

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

February 7, 2023



California Public
Utilities Commission

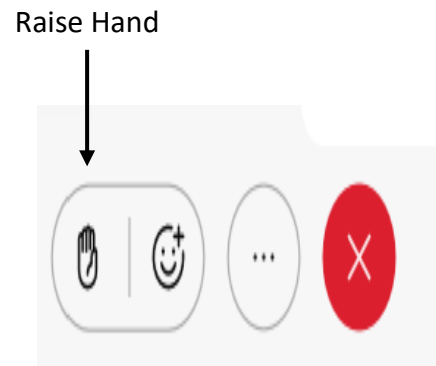
Welcome

En Banc Logistics

- Today's agenda and presentations are available on the CPUC's website at <https://www.cpuc.ca.gov/winter2023naturalgas>
- There will be three panel discussions today, followed by a 15-minute Q&A after each panel.
 - Only moderators and dais members will be able to ask questions to the panelists.
- Opportunity for public comment at the end of the En Banc.
 - To make a public comment during the public comment portion of the En Banc:
 - Please call 800-857-1917
 - Access code: 1767567#
 - You may also email your comments to GasPolicy@cpuc.ca.gov
- ***This En Banc is being recorded***

En Banc Logistics

- Please mute yourself when you are not speaking.
 - To self-mute: press star six. To unmute: press star zero. Or you can press mute on your iPhone.
- Members of Dais:
 - If you have a question during Q&A, please utilize the “Raise Hand” function on Webex and unmute yourself once called upon.
- Panelists:
 - If you would like to respond to a general question from the dais, please utilize the “Raise Hand” function and unmute yourself once called upon.



Dais Remarks

**California Public Utilities Commission
California Energy Commission
California Independent System Operator**

Panel One: Current Gas Market Conditions and Prices

- **Moderator:** Jean Spencer, Supervisor, Energy Division, CPUC
- **Panelists:**
 - Aleecia Gutierrez, Director, Energy Assessments Division, California Energy Commission
 - Rodger Schwecke, Senior Vice President and Chief Infrastructure Officer, SoCalGas
 - Pacific Gas and Electric
 - Gillian Clegg, Vice President, Energy Policy and Procurement
 - Lucy Redmond, Director, Gas Reservoir Engineering and Facilities
 - Alfred Musgrove, Director, Gas Control
 - Mark Pocta, Program Manager, Public Advocates Office
 - Michael Williamson, CEO Williamson Energy

High Winter Gas Prices

February 7, 2023

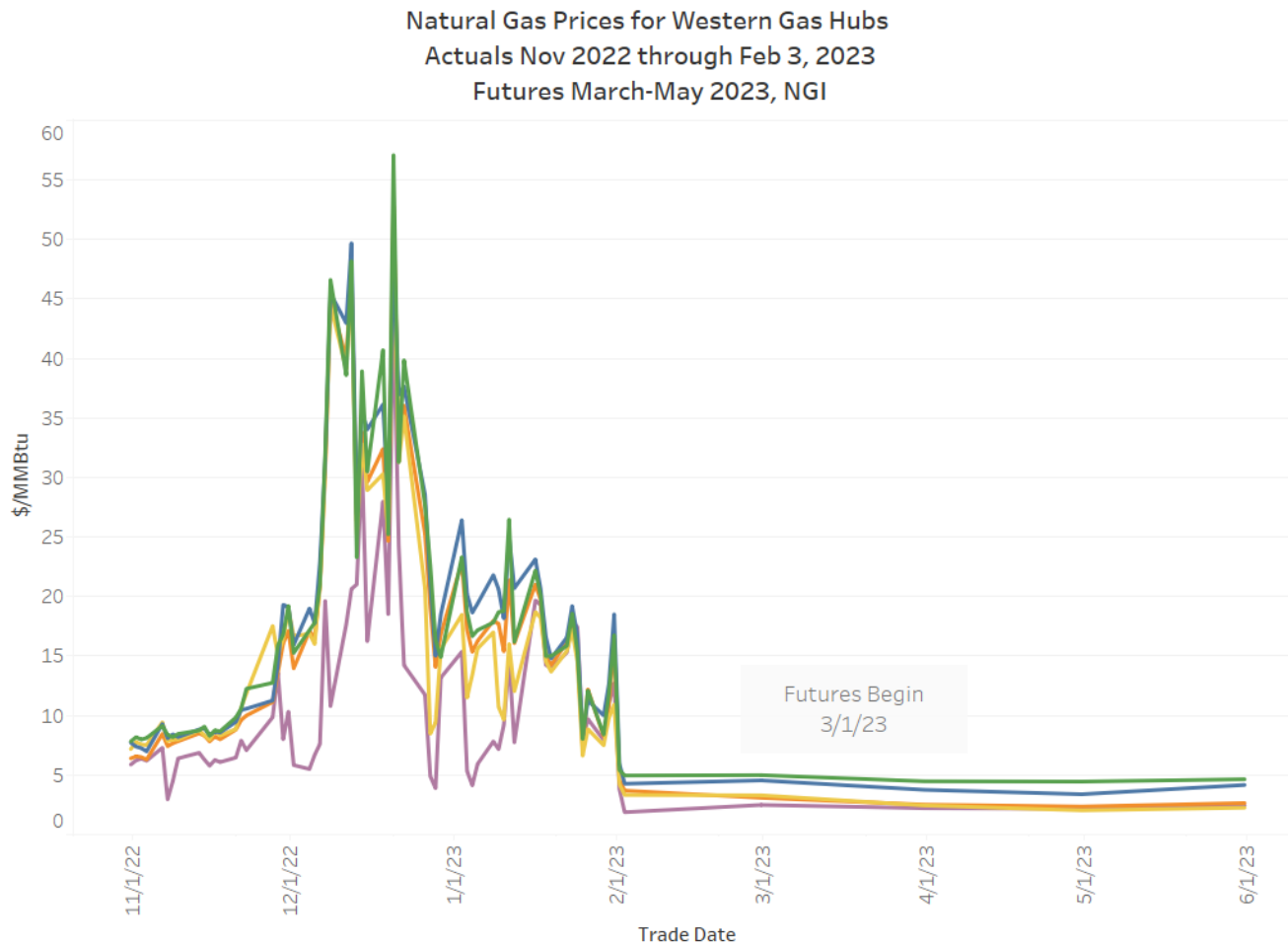
Jean Spencer

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



California Public
Utilities Commission

Western Gas Prices: Actuals and Futures



- Pricing_Point
- PG&E Citygate
 - SoCal Citygate
 - Northwest Sumas
 - Opal (Rocky Mountains Region)
 - El Paso San Juan



Bill Impacts

Estimated Average Residential Gas Bills: 2022 vs. 2023

	SoCalGas	Jan-22	Jan-23	Feb-22	Feb-23
SoCalGas	Non-CARE	\$123.52	\$299.77	\$98.52	\$134.82
	CARE	\$66.40	\$167.20	\$52.73	\$73.86
SDG&E	Non-CARE	\$103.81	\$225.13	\$83.67	\$109.51
	CARE	\$59.40	\$131.37	\$49.50	\$64.55
PG&E	Non-CARE	\$151.20	\$195.56	\$119.00	\$150.00
	CARE	\$104.60	\$136.29	\$94.00	\$118.00

Source: SoCalGas and PG&E

EIA Analysis of High Gas Prices ([12/21/2022](#) & [1/24/2023](#))

- Widespread, below-normal temperatures
- High natural gas consumption
- Lower natural gas flows from Canada
- Pipeline constraints, including maintenance in West Texas
- Low natural gas storage levels in the Pacific region



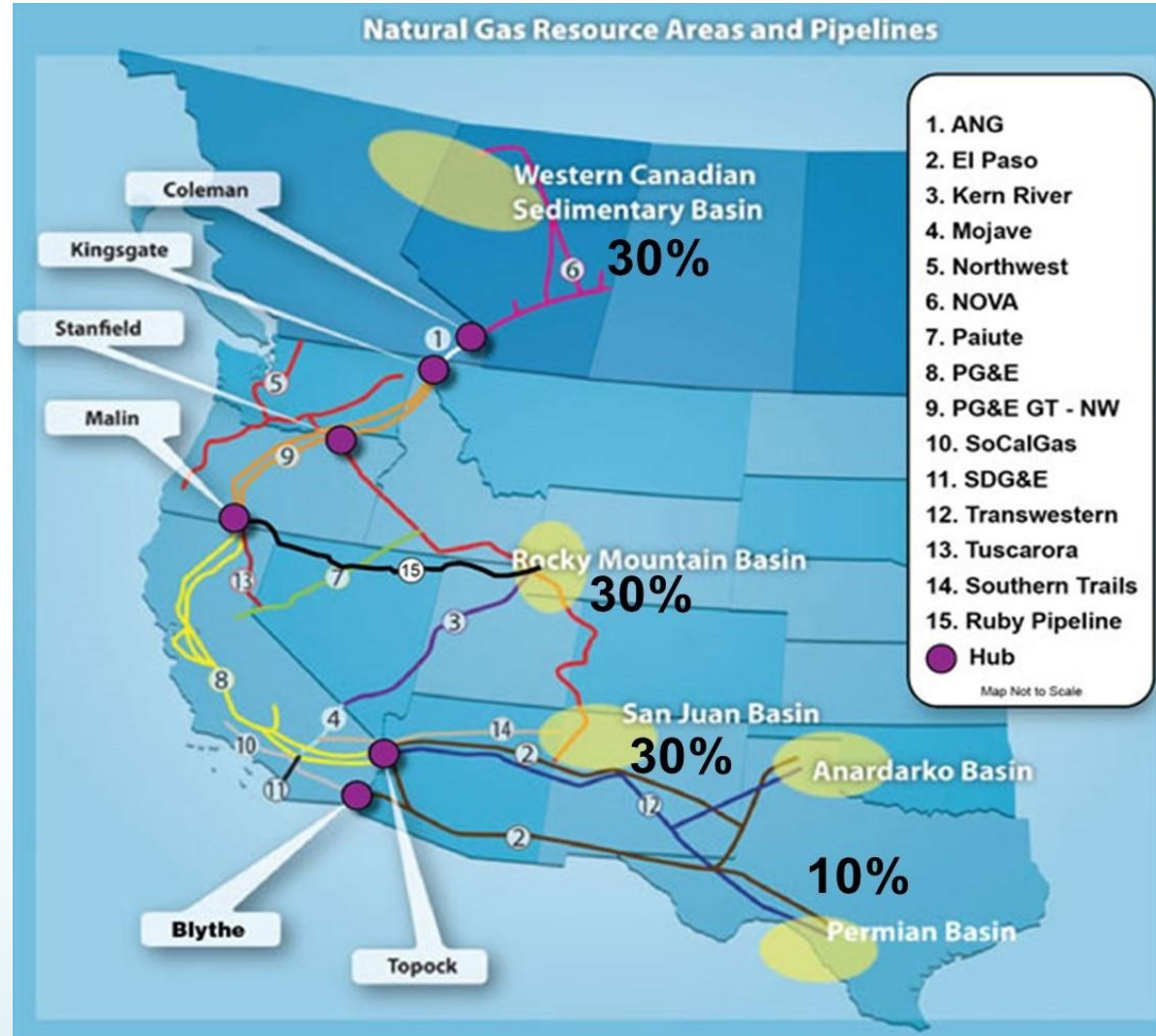
Gas Market Trends

Aleecia Gutierrez, Director, Energy Assessments Division

February 7, 2023

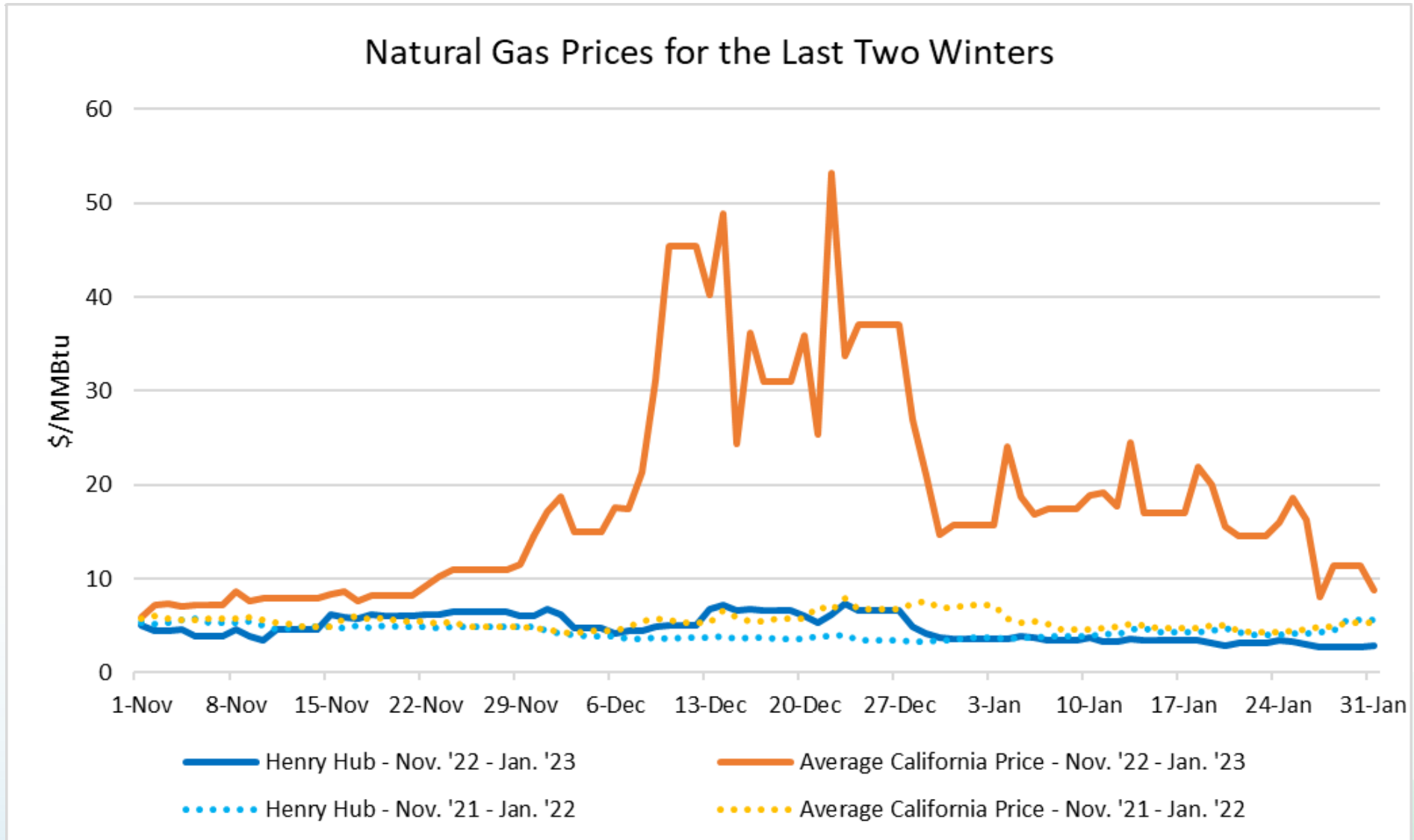


California Natural Gas Supplies



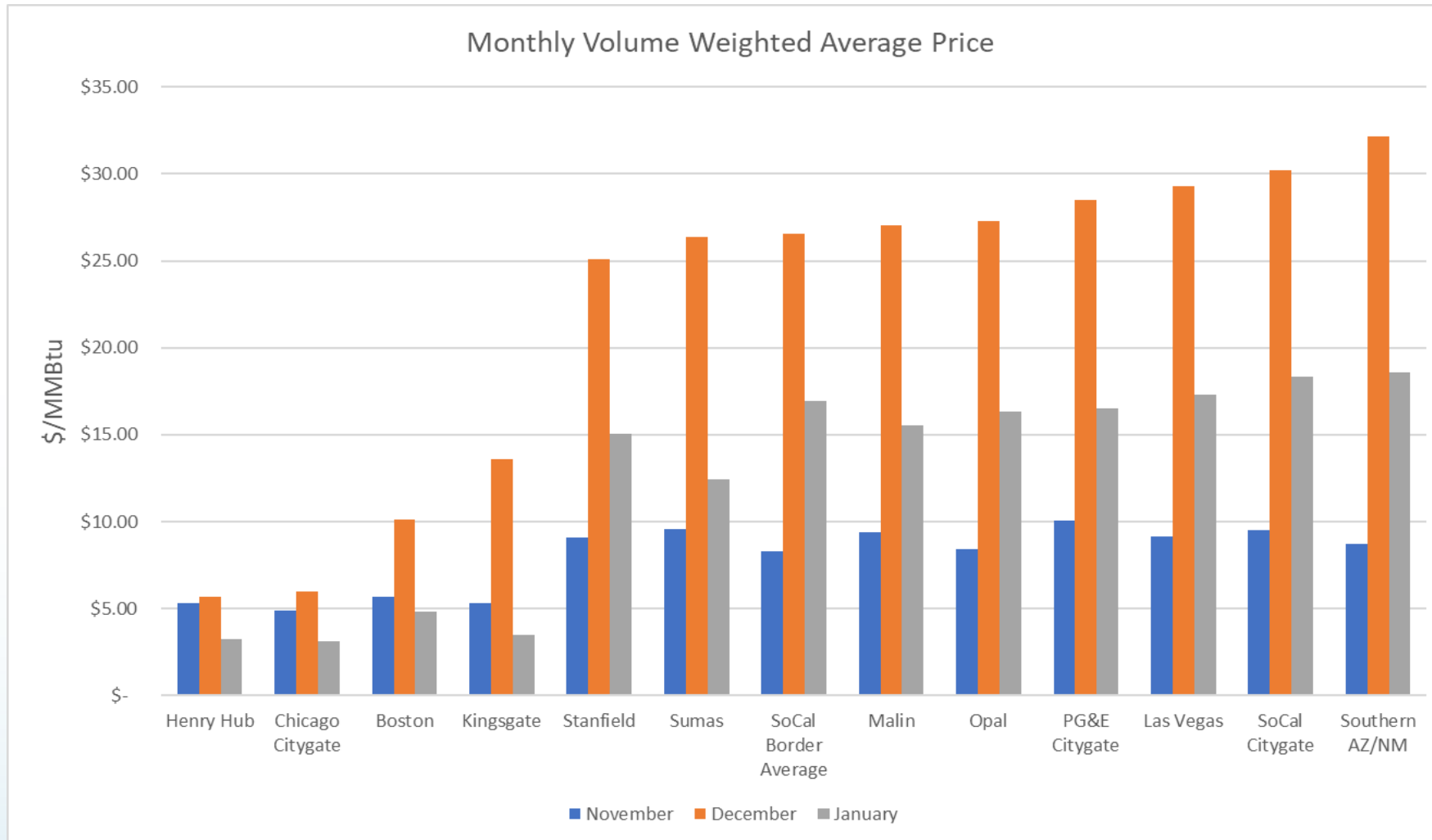


California Natural Gas Prices





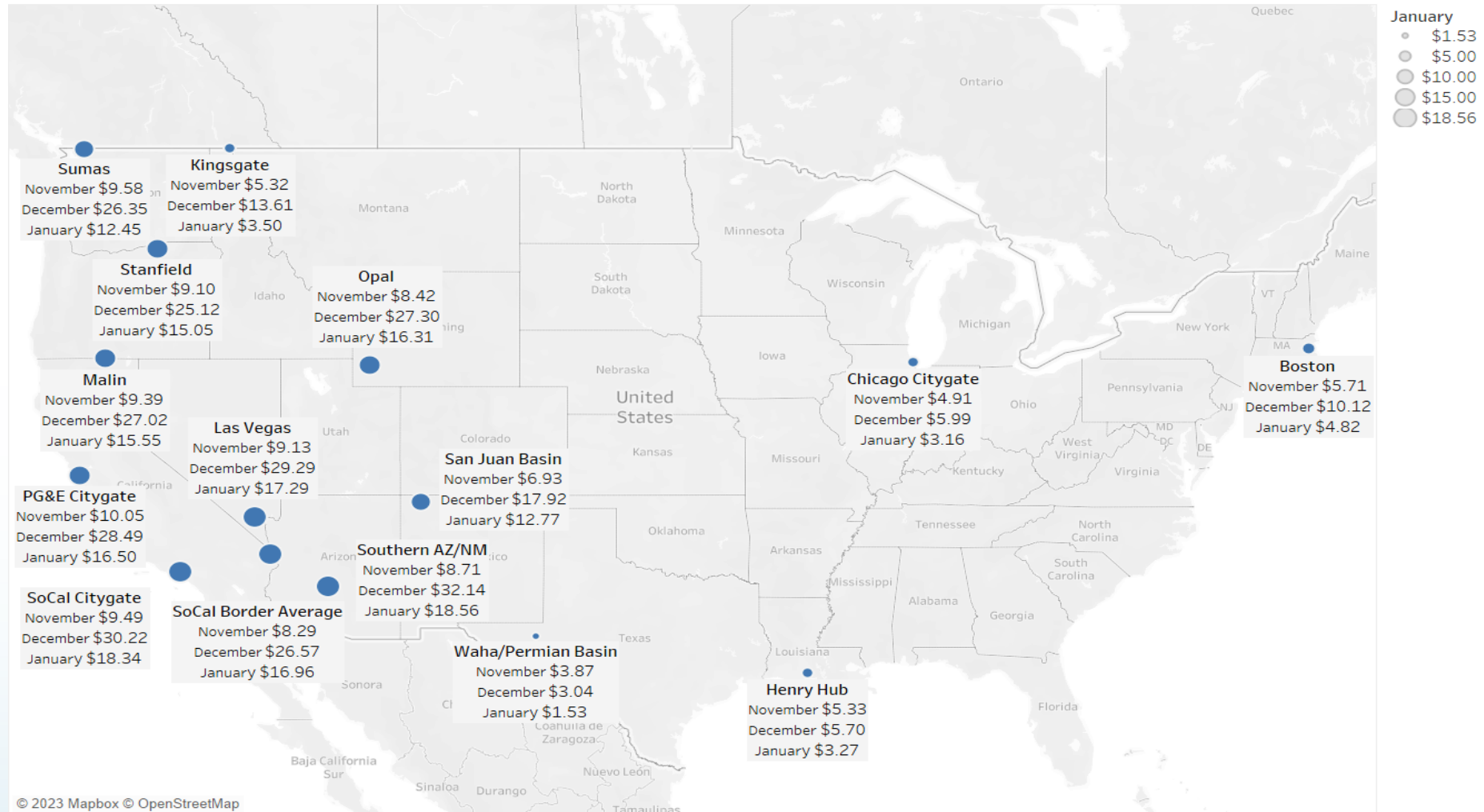
Price Comparison at US Hubs (avg) Nov 2022 - Jan 2023





Price Comparison Map

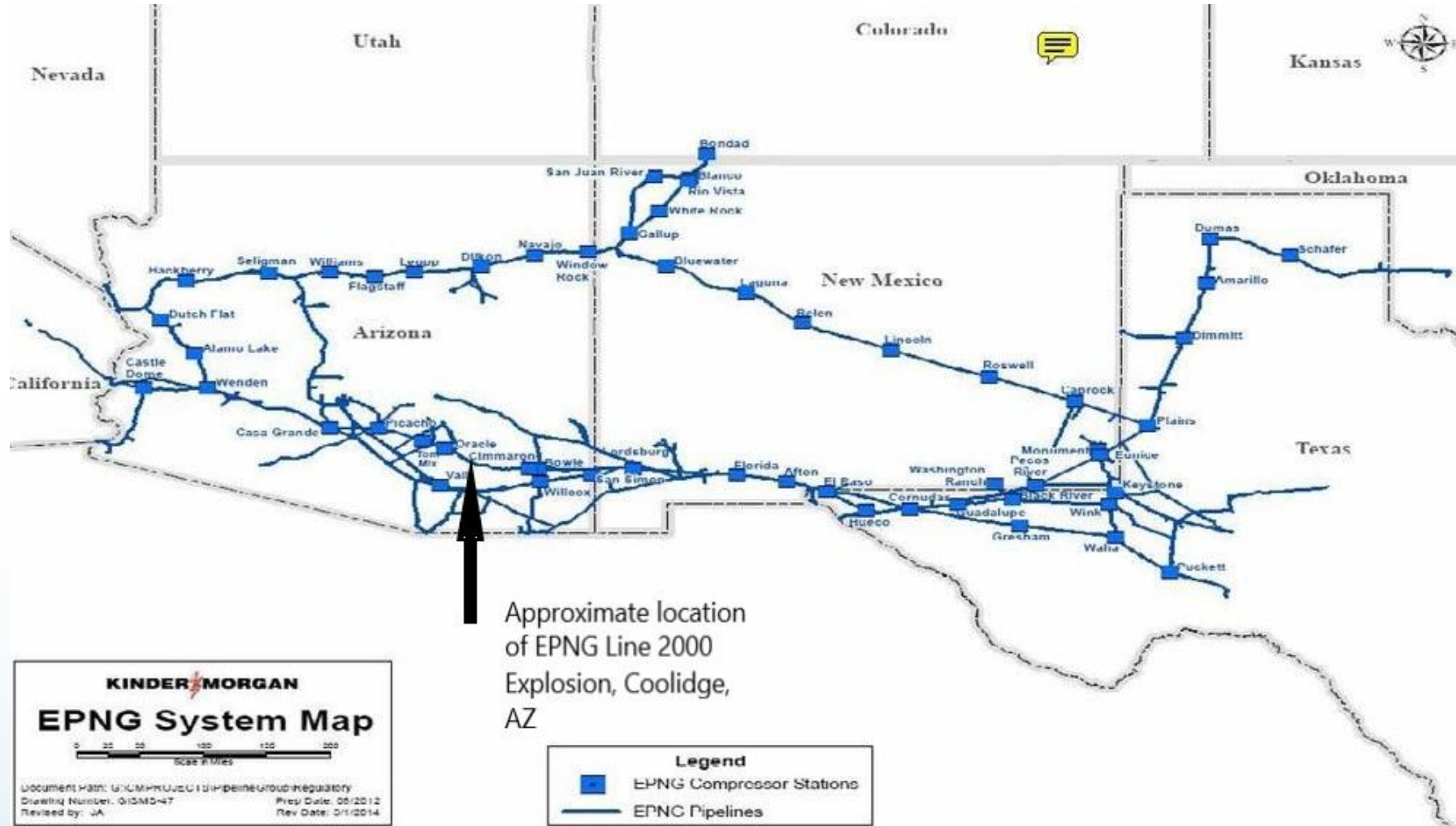
Winter 2022-2023 Natural Gas Hub Prices (\$/MMBtu)



Map based on Longitude (generated) and Latitude (generated). Size shows sum of January. The marks are labeled by sum of November, sum of December, sum of January and Pricing Hub. Details are shown for State and City.

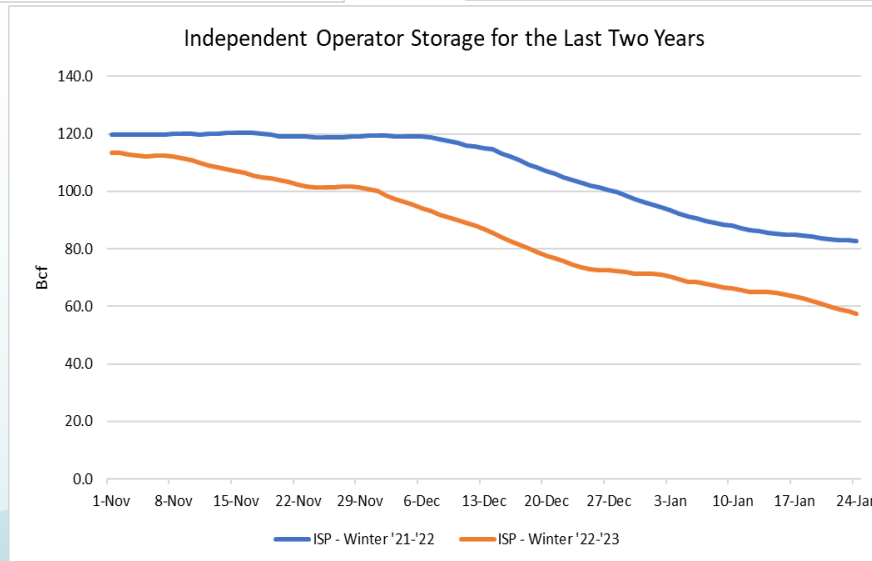
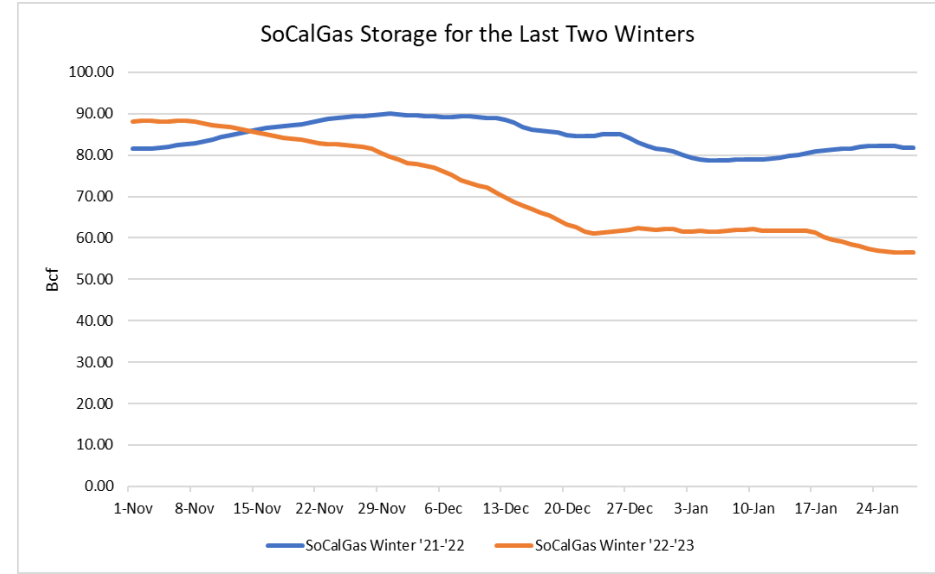
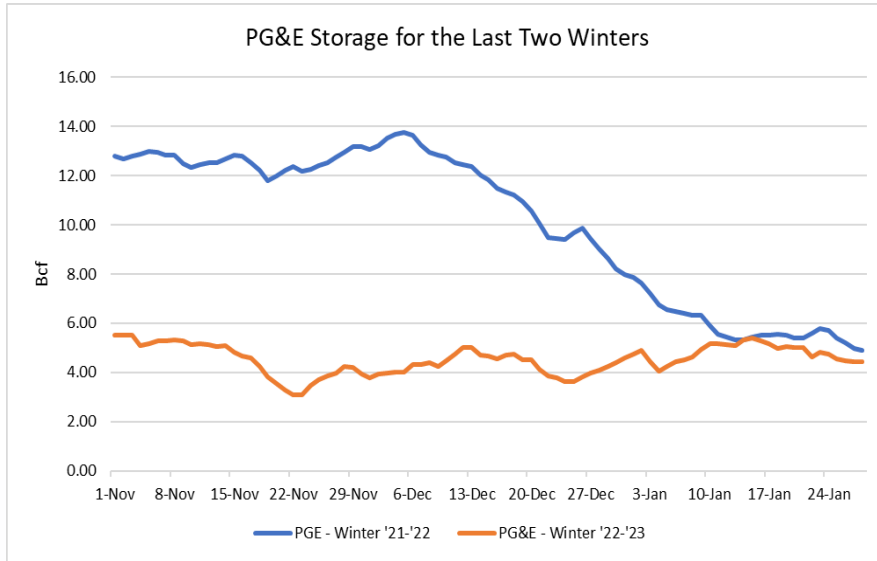


Intrastate/Interstate Pipelines





Gas Storage





Winter 2022-23 Observations

- California US spot prices have been volatile since end of November 2022.
- This has also been the case for western US spot prices.
- CA prices are still high compared to Henry Hub.
- On January 31, 2023, CA average prices were 215 percent higher than Henry Hub.
- Contributing factors:
 - Cold weather and higher gas demand
 - Interruptions to supply
 - Lower storage inventories



Recommendations

- As part of the CEC's 2023 IEPR process, the CEC will hold public workshops to tee up key gas planning issues, including prices and affordability.
- The CEC will continue to work collaboratively with the other energy agencies on both near and long-term strategies that will help manage overall system costs.



Thank You!



CPUC EN BANC ON CURRENT GAS MARKET CONDITIONS AND IMPACTS OF GAS PRICES ON ELECTRICITY

Rodger Schwecke, Senior Vice President
and Chief Infrastructure Officer



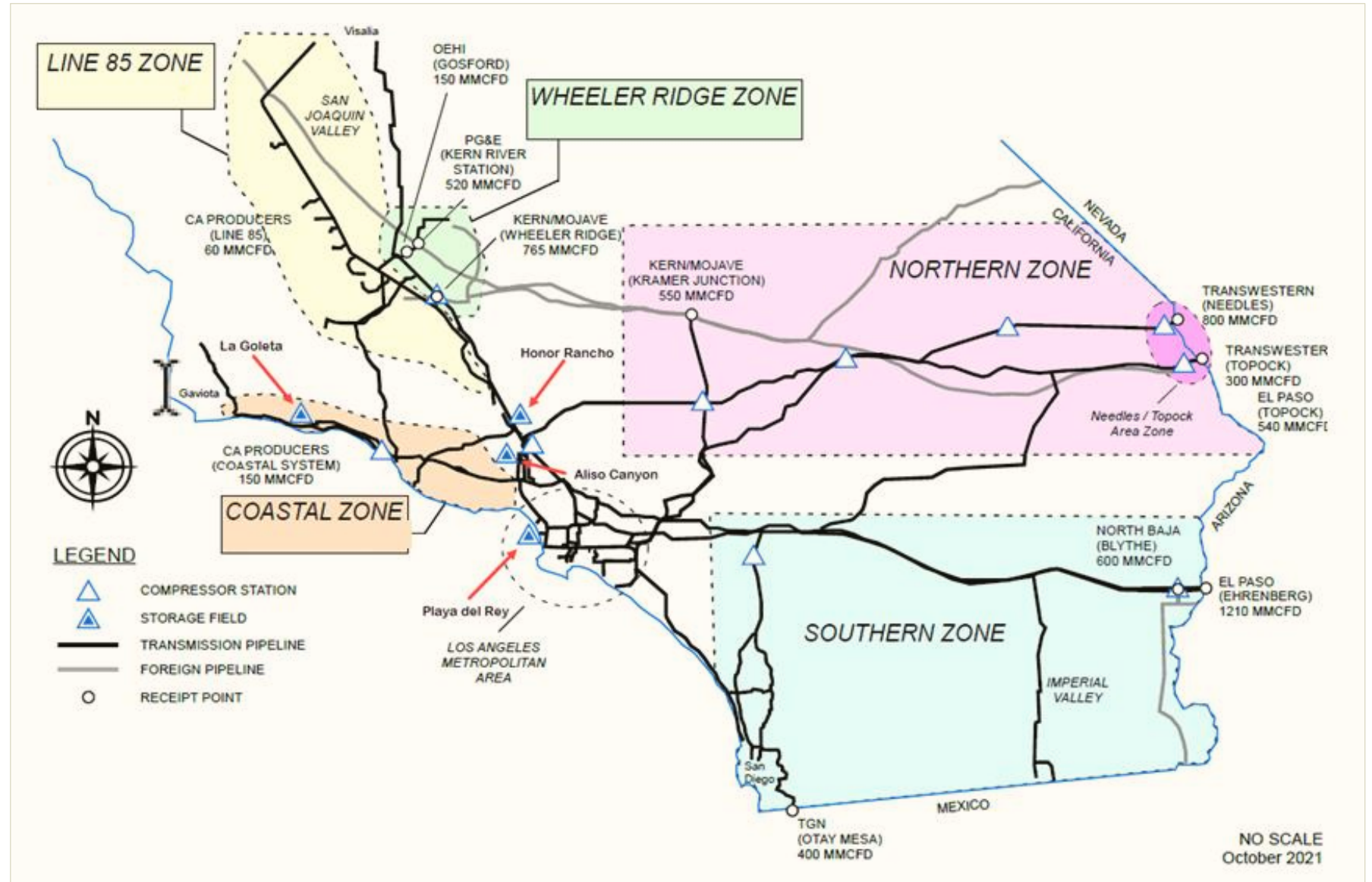
Executive Summary

- » Building and maintaining infrastructure is critical to the reliability and affordability of energy.
- » Gas infrastructure, including compressors and storage, is needed to help maintain gas and electric service reliability during peak demand periods and to mitigate price volatility.
- » SoCalGas's pipeline capacity to bring gas into its system from out-of-state has been at a 5-year high this winter.
- » SoCalGas's storage inventories were at a 6-year high and essentially full to the CPUC authorized level on November 1st, the start of this winter season.
- » Additional gas infrastructure can be leveraged and invested in to support customers (e.g., increasing the authorization and use of Aliso Canyon, pipeline enhancements, compressor station modernization, Angeles Link).
- » In the near-term, SoCalGas has been utilizing a wide array of tools, with CPUC assistance where needed, to help customers navigate this unusual period.

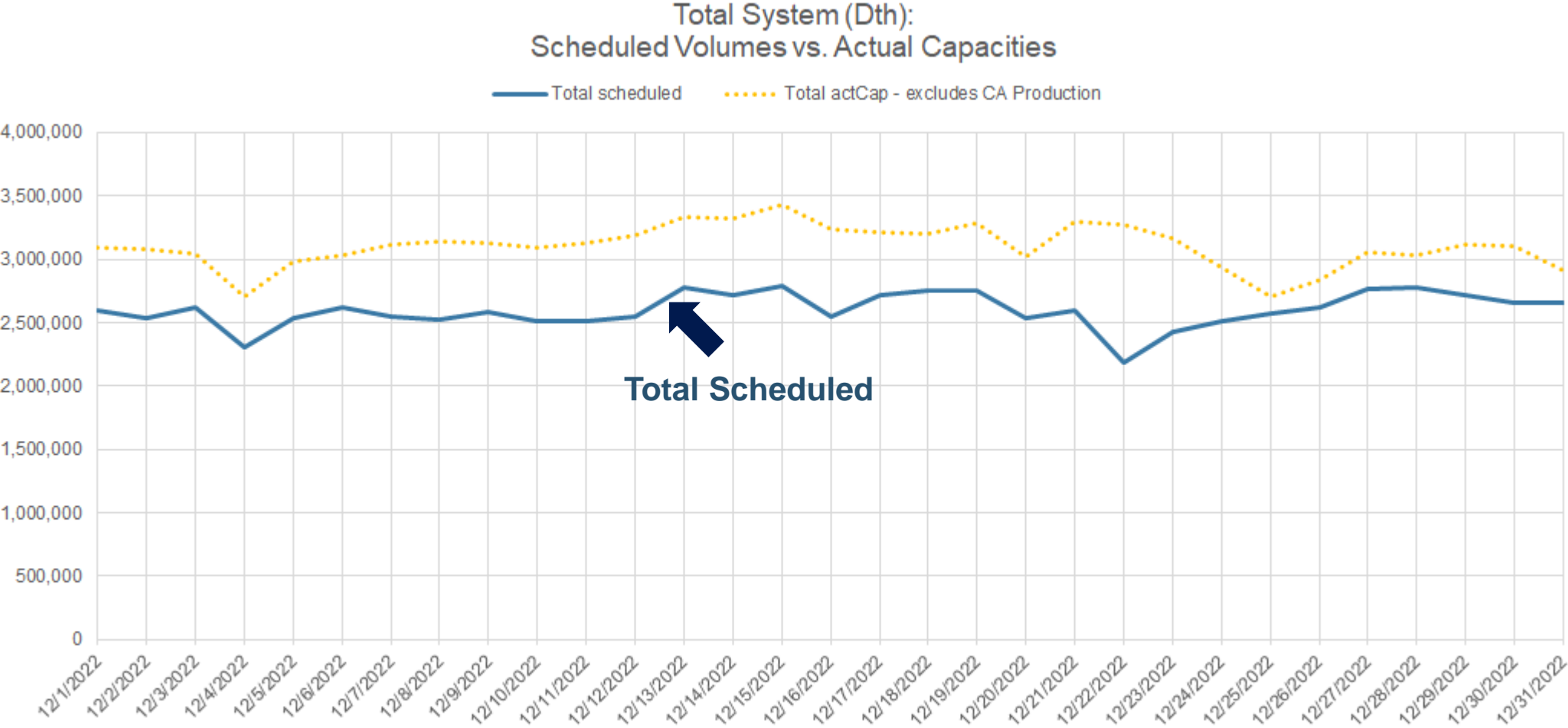
SoCalGas System Overview

End of the Western U.S. Natural Gas Pipeline System

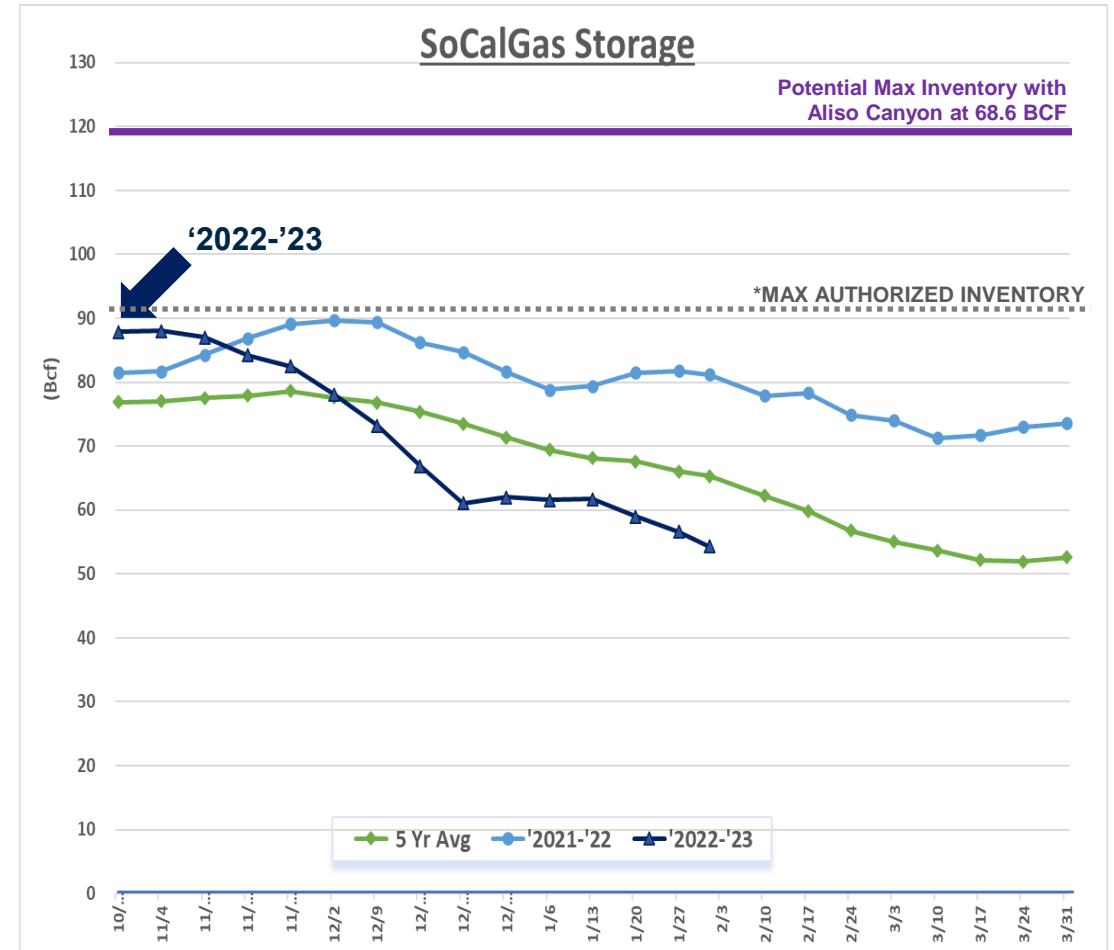
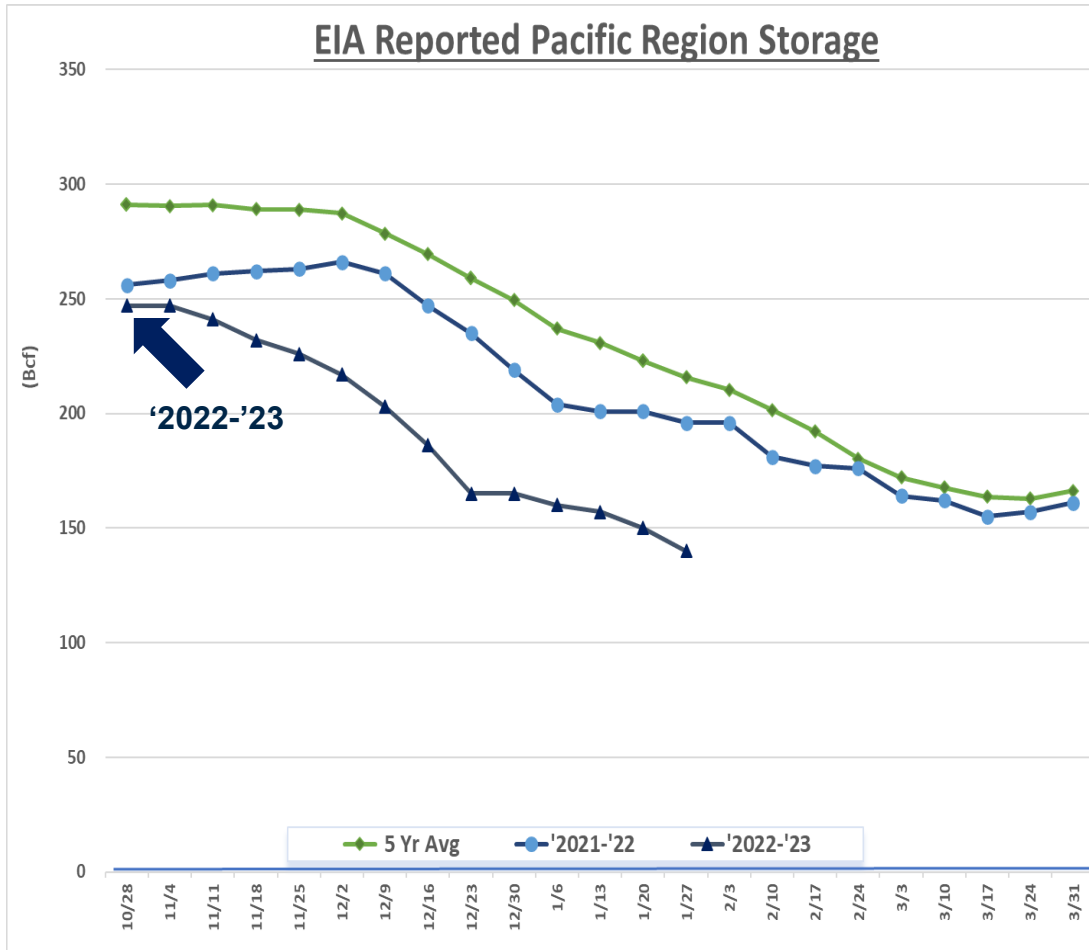
- >95% of natural gas used in Southern California is produced outside of the state
- Southern California is the end-point of western gas flow
- Natural gas storage supports local and regional reliability and helps moderate price shocks



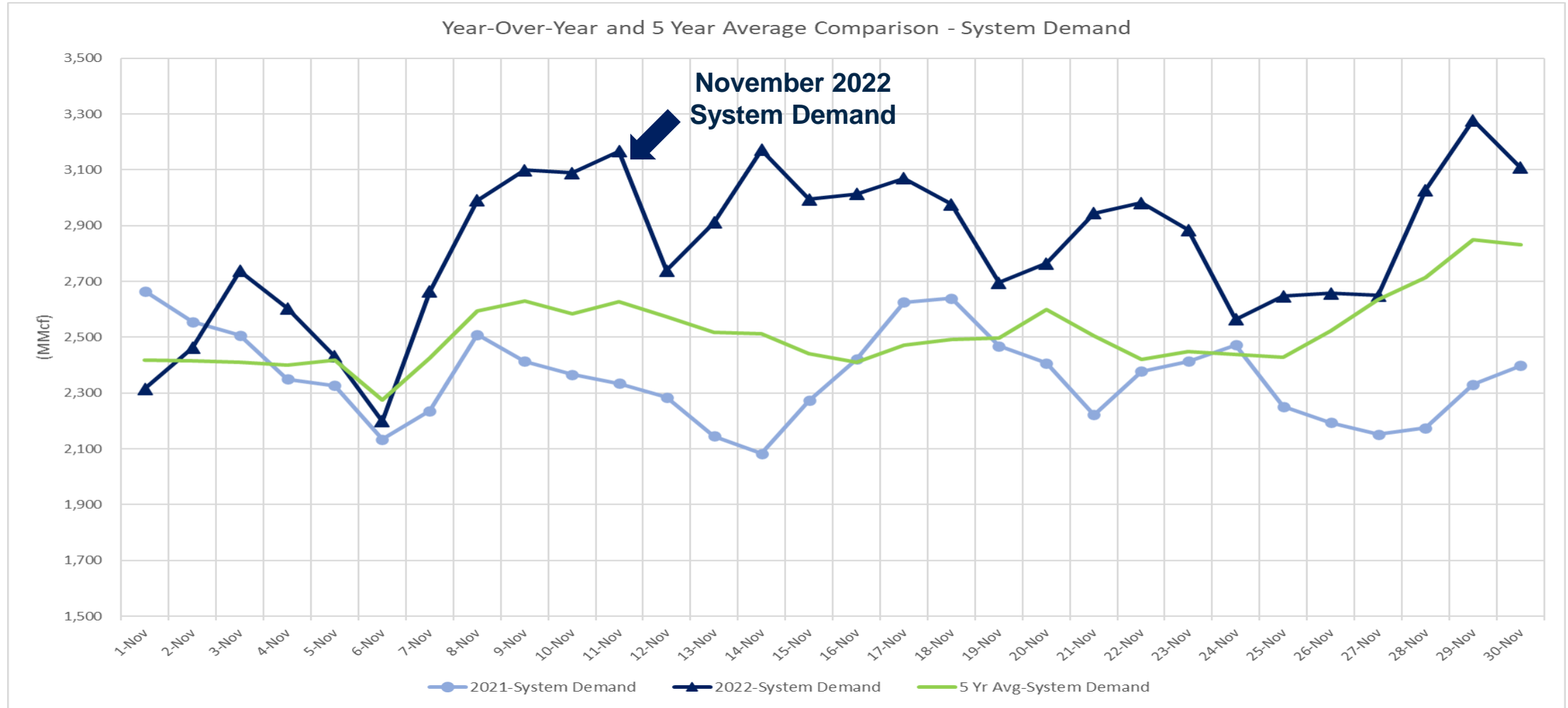
SoCalGas Receipt Capacity Utilization



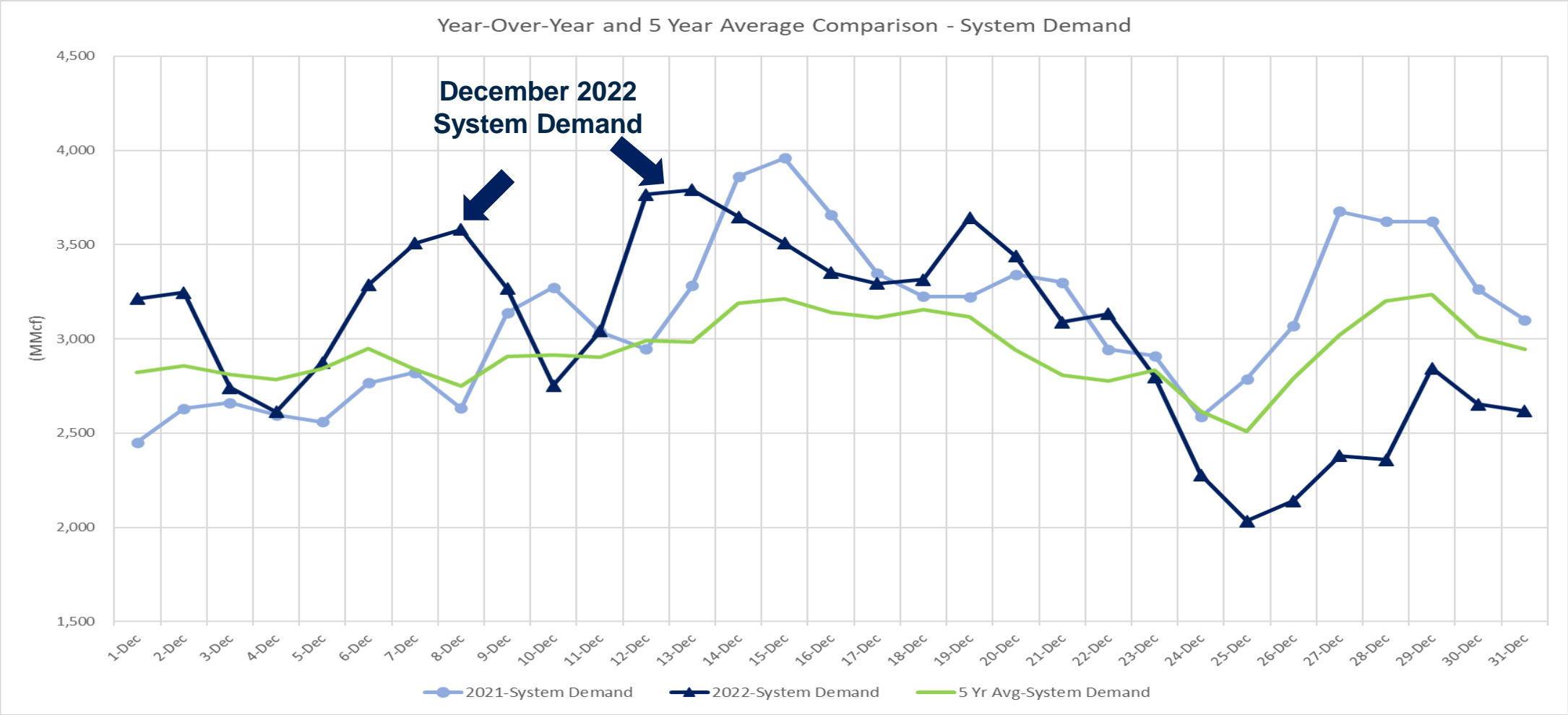
SoCalGas Storage Relied Upon Heavily to Meet Winter Demand



November Cold Weather Impacts SoCalGas Storage



December Cold Weather Further Impacts SoCalGas Storage

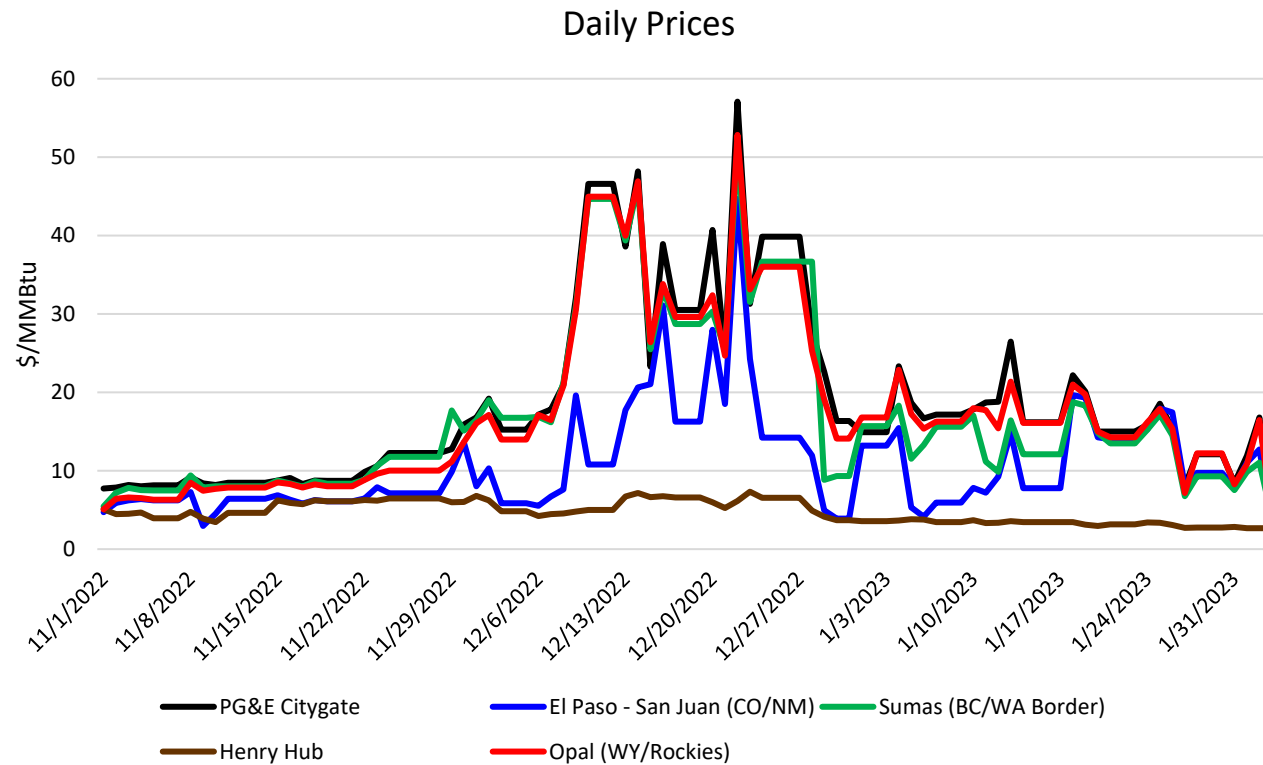


En Banc
on Current Gas Market Conditions and
Impacts of Gas Prices on Electricity

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

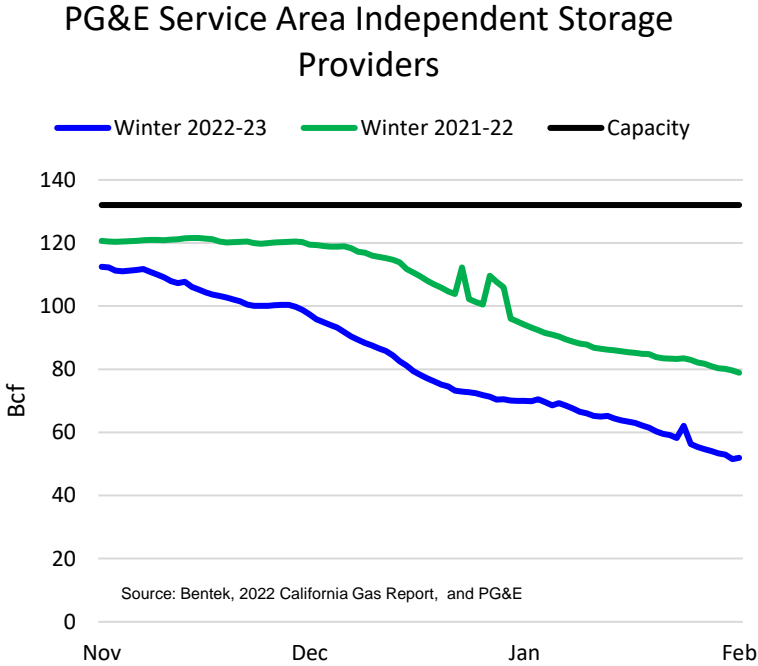
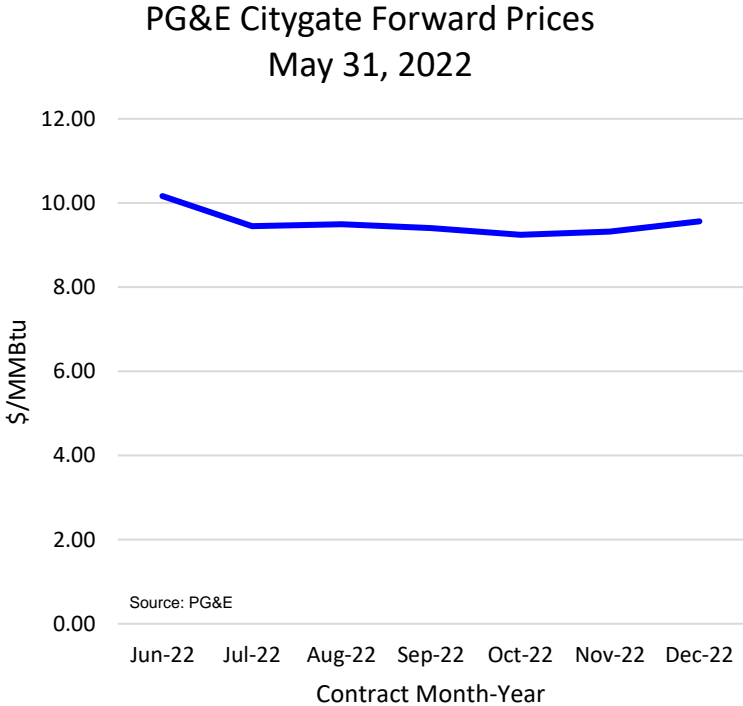
Extreme Winter Gas Prices Driven By Market Forces

- 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%

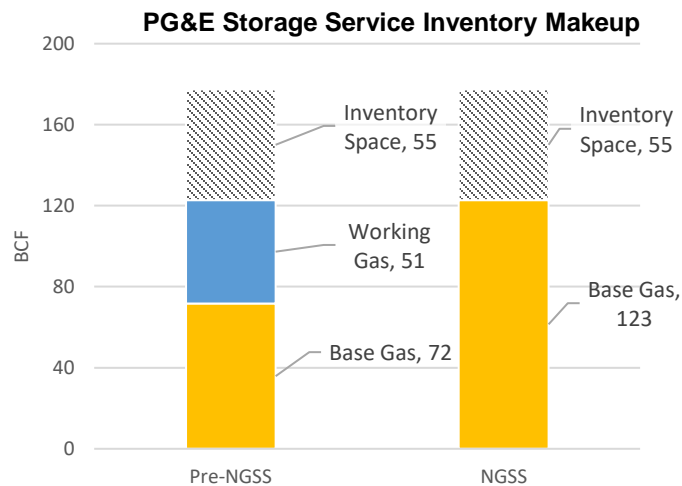
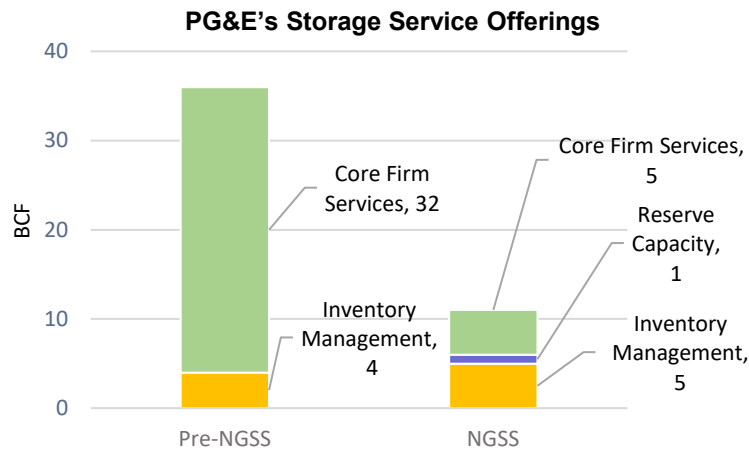
Northern California Storage Facilities Began Winter - Nov 1 - With Available Space

- 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.



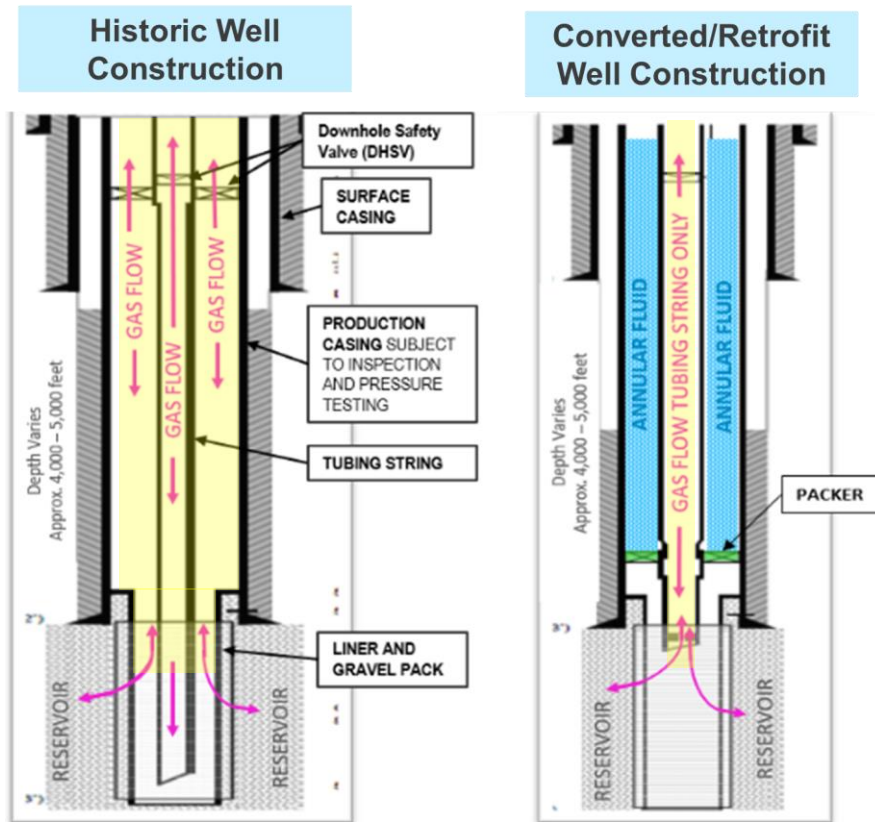
Reclassification of Base Gas

as part of the Natural Gas Storage Strategy (NGSS)



- 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



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

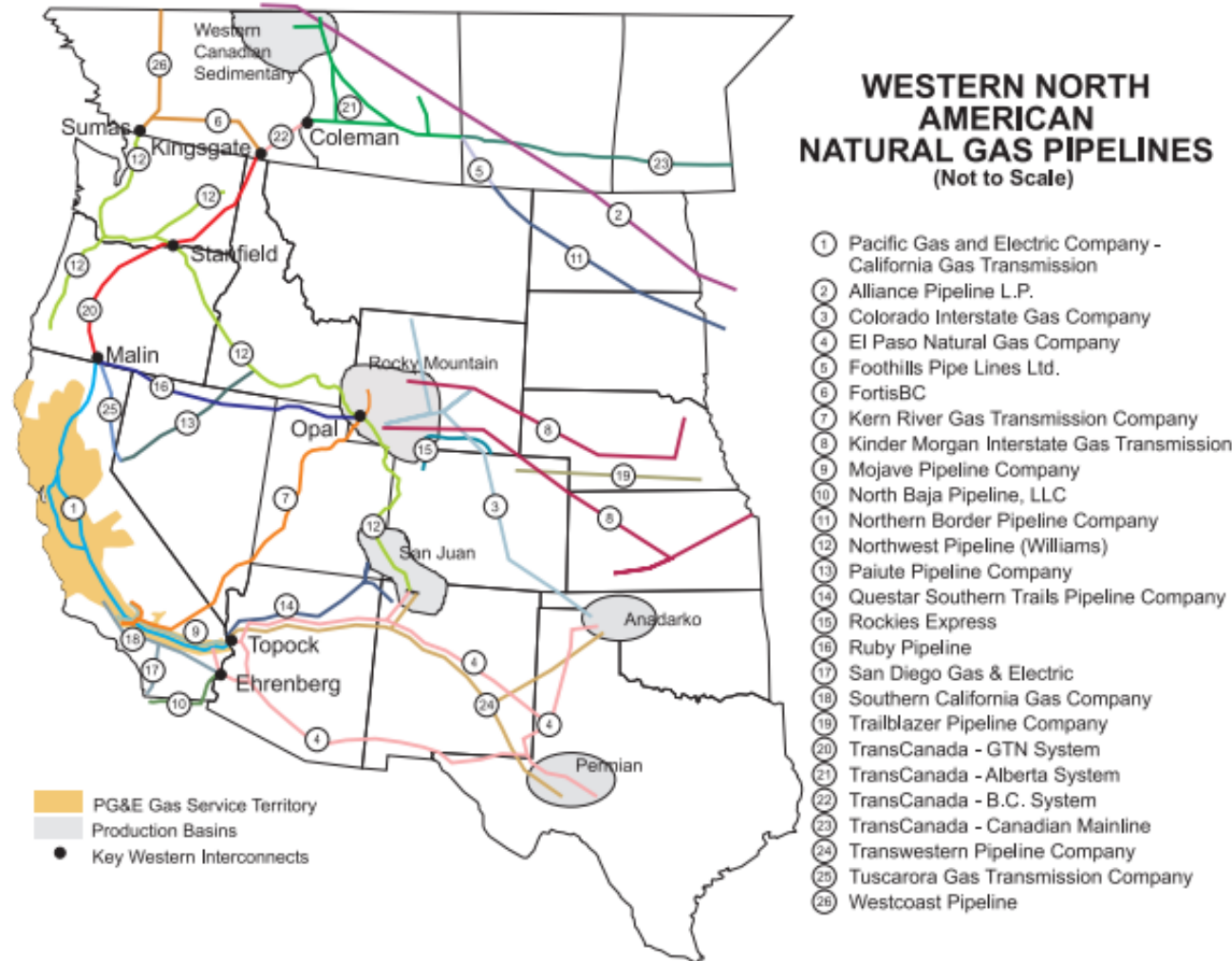
Well Inspection Frequency Requirements:

- **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)								
MMcf	Ending Inventory History				Ending Inventory Forecasts			
	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)								
MMcf	Ending Inventory History				Ending Inventory Forecasts			
	1/29/2023	1/30/2023	1/31/2023	2/1/2023	2/2/2023	2/3/2023	2/4/2023	
4750								
4700								
4650								
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4550								4590
4500								
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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

Mark Pocta

Cal Advocates

Michael Williamson

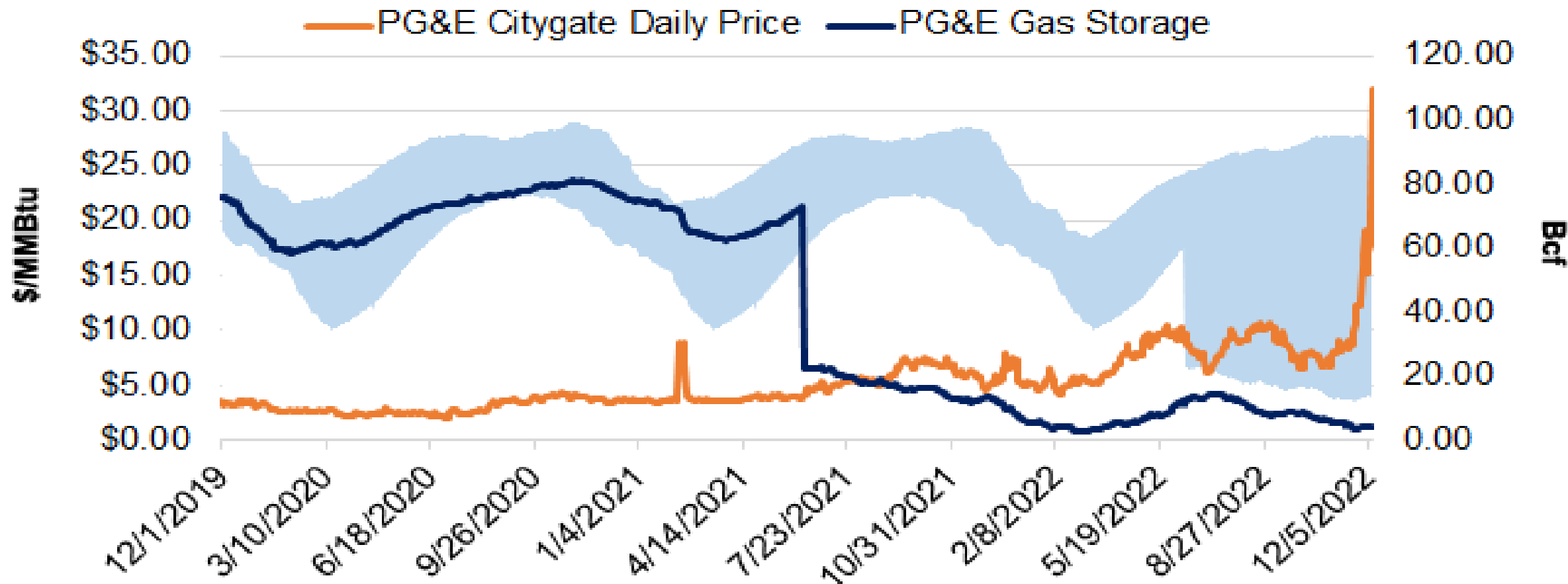
Williamson Energy

Working gas in underground storage, Lower 48 states

[Summary text](#) [CSV](#) [JSON](#)

Region	Stocks billion cubic feet (Bcf)				Historical Comparisons			
	01/27/23	01/20/23	net change	implied flow	Year ago (01/27/22)		5-year average (2018-22)	
					Bcf	% change	Bcf	% change
East	578	622	-44	-44	551	4.9	560	3.2
Midwest	708	754 R	-46	-46	628	12.7	656	7.9
Mountain	132	140	-8	-8	134	-1.5	137	-3.6
Pacific	140	150	-10	-10	197	-28.9	213	-34.3
South Central	1,025	1,067	-42	-42	851	20.4	854	20.0
Salt	297	310	-13	-13	238	24.8	250	18.8
Nonsalt	728	757	-29	-29	613	18.8	604	20.5
Total	2,583	2,734 R	-151	-151	2,361	9.4	2,420	6.7

PG&E Citygate Daily Price & PG&E Storage Dec 1, 2019–Dec 8, 2022



Note: PG&E's gas storage was reclassified in June 2021 as shown by the significant drop in storage volume.

Source: NGI's Daily Gas Price Index, NGI calculations, PG&E Pipe Ranger

Questions?



Panel Two: Understanding Interstate Gas Pipeline Safety

- **Moderator:** Bruce Kaneshiro, Program Manager, Energy Division, CPUC
- **Panelists:**
 - Matthewson Epuna, Supervisor, Safety and Enforcement Division, CPUC
 - Alan Mayberry, Associate Administrator for Pipeline Safety, PHMSA, US Department of Transportation

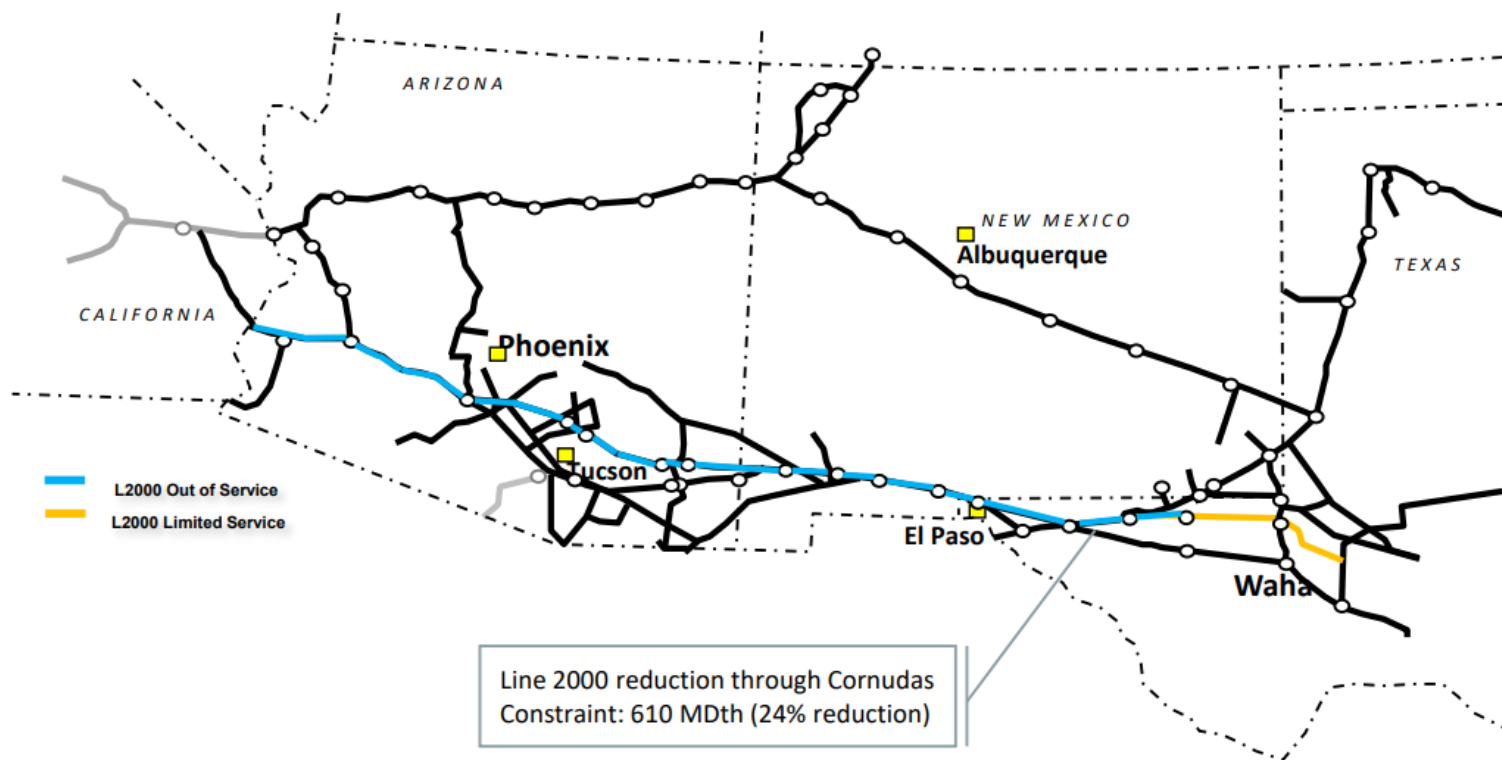
Understanding Interstate Gas Pipeline Operations and Impacts of Outages

February 7, 2023



California Public
Utilities Commission

Line 2000 Outage



Source: Kinder Morgan

Timeline of Line 2000 Outage

8/15/2021: Line
2000 ruptures

9/15/2021: NTSB
opens docket on
incident

8/19/2021: PHMSA
issues Corrective
Action Order

Timeline of Line 2000 Outage

12/2/2022: PHMSA approves restart of isolated segment

PHMSA reviewing KM request to lift pressure restriction

1/25/2023: Kinder Morgan announces work complete



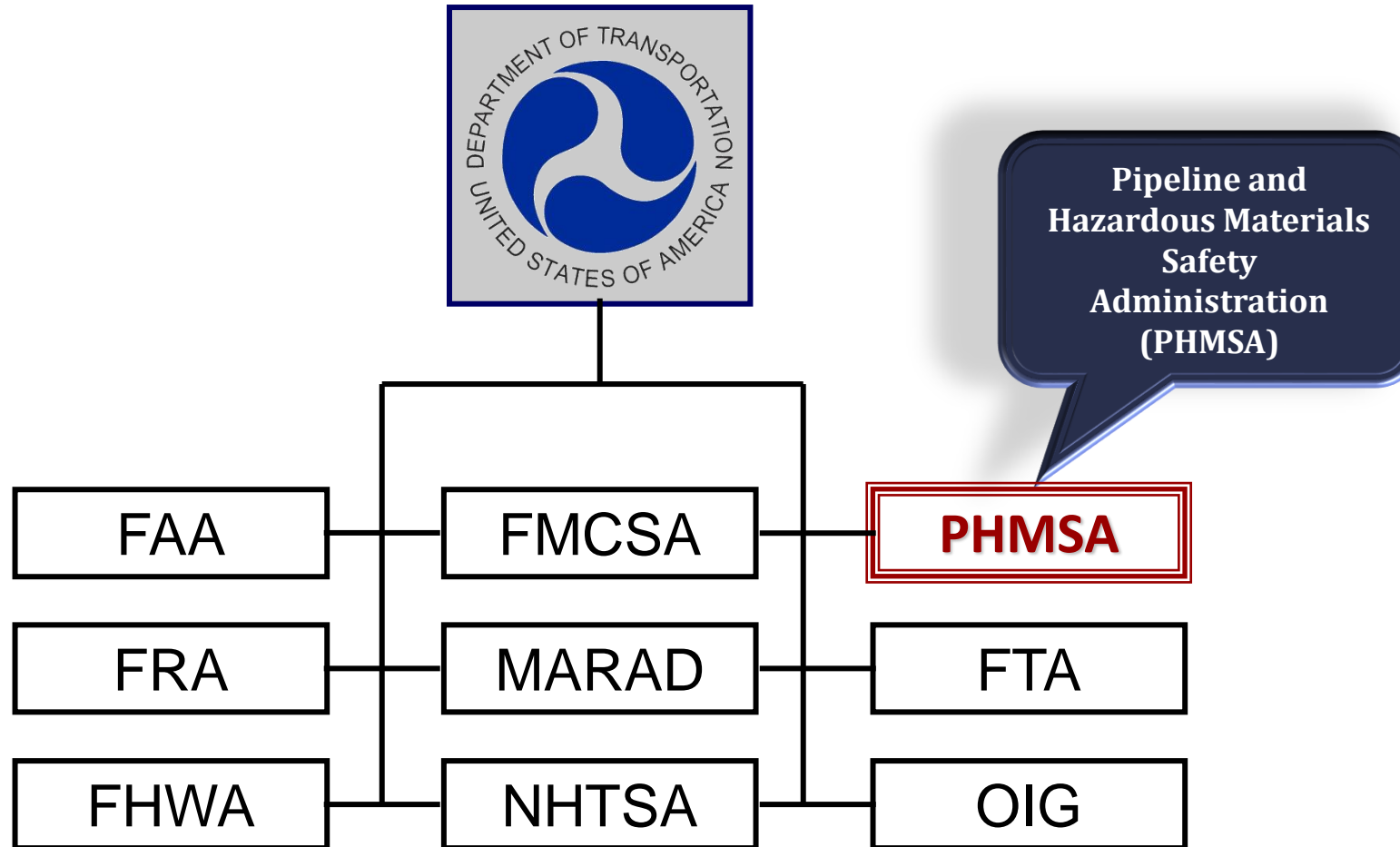
Pipeline and Hazardous Materials Safety Administration
Office of Pipeline Safety

California Public Utility Commission

February 7, 2023



Who is DOT/PHMSA?



PHMSA Incident Investigations

- Nationwide incidents received by the National Response Center
- PHMSA deploys based on a defined protocol (NTSB may also deploy)
- Response phase versus recovery phase
- Various enforcement tools are available in the aftermath of an incident
- Corrective Action Orders are a common post incident action, and follow a pattern
 - Statement of facts and the justification of an imminent hazard
 - Restricted operations until issue resolved
 - Remedial work plan
- Failure Investigation Report



Brief History of Gas Rule

- *September 9, 2010* - PG&E incident at San Bruno,
- *August 25, 2011* - PHMSA issues Gas ANPRM
 - Sought public comment on 15 topics / 122 questions. Received 103 responses containing thousands of comments.
- *August 30, 2011* - NTSB issues 32 recommendations to PHMSA, CPUC, PG&E, AGA, and INGAA
- *January 3, 2012* - Pipeline Safety Act of 2011 issued
 - Includes several mandates correlating to PG&E investigation findings



Brief History of Gas Rule

- *December 11, 2012* – Columbia Gas Transmission Incident near Sissonville, WV
 - Destroys 3 homes, damages several other houses, shuts down I-77 for 19 hours
- *February 19, 2014* - NTSB issues 4 recommendations to PHMSA and Columbia Gas
- *April 8, 2016* - PHMSA issues Gas NPRM
 - Approximately 300 responses received containing thousands of comments



Brief History of Gas Rule

- In 2018 Gas Rule split into 3 final rules:
 - **RIN-1** (issued October 2019) – MAOP Reconfirmation, Expansion of Assessment Requirements, and Other Related Amendments
 - **RIN-2** (issued August 2022) – Repair Criteria, IM Improvements, CP, MOC, and Other Related Amendments
 - **RIN-3** (issued November 2021) – Gas Gathering



MAOP Reconfirmation, Expansion of Assessment Requirements, and Other Related Amendments

PHMSA revised Part 192 by:

1. Requiring operators to confirm the MAOP of certain GT pipelines
2. Consider seismicity
3. Codifying a 6-month grace period for integrity assessments
4. Requiring operators install safety features on ILI launchers and receivers
5. Requiring operators to report MAOP exceedances
6. Strengthened assessment requirements
7. Required operators to assess certain non-HCA lines at least once every 10 years
8. Imposed related recordkeeping requirements



Enforcement

2022 Enforcement Numbers

1. PROPOSED PENALTIES:

- Record high \$11.6 million against operators who violated safety standards
- Previous record \$10.6 million set in 2021

2. NOTICES OF PROBABLE VIOLATIONS (NOPVs) ISSUED:

- 78, tied with 78 in 2021, both the highest since 2013

3. TIMELY CORRECTIVE AND DETERRENT ACTIONS:

- Reduced average time to initiate and fully close a NOPV case to 323 days, a record low
- From 2009 to 2022, PHMSA reduced this average time by 76%
- Important to shorten time unsafe conditions allowed to persist and increase deterrence

4. CONSENT AGREEMENTS/ORDERS:

- 11, considered a high number although there were 14 in 2021
- Implemented Consent Agreements/Order provisions of the PIPES Act of 2020



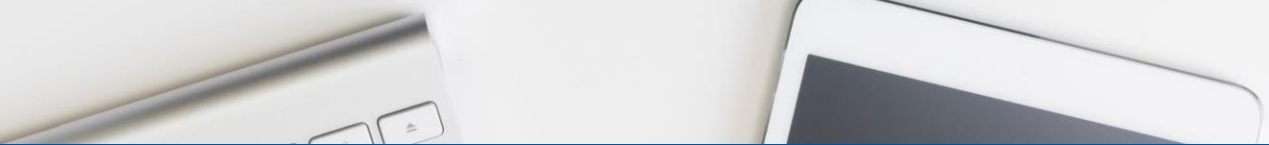
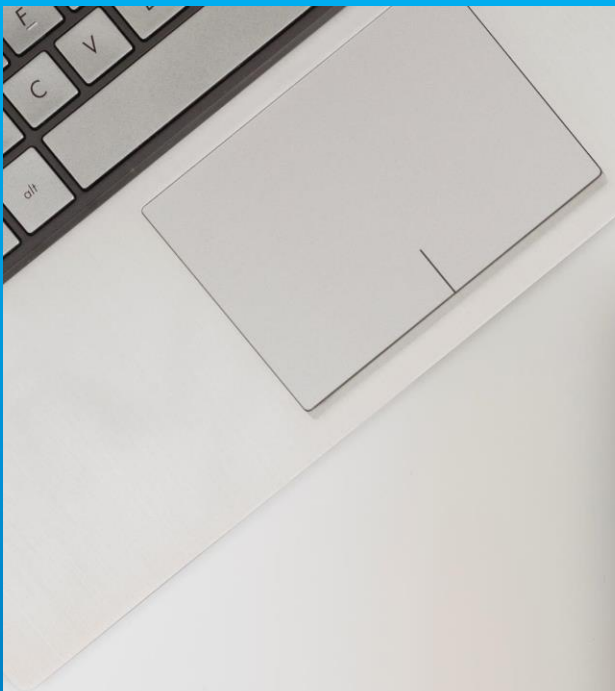
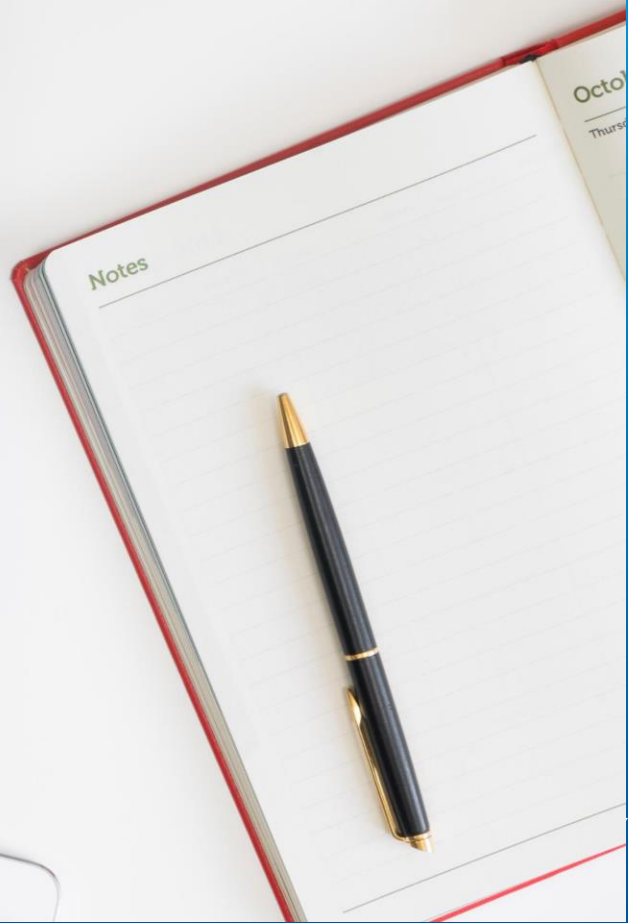
Thank You



Questions?



RELAX
REFRESH
RECHARGE



Panel Three: Impacts on the Electric Market from High Gas Prices

- **Moderator:** Molly Sterkel, Program Manager, Energy Division, CPUC
- **Panelists:**
 - Amelia Blanke, Manager, Monitoring and Reporting, CAISO Department of Market Monitoring
 - William Walsh, Vice President, Energy Procurement and Management, Southern California Edison
 - Marlon Santa Cruz, Manager of Fuel and Purchased Power, Los Angeles Department of Water and Power
 - Fred Heutte, Senior Policy Associate, NW Energy Coalition
 - Becky Robinson, Principal Economist, CAISO



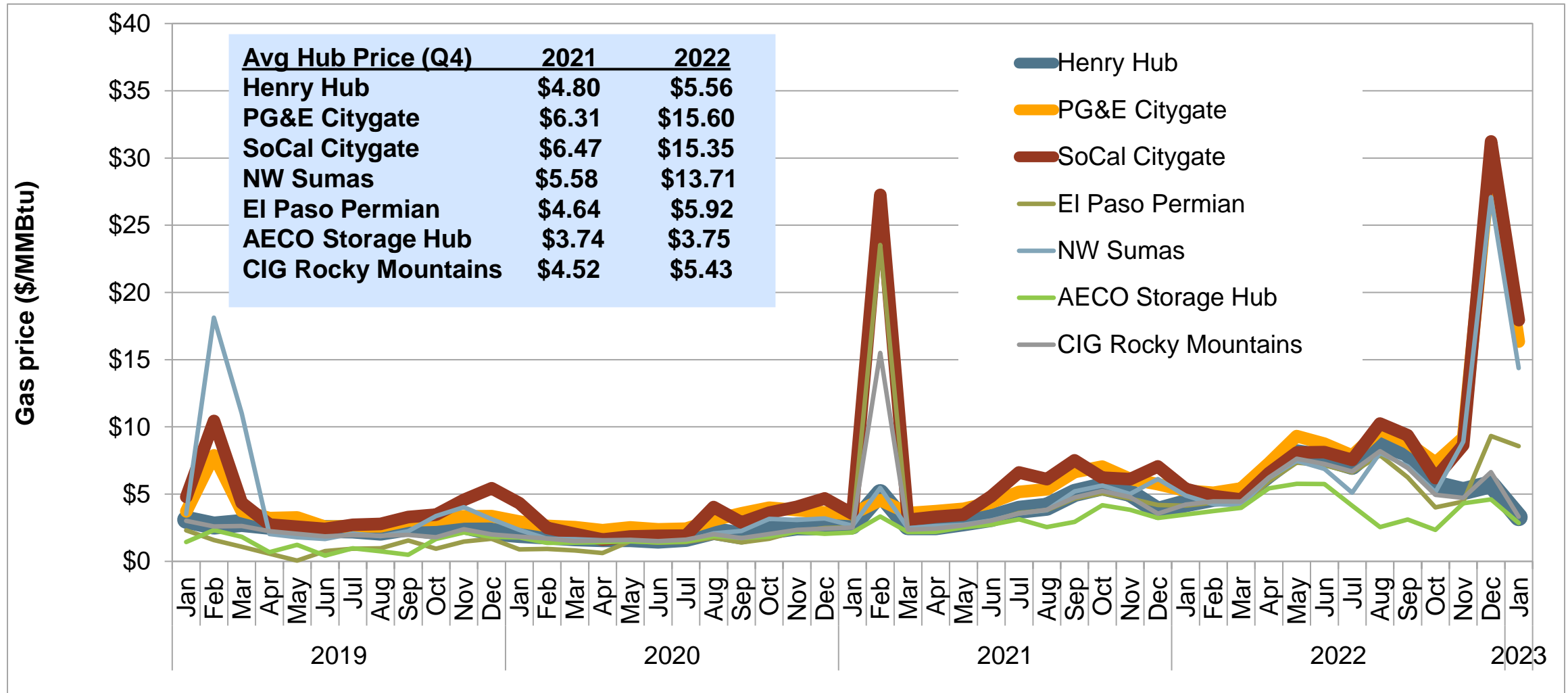
Current gas market conditions & impacts of gas prices on electricity markets

California Public Utilities Commission, En Banc Proceeding
February 7, 2023

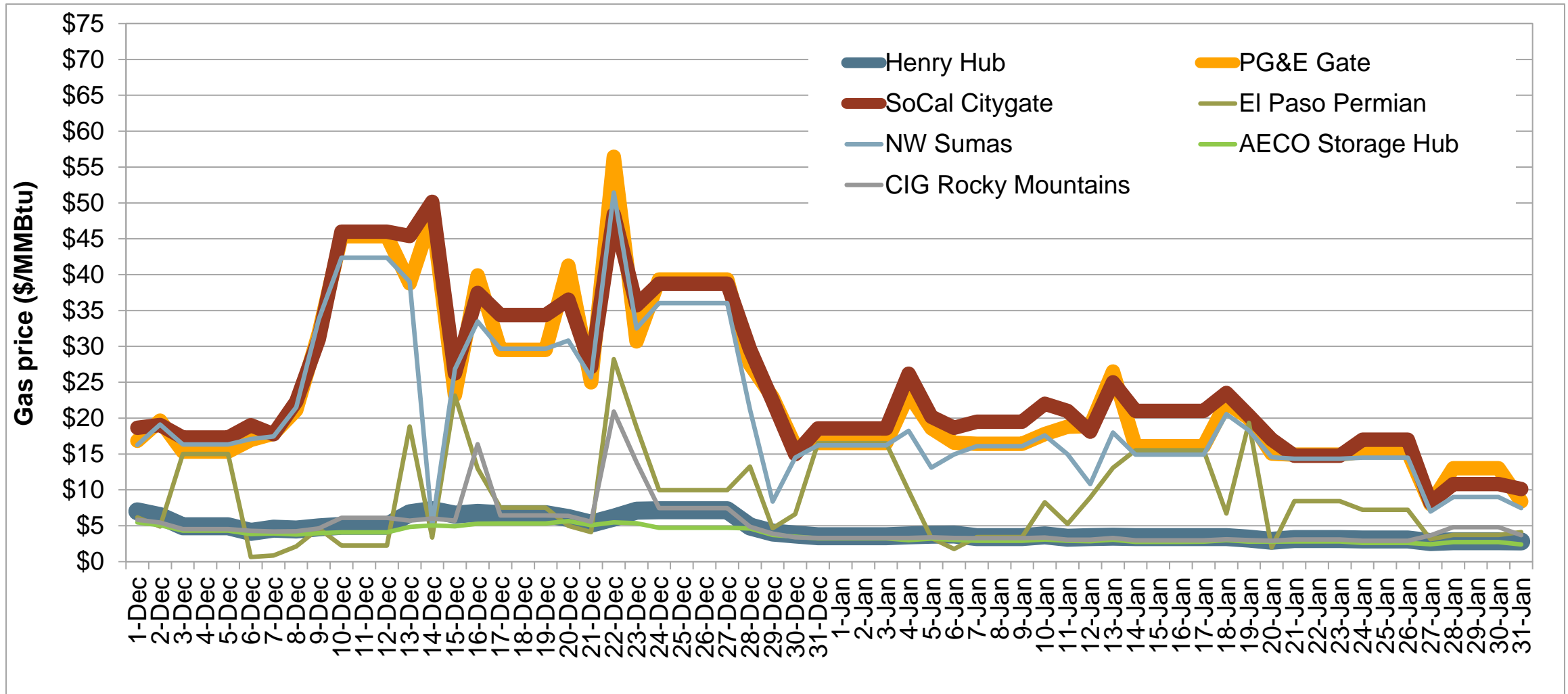
Amelia Blanke
Senior Manager, Monitoring & Reporting
Department of Market Monitoring

<http://www.caiso.com/market/Pages/MarketMonitoring/Default.aspx>

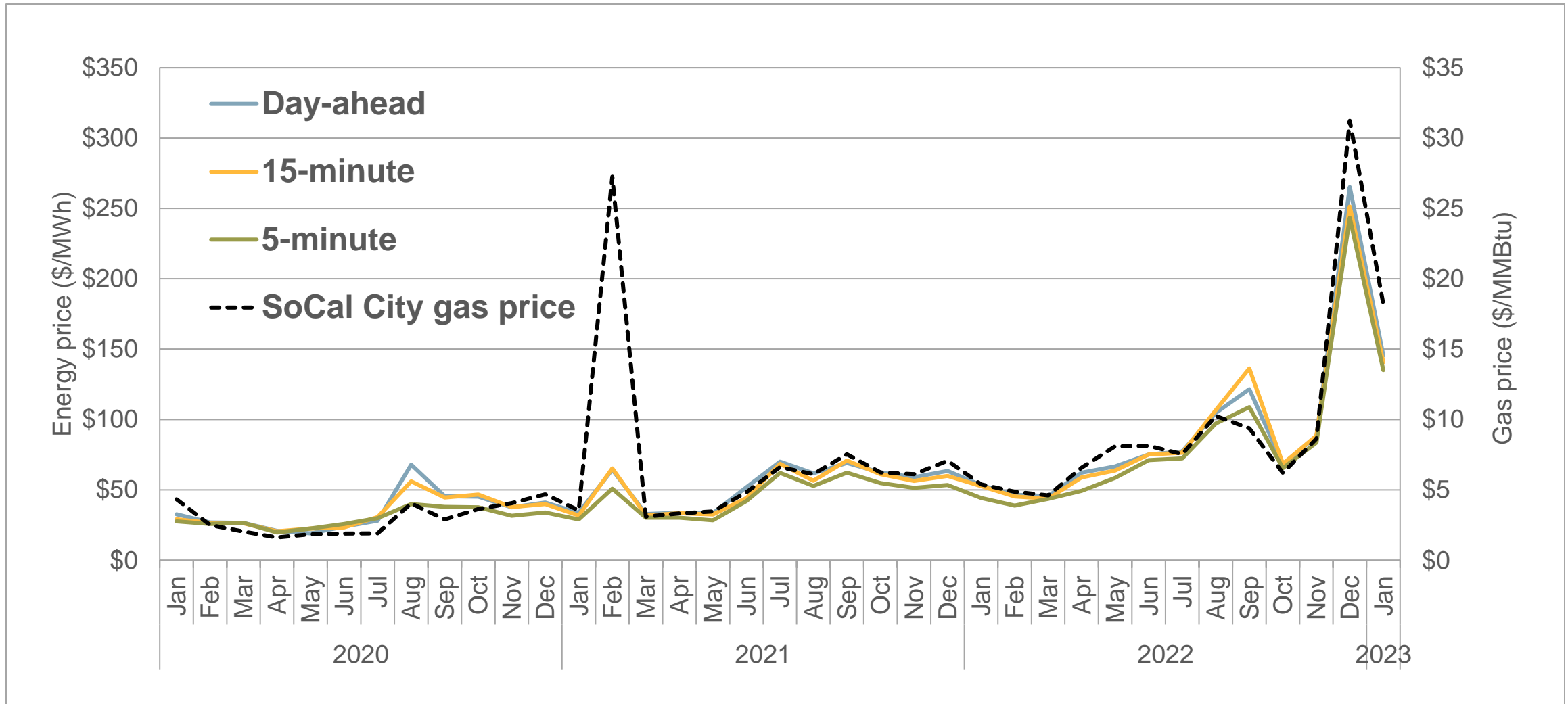
Higher natural gas prices are driving higher electricity prices



Gas prices in California rose in December and remain high relative to national indices

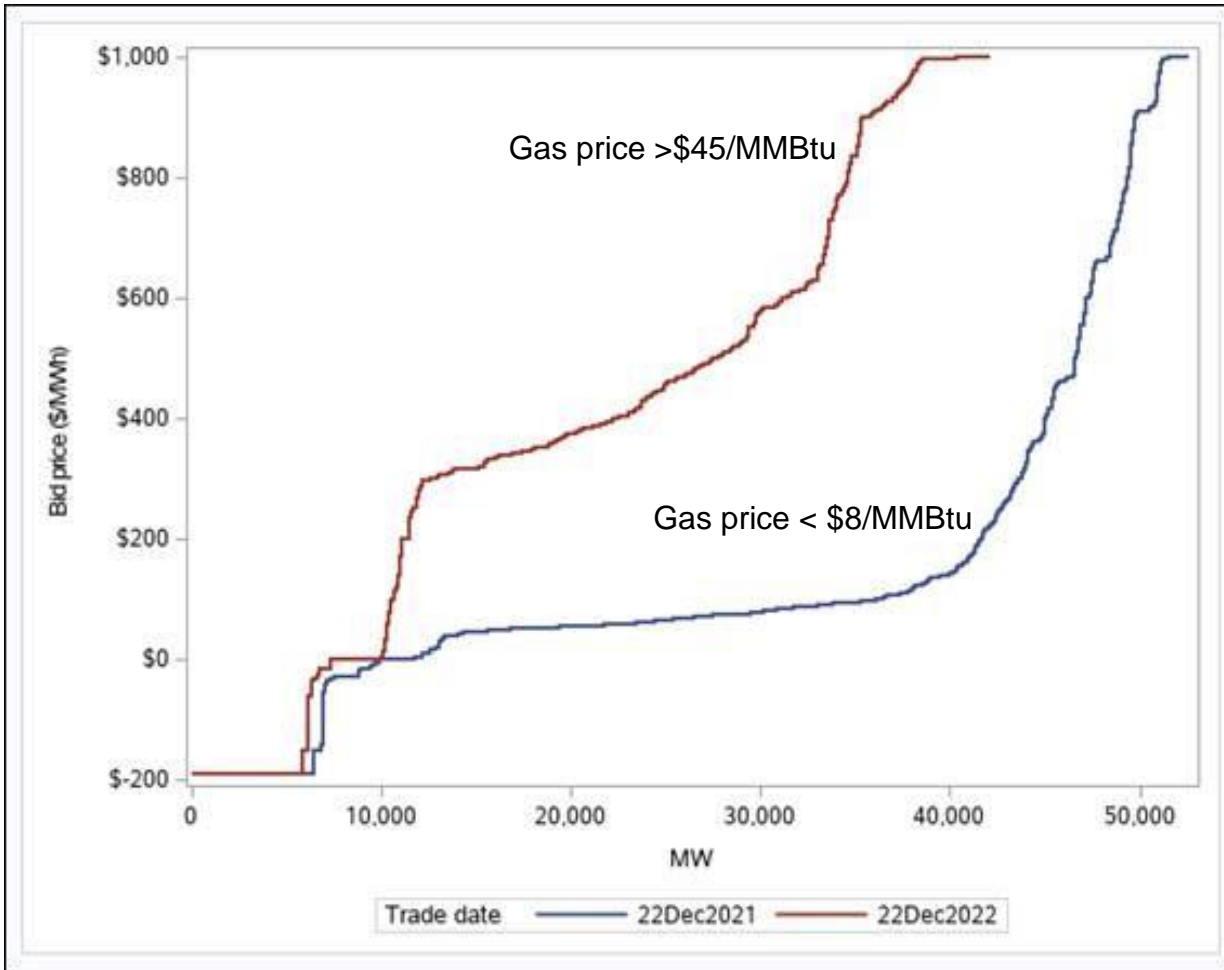


Natural gas price increases drive wholesale electricity costs up

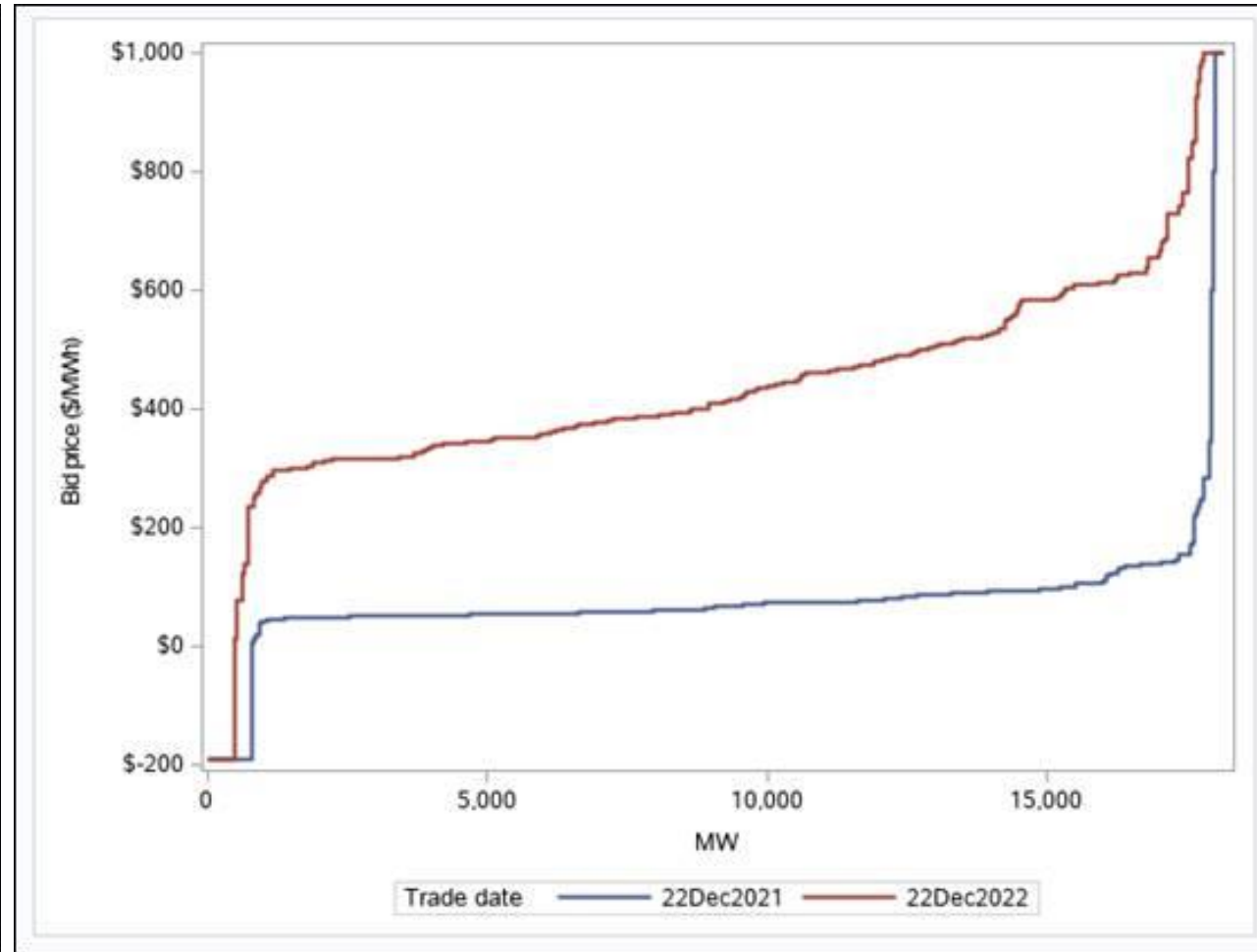


Bids reflect higher marginal costs for both gas and non-gas resources

All day-ahead supply

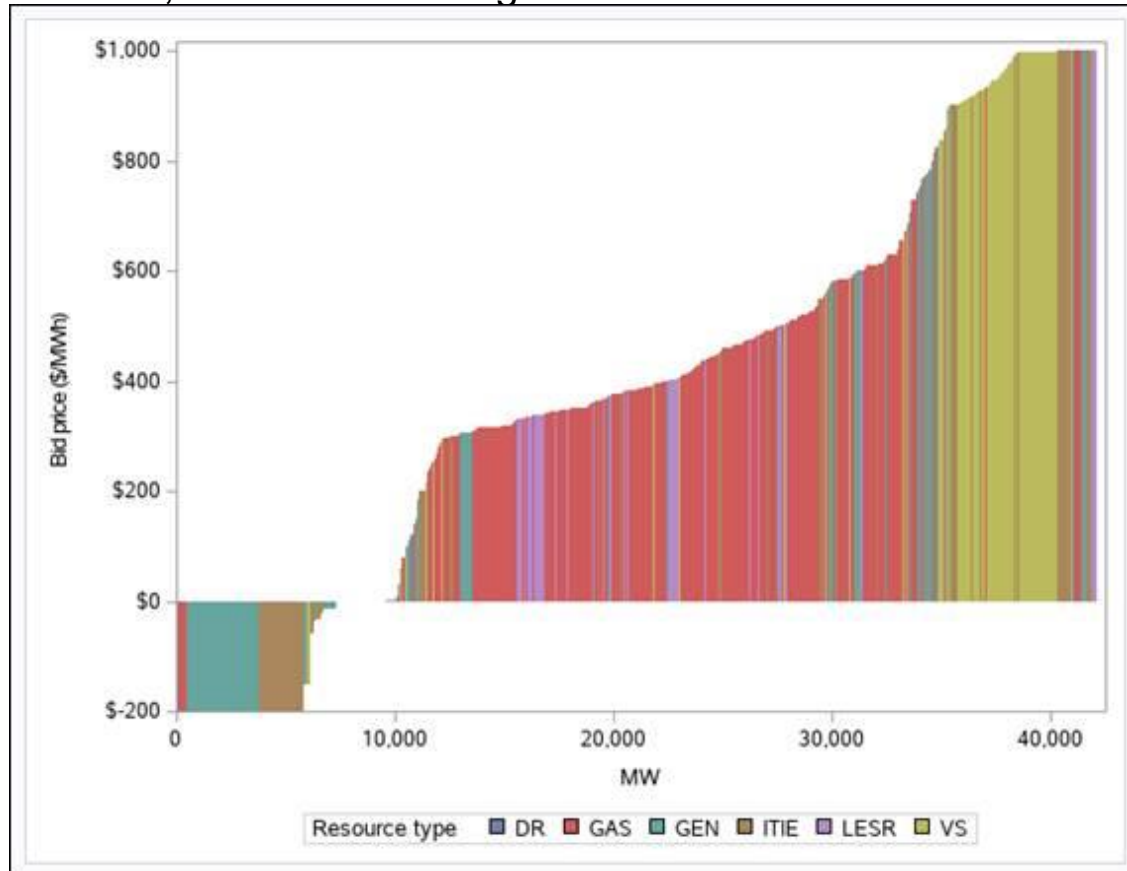


Gas resource bids

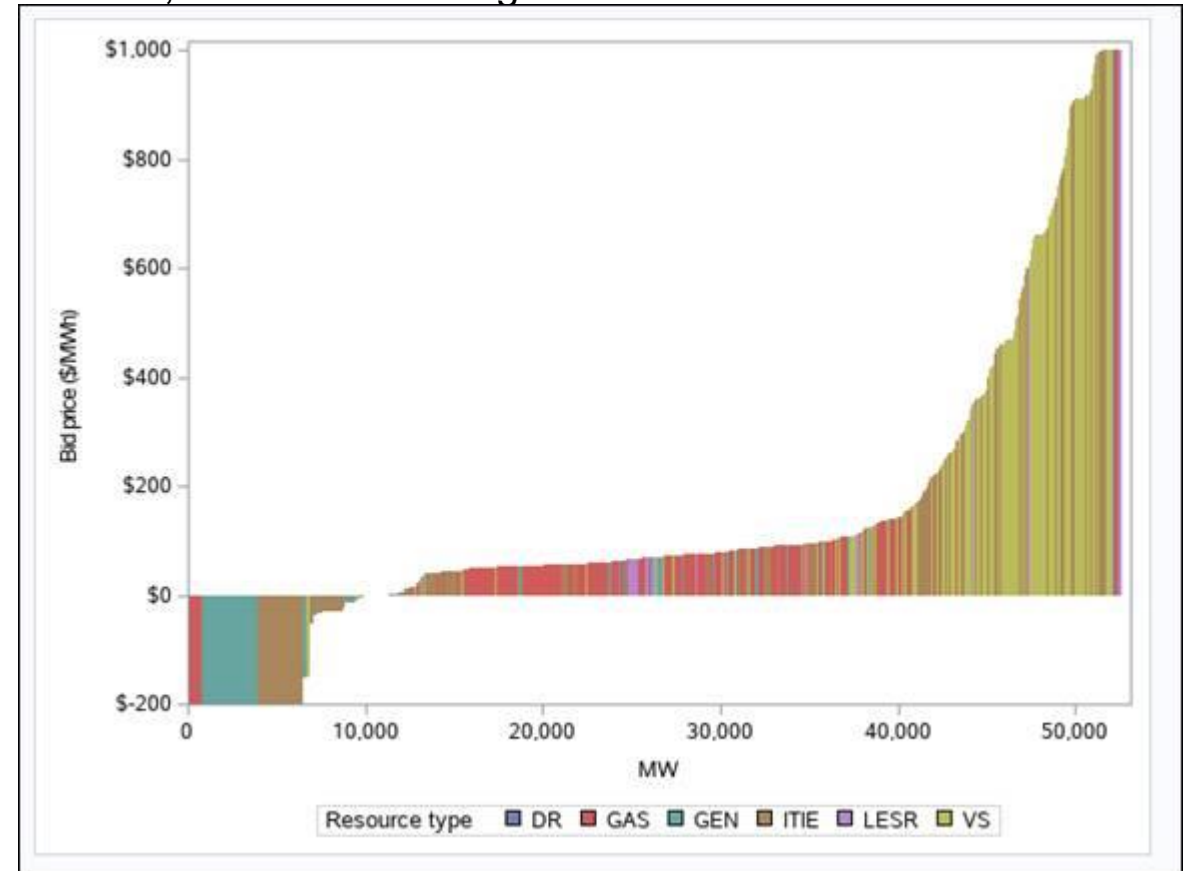


Higher natural gas prices also raise bids and opportunity costs of non-gas resources

Dec 22, 2022 hour ending 18

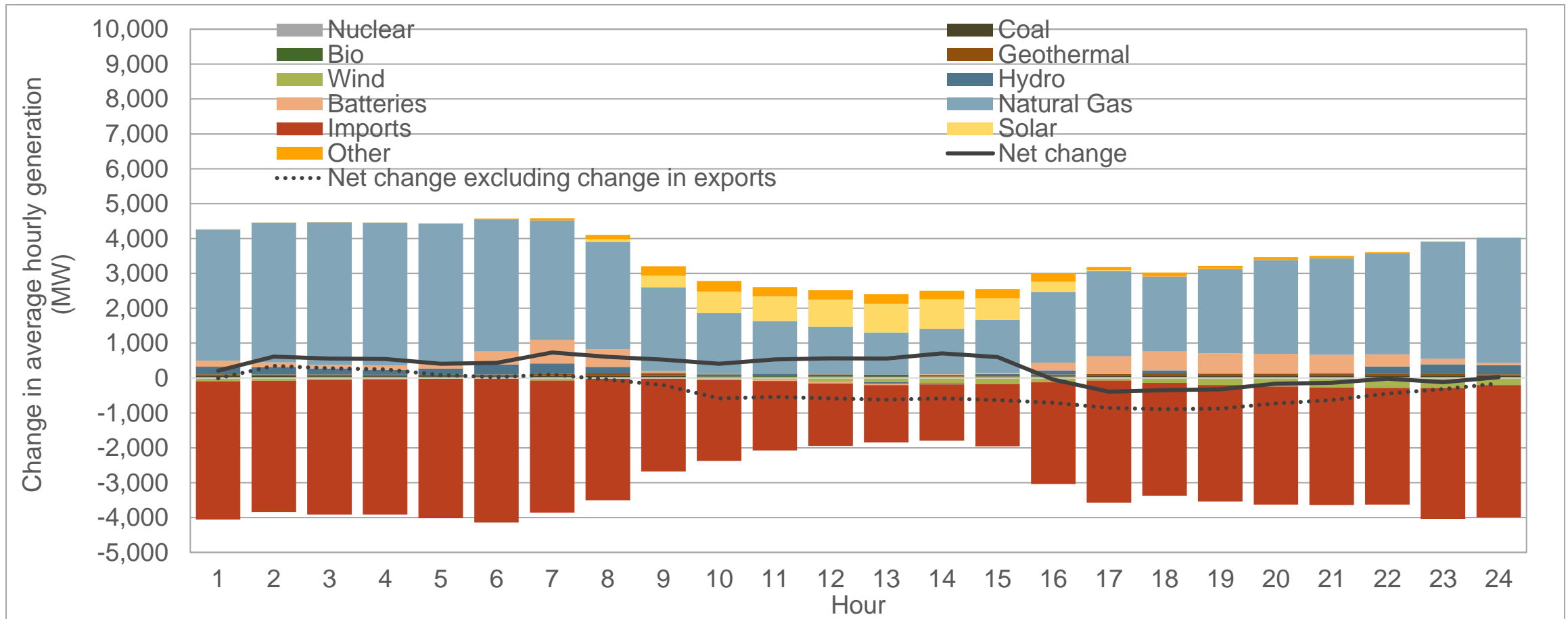


Dec 22, 2021 hour ending 18



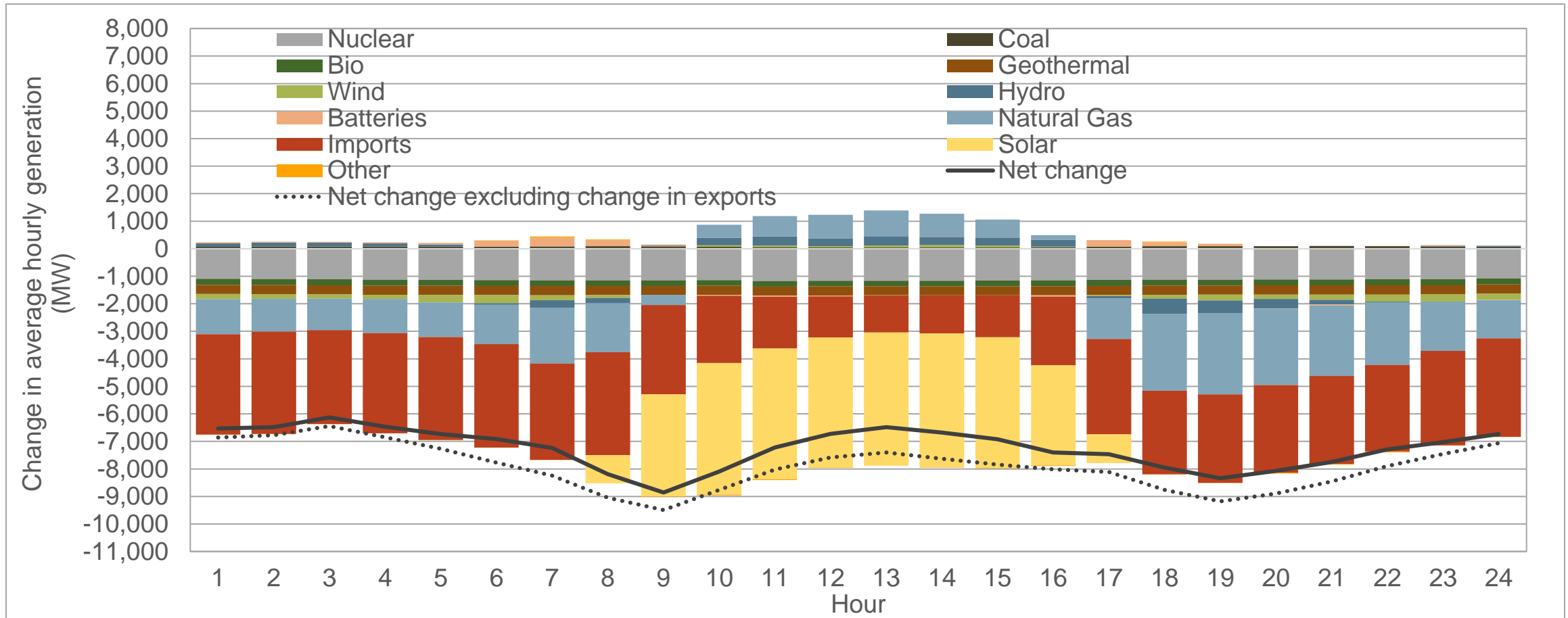
Changes in generation dispatch reflect bidding behavior and demand ---, in the California ISO and regionally

Change in generation dispatch (December 2022 – December 2021)



In January, lower demand and unusual weather led to lower generation

Change in generation dispatch (January 2023 – January 2022)

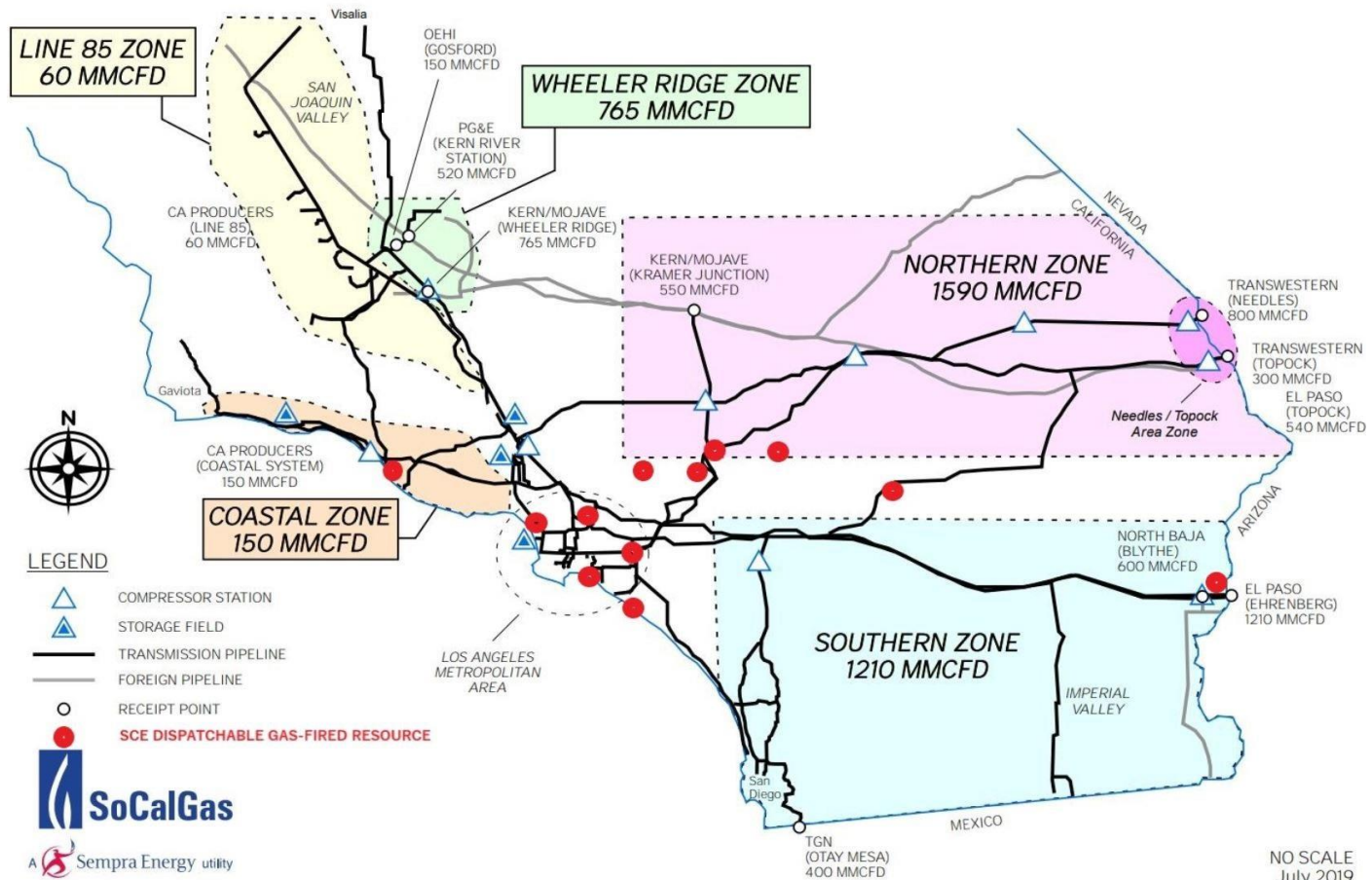


CPUC En Banc Impact on the Electric Market from High Gas Prices

William Walsh, SCE
Vice President, Energy Procurement & Management

SCE's Supply Portfolio Includes a Fleet of 12 Gas-Fired Resources Primarily Served By the SoCalGas system

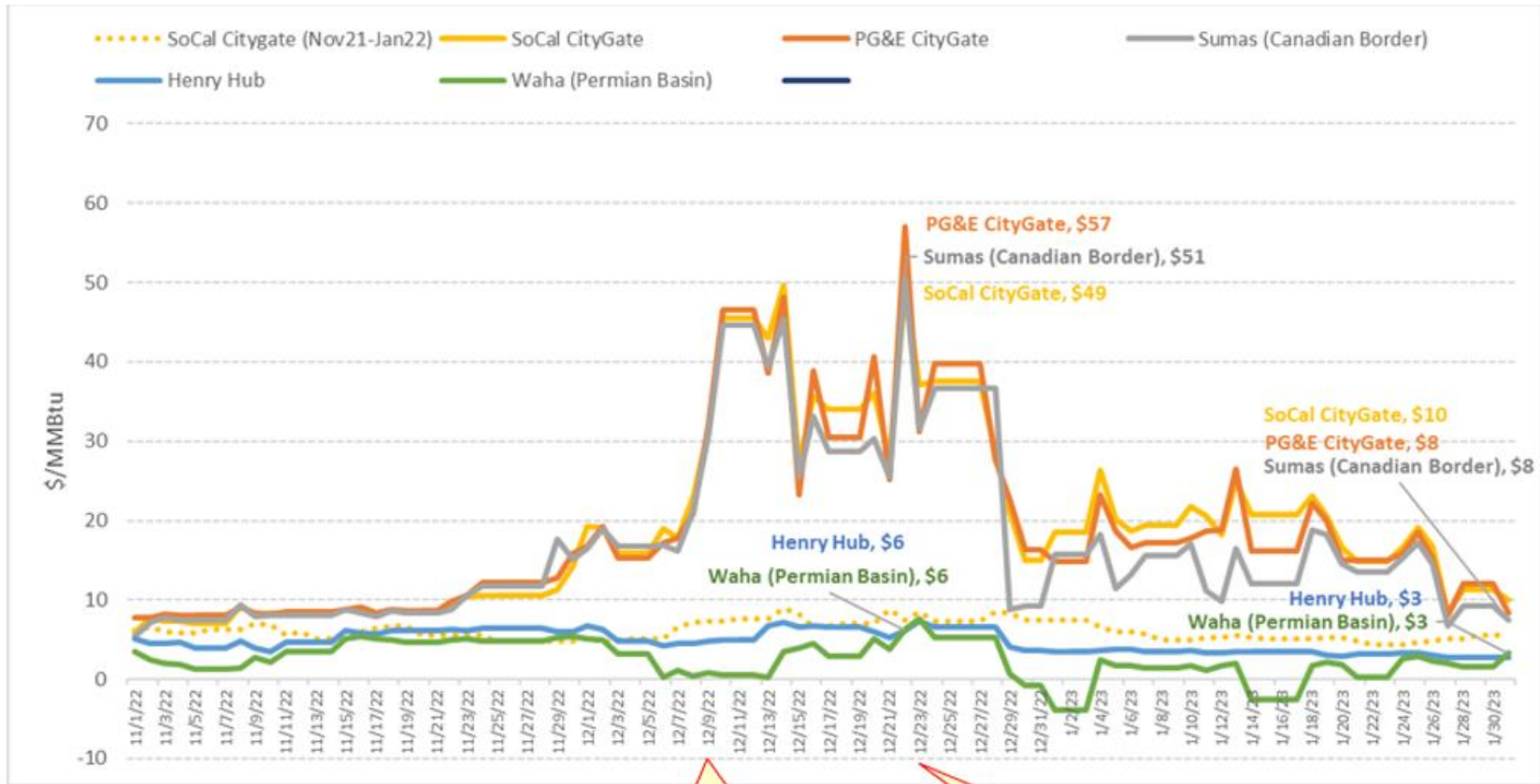
RECEIPT POINT & TRANSMISSION ZONE FIRM CAPACITIES



Since Dec 9, 2022, SoCal Citygate gas prices have averaged above \$25/MMBtu, which is 304% higher than the same time last year (Dec 9, 2021 – Jan 31, 2022).

- While fundamentals point to sustained cold Western weather and lower gas storage levels, the natural gas benchmark Henry Hub has traded significantly lower (\$3-\$7/MMBtu)
 - Storage levels in the West are 25% less than one year ago, and 32% below the 5-year average, yet market liquidity has not been an issue
- The capacity reduction of Line 2000 on the El Paso pipeline may be a contributor, however supply has remained liquid and production levels are normal across much of the US
- Both SoCalGas and El Paso pipelines have imposed frequent tighter balancing requirements at various levels, but none at the emergency level
- Although still at elevated levels, Western gas prices declined in January 2023, with SoCal Citygate gas prices averaging \$17.96/MMBtu, which is still very high (241% higher than the same time last year)

Daily Natural Gas Prices



- Henry Hub is the US nat gas benchmark trading hub.
- Western gas prices have been abnormally higher (~10x higher) as compared to Henry Hub.

Forecast shows major cold system moving through Western US. 6-10 and 10-15 day forecasts show cold but uncertainty

Winter Storm Elliot hits center of country & Texas. EPNG warns of freeze offs in Permian Basin

Electric Customer Impacts

- Based on recent gas and power premiums, SCE filed an ERRA Trigger Application (A.23-01-020) on January 31, 2023, requesting up to a \$595.6 million rate increase, effective June 1
 - This represents a 4.4% average increase across bundled customer generation rates
 - SCE is seeking flexibility to right size the increase, and reduce the rate increase if prices “self-correct”
- SCE's hedging activities (power and gas) provide some protection from price volatility, but does not fully protect against the sustained premiums
- Electric climate credits which normally would have been paid in Apr '23 will be accelerated for residential and small business customers to March
- Communication to customers is a top priority
 - Beginning January 4, SCE emailed 2.9 million residential customers and 156,000 business customers about natural gas price impacts to rates, and available customer assistance programs
 - On-going collaboration with 1,600 community-based organizations
 - Expanded affordability content on [sce.com](https://www.sce.com)

Mitigations and Potential Mitigations

- Reduce reliance on natural gas in California by advancing policies that support California's GHG emissions goals
 - Building and Transportation Electrification
 - Renewables and Storage technologies
- Hedging is an important part of any portfolio. The CPUC provides a framework to hedge for IOUs
 - SCE has a hedging program that seeks to mitigate both power and gas price spike impacts; however, hedging comes at a cost and it is not possible to hedge fundamental shifts in the market
 - Additional monitoring of CCA financial health and hedging activities could help reduce impact on customers – CPUC currently reviewing these issues in the Provider of Last Resort proceeding
 - Owners of physical generation likely already hedge gas positions, but hedging has additional cost and has limitations
- Gas storage is an important component of gas infrastructure; continued access to Aliso Canyon, as long as it continues to remain safe, helps to manage price volatility
- The Operational Flow Order (OFO) structures have been adjusted and are consistent across the IOUs
- Areas to consider:
 - Who benefits the most from higher prices? Pipeline transporters, third-party gas storage rights holders, gas utilities, marketers?
 - Misalignment between the natural gas and power markets continue to add uncertainty for market participants
 - Electric generators should have access to gas storage in Southern California (access exists in Northern California) as an additional lever to manage gas price volatility and operational constraints
 - CPUC could consider more scrutiny on actions that impact the market on entities that fall within their jurisdiction



CURRENT GAS & ELECTRIC MARKET CONDITIONS

February 7, 2023

MARLON O. SANTA CRUZ

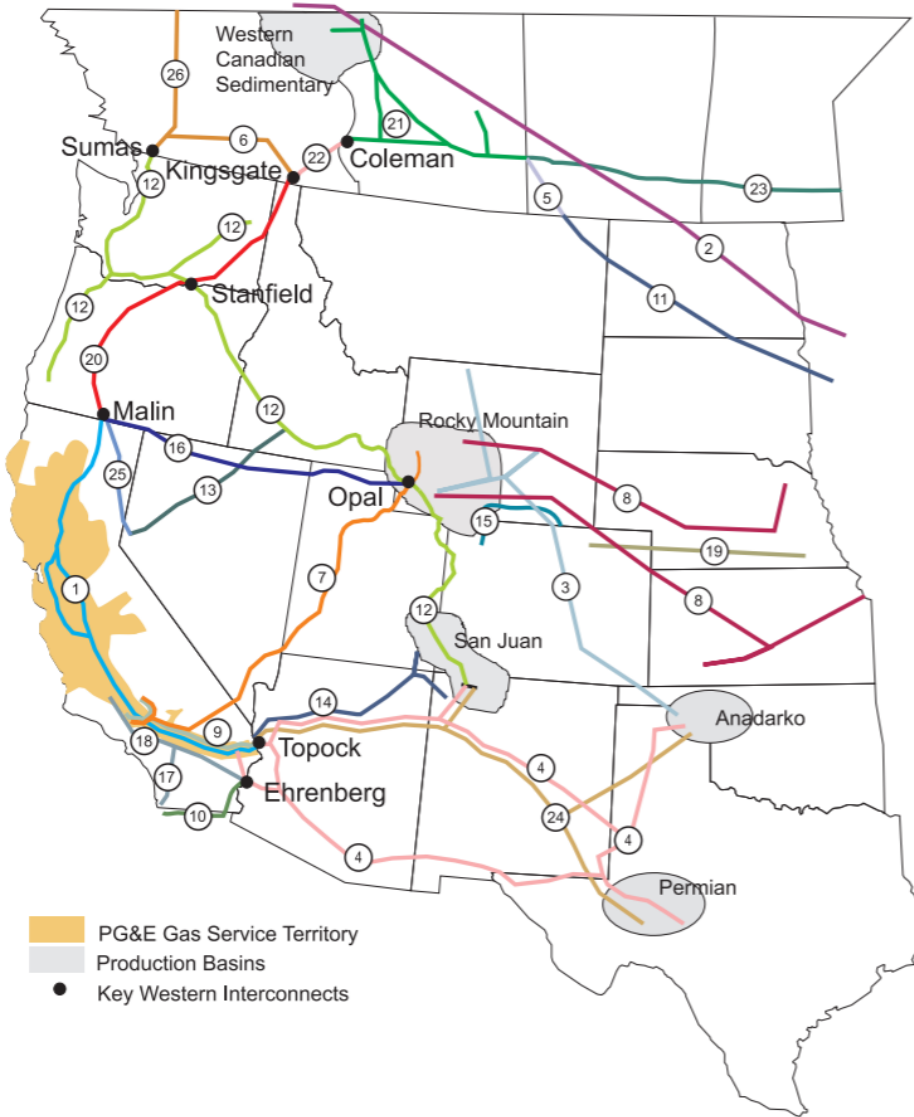
MANAGER OF FUEL AND PURCHASED POWER

BACKGROUND

LADWP Generation

- Municipality
- Load Serving Entity
- Balancing Authority
- Vertically Integrated
- Resource Portfolio
- Environmental Goals
- Inadvertent Risk Exposure

Gas Market Access



WESTERN NORTH AMERICAN NATURAL GAS PIPELINES (Not to Scale)

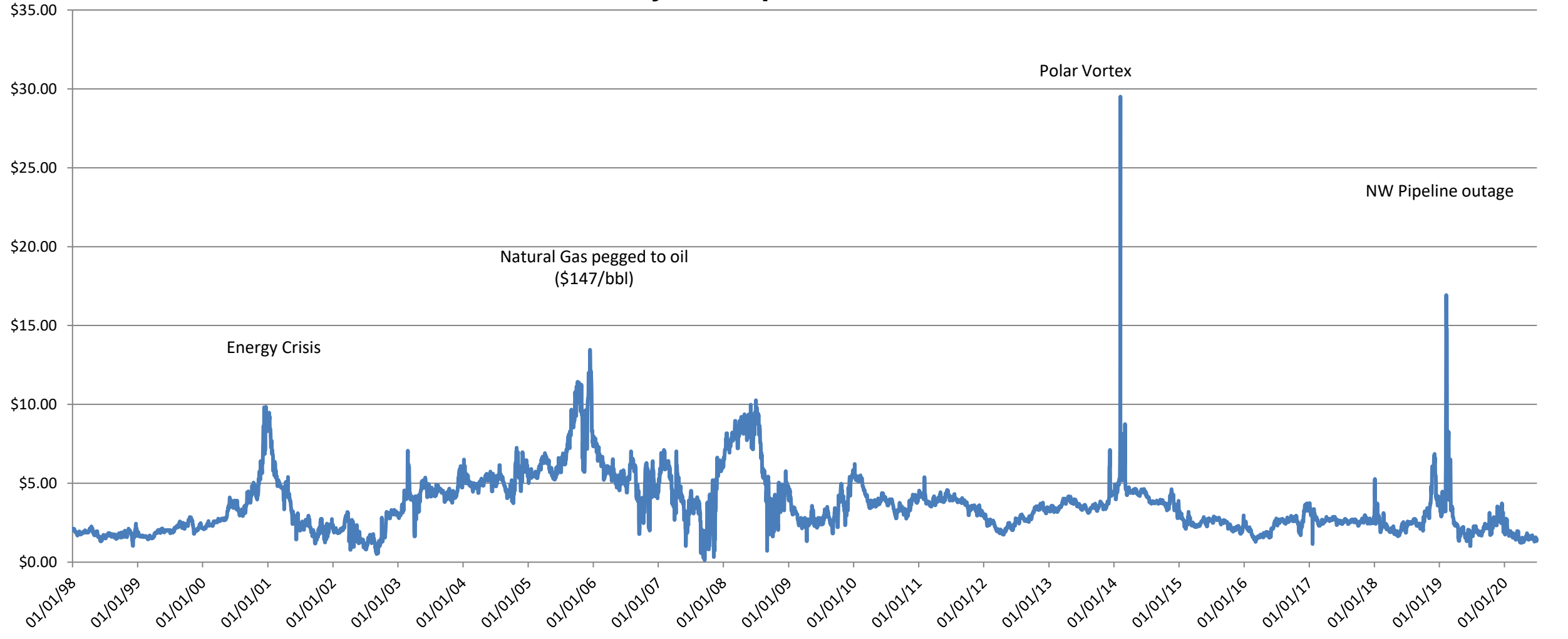
- ① Pacific Gas and Electric Company - California Gas Transmission
- ② Alliance Pipeline L.P.
- ③ Colorado Interstate Gas Company
- ④ El Paso Natural Gas Company
- ⑤ Foothills Pipe Lines Ltd.
- ⑥ FortisBC
- ⑦ Kern River Gas Transmission Company
- ⑧ Kinder Morgan Interstate Gas Transmission
- ⑨ Mojave Pipeline Company
- ⑩ North Baja Pipeline, LLC
- ⑪ Northern Border Pipeline Company
- ⑫ Northwest Pipeline (Williams)
- ⑬ Paiute Pipeline Company
- ⑭ Questar Southern Trails Pipeline Company
- ⑮ Rockies Express
- ⑯ Ruby Pipeline
- ⑰ San Diego Gas & Electric
- ⑱ Southern California Gas Company
- ⑲ Trailblazer Pipeline Company
- ⑳ TransCanada - GTN System
- ㉑ TransCanada - Alberta System
- ㉒ TransCanada - B.C. System
- ㉓ TransCanada - Canadian Mainline
- ㉔ Transwestern Pipeline Company
- ㉕ Tuscarora Gas Transmission Company
- ㉖ Westcoast Pipeline

PG&E Gas Service Territory
 Production Basins
 Key Western Interconnects

CURRENT GAS MARKET CONDITIONS

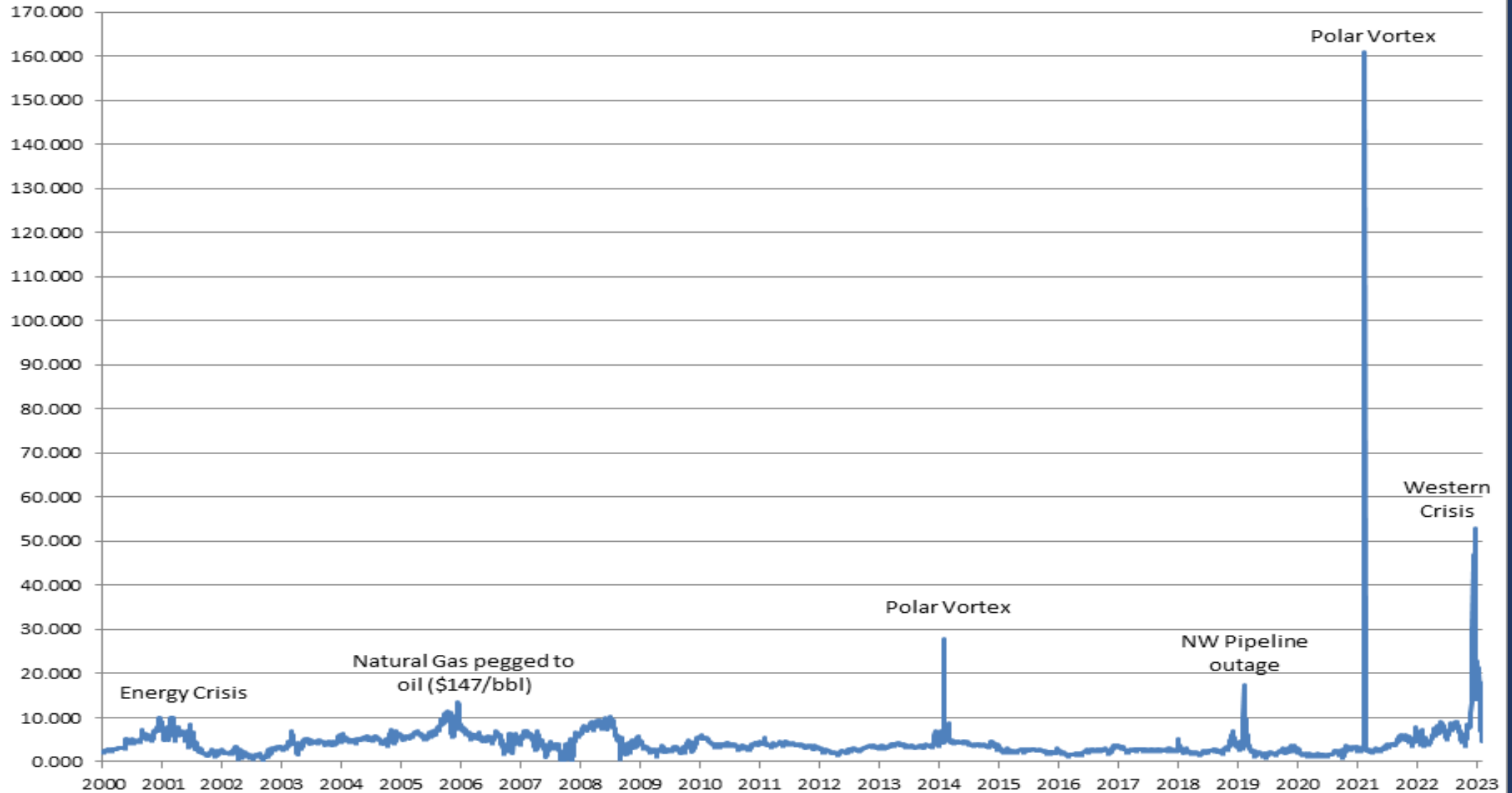
Historical Natural Gas Prices

NW Rockies Daily Gas Spot Prices



Recent Natural Gas Prices

Opal Gas Daily Average Price 2000-Present



IMPACTS OF GAS PRICES ON ELECTRIC GENERATION MARKETS

Not Your Normal Spike

Demand

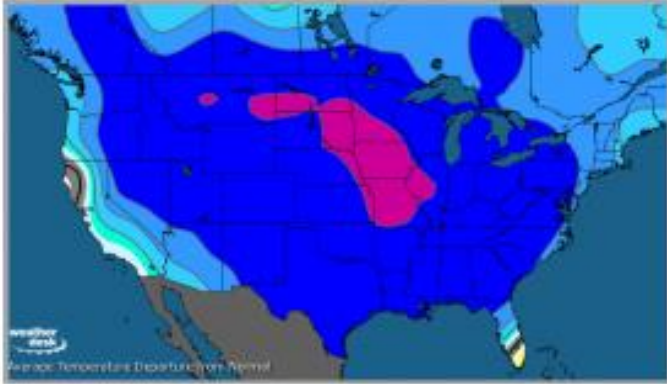
- East vs. West
- Sustained below average overnight temperatures
- Everything west of the Rockies

Supply

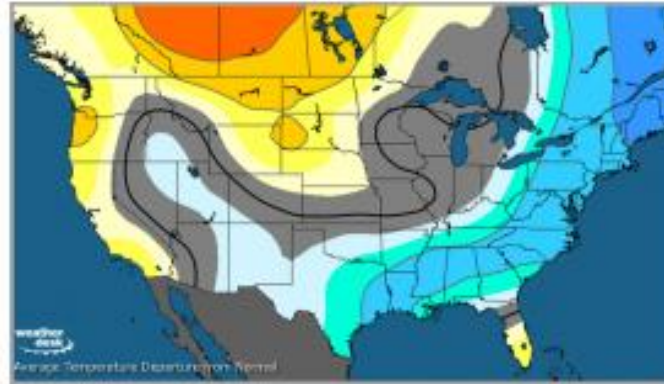
- Force Majeure on TransCanada GTN pipeline – limited market access
- Low storage inventory (declared)
- Ongoing pipeline restrictions

Unexpected Weather

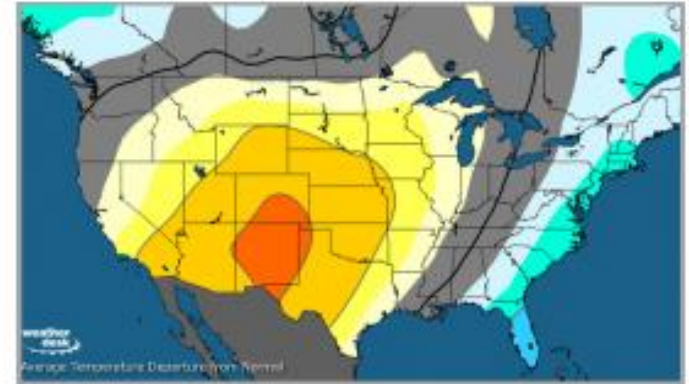
1-5 Day: Wednesday Nov 16 - Sunday Nov 20



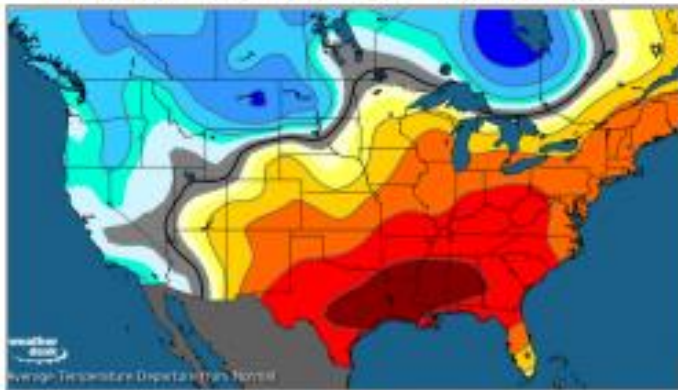
6-10 Day: Monday Nov 21 - Friday Nov 25



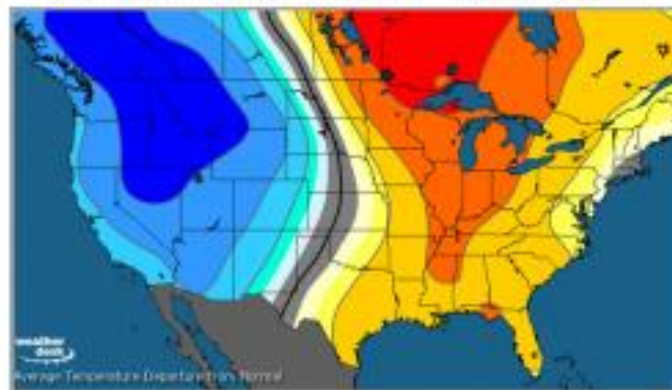
11-15 Day: Saturday Nov 26 - Wednesday Nov 30



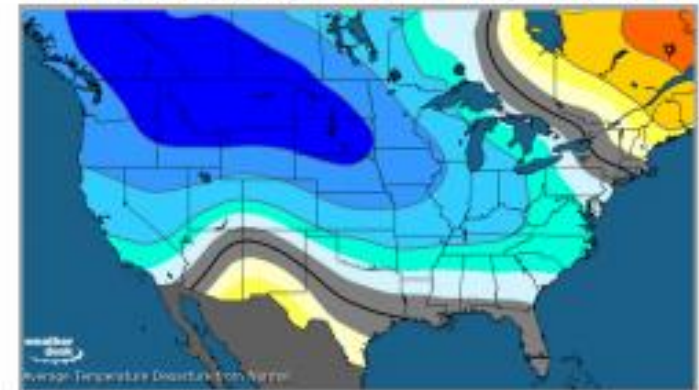
1-5 Day: Wednesday Dec 7 - Sunday Dec 11



6-10 Day: Monday Dec 12 - Friday Dec 16

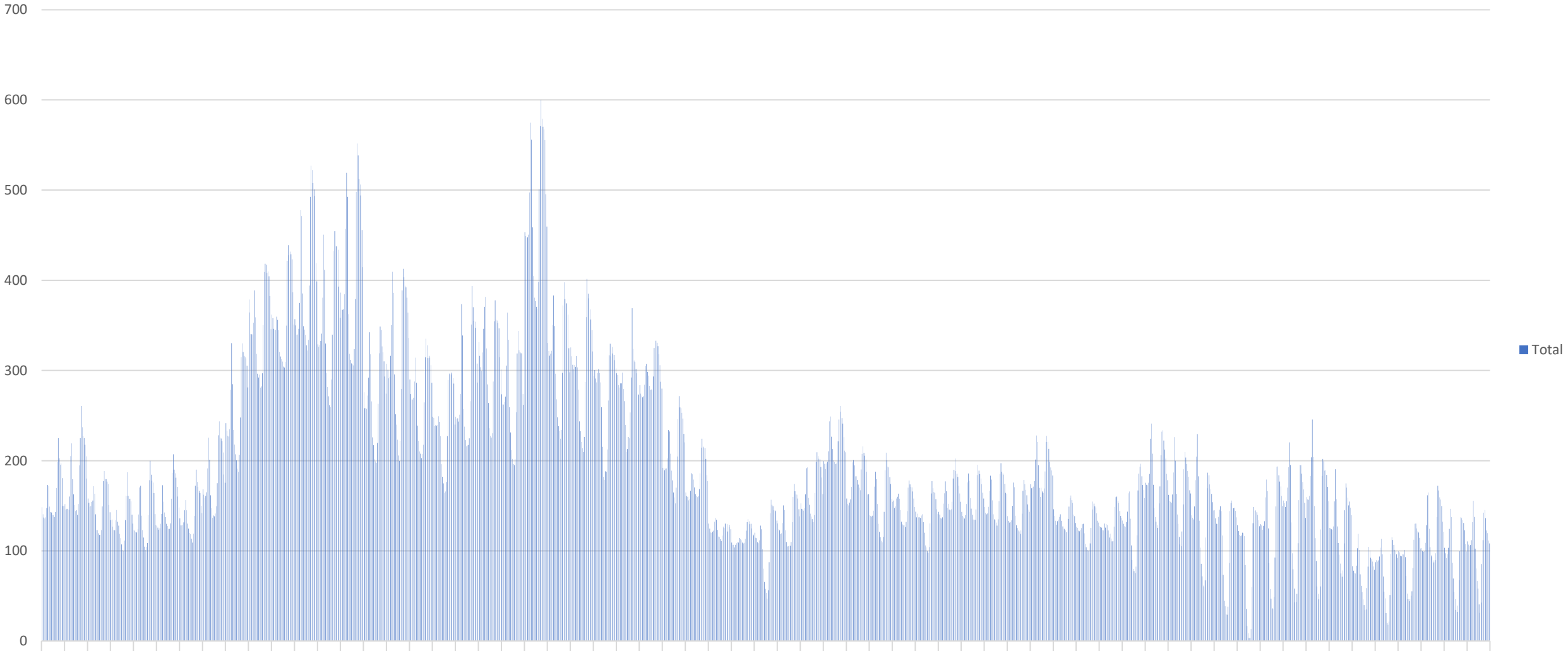


11-15 Day: Saturday Dec 17 - Wednesday Dec 21



Increased Generation Costs

Sylmar LMP Prices December and January

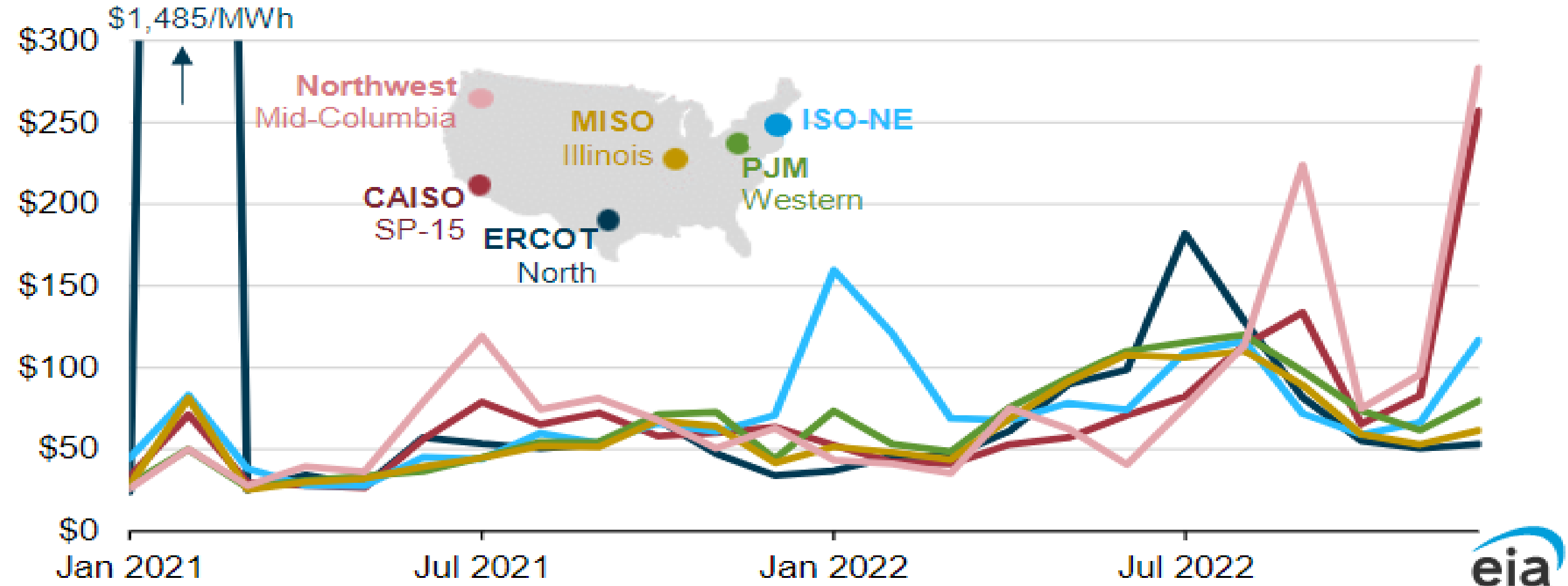


■ Total

December 2022 – January 2023

Wholesale U.S. electricity prices were volatile in 2022

Monthly average wholesale electricity prices at selected trading hubs (Jan 2021–Dec 2022)
dollars per megawatt-hour (\$/MWh)



Data source: S&P Global Market intelligence



Double Bind: Gas-Electric Scarcity Pricing

California Public Utilities Commission
En Banc Proceeding

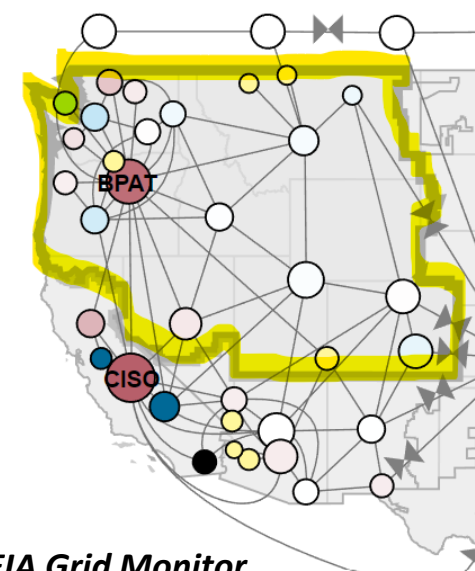
February 7, 2023

Fred Heutte
NW Energy Coalition

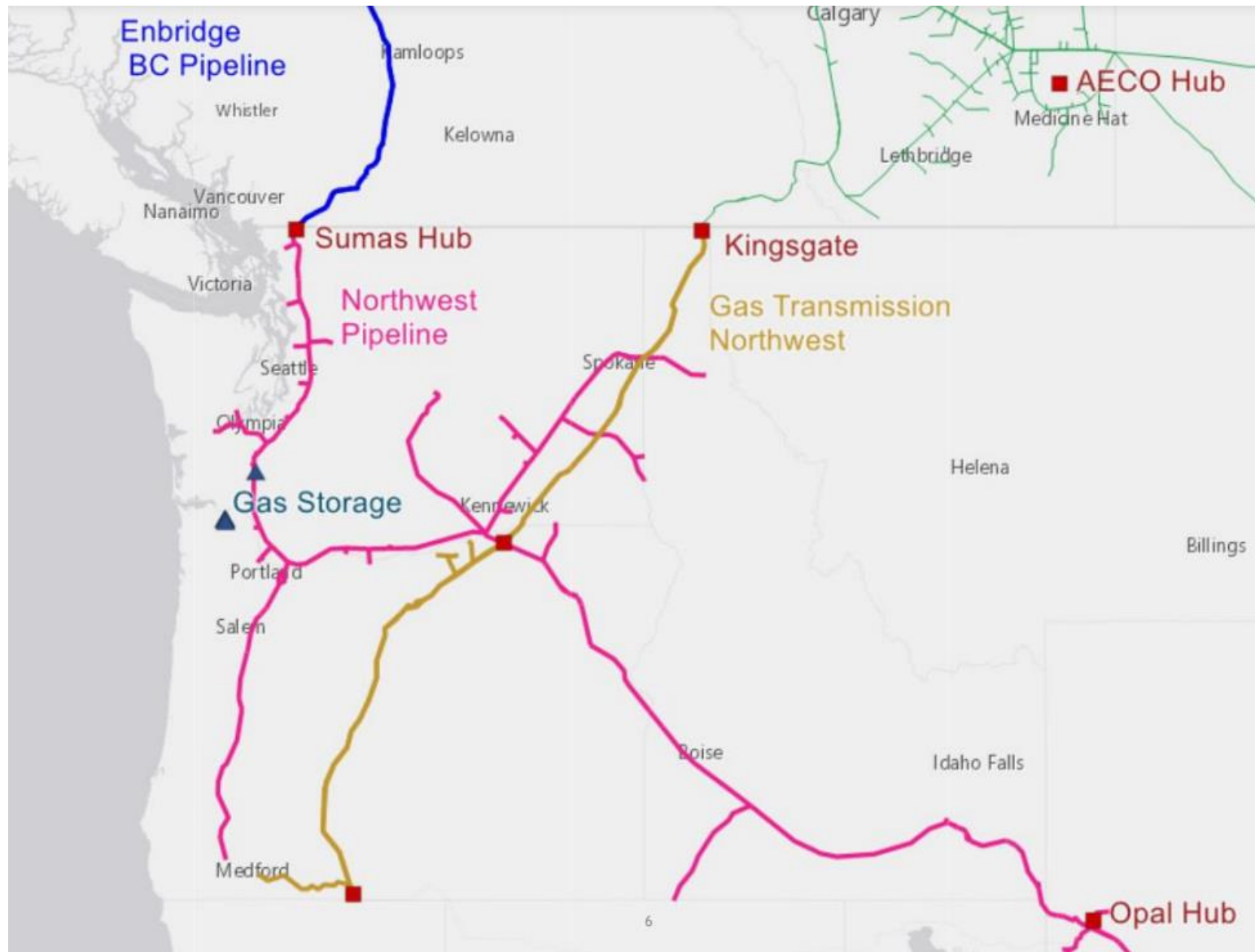
fred@nwenergy.org



		2019-20	2020-21	2021-22	Avg 2019-22	2022-23	+/-	%
Portland temp	Nov	46.8	46.4	50.4	47.9	43.7	-4.2	
<i>daily avg F</i>	Dec	43.0	43.9	41.3	42.7	39.0	-3.8	
	Jan	45.8	44.8	41.8	44.1	43.3	-0.8	
Spokane temp	Nov	35.6	37.1	40.2	37.6	28.3	-9.3	
<i>daily avg F</i>	Dec	33.4	31.8	29.4	31.5	23.9	-7.7	
	Jan	34.1	33.5	29.0	32.2	31.2	-1.0	
Sumas \$/mmBtu	Nov	4.09	3.21	2.64	3.31	9.29	5.97	280%
	Dec	3.20	3.18	4.96	3.78	27.77	23.99	735%
	Jan	2.30	2.64	5.79	3.58	13.72	10.14	383%
NW demand (aMW)	Nov	39,799	34,841	38,039	37,560	42,405	4,846	113%
<i>EIA Grid Monitor</i>	Dec	42,152	37,844	43,048	41,015	45,714	4,699	111%
	Jan	38,183	40,471	43,447	40,700	43,865	3,165	108%
NW hydro (aMW)	Nov	13,211	14,823	13,337	13,790	13,094	-696	95%
<i>EIA Grid Monitor</i>	Dec	13,341	15,264	17,842	15,482	13,557	-1,925	88%
	Jan	15,916	17,825	18,914	17,551	13,461	-4,090	77%
NW gas gen (aMW)	Nov	8,966	7,455	7,974	8,132	8,850	718	109%
<i>EIA Grid Monitor</i>	Dec	10,281	9,564	8,601	9,482	10,475	993	110%
	Jan	9,346	8,621	8,714	8,893	10,376	1,482	117%
AC+DC Intertie (aMW)	Nov	2,349	3,800	3,671	3,273	1,374	-1,900	42%
<i>net N>S flow</i>	Dec	2,775	4,053	4,431	3,753	843	-2,910	22%
	Jan	3,770	4,646	4,663	4,360	1,557	-2,803	36%
<i>Data sources: NWS, CAISO OASIS, EIA Grid Monitor, BPA results are provisional</i>								

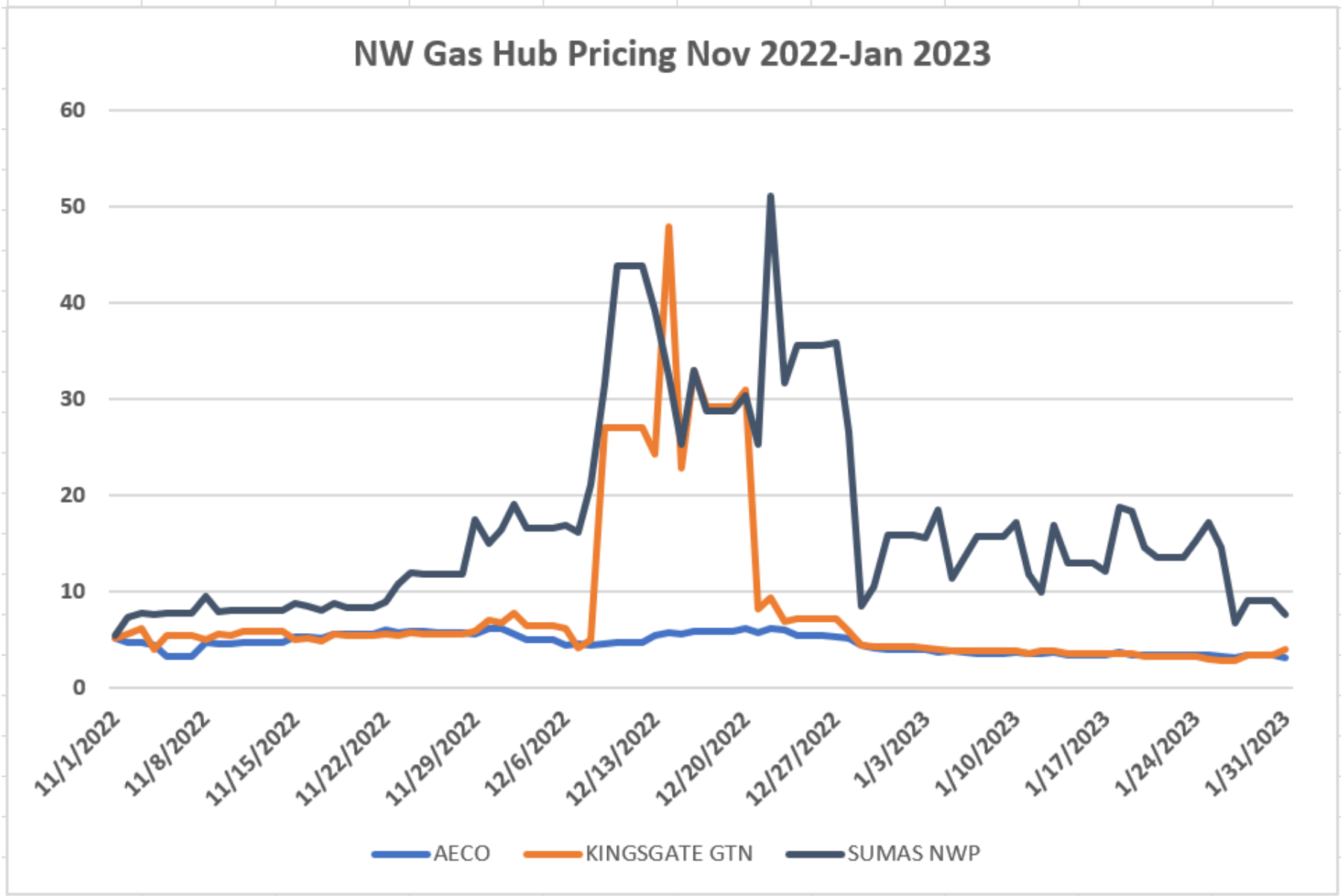


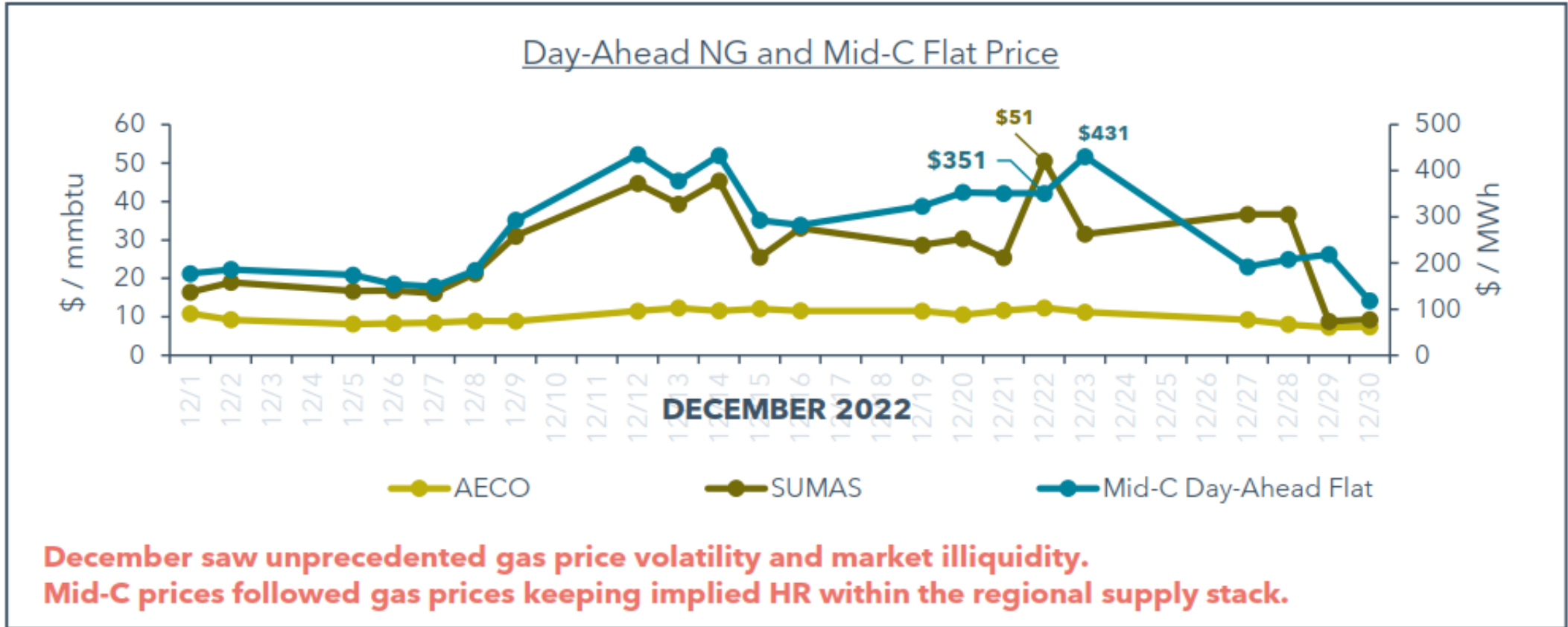
**EIA Grid Monitor
NW Region**



Northwest Power and Conservation Council

NW Gas Hub Pricing Nov 2022-Jan 2023





*Portland General Electric, presentation to Oregon Public Utility Commission
 January 31, 2023*

Winter 2022-23 Gas-Electric Scarcity Pricing Bubble

1. Convergence of multiple factors: weather, economic trends, gas delivery and storage constraints, reduced electric resource margins, rapid changes in the US gas sector (especially LNG exports), market "sentiment"
2. Harsh consequences for customers – hundreds of millions of dollars of unanticipated costs in gas and electric fuel cost adjustments
3. Not unprecedented – warning signs from previous scarcity pricing episodes, including February-March 2019
4. Elevated risk of price surge recurrence
5. The cost of not doing enough fast enough is increasing rapidly

Futures: Buy the Rumor, Sell the Refill



BY NGI STAFF REPORTS

June 10, 1999

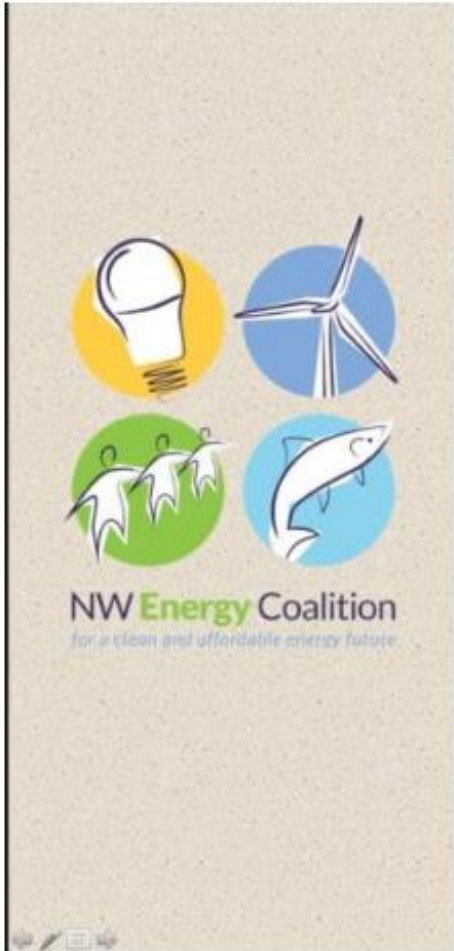
Gas-Electric Double Bind

1. Most of the time, power markets are price-takers from gas markets.
2. Electric prices are regional, gas prices are continental and increasingly prone to global market forces (via LNG exports) and eventual shale gas peak and decline.
3. Gas market transparency is very limited.
4. Scarcity pricing is enhanced by constraints: critical line pressure (gas) and reliability requirements (electric), but the gas constraint is “harder.”
5. Electric power pricing and reliability depends on peaking units that do not have firm gas and compete with non-core customers during supply crunches.
6. Longstanding misalignment between gas nomination cycle and electric commitment-dispatch creates capital misallocation and arbitrage.

Search for Solutions: Cooperation and Resource Diversity

Highly disruptive and long-duration scarcity pricing in the gas and electric markets is sounding the alarm to move much faster on regulatory cooperation, event readiness, and expanding resource diversity among the Pacific and Western states:

- Enhanced customer protections (shutoffs, bill payment assistance)
- Event analysis, situational awareness and readiness, including advanced met/climate data
- Reforming fuel cost adjustments and hedging programs
- Accelerated gas and electric load management
- Expanding power markets to access load and resource diversity
- Structural changes to the gas-electric interface (gas nominations, electric unit commitment/dispatch)
- Expanding gas market transparency
- Price and supply backstops
- Windfall profits recapture



Double Squeeze

How the Arctic Express and natural gas constraints are turning the West Coast gas and power markets upside down

Fred Heutte
NW Energy Coalition
March 6, 2019
Work in progress – updates and refinements will be incorporated.

March 2019

<https://nwenergy.org/featured/double-squeeze-arctic-express-system-constraints-skyrocket-nw-wholesale-energy-prices/>



Topics ▾ Resources ▾

Customer-side resources can reduce risks from volatile energy prices

By [Chris Connolly](#) | February 1, 2023

Winter is here. It's barely February and we've already witnessed the value of a diversified energy system and the risks that come from fossil fuels. Volatile fossil fuel prices are causing concern for customers that end up footing the bill when their utility purchases fossil-fueled power. By accelerating our investments in customer-side resources, we can better manage loads and reduce our exposure to spiking energy prices while also making communities more resilient.

February 2023

<https://nwenergy.org/featured/customer-side-resources-can-reduce-risks-from-volatile-energy-prices/>

Becky Robinson

CAISO

Questions?



Public Comment

- To make a public comment:
 - Dial 800-857-1917
 - Access code: 1767567#
 - You may also email your comments to GasPolicy@cpuc.ca.gov
 - For more information, visit: <https://www.cpuc.ca.gov/winter2023naturalgas>

Closing Remarks