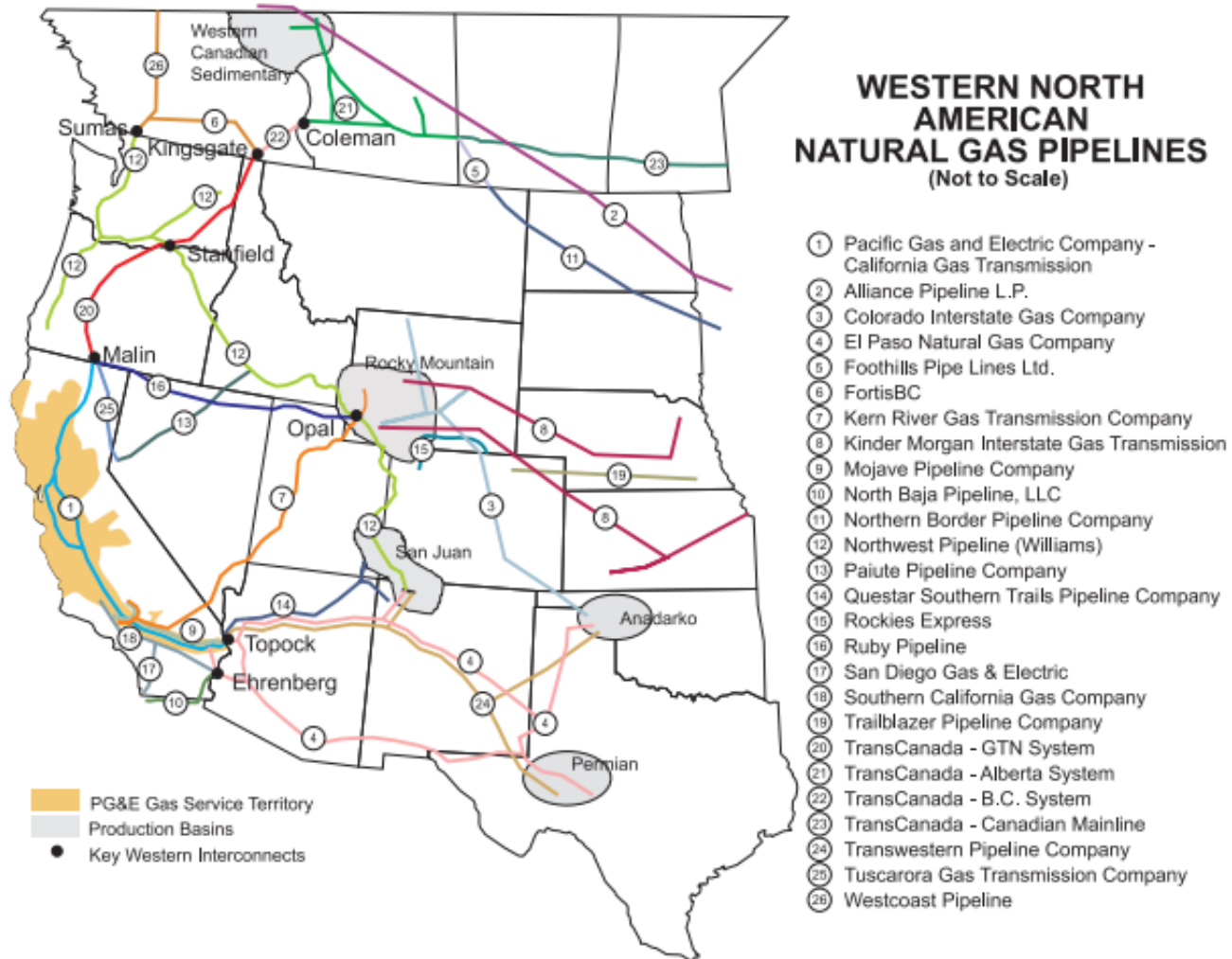
Well Inspection Frequency Requirements:

- **Mechanical Integrity Testing Frequency for wells impacts the availability of storage capacity for market use** because it introduces outages to perform the assessments to withdrawal and injection capacity.
- **PG&E has maintained capacity obligations** as the implementation and inspection frequency was phased from 2019-2025. However, PG&E did experience premature well capacity loss due to request from CalGEM to accelerate baseline inspections – now planned to be complete by 2024.
- **Future well withdrawal capacity is at risk** due to regulatory uncertainty as reinspection frequency approval remains pending with CalGEM.
- **PG&E is seeking approval from CalGEM for a risk-based reinspection frequency for operators to mitigate this ongoing impact and balance well safety, gas system reliability and cost.**



Typical well site with rig performing well inspection. Multiple wells are removed from service due to close spacing layout of facility.

Western Gas Pipelines



Patterns Seen In Market Deliveries of Gas to PG&E's System

- Generally, market supplies are in alignment with end-use and we can manage our system inventory with pipeline balancing
 - 200 MMcf/d Injection or 300 MMcf/d Withdrawal
 - However, during times when PG&E sees large imbalances between supply and demand and the projected inventory levels exceed the upper or lower thresholds, PG&E Gas Control calls an Operational Flow Order (OFO) to bring the system in balance.
- Operational Flow Orders (OFO) Summary

Winter	Nov	Dec	Jan	Feb	Total
Nov-22 thru Feb 23	6	12	13	3	34
Nov-21 thru Feb 22	5	2	2	10	19
Nov-20 thru Feb-21	1	6	4	6	17

Source: <https://www.pge.com/pipeline/operations/ofo/ofearch.page>,
Accessed 2/3/2023

OFOs Provide Sufficient Incentive To Bring The Market Into Balance

System Inventory Status								
Plan 5, posted 3:51 AM PT (Before OFO called on 2/1/2023)								
Ending Inventory History				Ending Inventory Forecasts				
MMcf	1/28/2023	1/29/2023	1/30/2023	1/31/2023	2/1/2023	2/2/2023	2/3/2023	
4750								
4700								
4650								
4600								
4550								
4500								
4450								
4400	4443							
4350								
4300		4345						
4250								
4200								
4150				4188				
4100								
4050			4061		4099			
4000								
3950						3984		
3900								
3850							3863	
3800								
3750								
3700								
3650								
3600								



System Inventory Status								
Plan 2, posted 12:53 PM PT (After OFO called on 2/1/2023)								
Ending Inventory History				Ending Inventory Forecasts				
MMcf	1/29/2023	1/30/2023	1/31/2023	2/1/2023	2/2/2023	2/3/2023	2/4/2023	
4750								
4700								
4650								
4600								
4550								4590
4500								
4450								
4400							4409	
4350								
4300	4345							
4250						4265		
4200								
4150								
4100			4147	4149				
4050		4061						
4000								
3950								
3900								
3850								
3800								
3750								
3700								
3650								
3600								

	Within Operating Limits
	Outside Operating Limits

All numbers are expressed in MMcf/day

When the forecast pipeline ending inventory **exceeds** the upper pipeline inventory operating limit or falls **below** the lower pipeline inventory operating limit, an OFO may be called to maintain the integrity and reliability of the gas transportation system.

Actions To Help

- PG&E and CPUC customer mitigations
 - California Climate bill credit accelerated from April
 - Amortize December under-collections over 2 months instead of 1 month
- PG&E recommends the CEC and CPUC to conduct a detailed gas and electric market fundamental study to determine the root causes of supply and demand factors driving winter high prices
- PG&E suggests considering applying the Climate Credit during the winter when bills reflect higher consumption