

Energy Market Insights

May 2022

New England

Mid-Atlantic

California

Mexico

New York

Midwest

Texas

Natural Gas

New England

May 2022

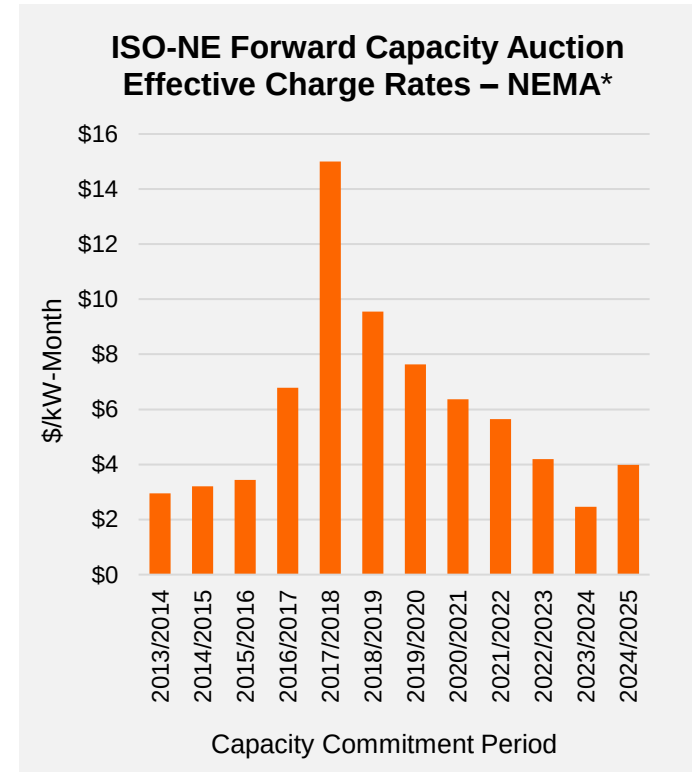
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Insight of the Month

ISO-NE proposes ending Minimum Offer Price Rule (MOPR) in 2025



- ISO-NE has submitted a proposal to FERC calling for the elimination of the MOPR beginning with the Forward Capacity Auction (FCA) in 2025. A decision is expected from FERC by the end of May.
- The MOPR sets an artificial bidding price floor for state-supported clean energy resources in ISO-NE's annual FCAs. The graph to the right shows the \$/kW-month charge rates cleared in prior FCA's for the Northeastern Massachusetts subarea (NEMA) with commitment periods ranging from 2013/2014 - 2024/2025.
- ISO-NE has expressed interest in phasing out the MOPR due to concerns that it will raise costs for consumers as more state-subsidized resources are built. "While there is no evidence that this potential inefficiency has harmed consumers to date," ISO-NE says in its proposal, "that result is clearly looming."
- The ISO's proposal allows for a graduated removal of the MOPR over a three-year period, with an immediate exemption of the rule for 300 MW of qualified capacity in FCA 17 (2026-2027) and 400 MW of qualified capacity in FCA 18 (2027-2028).
- In its proposal, ISO-NE cited reliability concerns as the primary reason for delaying an end to the MOPR. Immediate elimination could cause other capacity resources to withdraw from the market, as capacity market prices decline, which could create reliability problems if the renewable resources aren't commercially available.



*NEMA = Northeastern Massachusetts subarea

KEY TAKEAWAY: Eliminating the MOPR would allow state-supported clean energy resources to bid in to ISO-NE's FCAs at lower prices. Should FERC approve of ISO-NE's proposal, we could expect capacity prices in New England to remain low for the foreseeable future. It is unclear how FERC will rule on the matter, though clean energy advocates are urging the commission to reject the proposal in favor of a shorter timeline for removing the MOPR.

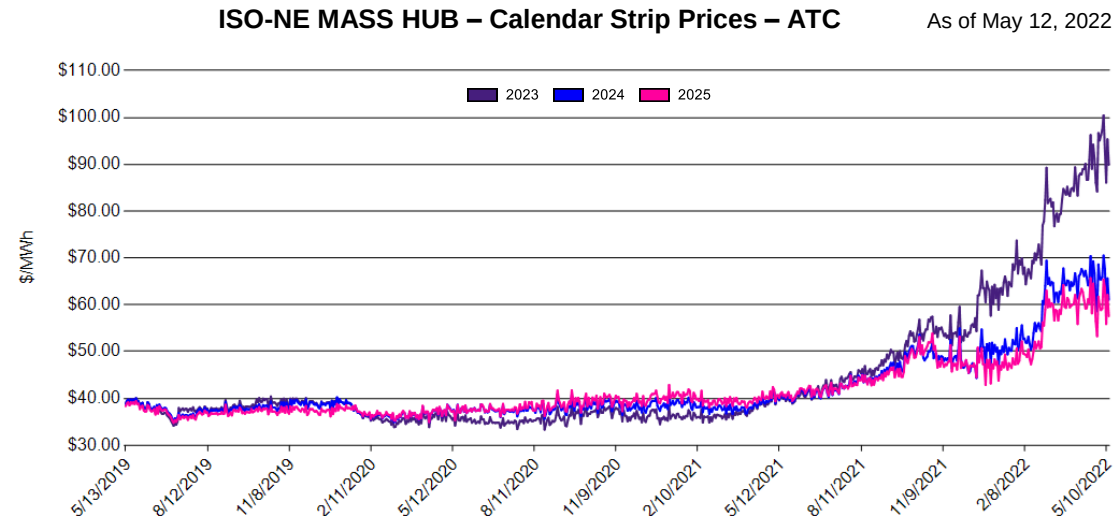
New England – Power Prices

CY23 forwards continue upward trend, widening premium with CY24/25 strips



Where are forwards trending?

- CY2023 forwards continued to trend upward in the past month, averaging \$95/MWh through the first two weeks of May.
- CY2024 strips remained in the \$60-\$70/MWh range for most of the past month, with CY2025 strips trading at a ~\$5/MWh discount.
- The widening premium between CY2023 and CY2024/25 strips reflects near-term concerns in the market over natural gas supply.



Where are index prices trending?

- The average day ahead price for April 2022 was \$62.37/MWh, down about \$4/MWh month-over-month.
- April 2022 spot pricing was the highest spot price on record for the month in over ten years. The day ahead average for the month was up 139% compared to April 2021.

Average Monthly Day Ahead LMP - MaHub									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$168.81	\$71.14	\$38.60	\$40.30	\$108.75	\$56.76	\$26.45	\$42.73	\$149.46
Feb	\$156.02	\$122.77	\$29.90	\$30.02	\$39.58	\$35.62	\$23.06	\$73.12	\$117.08
Mar	\$111.16	\$64.25	\$20.63	\$35.75	\$35.38	\$38.07	\$17.18	\$34.88	\$66.18
Apr	\$44.98	\$28.43	\$28.36	\$29.23	\$45.00	\$26.97	\$18.36	\$26.14	\$62.37
May	\$36.95	\$24.92	\$21.24	\$27.31	\$24.04	\$24.21	\$16.48	\$24.98	\$72.44
Jun	\$37.92	\$21.16	\$22.61	\$25.48	\$26.82	\$22.09	\$19.84	\$37.10	
Jul	\$37.50	\$26.44	\$31.12	\$27.60	\$32.89	\$29.78	\$23.78	\$37.16	
Aug	\$30.35	\$30.06	\$35.54	\$24.90	\$39.16	\$25.69	\$23.79	\$49.47	
Sep	\$34.10	\$30.82	\$28.62	\$23.57	\$33.89	\$21.14	\$20.46	\$48.01	
Oct	\$32.19	\$37.01	\$21.98	\$29.74	\$38.46	\$20.75	\$24.78	\$57.71	
Nov	\$47.71	\$29.42	\$24.98	\$33.98	\$57.43	\$32.29	\$25.12	\$56.69	
Dec	\$43.00	\$22.42	\$53.28	\$71.31	\$47.31	\$40.98	\$40.15	\$65.14	
Avg.	\$65.06	\$42.40	\$29.74	\$33.27	\$44.06	\$31.20	\$23.29	\$46.09	\$93.50

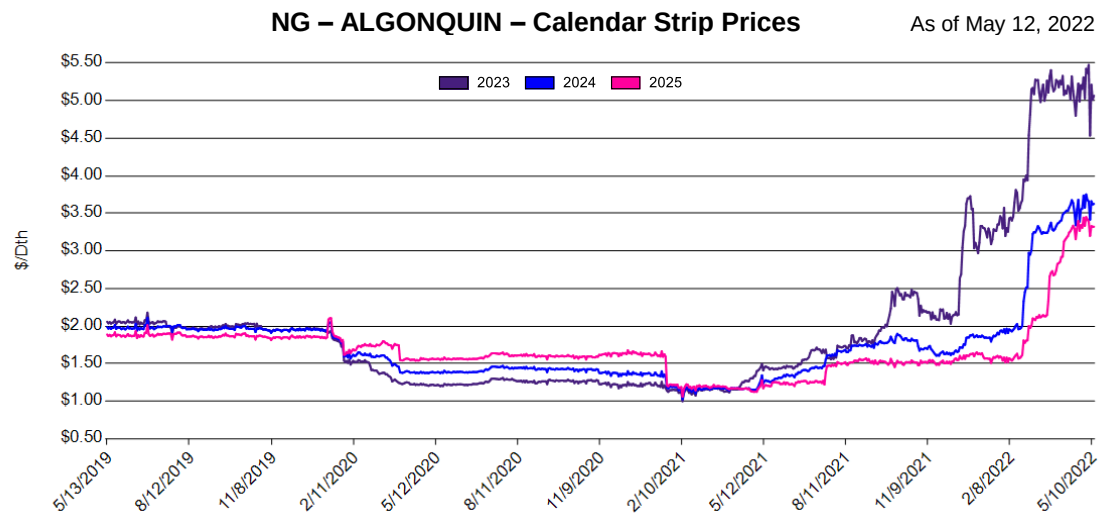
New England – Gas Prices

2023 Algonquin basis contracts dip briefly, rally back above \$5.00/MMBtu



Where are forwards trending?

- Algonquin Basis prices for CY2023 averaged ~\$5.14/MMBtu through April. Prices dipped sharply to \$4.50 on May 9th before rising back above \$5.00/MMBtu in the subsequent trading days.
- The CY2024 and CY2025 strips are both trending upward, climbing to \$3.64/MMBtu and \$3.36/MMBtu, respectively.



**This is a generic wholesale curve to New England. Pricing does not reflect locational adjustments, utility tariff designations or rate class adjustments specific to your facility. For more detailed pricing please contact your Enel X representative.*

Where are index prices trending?

- Algonquin City-Gate daily prices averaged \$6.49/MMBtu in April 2022 — a 1% decrease from the March 2022 average.
- April 2022 spot pricing was 179% higher than April 2021 and 122% above the five-year average for April.

Average of Daily Prices - Algonquin, City-Gates Full Price w/ HH										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$10.64	\$24.69	\$9.34	\$4.54	\$5.09	\$15.62	\$6.95	\$2.83	\$4.92	\$20.00
Feb	\$17.87	\$21.05	\$17.50	\$3.46	\$3.73	\$4.40	\$4.20	\$2.27	\$8.37	\$14.56
Mar	\$6.78	\$15.19	\$7.99	\$1.87	\$4.52	\$3.97	\$4.04	\$1.58	\$3.40	\$6.54
Apr	\$5.07	\$4.80	\$3.16	\$2.93	\$3.11	\$4.98	\$2.56	\$1.63	\$2.33	\$6.49
May	\$4.45	\$3.85	\$1.87	\$2.12	\$3.08	\$6.78	\$2.32	\$1.39	\$2.31	\$7.57
Jun	\$4.38	\$4.05	\$1.69	\$2.28	\$2.45	\$2.62	\$2.12	\$1.52	\$2.84	
Jul	\$4.65	\$3.10	\$1.99	\$2.75	\$2.50	\$2.83	\$2.28	\$1.63	\$3.22	
Aug	\$3.49	\$2.71	\$2.34	\$3.11	\$2.36	\$3.17	\$2.02	\$1.49	\$3.93	
Sep	\$3.79	\$3.16	\$2.80	\$2.59	\$1.90	\$2.94	\$1.95	\$1.42	\$4.44	
Oct	\$3.84	\$2.83	\$3.69	\$2.26	\$2.78	\$3.23	\$1.66	\$2.00	\$4.78	
Nov	\$6.44	\$6.18	\$3.29	\$2.54	\$3.27	\$6.08	\$3.31	\$1.95	\$5.63	
Dec	\$13.09	\$6.01	\$2.19	\$6.74	\$9.35	\$5.77	\$4.61	\$4.24	\$8.27	
Avg	\$6.97	\$8.07	\$4.74	\$3.10	\$3.69	\$5.22	\$3.17	\$2.00	\$4.51	\$11.49

New York

May 2022

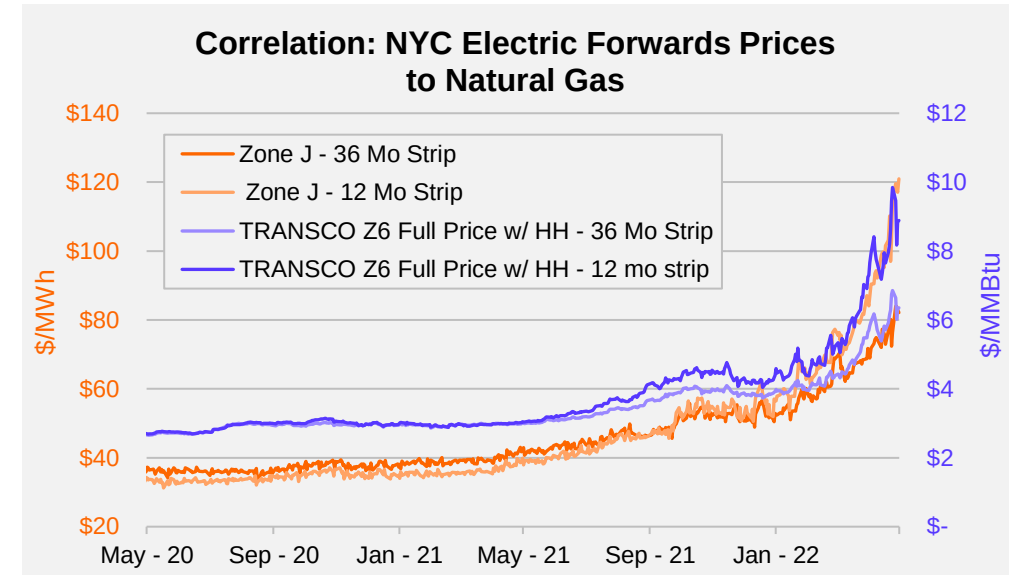
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Insight of the Month

Forwards remain elevated amid market volatility



- Forward power prices have more than doubled since the beginning of year, rising from \$52/MWh to a peak of \$120/MWh for the Jun '22 – May '23 period.
- The increase in pricing for the winter months remains the largest driver, with Dec 22 to Feb 23 strip trading between \$160-\$180/MWh.
- New York's reliance on natural gas for electricity generation has been the underlying cause in the market run-up.
- With low gas storage numbers heading into the injection season, increasing post COVID demand, lagging supply and maxed out domestic LNG exports, the 12-month Transco Z6 full price basis strip has risen 215% since this time last year.
- Despite high prices, taking advantage of the volatility and hedging when the market dips or locking in long term contracts to benefit from market backwardation may help mitigate the near-term cost impact.



YoY Comparison of Forward Prices by Month - \$/MWh													
Price Date	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Average
5/10/21	\$29.02	\$36.29	\$35.32	\$28.17	\$26.69	\$34.13	\$48.41	\$69.67	\$66.01	\$40.97	\$28.62	\$28.21	\$39.29
5/10/22	\$77.38	\$95.21	\$87.68	\$79.78	\$69.96	\$90.16	\$125.63	\$217.96	\$208.50	\$105.95	\$54.15	\$43.39	\$104.65
% Delta	167%	162%	148%	183%	162%	164%	160%	213%	216%	159%	89%	54%	166%

KEY TAKEAWAY: Northeast natural gas prices have dragged up regional electricity prices, with the largest percentage jump seen in winter month contracts. Non-winter months and outer years have also seen a significant price increase, however, the market remains backwardated with shorter-term strips trading at a premium to their longer-term counterparts. Locking in during price dips and signing onto long-term deals will allow end-users with supply contracts that expire in 2022 to strengthen their position relative to the market.

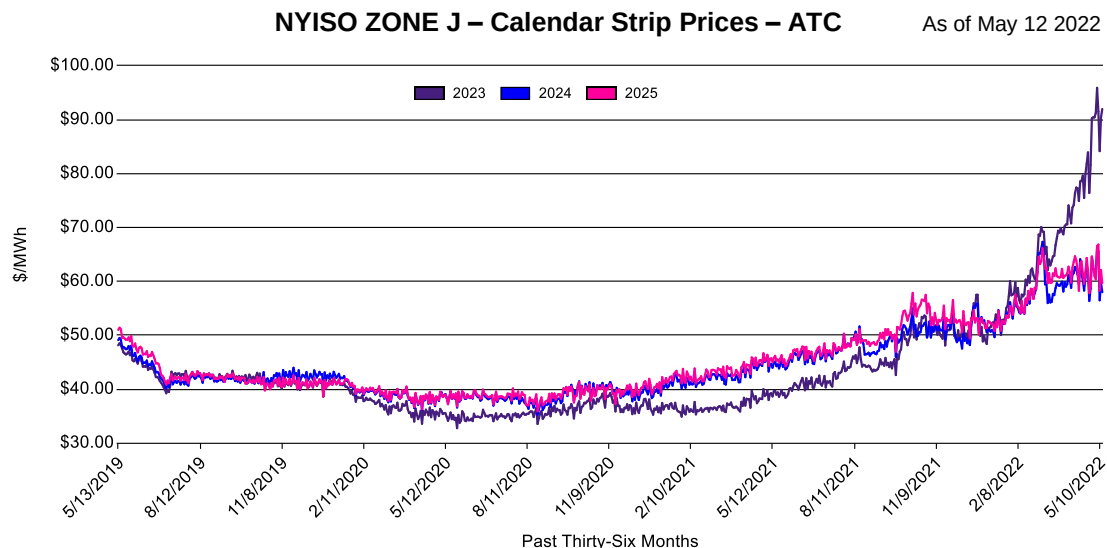
NYC – Power Prices

CY2023 strips reach new highs at \$90/MWh, spot pricing remains elevated



Where are forwards trending?

- CY2023 strips have surged in recent weeks, trading above \$85-90/MWh through the first two weeks of May, up \$15/MWh from the beginning of April.
- CY2024/25 strips are trading in tandem just south of \$60/MWh.
- CY2023's premium to CY24/25 has grown from \$1/MWh in early March to \$30/MWh in mid-May.



Where are index prices trending?

- Average DA monthly prices for NYISO Zone J rose ~\$5/MWh month-on-month to \$64.88/MWh in April 2022.
- April 2022 DA monthly averages were about 138% above the five-year average for April and 164% above the average spot price in April 2021.

Average Monthly Day Ahead LMP - NYISO - Zone J									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$175.92	\$57.34	\$35.04	\$40.64	\$96.58	\$49.20	\$25.12	\$36.35	\$138.44
Feb	\$122.84	\$112.33	\$29.61	\$30.55	\$34.05	\$33.07	\$21.26	\$64.78	\$94.62
Mar	\$102.52	\$51.26	\$20.75	\$36.04	\$31.98	\$35.00	\$16.81	\$29.40	\$59.23
Apr	\$46.49	\$27.53	\$28.62	\$32.27	\$34.77	\$28.82	\$15.53	\$24.55	\$64.88
May	\$37.31	\$30.35	\$23.45	\$31.61	\$26.96	\$23.39	\$14.95	\$26.11	
Jun	\$39.95	\$24.95	\$25.47	\$30.17	\$29.79	\$23.41	\$19.78	\$34.84	
Jul	\$39.79	\$30.01	\$35.43	\$33.57	\$36.94	\$31.23	\$25.50	\$42.00	
Aug	\$32.10	\$31.10	\$35.64	\$28.66	\$39.36	\$26.59	\$23.45	\$46.90	
Sep	\$32.91	\$32.45	\$27.01	\$26.26	\$35.52	\$21.49	\$19.33	\$48.41	
Oct	\$32.09	\$27.68	\$20.84	\$27.88	\$34.70	\$19.86	\$19.59	\$54.47	
Nov	\$41.29	\$23.34	\$25.62	\$29.97	\$38.60	\$26.55	\$22.04	\$57.10	
Dec	\$36.23	\$20.24	\$46.06	\$49.54	\$38.63	\$28.53	\$33.09	\$47.29	
Avg	\$61.62	\$39.05	\$29.46	\$33.10	\$39.82	\$28.93	\$21.37	\$42.68	\$89.29

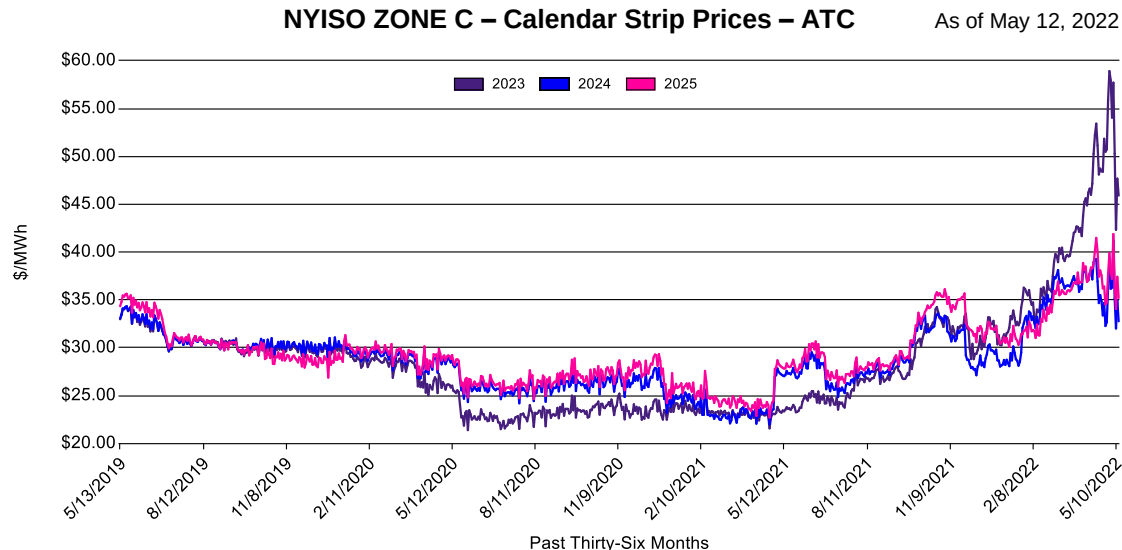
Upstate NY – Power Prices

CY2023 strips surge and crash, April spot averages up 200+% YoY



Where are forwards trending?

- CY2023 strips rose to \$59/MWh before crashing to \$45/MWh in early May.
- CY2023 prices are still trading \$20/MWh above this time last year.
- The CY2024/25 strips are trading around \$35/MWh, down slightly from \$37/MWh in early March.



Where are index prices trending?

- Elevated natural gas prices pushed the average DA settlement in March to settle at \$34.31/MWh.
- April 2022 spot pricing was ~238% above the average spot price from April 2021, and ~84% above the five-year average for April.

Average Monthly Day Ahead LMP - NYISO - Zone C									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$121.65	\$37.81	\$21.50	\$29.68	\$62.19	\$35.02	\$16.57	\$23.96	\$96.30
Feb	\$80.31	\$75.58	\$17.63	\$24.98	\$23.91	\$25.74	\$16.36	\$38.58	\$66.26
Mar	\$85.79	\$37.35	\$12.58	\$24.47	\$22.14	\$27.67	\$13.99	\$14.43	\$35.21
Apr	\$40.38	\$22.80	\$22.01	\$20.86	\$28.14	\$21.82	\$11.87	\$10.15	\$34.31
May	\$32.23	\$25.66	\$16.11	\$20.28	\$22.94	\$15.11	\$13.08	\$15.97	
Jun	\$35.71	\$20.24	\$21.06	\$20.86	\$25.51	\$15.67	\$16.46	\$28.27	
Jul	\$34.52	\$24.94	\$29.31	\$25.74	\$31.54	\$25.27	\$22.18	\$32.81	
Aug	\$29.40	\$25.43	\$30.40	\$22.71	\$32.87	\$22.40	\$19.94	\$40.97	
Sep	\$28.79	\$25.14	\$22.75	\$21.72	\$29.40	\$16.90	\$16.36	\$35.01	
Oct	\$29.30	\$24.02	\$18.27	\$20.67	\$29.50	\$16.49	\$16.10	\$43.23	
Nov	\$34.18	\$16.32	\$21.58	\$23.18	\$31.86	\$19.75	\$13.45	\$41.57	
Dec	\$31.50	\$13.65	\$25.79	\$33.62	\$31.12	\$19.76	\$19.69	\$34.51	
Avg	\$48.65	\$29.08	\$21.58	\$24.06	\$30.93	\$21.80	\$16.34	\$29.95	\$58.02

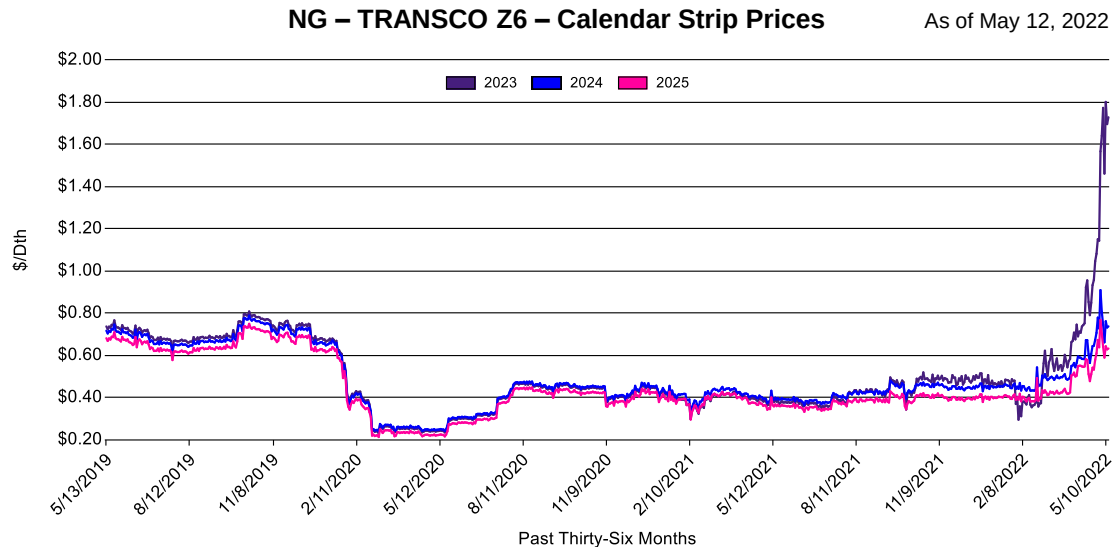
New York – Gas Prices

Transco Z6 NY basis forwards jump to \$1.80/MMBtu



Where are forwards trending?

- Transco Z6 NY basis-only CY2023 strip jumped significantly over the course of April and early May, peaking at \$1.80/MMBtu.
- The CY2024 and CY2025 strips are trading notably lower around \$0.63/MMBtu and \$0.75/MMBtu, respectively.
- The CY2023 strip's widening premium to CY2024/25 is primarily due to near-term concerns over natural gas supply amid high demand and low storage numbers heading into the injection season.



Where are index prices trending?

- Daily prices averaged \$6.11/MMBtu in April 2022, equating to a ~\$1.63/MMBtu increase month-over-month.
- April 2022 spot pricing is 163% above the five-year average for April and 187% higher than April 2021.

Average of Daily Prices - Transco Z6 NY Full Value									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$27.66	\$7.24	\$3.82	\$3.82	\$18.73	\$6.02	\$2.20	\$3.13	\$11.15
Feb	\$11.27	\$16.01	\$3.09	\$2.85	\$3.21	\$2.85	\$1.87	\$5.21	\$6.17
Mar	\$8.24	\$3.67	\$1.29	\$3.44	\$2.83	\$2.91	\$1.49	\$2.24	\$4.48
Apr	\$4.13	\$2.22	\$1.57	\$2.81	\$2.79	\$2.37	\$1.51	\$2.13	\$6.11
May	\$3.49	\$2.60	\$1.56	\$2.80	\$2.56	\$2.28	\$1.35	\$2.36	
Jun	\$3.22	\$2.35	\$1.83	\$2.34	\$2.78	\$2.11	\$1.43	\$2.61	
Jul	\$2.72	\$1.98	\$2.14	\$2.44	\$2.88	\$2.17	\$1.69	\$3.32	
Aug	\$2.38	\$2.37	\$2.03	\$2.17	\$3.00	\$1.87	\$1.47	\$3.75	
Sep	\$2.25	\$2.09	\$1.34	\$2.29	\$2.74	\$1.75	\$1.25	\$4.27	
Oct	\$2.09	\$2.22	\$1.12	\$2.32	\$2.89	\$1.53	\$1.22	\$4.56	
Nov	\$3.88	\$1.77	\$2.10	\$2.91	\$4.18	\$2.62	\$1.47	\$4.92	
Dec	\$3.25	\$1.58	\$4.37	\$5.67	\$4.12	\$2.56	\$2.78	\$3.44	
Avg	\$6.21	\$3.84	\$2.19	\$2.99	\$4.39	\$2.59	\$1.64	\$3.49	\$6.98

Mid-Atlantic

May 2022

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Insight of the Month

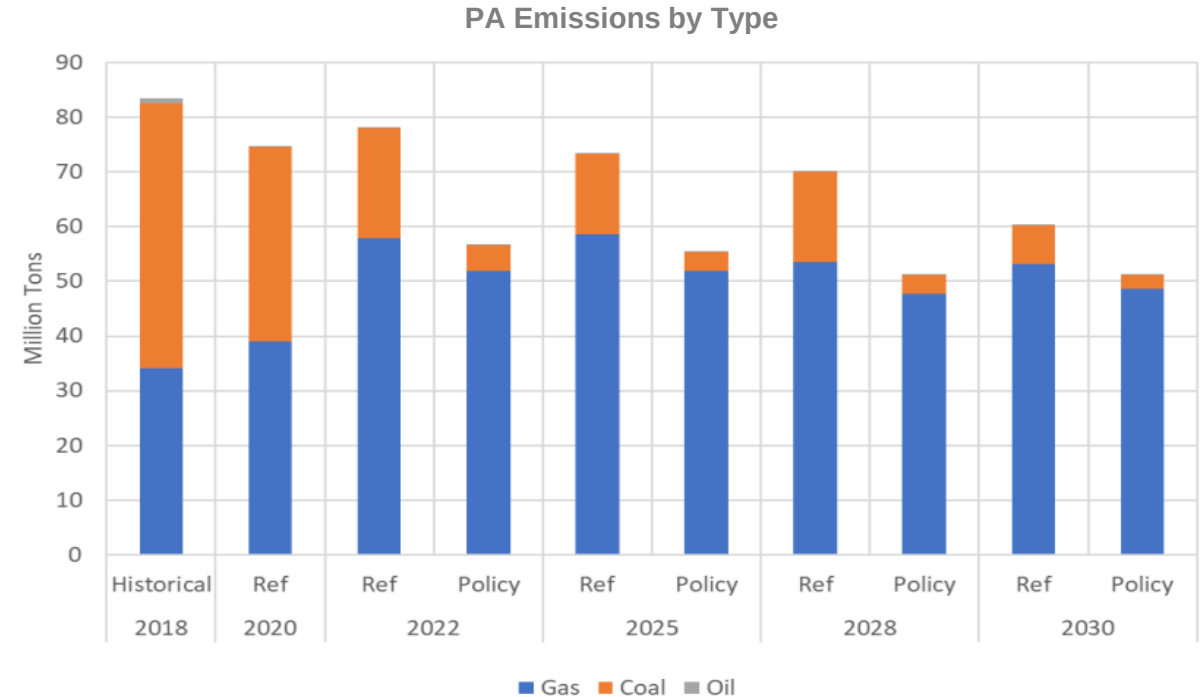
Pennsylvania finally joins the Regional Greenhouse Gas Initiative (RGGI)



After an intense and nearly 3-year-long political and legal battle, Pennsylvania has formally entered the RGGI program, joining 11 other states in their effort to drastically reduce carbon emissions through a cap and trade program. Current members are Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont and Virginia.

Features of the RGGI:

- ✓ States hold quarterly auctions where the price per ton of CO₂ emissions is established, and emitting facilities can purchase allowances. PA will participate in the Q3 2022 auction.
- ✓ Proceeds from the auctions are collected in each state and allocated to energy efficiency programs and renewable generation facilities.
- ✓ Initial observations of early adopters showed CO₂ emissions reductions of 47% among member states along with \$4 billion in economic benefit.



Study showing Pennsylvania emissions estimates without (Ref) and with (Policy) the RGGI program.
Source: PA Department of Environmental Protection

KEY TAKEAWAY: Among fierce opposition, Pennsylvania joins the program which is projected to both reduce power generation emissions by up to 200 million tons and create tens of thousands of new clean energy jobs in the state. While this is a positive from an environmental perspective, this has a chance to increase energy prices since coal and gas still make up a significant portion of the PA generation portfolio. As the program matures, the expectation is that coal, oil and inefficient gas plants will be phased out, reducing the need for emissions allowances.

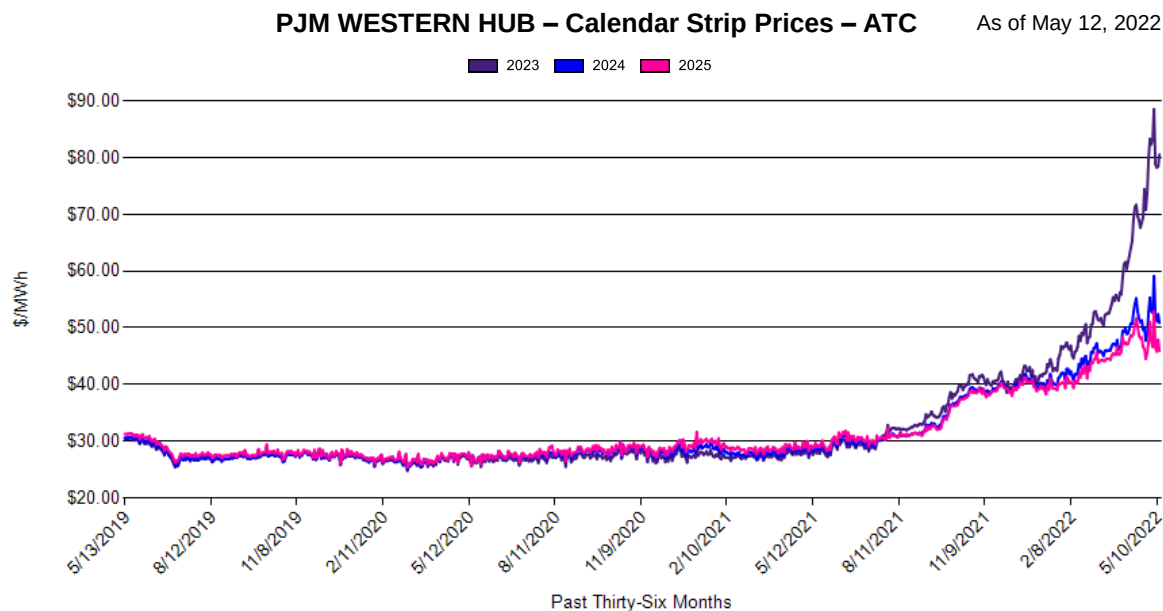
PJM – Power Price

Power forwards continue charging ahead despite the lower-demand shoulder month period



Where are forwards trending?

- The separation of 2023 from the outer years continues to grow as uncertainty lingers and buying activity in the near-term accelerates.
- As natural gas uncertainty continues to dominate the market, near-term power contracts will come with a massive premium.



Where are index prices trending?

- PJM West Hub continued its wild 2022, with April average prices significantly higher than even the highest of the past 10 years.
- Abnormally cold weather meant higher demand, which exacerbated the upward pressure on prices already high from high natural gas prices.

Average Monthly Day Ahead LMP - West Hub										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$36.01	\$132.05	\$38.62	\$30.99	\$31.24	\$72.91	\$33.57	\$22.03	\$25.76	\$68.75
Feb	\$36.23	\$71.44	\$75.79	\$28.48	\$26.51	\$27.61	\$27.28	\$19.89	\$42.32	\$51.25
Mar	\$40.19	\$69.56	\$39.94	\$25.49	\$31.66	\$33.69	\$29.82	\$18.63	\$24.85	\$46.31
Apr	\$39.76	\$41.45	\$32.99	\$30.00	\$29.41	\$35.25	\$25.76	\$17.38	\$26.95	\$66.53
May	\$39.37	\$42.04	\$34.74	\$24.30	\$29.14	\$35.50	\$25.30	\$17.38	\$28.00	
Jun	\$37.27	\$40.79	\$31.57	\$26.34	\$26.16	\$29.64	\$22.61	\$18.53	\$30.86	
Jul	\$47.37	\$37.23	\$34.07	\$32.38	\$28.88	\$32.27	\$27.64	\$25.42	\$36.63	
Aug	\$34.66	\$34.46	\$30.45	\$32.60	\$27.08	\$32.23	\$24.30	\$23.18	\$43.54	
Sep	\$36.31	\$35.63	\$30.25	\$30.76	\$29.99	\$32.71	\$26.15	\$19.56	\$45.27	
Oct	\$35.83	\$35.34	\$31.46	\$30.20	\$29.34	\$33.21	\$25.02	\$21.75	\$59.23	
Nov	\$36.48	\$39.43	\$27.71	\$26.81	\$30.23	\$37.34	\$29.22	\$21.32	\$65.47	
Dec	\$41.20	\$33.31	\$25.42	\$32.13	\$36.70	\$33.79	\$23.63	\$26.03	\$38.81	
Avg	\$38.39	\$51.06	\$36.08	\$29.21	\$29.70	\$36.34	\$26.69	\$20.92	\$38.97	\$58.21

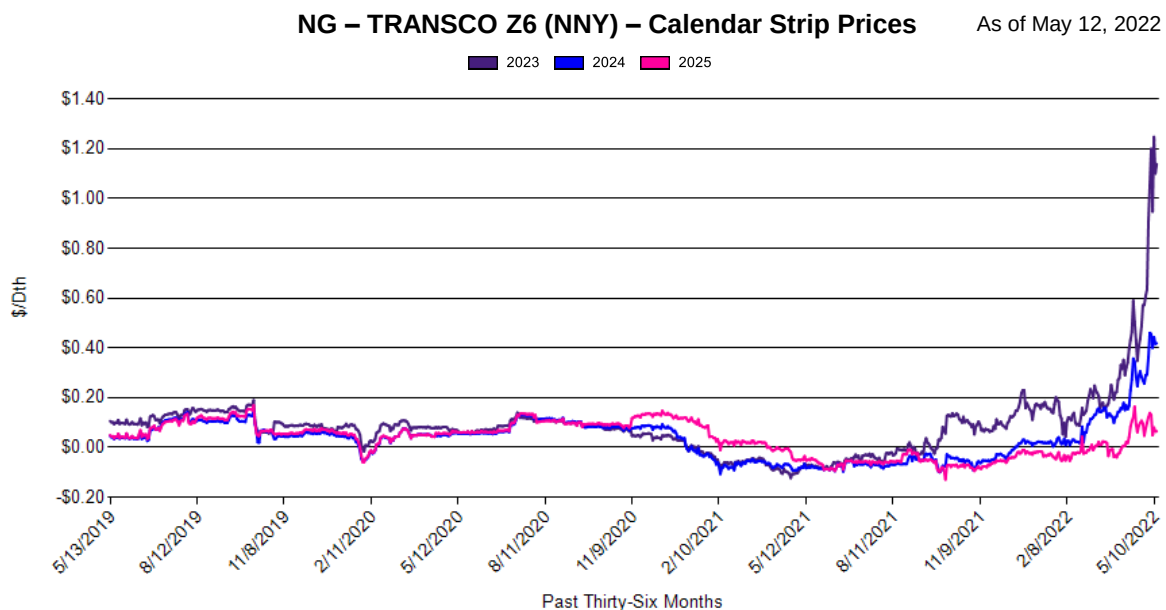
PJM – Gas Price

Transco Zone 6 basis spike means little relief in a typical shoulder month



Where are forwards trending?

- Transco z6 xNY calendar basis strips experienced a brief dip in late April before a meteoric rise towards the end of month and early May.
- A cold weather system in early May caused the 12-mo strip to skyrocket before seeing a slight downturn as warmer weather allowed some relief. Outer year's pricing is still relatively muted in comparison.



Where are index prices trending?

- Transco Zone 6 xNY April prices finished with the highest daily average in over 10 years due to unprecedented market volatility.
- Basis stayed relatively flat to March at (\$0.41) delta to NYMEX.

Average of Daily Prices - Transco Zone 6 xNY										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$4.77	\$25.21	\$5.12	\$3.19	\$3.56	\$16.78	\$4.16	\$2.16	\$2.82	\$9.60
Feb	\$3.96	\$8.47	\$14.03	\$2.66	\$2.72	\$3.07	\$2.74	\$1.85	\$4.88	\$5.40
Mar	\$4.09	\$5.96	\$3.53	\$1.31	\$3.15	\$2.78	\$2.88	\$1.48	\$2.23	\$4.44
Apr	\$4.33	\$4.27	\$2.22	\$1.57	\$2.84	\$2.77	\$2.35	\$1.50	\$2.12	\$6.07
May	\$4.13	\$3.52	\$2.62	\$1.60	\$2.83	\$2.55	\$2.26	\$1.36	\$2.34	
Jun	\$3.88	\$3.22	\$2.41	\$1.92	\$2.38	\$2.77	\$2.09	\$1.42	\$2.59	
Jul	\$3.74	\$2.70	\$2.11	\$2.18	\$2.47	\$2.87	\$2.16	\$1.67	\$3.31	
Aug	\$3.49	\$2.38	\$2.41	\$2.12	\$2.25	\$3.01	\$1.87	\$1.46	\$3.73	
Sep	\$3.71	\$2.22	\$2.17	\$1.53	\$2.31	\$2.73	\$1.74	\$1.23	\$4.25	
Oct	\$3.65	\$2.15	\$2.22	\$1.36	\$2.31	\$2.86	\$1.52	\$1.20	\$4.54	
Nov	\$3.90	\$3.87	\$1.81	\$2.16	\$2.83	\$4.10	\$2.59	\$1.46	\$4.88	
Dec	\$4.77	\$3.37	\$1.58	\$3.69	\$4.93	\$4.01	\$2.43	\$2.78	\$3.36	
Avg	\$4.03	\$5.61	\$3.52	\$2.11	\$2.88	\$4.19	\$2.40	\$1.63	\$3.42	\$6.38

Midwest

May 2022

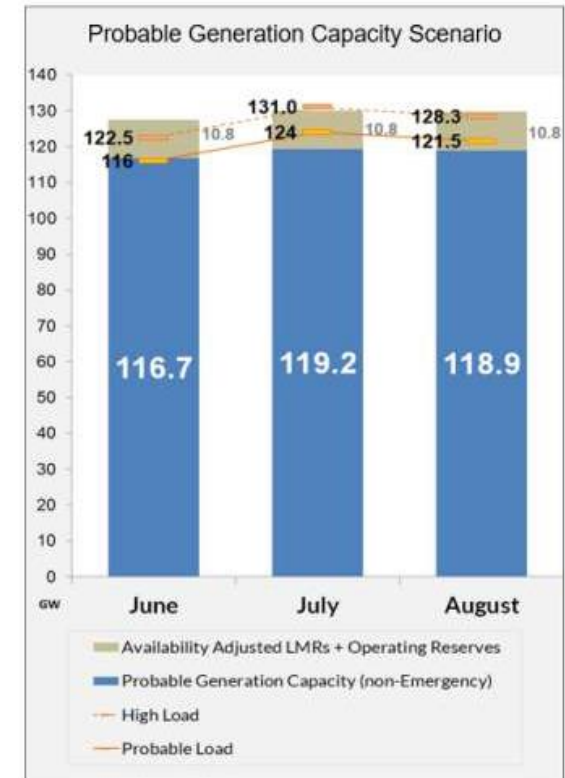
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Insight of the Month

MISO projects a 5 GW shortfall in firm generation this summer



- MISO is forecasting a 2022 summer peak of 124.0 GW and 119.2 GW of projected regularly available (firm¹, non-emergency) generation (see graphic).
- Assessment aligns with 2022/23 capacity auction, which indicated a shortfall of capacity in north and central MISO zones.
- Non-firm and Emergency Resources will be needed to maintain system reliability.
 - Non-firm resources (e.g., wind capacity above rating, non-firm imports, and generation scheduled to retire later this year) might bolster supplies through peak summer months.
 - Emergency resources such as Load Modifying Resources (e.g., behind-the-meter generation, and demand resources such as Interruptible Load and Direct Control Load Management that can provide Emergency Demand Response) and Operating Reserves will be called on should load exceed available capacity.
- MISO may have to implement load shedding procedures if the above steps do not address load/generation imbalances.
 - Energy and Ancillary Services price caps of \$3,500/MWh for each might be realized as a result.
- A high generation outage scenario developed by MISO exacerbates the situation as only 114.4 GW of firm generation is available under their parameters.



Source: MISO Summer 2022 Seasonal Readiness Workshop

KEY TAKEAWAY: MISO energy prices, already high due to current natural gas and coal prices, will be pushed higher (all things equal) as the least efficient, higher priced generators in the merit order are called on to run in more hours this summer. This will be exacerbated by higher ancillary services prices as Operating Reserves will be relied on to address load imbalances.

¹ Firm generation refers to a resource committed to MISO and obligated to respond if called by MISO for an emergency. It includes native generation and firm imports.

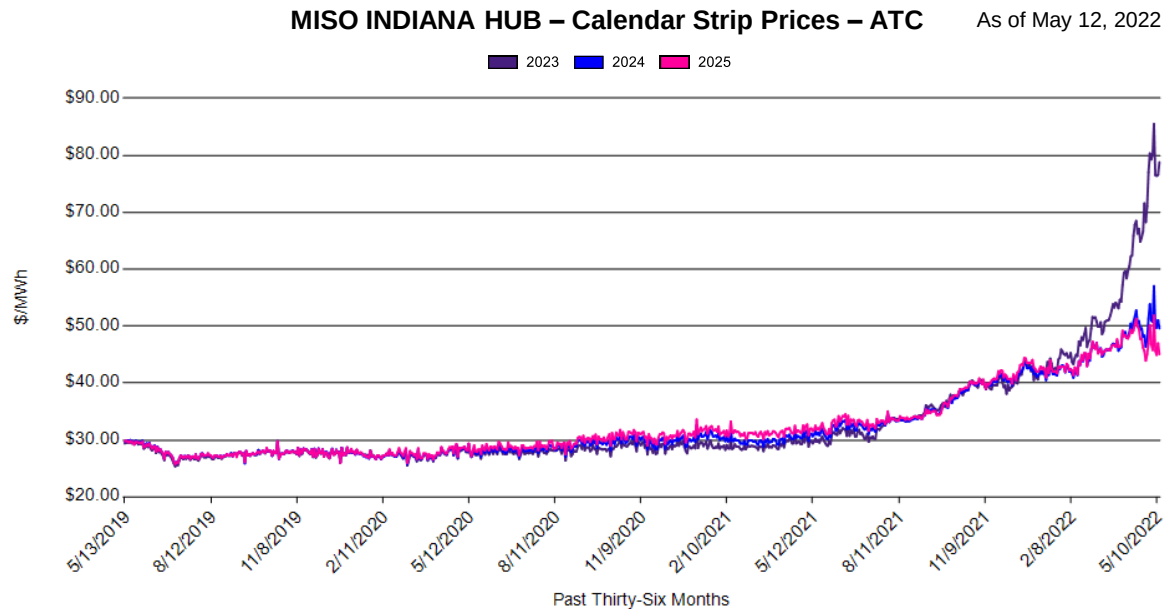
MISO – Power Price

Prices remain high in the region, with hope for some relief on the horizon



Where are forwards trending?

- 2023 calendar strip price continues its separation from the outer years as near-term risk to natural gas volatility persists amid low storage stocks.
- Capacity concerns in summer 2022 and the potential need for MISO to enact emergency operations is contributing to near-term price volatility.



Where are index prices trending?

- April and May prices to date have continued to track higher, in step with higher natural gas prices; May prices are further supported by significantly higher load tied to warming weather over the past week.
- May prices (through the 12th) are trading at the highest monthly-average level over the nine-year range reported in the table below and are 179% higher than May 2021.

Average Monthly Day-Ahead LMP - Indiana Hub									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$ 63.86	\$ 30.77	\$ 23.96	\$ 31.28	\$ 40.67	\$ 32.80	\$ 23.49	\$ 25.78	\$ 52.64
Feb	\$ 58.29	\$ 40.41	\$ 22.23	\$ 26.45	\$ 27.77	\$ 27.25	\$ 22.00	\$ 61.88	\$ 49.55
Mar	\$ 46.93	\$ 30.22	\$ 22.03	\$ 28.37	\$ 28.32	\$ 29.18	\$ 20.81	\$ 23.78	\$ 49.51
Apr	\$ 37.30	\$ 27.64	\$ 27.99	\$ 29.86	\$ 31.37	\$ 27.18	\$ 19.73	\$ 28.27	\$ 67.22
May	\$ 38.41	\$ 29.47	\$ 24.35	\$ 29.66	\$ 33.79	\$ 25.84	\$ 19.94	\$ 27.27	\$ 76.08
Jun	\$ 36.35	\$ 27.52	\$ 27.13	\$ 28.90	\$ 32.47	\$ 24.58	\$ 22.16	\$ 34.17	
Jul	\$ 32.12	\$ 28.52	\$ 31.28	\$ 29.94	\$ 31.59	\$ 28.45	\$ 26.88	\$ 37.86	
Aug	\$ 32.49	\$ 27.36	\$ 31.14	\$ 27.49	\$ 31.73	\$ 25.21	\$ 25.36	\$ 44.24	
Sep	\$ 32.51	\$ 27.97	\$ 32.69	\$ 33.55	\$ 33.39	\$ 26.83	\$ 21.34	\$ 45.15	
Oct	\$ 33.09	\$ 26.90	\$ 32.66	\$ 29.60	\$ 36.12	\$ 24.98	\$ 25.36	\$ 58.19	
Nov	\$ 35.99	\$ 25.37	\$ 27.87	\$ 28.39	\$ 36.07	\$ 27.81	\$ 24.12	\$ 64.62	
Dec	\$ 31.21	\$ 22.82	\$ 33.76	\$ 28.88	\$ 34.46	\$ 23.56	\$ 24.39	\$ 43.31	
Avg	\$39.88	\$28.75	\$28.09	\$29.36	\$33.15	\$26.97	\$22.97	\$41.21	\$59.00

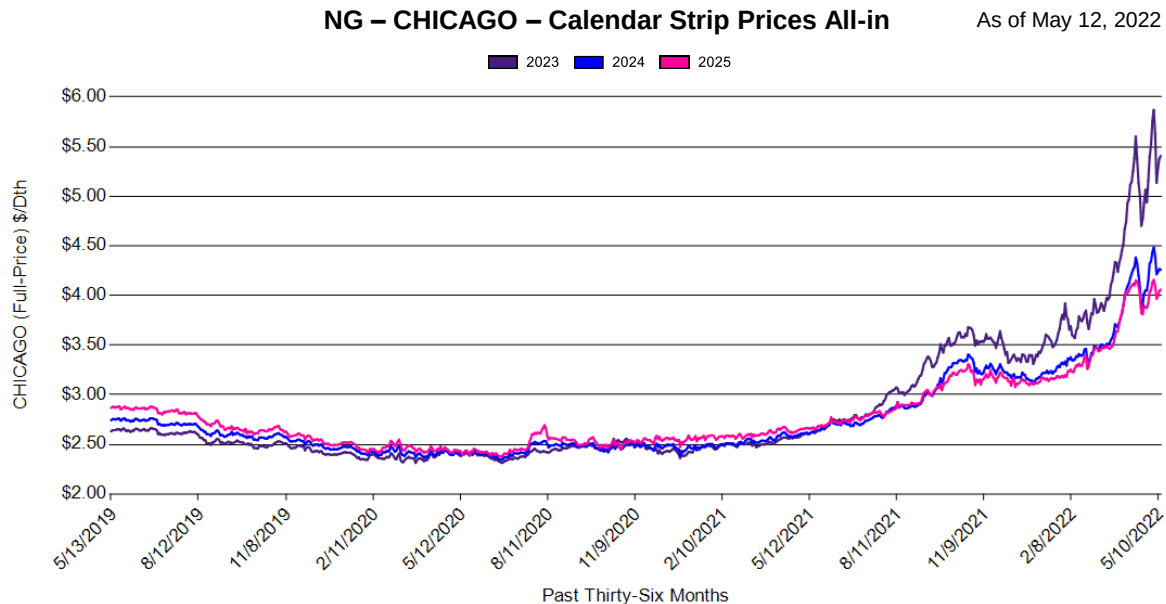
Chicago – Gas Prices

Midwest gas prices have steadied at a new elevated level



Where are forwards trending?

- Forward prices have pulled back slightly from their recent high, but questions remain about the ability to refill inventories prior to next winter's withdrawal season.
- US Midwest storage sits at a 18.4% deficit to the 5-year average, a slight improvement to the 20% deficit in April, and certain areas within the region, particularly Michigan, are forecasted to eat into this deficit using increased Canadian exports.



Where are index prices trending?

- Higher gas heating demand into early May continued to drive prices higher, however, the demand for gas for heating has fallen to 75% of its 3-year average in the past week, lending some price relief.
- May prices (through the 12th) have continued the month-on-month growth trajectory that started in January and are trading at a 175% premium to May 2021.

Average of Daily Prices - Chicago City-Gate									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$ 7.93	\$ 3.04	\$ 2.34	\$ 3.29	\$ 3.79	\$ 3.22	\$ 1.92	\$ 2.53	\$ 4.17
Feb	\$ 11.95	\$ 3.98	\$ 1.99	\$ 2.81	\$ 2.57	\$ 2.64	\$ 1.74	\$ 22.75	\$ 4.48
Mar	\$ 9.35	\$ 2.90	\$ 1.79	\$ 2.84	\$ 2.48	\$ 3.39	\$ 1.57	\$ 2.47	\$ 4.60
Apr	\$ 4.72	\$ 2.59	\$ 1.90	\$ 2.96	\$ 2.77	\$ 2.45	\$ 1.66	\$ 2.54	\$ 6.39
May	\$ 4.59	\$ 2.81	\$ 1.91	\$ 3.02	\$ 2.49	\$ 2.36	\$ 1.67	\$ 2.75	\$ 7.56
Jun	\$ 4.64	\$ 2.70	\$ 2.46	\$ 2.79	\$ 2.75	\$ 2.11	\$ 1.55	\$ 3.12	
Jul	\$ 4.11	\$ 2.83	\$ 2.72	\$ 2.80	\$ 2.69	\$ 2.12	\$ 1.67	\$ 3.61	
Aug	\$ 3.92	\$ 2.85	\$ 2.74	\$ 2.81	\$ 2.86	\$ 1.98	\$ 2.05	\$ 3.91	
Sep	\$ 3.94	\$ 2.69	\$ 2.89	\$ 2.87	\$ 2.81	\$ 2.13	\$ 1.80	\$ 4.80	
Oct	\$ 3.84	\$ 2.39	\$ 2.86	\$ 2.78	\$ 3.21	\$ 1.94	\$ 2.08	\$ 5.26	
Nov	\$ 4.37	\$ 2.14	\$ 2.41	\$ 2.97	\$ 4.06	\$ 2.51	\$ 2.41	\$ 4.89	
Dec	\$ 3.49	\$ 1.94	\$ 3.63	\$ 2.84	\$ 3.75	\$ 2.10	\$ 2.44	\$ 3.60	
Avg	\$5.57	\$2.74	\$2.47	\$2.90	\$3.02	\$2.41	\$1.88	\$5.19	\$5.44

California

May 2022

[< back to beginning](#)

Insight of the Month

Summer 2022 presents increased risk of energy emergencies for electric consumers



- In a press briefing on May 6, leaders from the California Public Utilities Commission, California Energy Commission, and California Independent System described the latest Summer 2022 supply demand outlook. The forecast made headlines, showing a potential shortfall of 1,700 MW in evening hours during periods of high demand.
- While CAISO’s official 2022 Summer Load and Resources Assessment report will be published later in May, regulators provided a [memo](#) detailing the forecast methodology and some initial results.
- The table to the right, taken from the memo, shows the likelihood of the grid entering Energy Emergency 3 conditions (imminent power curtailments) doubling compared to the 2021 forecast, but a slight reduction in the probability of actual load interruption 4% (Unserved Energy EEA 3).
- The memo cites 7,556 MW of net new capacity compared to the 2021 forecast, of that 3,206 MW is dispatchable capacity mostly from new battery storage. Despite the net capacity increase, the 2022 forecast includes a greater assumed likelihood of extreme temperature events resulting in the higher probability of energy emergencies this summer.
- In 2021, CAISO called for voluntary consumer curtailments 7 times and in July the state was pushed to issue a [state of emergency](#) to support grid reliability.

Probabilities for System Capacity Shortages		
System Capacity Shortfall	Shortfall Probability	
	2021	2022
Entering EEA 3	6.40%	15.10%
EEA 3 - firm Load used for contingency reserves	4.80%	7.70%
Unserved energy EEA 3 - firm load interruption	4.60%	4.00%

Source: [CAISO Memorandum](#) Re: Briefing on 2022 Summer Loads and Resources Assessment results

KEY TAKEAWAY: CAISO’s 2022 summer load and resources assessment has yet to be officially released but initial comments and data from regulators present a concerning outlook. Increased likelihood of capacity shortfall should be noted by those who participate in Demand Response due to the heightened probability of dispatch calls. Customers with hourly spot market exposure should expect greater price volatility this summer.

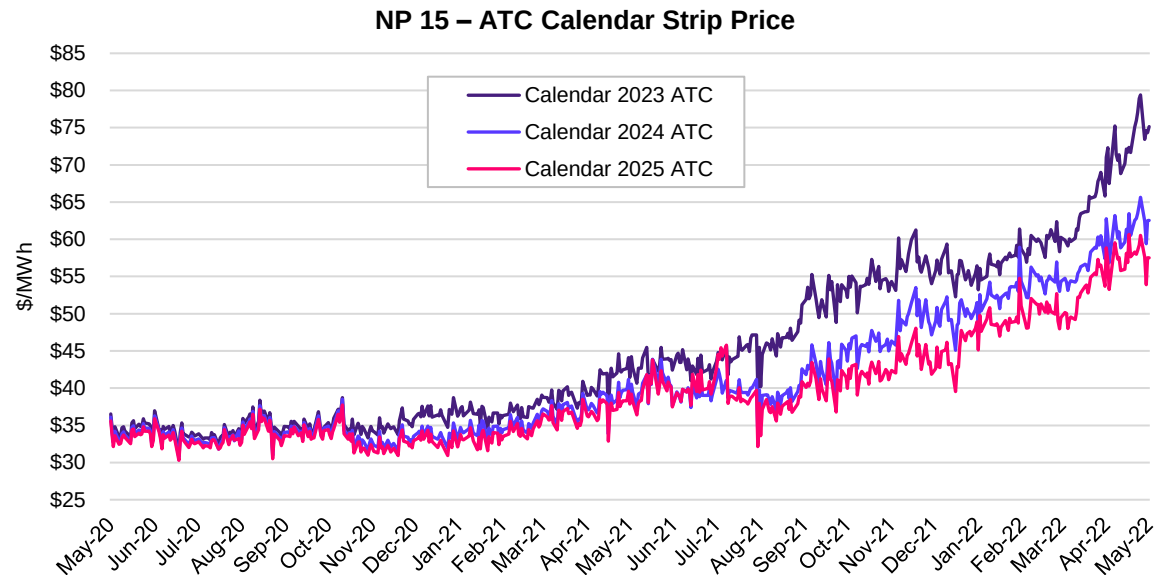
Northern CA – Power Prices



Where are forwards trending?

Prices for the NP-15 2023 strip price have continued to climb since August and are now up 70% compared to this time last year.

National natural gas forward prices have continued to rise due to supply concerns through the winter of 22/23. The increased pressure on near-term forwards has exacerbated backwardation in power markets, with the 2024 strip price trading at a \$13/MWh (20%) discount compared to the 2023 calendar year price.



Where are index prices trending?

April 2022 Day Ahead spot prices averaged roughly \$47/MWh, increasing 34% compared to March. Through the first half of May, hourly spot prices this spring have been the highest in over a decade. While the spring season typically has the lowest hourly prices of the year, worsening drought conditions resulting in decreased hydro output will continue to hold spot market prices above the historical averages.

Average Daily Price - NP 15									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$ 46.07	\$ 33.40	\$ 28.54	\$ 34.90	\$ 32.94	\$ 41.09	\$ 31.19	\$ 33.61	\$ 52.71
Feb	\$ 61.99	\$ 30.71	\$ 24.01	\$ 29.23	\$ 30.47	\$ 75.58	\$ 26.34	\$ 59.48	\$ 47.63
Mar	\$ 47.63	\$ 30.72	\$ 19.60	\$ 22.12	\$ 30.06	\$ 36.63	\$ 26.58	\$ 33.04	\$ 46.90
Apr	\$ 47.48	\$ 32.27	\$ 21.23	\$ 22.13	\$ 24.91	\$ 22.25	\$ 21.61	\$ 35.58	\$ 63.42
May	\$ 46.67	\$ 32.69	\$ 20.76	\$ 29.28	\$ 20.75	\$ 18.46	\$ 18.43	\$ 35.95	\$ 64.78
Jun	\$ 45.42	\$ 34.64	\$ 28.09	\$ 33.12	\$ 28.14	\$ 22.94	\$ 23.49	\$ 50.31	
Jul	\$ 47.23	\$ 35.54	\$ 32.80	\$ 35.84	\$ 54.89	\$ 30.28	\$ 25.70	\$ 67.21	
Aug	\$ 46.49	\$ 34.32	\$ 34.85	\$ 45.20	\$ 49.84	\$ 31.82	\$ 49.66	\$ 60.30	
Sep	\$ 45.45	\$ 34.46	\$ 34.66	\$ 39.72	\$ 33.42	\$ 34.55	\$ 41.66	\$ 66.53	
Oct	\$ 44.73	\$ 32.49	\$ 34.03	\$ 41.19	\$ 43.74	\$ 36.32	\$ 42.90	\$ 66.29	
Nov	\$ 45.12	\$ 29.41	\$ 30.17	\$ 36.27	\$ 52.40	\$ 41.51	\$ 38.58	\$ 58.84	
Dec	\$ 37.52	\$ 28.65	\$ 36.60	\$ 34.22	\$ 54.17	\$ 39.82	\$ 40.06	\$ 61.88	
Avg	\$ 46.81	\$ 32.44	\$ 28.78	\$ 33.60	\$ 37.98	\$ 35.94	\$ 32.18	\$ 52.42	\$ 55.09

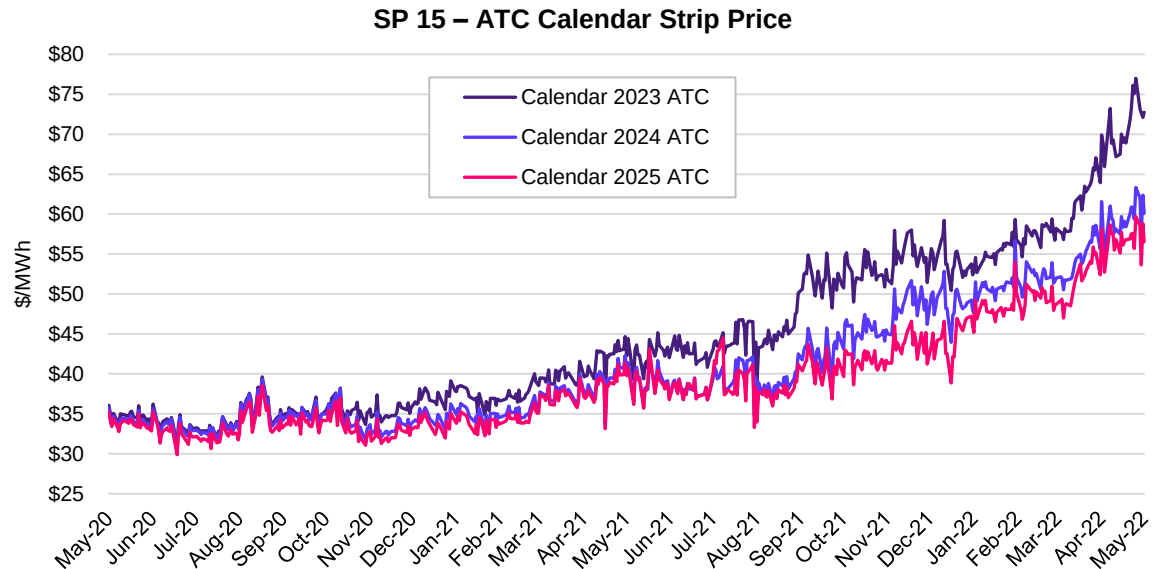
Southern CA – Power Prices



Where are forwards trending?

SP-15 forward prices have continued to trend upwards through the first half of May showing increased volatility correlated with natural gas markets. Prices for the CY 2023 strip are now 69% higher than last year and 44% higher from the last market dip in late December.

Forward prices across all years have continued to increase amid rising national natural gas prices. Longer term future contracts present backwardation with the CY 2024 strip price trading at a 17% discount compared to 2023.



Where are index prices trending?

Southern California DA average spot prices for April 2022 (\$56.09/MWh) were the highest in over a decade. Drought conditions leading to increased reliance on natural gas have driven up hourly prices, particularly in evening hours. Average Day Ahead prices for the first half of May are also at decade highs, a worrying trend for typically the least expensive time of year for spot market prices in the state.

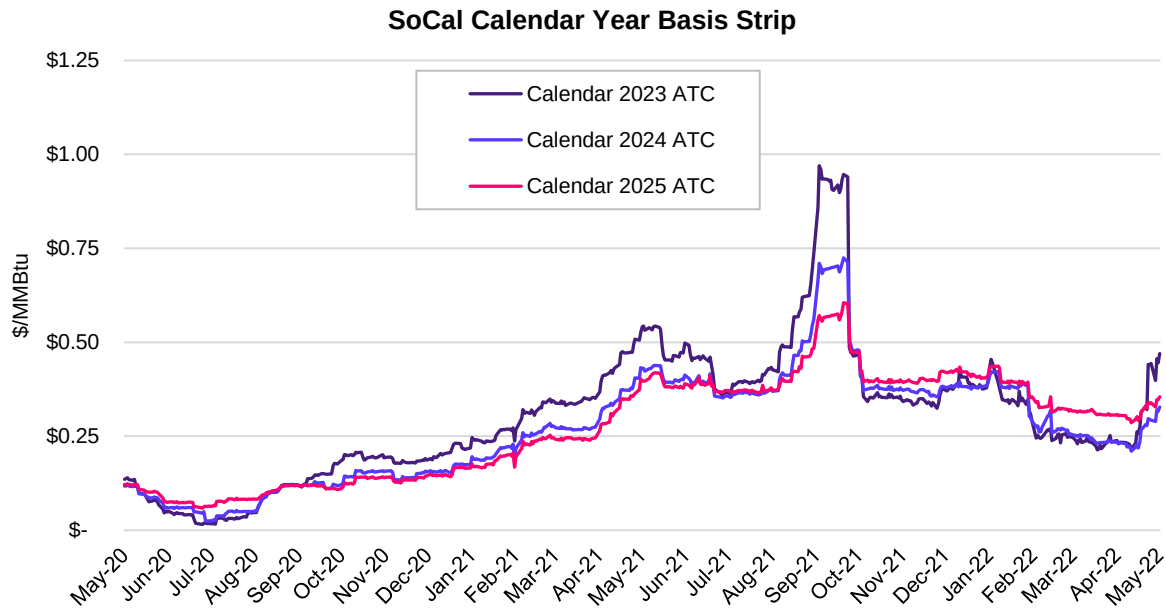
Average Daily Price - SP 15									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$ 46.47	\$ 33.51	\$ 28.18	\$ 33.55	\$ 34.37	\$ 39.96	\$ 31.22	\$ 31.73	\$ 50.69
Feb	\$ 61.70	\$ 30.05	\$ 22.99	\$ 26.39	\$ 34.24	\$ 70.89	\$ 25.67	\$ 64.01	\$ 43.17
Mar	\$ 47.60	\$ 29.00	\$ 18.05	\$ 21.75	\$ 30.53	\$ 36.02	\$ 24.99	\$ 30.48	\$ 41.47
Apr	\$ 44.71	\$ 27.93	\$ 18.44	\$ 24.80	\$ 24.88	\$ 23.52	\$ 18.53	\$ 30.30	\$ 56.09
May	\$ 45.85	\$ 27.21	\$ 21.01	\$ 28.35	\$ 21.65	\$ 18.43	\$ 17.26	\$ 28.13	\$ 56.67
Jun	\$ 45.25	\$ 33.94	\$ 29.95	\$ 32.80	\$ 28.17	\$ 23.07	\$ 22.20	\$ 49.85	
Jul	\$ 47.75	\$ 36.02	\$ 34.29	\$ 36.70	\$ 75.43	\$ 31.52	\$ 27.99	\$ 67.94	
Aug	\$ 45.89	\$ 35.69	\$ 34.93	\$ 45.35	\$ 69.73	\$ 32.84	\$ 77.05	\$ 59.05	
Sep	\$ 46.65	\$ 34.76	\$ 32.89	\$ 38.43	\$ 35.33	\$ 36.08	\$ 44.22	\$ 66.09	
Oct	\$ 45.17	\$ 32.62	\$ 33.06	\$ 41.09	\$ 38.88	\$ 34.36	\$ 42.23	\$ 56.90	
Nov	\$ 44.98	\$ 28.86	\$ 27.79	\$ 39.51	\$ 51.59	\$ 42.03	\$ 36.74	\$ 56.35	
Dec	\$ 37.87	\$ 28.09	\$ 33.95	\$ 39.12	\$ 52.93	\$ 40.24	\$ 38.68	\$ 59.17	
Avg	\$ 46.66	\$ 31.47	\$ 27.96	\$ 33.99	\$ 41.48	\$ 35.75	\$ 33.90	\$ 50.00	\$ 49.62

California – Gas Prices



Where are forwards trending?

After a relatively flat April, Calendar Year 2023 strip prices for SoCal gas basis have increased 50% since the start of May. While prices were in contango through the first half of April, the rise in 2023 pricing has resulted in backwardation compared to the 2025 forward strip price. Calendar 2023 prices are now trading in the 80th percentile over the past year while 2024 and 2025 are in the 30th percentile over the same period.



Where are index prices trending?

SoCal Basis spot prices increased month over month in April but have remained negative so far this spring. PG&E monthly average spot basis prices increased month-over-month but at \$0.83/Dth were roughly in line with the 3-year average.

SoCal Gas's maintenance outlook for May and June indicates planned pipeline outages totaling roughly 1,500 Dth/d. While these outages are projected to be 7 days or less, the reduction in available pipeline capacity could increase volatility on spot market prices in Southern California.

Average Daily Price - PG&E City Gate Basis Only				
	2019	2020	2021	2022
Jan	\$0.61	\$0.95	\$0.92	\$0.97
Feb	\$4.88	\$0.76	(\$0.56)	\$0.43
Mar	\$1.12	\$0.80	\$1.02	\$0.59
Apr	\$0.63	\$0.64	\$1.17	\$0.83
May	\$0.65	\$0.83	\$0.96	\$0.87
Jun	\$0.18	\$0.81	\$1.17	
Jul	\$0.24	\$0.74	\$1.28	
Aug	\$0.44	\$0.85	\$1.32	
Sep	\$0.51	\$1.67	\$1.61	
Oct	\$0.92	\$1.70	\$1.51	
Nov	\$0.76	\$1.26	\$1.05	
Dec	\$1.19	\$1.03	\$2.02	

Average Daily Price - SoCal Basis Only				
	2019	2020	2021	2022
Jan	\$0.45	\$0.26	\$0.25	\$0.87
Feb	\$4.11	(\$0.01)	\$17.93	\$0.04
Mar	\$0.34	(\$0.21)	\$0.37	(\$0.50)
Apr	(\$0.61)	(\$0.30)	\$0.23	(\$0.10)
May	(\$0.82)	(\$0.06)	\$0.26	(\$0.20)
Jun	(\$0.58)	\$0.03	\$1.67	
Jul	\$0.05	\$0.02	\$2.49	
Aug	\$0.23	\$0.99	\$1.73	
Sep	\$0.14	\$0.70	\$1.48	
Oct	\$0.21	\$0.49	\$0.25	
Nov	\$0.11	\$0.42	\$0.11	
Dec	\$0.79	\$0.86	\$2.08	

Texas

May 2022

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Insight of the Month

Texas draws an influx of large power customers



According to the “*Overview of Large Load Interconnection Requests*” presentation published on April 26, ERCOT has received an increased number of requests to interconnect large loads.

- Out of 17,376 requests received so far, 35% of the interconnection loads are expected to be made in the North of Texas and 26% in the Far West. There are requests for both co-located and standalone facilities.
- **The risk associated with large loads is that ERCOT has not taken into consideration this influx with accelerated timelines in their forecast models and planning.**

What is driving new loads into Texas?

- Many of these requests come from crypto-miners as Texas has a history of being a global leader in energy, has a competitive and deregulated approach to power markets, and offers demand response programs.
- According to the Texas Blockchain Council (TBC) presentation in the last ERCOT meeting, energy consumption from the global bitcoin network is between 16 GW and 25 GW, and there is approximately 1.5 GW or ~8% of institutional bitcoin mining already active in TX.

To address this issue ERCOT has taken two important steps:

1. Establish the **Large Flexible Load Task Force (LFLTF)** to develop a long-term large load interconnection process and engage with industry participants in a constructive way.
2. Implement an interim process requiring documentation from large flexible loads before allowing them to connect to the grid. This process is effective immediately and has been established to ensure compliance with the current NERC requirements.

What type of loads will be required to submit studies for interconnection?	
New Loads	Existing Loads
Not co-located with a resource with total demand within the next two years of 75 MW or greater	Not co-located with a resource increasing total demand by 75 MW or greater within the next two years
Co-located with a resource with total demand within the next two years of 20 MW or greater	Co-located with a resource increasing total demand by 20 MW or greater within the next two years.

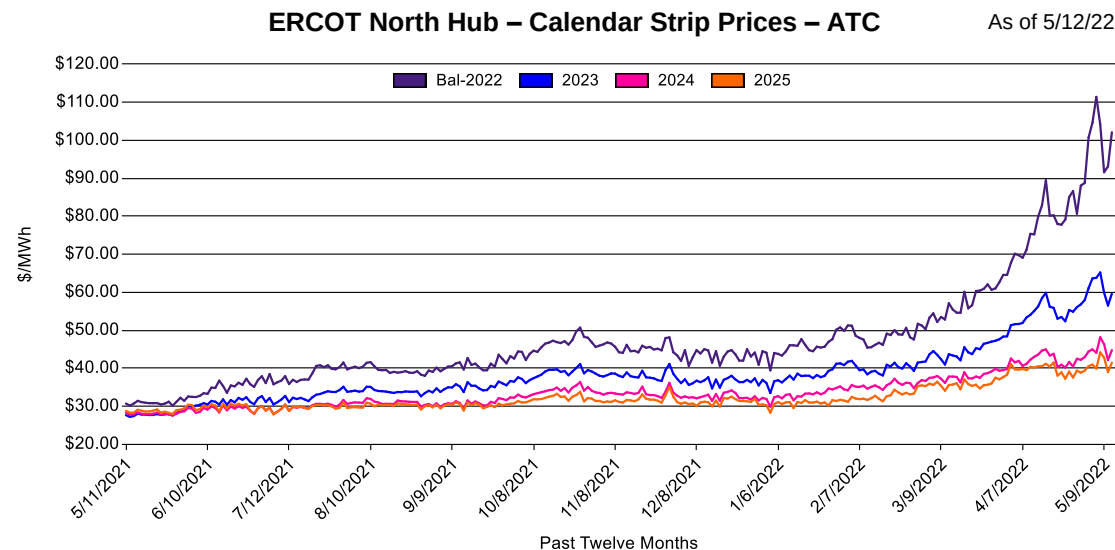
ERCOT – Power Price Update

High summer forwards continue to drive Bal-22 strips upwards



Where are forwards trending?

- Bal-22 forwards reached \$110/MWh in May, the highest level in the last 3 years, as a result of the upcoming summer months and expected increase in demand.
- The spread between summer 2022 forwards (June-Sept) and summer 2023 (June-Sept) forwards is \$40/MWh, ~21% greater month-over-month.
- CY 2024 & 2025 continue to trade close to \$40/MWh, which is relatively flat compared to a month ago.



Where are index prices trending?

- North Hub Day-Ahead prices averaged \$52.52/MWh in April, up ~36% month-over-month.
- Year-to-date, 2022 North Hub spot prices have averaged \$71.49/MWh.
- Above-average temperatures and high peak-load demand in May pushed real-time locational marginal prices up. On May 9th prices in Houston stayed in the quadruple digits for more than two hours.

Average Monthly Day Ahead LMP - North Hub										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	\$26.19	\$36.71	\$25.00	\$19.13	\$22.99	\$37.59	\$24.32	\$16.96	\$21.54	\$33.65
Feb	\$25.12	\$51.30	\$23.93	\$15.29	\$19.45	\$21.77	\$20.86	\$17.72	\$1,485.49	\$39.39
Mar	\$30.73	\$49.91	\$26.24	\$16.86	\$21.23	\$22.61	\$28.10	\$23.34	\$20.87	\$38.49
Apr	\$33.81	\$40.29	\$23.62	\$18.35	\$21.41	\$23.52	\$22.99	\$19.91	\$29.63	\$52.52
May	\$33.05	\$35.77	\$23.79	\$17.91	\$23.42	\$35.31	\$23.98	\$18.23	\$24.23	\$71.49
Jun	\$34.96	\$39.73	\$24.32	\$23.16	\$25.89	\$30.21	\$25.18	\$18.92	\$42.23	
Jul	\$33.06	\$36.02	\$29.46	\$26.80	\$30.65	\$78.97	\$29.78	\$22.99	\$41.48	
Aug	\$35.84	\$39.33	\$45.30	\$29.83	\$26.83	\$31.60	\$126.52	\$39.21	\$41.36	
Sep	\$33.44	\$33.87	\$24.58	\$26.25	\$23.35	\$27.30	\$79.88	\$18.99	\$45.25	
Oct	\$29.73	\$34.69	\$20.82	\$24.01	\$21.41	\$30.03	\$28.00	\$23.36	\$53.70	
Nov	\$30.46	\$34.53	\$19.20	\$18.66	\$21.58	\$31.22	\$23.62	\$23.73	\$39.78	
Dec	\$35.42	\$26.57	\$17.44	\$25.15	\$20.95	\$30.40	\$18.73	\$20.89	\$29.70	
Avg	\$31.82	\$38.23	\$25.31	\$21.78	\$23.26	\$33.38	\$37.66	\$22.02	\$156.27	\$43.73

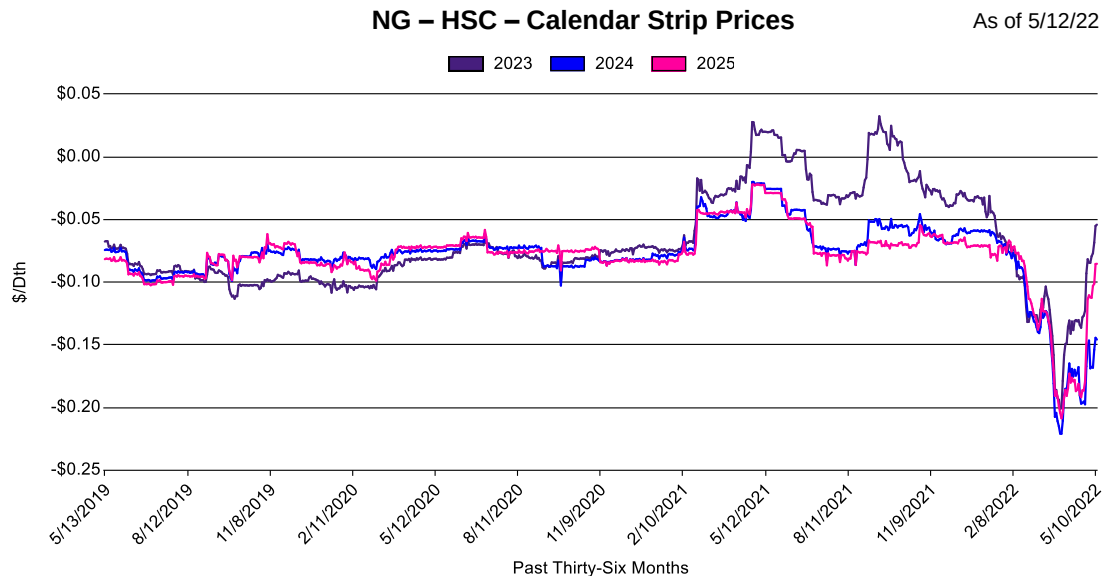
ERCOT – Gas Price Update

HSC basis continues in the negative territory but increased by ~ \$0.15/Dth since March



Where are forwards trending?

- HSC basis prices for CY 2023-2025 are up month-over-month. CY 2023 and 2025 basis strips are trading close to year-ago levels, at ~(\$0.05)/Dth and ~(\$0.07)/Dth, respectively.
- CY 2024 and 2025 strips are no longer trading in tandem. CY 2024 is trading at an ~8 cent discount compared to CY 2025 strips. Prices for CY 2024 were most recently seen trading at around ~\$(0.15)/Dth.



Where are index prices trending?

- May 2022 HSC basis averaged \$(0.17)/Dth, 3 cents higher compared to a month ago.
- Year-to-date, the 2022 HSC basis has averaged \$(0.28)/Dth and HSC full price with Henry Hub \$5.02/Dth.
- HSC basis is up 15% month-over-month, but still trading in the negative territory.

Average of Daily Prices - Houston Ship Channel Basis Only										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	(\$0.06)	(\$0.08)	(\$0.07)	(\$0.06)	(\$0.10)	\$0.35	(\$0.06)	(\$0.09)	(\$0.00)	(\$0.30)
Feb	(\$0.06)	\$0.21	(\$0.15)	(\$0.08)	(\$0.05)	(\$0.02)	\$0.00	(\$0.03)	\$50.21	(\$0.33)
Mar	(\$0.04)	(\$0.02)	(\$0.10)	(\$0.02)	\$0.04	\$0.03	(\$0.01)	(\$0.06)	(\$0.15)	(\$0.35)
Apr	(\$0.02)	(\$0.03)	(\$0.02)	(\$0.03)	\$0.04	\$0.07	(\$0.04)	(\$0.03)	\$0.04	(\$0.20)
May	\$0.02	(\$0.10)	(\$0.03)	(\$0.04)	\$0.11	\$0.04	(\$0.06)	\$0.00	\$0.03	(\$0.17)
Jun	(\$0.04)	\$0.04	(\$0.04)	(\$0.07)	\$0.13	\$0.07	(\$0.04)	(\$0.00)	(\$0.04)	
Jul	(\$0.01)	\$0.01	(\$0.00)	(\$0.08)	\$0.01	\$0.09	(\$0.06)	\$0.00	(\$0.10)	
Aug	(\$0.01)	\$0.06	(\$0.03)	(\$0.05)	(\$0.01)	\$0.08	(\$0.07)	\$0.01	(\$0.05)	
Sep	\$0.02	\$0.02	(\$0.03)	(\$0.03)	(\$0.01)	\$0.04	(\$0.07)	\$0.07	(\$0.05)	
Oct	(\$0.04)	(\$0.06)	\$0.02	\$0.15	\$0.06	\$0.25	(\$0.05)	\$0.14	(\$0.20)	
Nov	(\$0.07)	(\$0.07)	(\$0.02)	\$0.01	(\$0.04)	\$0.05	(\$0.14)	\$0.04	(\$0.25)	
Dec	\$0.09	(\$0.12)	\$0.06	(\$0.09)	(\$0.00)	(\$0.01)	(\$0.11)	(\$0.03)	(\$0.20)	

Mexico

May 2022

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Insight of the Month

Energy reform updates and the latest on the current situation



- On April 17th, the electricity reform proposed by the President of the Republic was discussed and put to a vote. As expected, the opposition parties voted against the reform and it did not pass.
 - On April 18th, in his morning press conference, the President of the Republic said that he did not plan to send a new energy reform proposal during the remainder of his six-year term, which ends in 2024.
 - The reform proposal, in addition to the points related to generation and commercialization of energy, also included an additional point which specified that the state will be tasked with stewardship over exploitation of lithium. Since the reform package failed to pass, the president made a separate change to the existing mining law on April 20th in order to ensure the exploitation of lithium only by the State.
 - Before the existence of the wholesale power market, **self-supply** contracts were contracts which allowed a generator to supply energy exclusively to its own shareholders.
 - Even prior to the energy reform proposal put forth by the current administration, the party was intending to outlaw the self-supply schemes created in the 90's which are considered fraudulent. Generators entered into partnerships with unaffiliated companies for the sole purpose of selling power to them creating a secondary market.
- *It is important to differentiate that a self-supply scheme is separate from generation of energy for one's own consumption (such as rooftop Solar Panels or on-site cogeneration) which in Mexico are called **Distributed Generation**. Government is not taking any action against DE.*

KEY TAKEAWAY: Since the energy reform has not been approved and the president says that it is not his intention to propose a new reform in the remainder of his term, the current electricity law is still in force and no changes are expected in the coming years, thus signifying stability for the market. Self-supply schemes, however, seem to still be on the chopping block. Participants in the self-supply market may be forced via executive action to sell energy to CFE (the government utility) and buy it at higher rates.

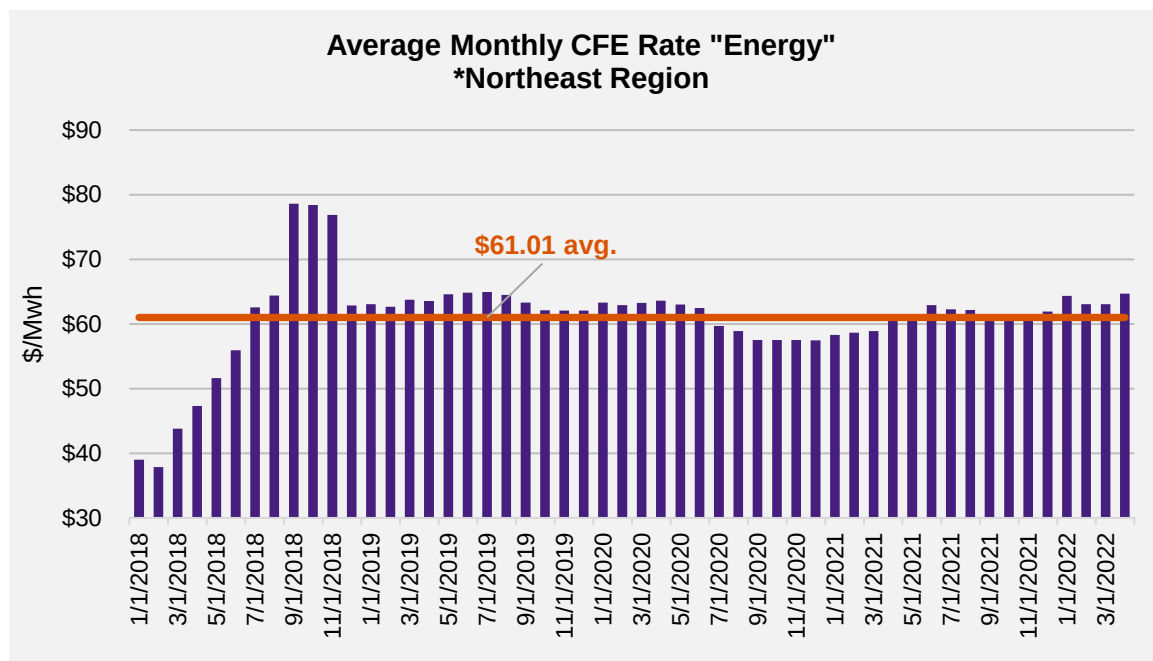
Monthly CFE¹ Rates

CFE rates in April, both month-over-month & year-over-year



Where are index prices trending?

In April 2022, Northeast² region GDMTH³ energy prices have an increase of 2.57% month-over-month and ~6.65% year-over-year.



Where are capacity prices trending?

Monthly GDMTH capacity prices increased ~3.0% month-over-month and ~7.7% year-over-year in the West⁴ region.

Average Monthly CFE GDMTH Capacity- West*						
	USD/MW					
	2018	2019	2020	2021	2022	
Jan	\$ 9,022	\$ 16,733	\$ 16,782	\$ 15,604	\$ 16,936	
Feb	\$ 9,522	\$ 16,619	\$ 16,656	\$ 15,709	\$ 17,082	
Mar	\$ 10,940	\$ 16,945	\$ 16,764	\$ 15,746	\$ 17,082	
Apr	\$ 12,029	\$ 16,884	\$ 16,871	\$ 16,336	\$ 17,595	
May	\$ 13,350	\$ 17,215	\$ 16,688	\$ 16,421		
Jun	\$ 14,683	\$ 17,282	\$ 16,529	\$ 17,051		
Jul	\$ 16,734	\$ 17,317	\$ 16,135	\$ 16,849		
Aug	\$ 19,044	\$ 17,181	\$ 15,890	\$ 16,817		
Sep	\$ 21,621	\$ 16,811	\$ 15,438	\$ 16,431		
Oct	\$ 21,570	\$ 16,450	\$ 15,440	\$ 16,387		
Nov	\$ 21,088	\$ 16,434	\$ 15,445	\$ 16,541		
Dec	\$ 16,768	\$ 16,427	\$ 15,425	\$ 16,750		
Avg	\$ 15,531	\$ 16,858	\$ 16,172	\$ 16,387	\$ 17,174	

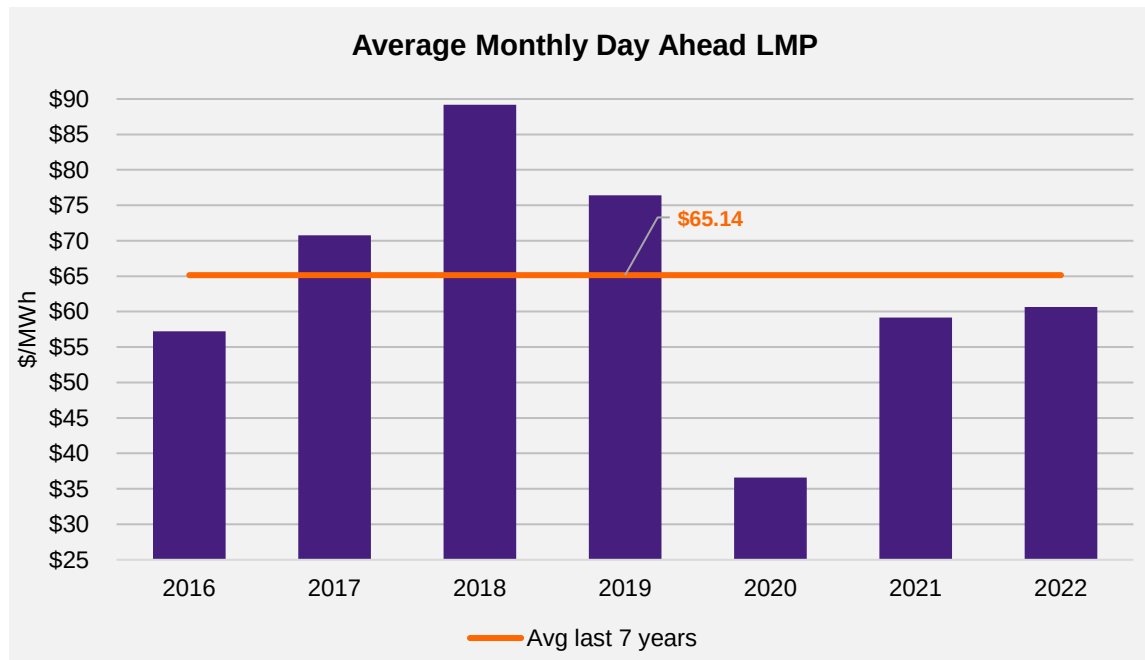
1. CFE: Federal electricity commission, Utility Company. CFE prices are issued in MXN/kWh. For publication this chart is presented in USD/MWh, for which an exchange rate of \$20.57 MXN is used. This rate can change monthly.
2. The Northeast region includes the states of Nuevo Leon and Tamaulipas.
3. GDMTH: Rate classification most used in medium voltage.
4. The West region includes the states of Nayarit, Jalisco, Zacatecas, Aguascalientes, Colima, Michoacan, San Luis Potosí, Queretaro.

Average Monthly Day Ahead LMP



Where are index prices trending?

- Day Ahead LMPs averaged \$67.50/MWh in March, which is 16% higher month-over-month and 75% higher year-over-year.
- In the 1Q-2022, LMPs averaged \$60.66/MWh, up 2.5% compared to the year before average when prices averaged \$59.16/MWh.
- This variation follows the high natural gas prices and the high temperatures of the zone.



Average Monthly Day Ahead LMP							
	USD/MWh						
	2016	2017	2018	2019	2020	2021	2022
Jan		\$ 46.36	\$ 60.47	\$ 61.59	\$ 29.62	\$ 37.85	\$ 56.30
Feb		\$ 47.03	\$ 67.99	\$ 78.43	\$ 31.70	\$ 71.62	\$ 58.19
Mar		\$ 53.59	\$ 64.59	\$ 81.47	\$ 27.04	\$ 38.62	\$ 67.50
Apr		\$ 72.16	\$ 78.05	\$ 92.96	\$ 21.69	\$ 47.47	
May	\$ 56.49	\$ 77.63	\$ 108.53	\$ 96.22	\$ 28.85	\$ 55.10	
Jun	\$ 64.42	\$ 103.41	\$ 116.31	\$ 84.62	\$ 36.24	\$ 59.96	
Jul	\$ 68.73	\$ 76.93	\$ 125.08	\$ 83.11	\$ 41.14	\$ 71.41	
Aug	\$ 58.22	\$ 91.57	\$ 137.61	\$ 92.77	\$ 51.49	\$ 71.62	
Sep	\$ 63.43	\$ 73.22	\$ 103.18	\$ 87.93	\$ 43.06	\$ 69.30	
Oct	\$ 63.24	\$ 74.94	\$ 78.63	\$ 66.80	\$ 44.84	\$ 75.37	
Nov	\$ 40.17	\$ 74.19	\$ 69.15	\$ 54.97	\$ 47.02	\$ 61.57	
Dec	\$ 42.90	\$ 58.09	\$ 60.69	\$ 36.12	\$ 36.29	\$ 50.03	
Avg	\$57.20	\$70.76	\$89.19	\$76.42	\$ 36.58	\$ 59.16	\$ 60.66

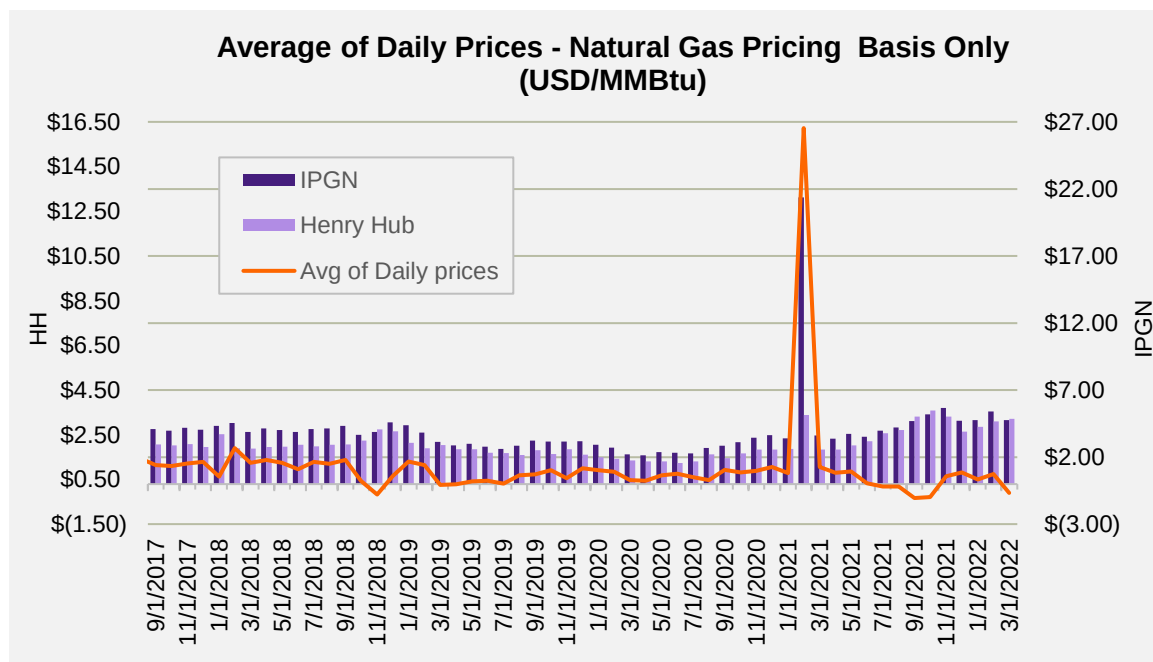
Sources: S&P Global Platt and CENACE. The published average price considers the 9 regions of the country. In turn, the misalignment of information is due to its publication by CENACE.

Natural Gas Price Index (IPGN)



Where are index prices trending?

- NGPI daily prices averaged \$(0.10)/MMBtu in March—down ~109% year-over-year.
- In Q1 2022, prices averaged \$0.38 USD/MMBtu, 78% less than the average prices of the previous year, which sat at \$1.77 USD/MMBtu.
- These changes are due to the reduction in IPGN and the increase in HH.



Average of Daily Prices - Natural Gas Pricing Basis Only USD/Mmbtu						
	2017	2018	2019	2020	2021	2022
Jan		\$ 0.63	\$ 1.30	\$ 0.91	\$ 0.78	\$ 0.50
Feb		\$ 1.90	\$ 1.15	\$ 0.84	\$ 16.23	\$ 0.74
Mar		\$ 1.24	\$ 0.25	\$ 0.47	\$ 1.05	\$ (0.10)
Apr		\$ 1.37	\$ 0.28	\$ 0.44	\$ 0.81	
May		\$ 1.25	\$ 0.41	\$ 0.68	\$ 0.86	
Jun		\$ 0.96	\$ 0.45	\$ 0.76	\$ 0.33	
Jul	\$ 1.15	\$ 1.29	\$ 0.32	\$ 0.60	\$ 0.19	
Aug	\$ 1.44	\$ 1.20	\$ 0.68	\$ 0.47	\$ 0.18	
Sep	\$ 1.14	\$ 1.37	\$ 0.73	\$ 0.94	\$ (0.32)	
Oct	\$ 1.10	\$ 0.43	\$ 0.92	\$ 0.81	\$ (0.29)	
Nov	\$ 1.21	\$ (0.18)	\$ 0.55	\$ 0.89	\$ 0.65	
Dec	\$ 1.29	\$ 0.67	\$ 1.00	\$ 1.07	\$ 0.81	
Avg	\$1.22	\$1.01	\$0.67	\$ 0.74	\$ 1.77	\$ 0.38

Sources: NGI, S&P Global Platt

Natural Gas

May 2022

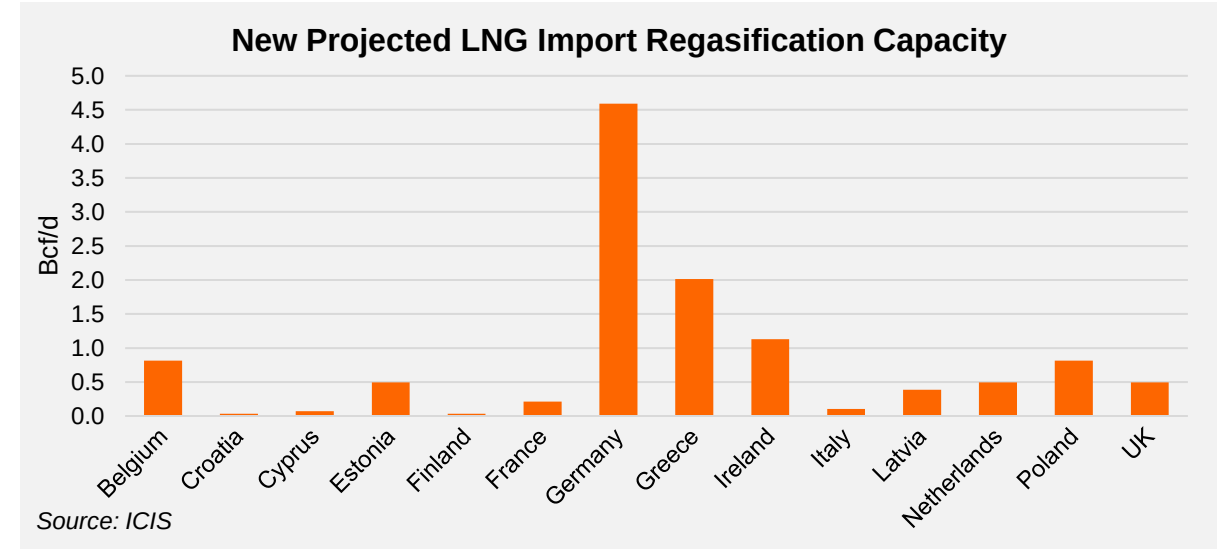
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Europe's Investment in Natural Gas Facilities



As news broke late in April that Poland and Bulgaria's gas supplies were being shut off from Russia, renewed uncertainty pushed the Dutch Title Transfer Facility (TTF) price to almost €120 MWh.

- Russia cut Bulgaria and Poland off from supplies because Russia wanted to be paid in Roubles, and demanded other European countries comply.
- Russia warned similar consequences are in place for other countries that are “unfriendly” towards Russia.
- Despite these cuts, Poland and Bulgaria continue to act as a “transit state” for Russian gas into European nations such as Germany, Hungary and Serbia.
- Poland and Bulgaria's agreement with Russia expires at the end of 2022, so they had already been planning for alternative fuel sources.
- Russian's actions underscore the importance and urgency in alternative fuel sources, and additional regasification capacity.
- Europe currently has ~22 Bcf/d of regasification capacity between the UK and mainland Europe.
- New LNG projects forecasted to come online between 2022 and 2026 suggest additional capacity of about 11.5 Bcf/d, a roughly 50% increase compared to current infrastructure.



- The chart above illustrates the various new regasification projects forecasted to come online within European countries, with Germany leading the investment in Europe.
- The additional import capacity within Europe is expected to provide market for new US LNG export capacity as it comes online, which is likely to increase Henry Hub volatility.

Key Takeaway: Europe is making serious investment in natural gas infrastructure, which appears to be a major component of its future energy supplies.

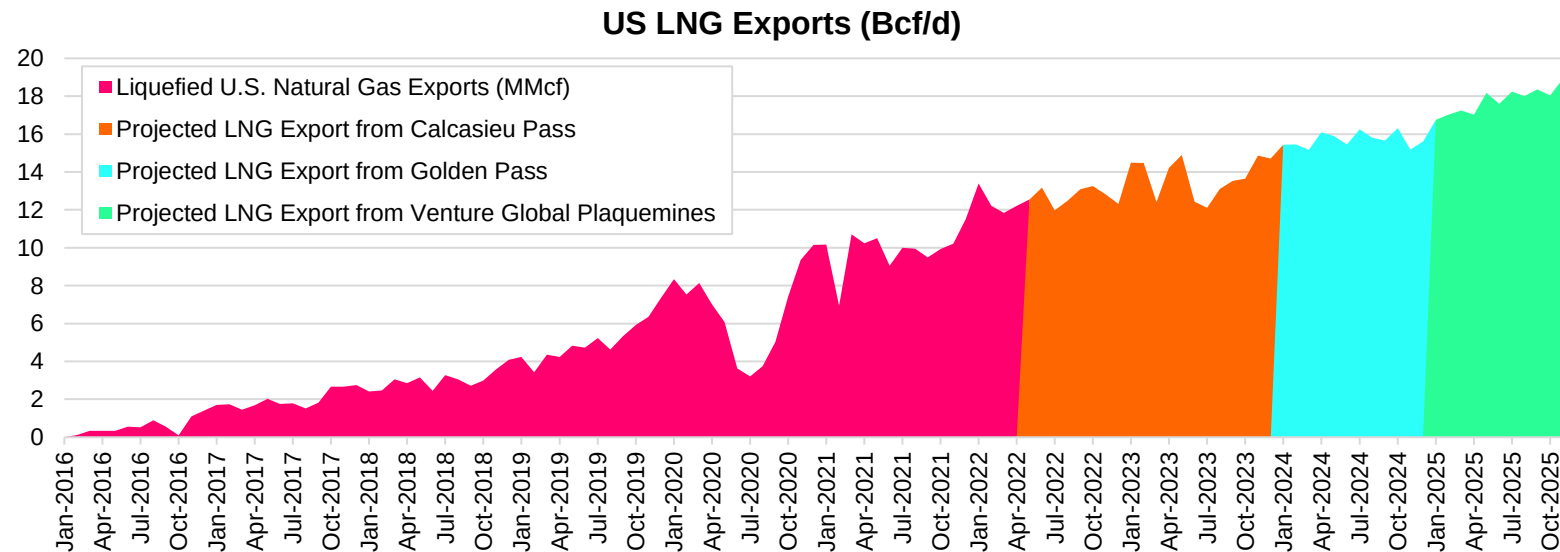
United State's Investment in Natural Gas Facilities



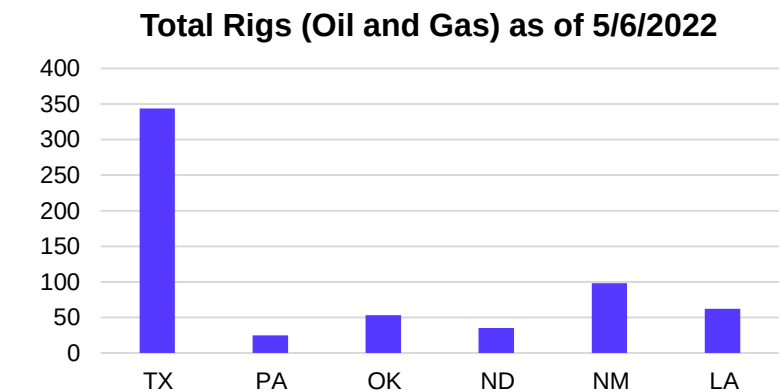
As international markets become more lucrative, investment in liquified natural gas (LNG) export facilities is on the rise in the US with three new LNG facilities already under construction.

These facilities, which are expected to come online between 2022 and 2025, include:

- Calcasieu Pass (*partially online* 1.41 Bcf/d export capacity) – *Louisiana*
- ExxonMobil – Golden Pass (2.26 Bcf/d export capacity) – *Texas*
- Venture Global Plaquemines (3.40 Bcf/d export capacity) – *Louisiana*
- The additional facilities are forecasted to bring the US to over 18 Bcf/d peak export capacity, from the 13.9 Bcf/d we see today.



- The investment in these facilities overlaps with heavy investment in gas and oil drilling within both Louisiana and Texas.
- The 6 states in the graph below account for almost 88% of the 705 rigs deployed in the US.
- The additional investments in supply within TX and LA suggest producers will be well positioned to fill the additional export capacity.

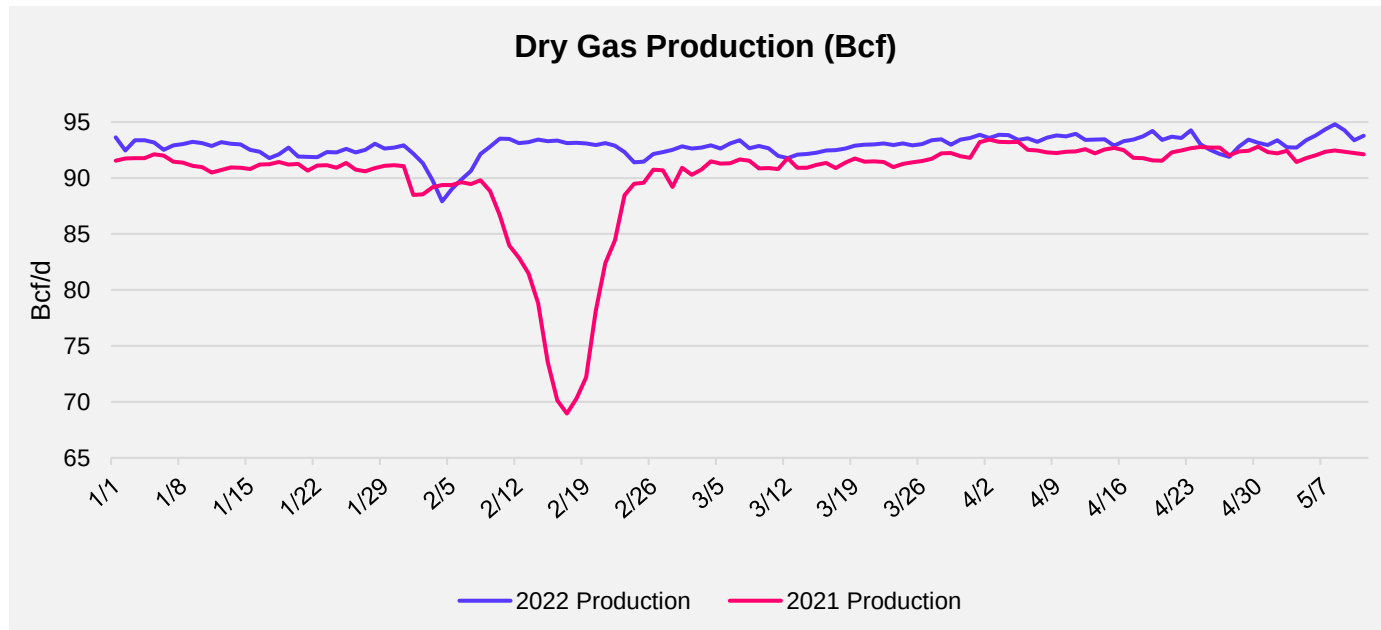


Key Takeaway: The additional US LNG export capacity should coincide with Europe's additional regasification projects, which puts the US in an optimal position to fill this new capacity, while likely increasing the Henry Hub's volatility as export capacity increases.

Natural Gas – Supply



- Natural gas production hit a 2022 high on May 8th, exceeding 95 Bcf/d.
- The news provided some downward pressure on the commodity in following days, as it hit a low of \$6.45/MMBtu on May 10th for the June 2022 contract.
- The bump in production was a welcome site for bears, but production levels were already expected as maintenance in Marcellus/Utica regions caused a dip in production for previous week.
- The production has dropped back into the 94 Bcf/d in subsequent days.



Overall, US producers still have a lot to overcome to ramp up to levels previously forecasted before 2022. Some of those issues include:

- Producers dealing with equipment/supply chain issues
 - Frack/setup crews not getting necessary supplies
- Labor shortage in producer services and well tenders
- Producers looking to maintain production levels and prove capital discipline to investors
- Uncertainty on public policy towards fossil fuels
- Limited pipeline capacity and coordinating with maintenance schedules
- Greater investment in certifying natural gas operations, and producing low methane intensity gas (Responsibly Sourced Gas)

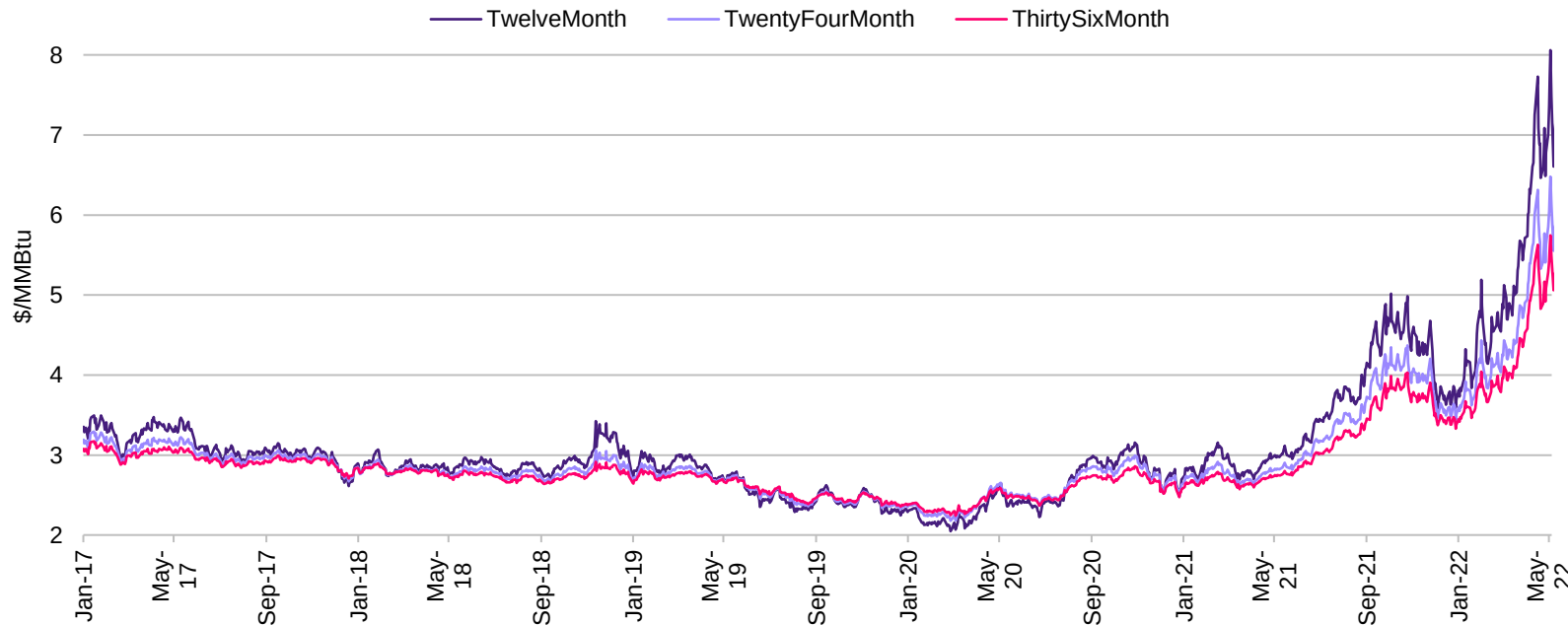
*Survey administered 3/23/22 (WTI was \$114/bbl at this time);
Source: Dallas Federal Reserve*

Natural Gas – Pricing



Term	12 month	24 month	36 month
Price (\$/MMBtu)	\$7.38	\$6.04	\$5.42
Variance to last week	11.71%	8.68%	7.05%
Variance to last year	146.37%	112.30%	96.25%

NYMEX Rolling Strip



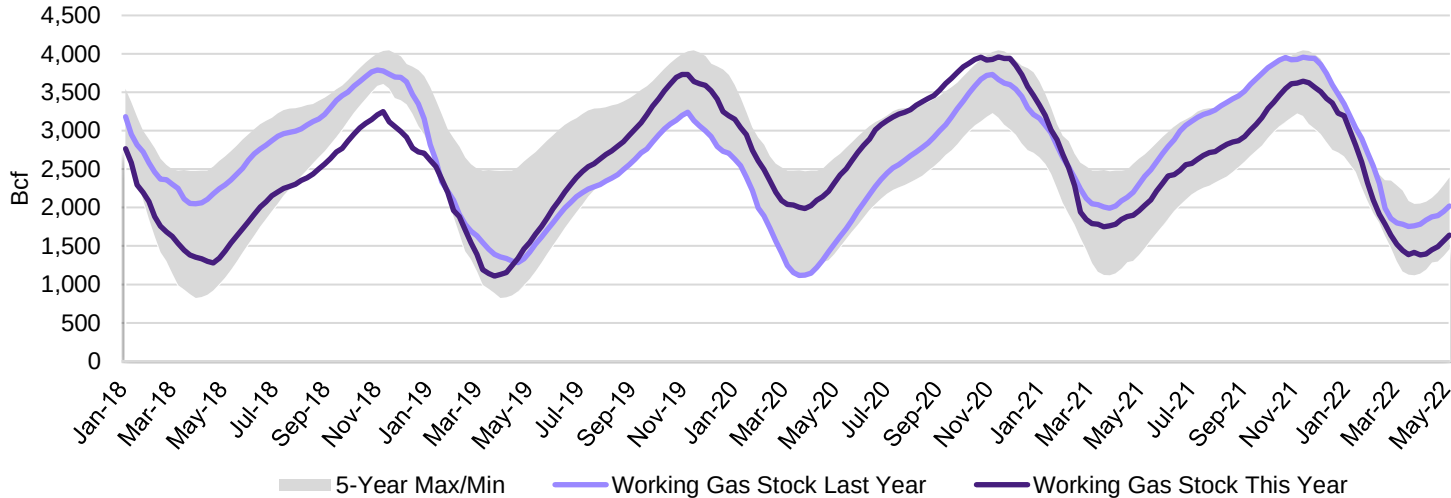
Rolling strip price data points refer to NYMEX futures 1, 2 and 3 years out respectively. Pricing updated as of 4/14/22 close.

- The Henry Hub 1 year rolling strip is up 11.71% from last week, and 146.37% up from last year
- The Henry Hub is facing bullish fundamentals right now from
 - Sluggish production growth
 - Low storage inventories
 - Greater demand for gas in power supply due to above average temperatures and higher coal prices
 - Robust export market

Natural Gas – Storage



Natural Gas Working Storage

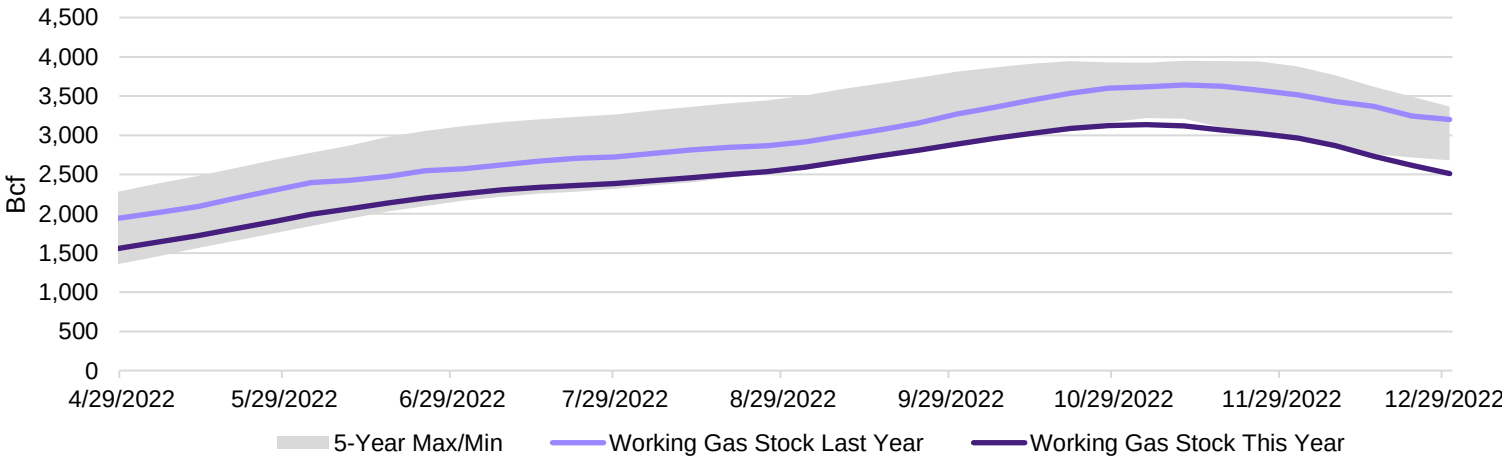


EIA Weekly
Storage Report
1,643

Bcf as of 05/06

Variance to Current Year	
5YA	1YA
1,955	2,019
-15.96%	-18.62%

Projected Working Storage for Apr22-Dec22



- Current working stocks are 1643 Bcf , which is 376 Bcf less than storage levels 1 year ago at this time, and 312 Bcf less than the storage level's 5-year average.
- The South Central Region had the smallest change from last week increasing 3.883%, while the East Region had the largest change at 8.3% more than last week at this time
- We project end of season storage levels to be about **3100 BCF** based on average pulls coupled with increased export capacity available this summer