Energy Market Insights

April 2022

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New England

April 2022

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Insight of the Month

Power prices face exposure to soaring pipeline & LNG prices

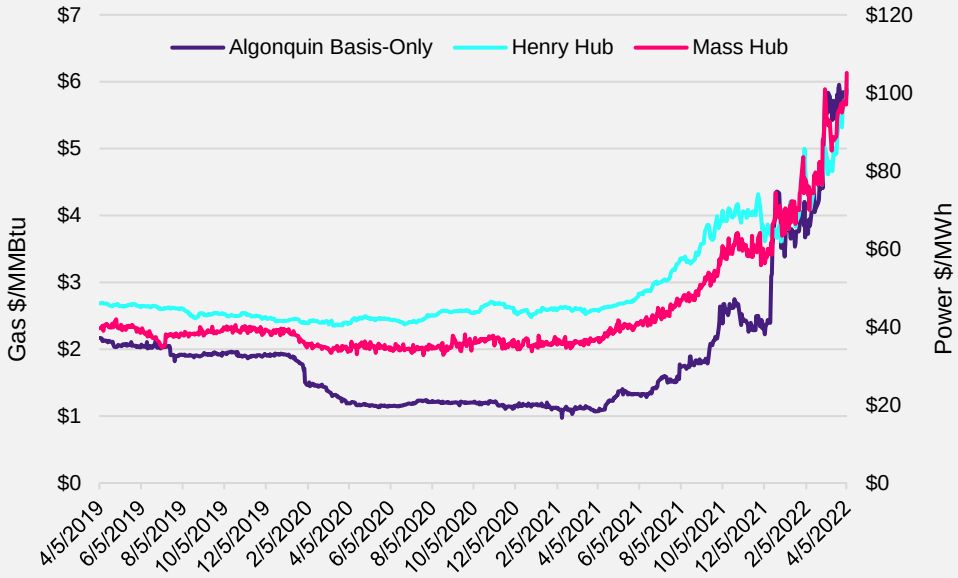
Mass Hub electricity prices have risen significantly YoY - from $40/MWh to over $100/MWh for a 12-month strip beginning May 1, 2022.

- Rising regional and national gas prices are the main driver behind the climb in electricity prices, as gas-fired generation makes up nearly 50% of New England's generating fleet.
- Full price Algonquin Citygate 12-month strips beginning May 1, 2022 have more than tripled YoY, reaching as high as $12/MMBtu.

Bullish fundamentals can partly explain the climb in regional gas prices.

- Working gas in storage across the US was 1,397 Bcf as of Friday, April 8, 2022, according to EIA estimates. This is 303 Bcf below the five-year average of 1,700 Bcf.
- Historically, New England's gas market has faced exposure to global LNG prices during peak heating season given the region's pipeline constraints and its limitations on delivery during periods of high demand. With the Russia-Ukraine conflict raising concern over the future of Europe's gas supply, forwards prices at the continent's benchmark TTF hub have risen significantly, keeping pressure on global gas indices.

Gas (left axis): Algonquin Basis, Henry Hub / Power (right axis): Mass Hub
12-Month Strip: May 22 - April 23



GLOBAL LNG PRICE UPDATE: At the Title Transfer Facility (TTF) in the Netherlands, the most liquid natural gas spot market in Europe, day-ahead LNG prices averaged $36.17/MMBtu for the week ending April 6, 2022. In the same week last year, prices at the TTF were $6.84/MMBtu.

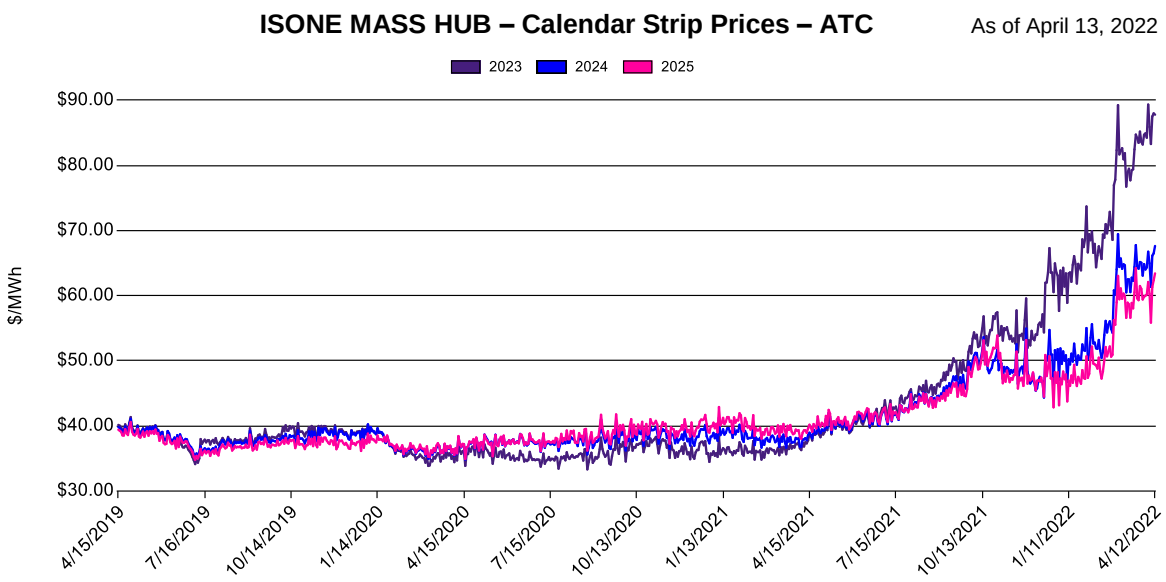
KEY TAKEAWAY: Electricity forward prices have been on the rise over the past year. Today, a customer with 10,000 MWh/year of usage would pay over $1,000,000 on the commodity portion of electricity supply for the 12-month period beginning May 1, 2022, as compared to $400,000 if the customer locked in prices for the same product one year ago.

New England – Power Prices

Forwards remain elevated, March 2022 spot pricing remains elevated

Where are forwards trending?

- CY2023 forwards experienced a brief dip in mid-March before elevating back within the $80-$90/MWh range.
- CY2024 strips hovered around $64/MWh for most of the past month, with CY2025 strips trading at a ~$5/MWh discount.
- The CY2023 strip's widening premium (~$20/MWh) to CY2024/25 is largely due to rising natural gas prices for winter 2023.



Where are index prices trending?

- The average daily spot price for March 2022 was $66.18/MWh, down over $50/MWh month-over-month.
- March spot pricing is the highest spot price on record for the month since 2014. March 2022 spot is up 90% compared to March 2021.

Average Monthly Day Ahead LMP - MaHub

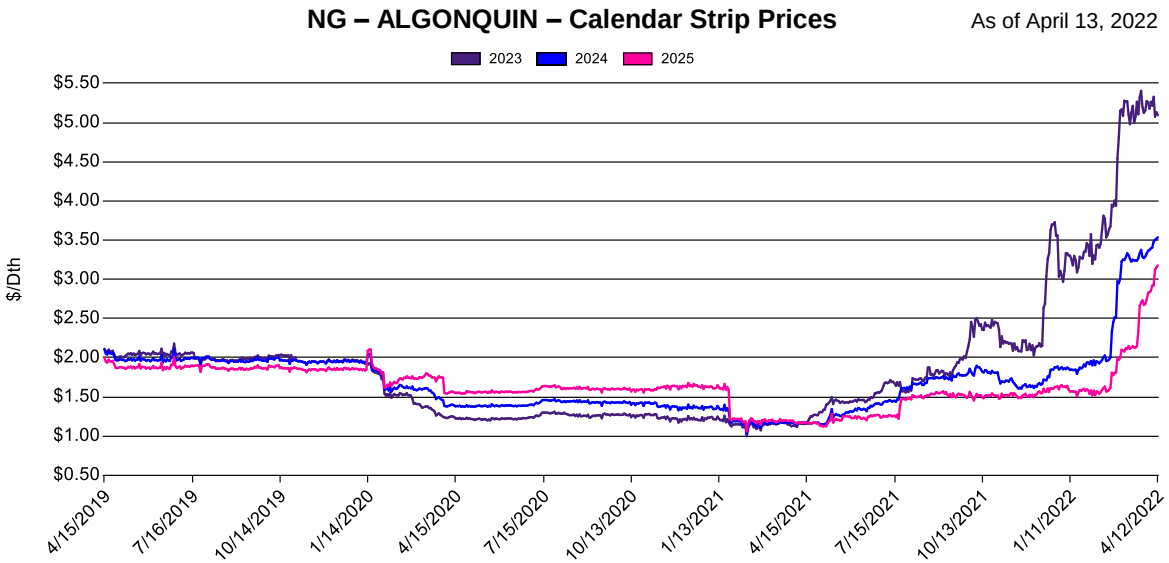
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$168.81	$71.14	$38.60	$40.30	$108.75	$56.76	$26.45	$42.73	$149.46
Feb	$156.02	$122.77	$29.90	$30.02	$39.58	$35.62	$23.06	$73.12	$117.08
Mar	$111.16	$64.25	$20.63	$35.75	$35.38	$38.07	$17.18	$34.88	$66.18
Apr	$44.98	$28.43	$28.36	$29.23	$45.00	$26.97	$18.36	$26.14	
May	$36.95	$24.92	$21.24	$27.31	$24.04	$24.21	$16.48	$24.98	
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**	**$110.91**

New England – Gas Prices

2023 Algonquin basis contracts trading above $5.00/MMBtu

Where are forwards trending?

- Algonquin Basis prices for CY2023 remained above $5.00/MMBtu for most of March, running a ~$1.75/MMBtu premium to the CY24 strip.
- The CY2024 and CY2025 strips are both trending upward, climbing to $3.50/MMBtu and $3.18/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 $6.55/MMBtu in March 2022 — a 55% decrease from the February 2022 average.
- March 2022 spot pricing was 93% higher than March 2021 and 87% above the five-year average for March.

Average of Daily Prices - Algonquin City-Gate									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$ 24.69	$ 9.34	$ 4.54	$ 5.09	$ 15.62	$ 6.95	$2.83	$ 4.92	$20.00
Feb	$ 21.05	$ 17.50	$ 3.46	$ 3.73	$ 4.40	$ 4.20	$2.27	$ 8.37	$14.56
Mar	$ 15.19	$ 7.99	$ 1.87	$ 4.52	$ 3.97	$ 4.04	$1.58	$ 3.40	$6.55
Apr	$ 4.80	$ 3.16	$ 2.93	$ 3.11	$ 4.98	$ 2.56	$1.63	$ 2.33	
May	$ 3.85	$ 1.87	$ 2.12	$ 3.06	$ 2.35	$ 2.32	$1.39	$ 2.31	
Jun	$ 4.05	$ 1.69	$ 2.28	$ 2.45	$ 2.62	$ 2.12	$1.52	$ 2.84	
Jul	$ 3.10	$ 1.99	$ 2.75	$ 2.50	$ 2.83	$ 2.28	$1.63	$ 3.22	
Aug	$ 2.71	$ 2.34	$ 3.11	$ 2.36	$ 3.17	$ 2.02	$1.49	$ 3.93	
Sep	$ 3.16	$ 2.80	$ 2.59	$ 1.90	$ 2.94	$ 1.95	$1.42	$ 4.44	
Oct	$ 2.83	$ 3.69	$ 2.26	$ 2.78	$ 3.23	$ 1.66	$2.00	$ 4.78	
Nov	$ 6.18	$ 3.29	$ 2.54	$ 3.27	$ 6.08	$ 3.31	$1.95	$ 5.63	
Dec	$ 6.01	$ 2.19	$ 6.74	$ 9.35	$ 5.77	$ 4.61	$4.24	$ 8.27	
Avg	$8.13	$4.82	$3.10	$3.68	$4.83	$3.17	$2.00	$4.54	$13.70

New York

April 2022

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Insight of the Month

NYISO Lowers Tier I REC compliance percentage, ponders market structure change

- The New York Public Service Commission recently filed an order reducing Tier I compliance percentages for 2022 and 2023 for LSEs. This order also established the 2024 Tier I compliance percentage.
- The table to the right displays the original Tier 1 compliance percentage alongside the October 2020, and March 2022 updates.
- The most recent change is in response to the 2021 Divergence Report, which references an undersupply of RECs in the market forcing LSE's to satisfy obligations using the ACP payment (32% & 60% of compliance was met through ACP in 2019 and 2020 respectively).
- This is the second reduction in Tier I compliance percentages in the past two years: The initial 2022 compliance percentage was 8.40%, but was modified to 5.61% in October 2020, and finally to 3.25% in the latest modification.
- NYSERDA is currently evaluating whether or not to move cost recovery of the Tier I program from the current market-based collection of funds (compliance %/REC cost) to a recovery method based on LSE-load share (flat $/MWh rate), like other CES tiers – Tier II RECs and ZECs.

	Tier I Compliance %			
Compliance Year	Initial	Oct 2020 Update	Mar 2022 Update	Final
2020	2.84%	2.84%		**2.84%**
2021	4.20%	2.04%		**2.04%**
2022	8.04%	5.61%	3.25%	**3.25%**
2023		8.20%	6.16%	**6.16%**
2024			6.45%	**6.45%**

	Estimated Tier I Retail Cost ($/MWh)		
	Oct 2020 Update*	Mar 2022 Update*	Delta*
2022	$1.68	$0.98	($0.71)
2023	$2.46	$1.85	($0.61)

Comparison in estimated retail costs associated with the March 22 reduction in Tier I Compliance Percentages.

**Assumes a $30/MWh REC price.*

KEY TAKEAWAY: The order from the NY PSC marks the second reduction in Tier I compliance percentage in the past two years and is an indicator that Tier I REC demand is outpacing supply. If you are on a CES pass-through supply product, your facility will be able to realize avoided costs associated with this reduction. A customer with 10,000MWh of annual usage should expect a ~$15k reduction in costs in 2022/23.

NYC – Power Prices

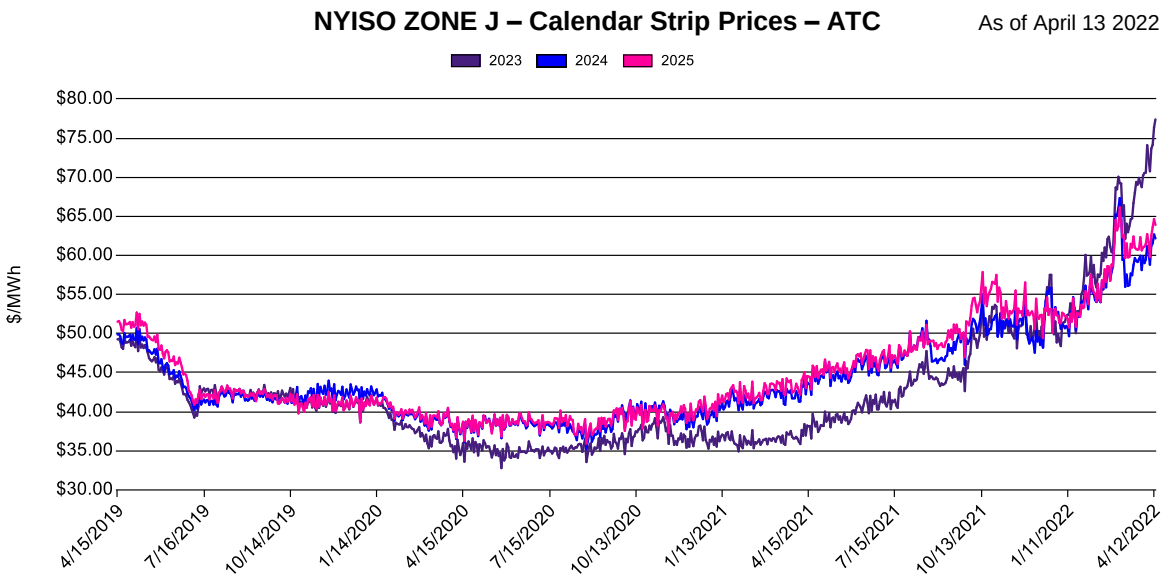
CY2023 strips reach new highs at $77/MWh

Where are forwards trending?

– CY2023 strips have surged in recent weeks, trading above $70/MWh through the first two weeks of April.

– CY2024 strips peaked in early-March at $67/MWh. Since then, prices for the strip have been floating around $60/MWh.

– CY2025 strips have been trading in tandem with the CY2024 strips, although at a $1-$2/MWh premium.



Where are index prices trending?

– Average DA monthly prices for NYISO Zone J dropped about $35/MWh month-on-month to $59.23/MWh in March 2022.

– March 2022 DA monthly averages were about 98% above the five-year average for March and 101% above the average spot price in March 2021.

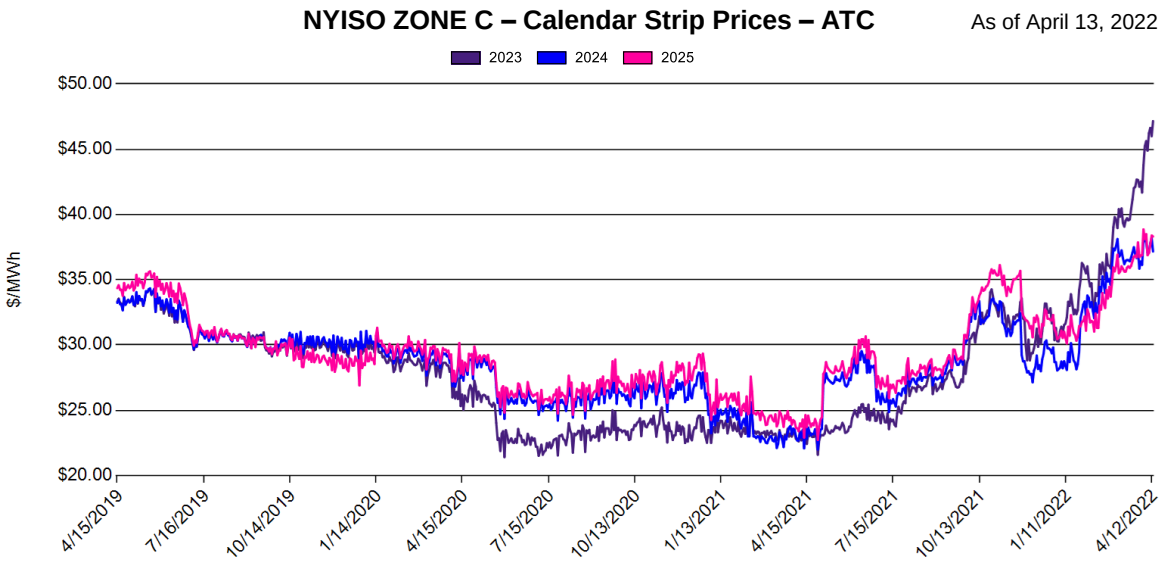
Average Monthly Day Ahead LMP - NYISO - Zone J									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$175.92	$57.34	$35.04	$40.64	$96.58	$49.20	$25.12	$36.35	$138.44
Feb	$122.84	$112.33	$29.61	$30.55	$34.05	$33.07	$21.26	$64.78	$94.62
Mar	$102.52	$51.26	$20.75	$36.04	$31.98	$35.00	$16.81	$29.40	$59.23
Apr	$46.49	$27.53	$28.62	$32.27	$34.77	$28.82	$15.53	$24.55	
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**	**$97.43**

Upstate NY – Power Prices

CY2023 strips surge upwards, March spot averages up 144% YoY

Where are forwards trending?

- CY2023 strip prices saw a significant departure from CY2024 and CY2025 strips in recent weeks, reflecting near-term concerns in the market over natural gas prices.
- The CY2023 strip pushed past the $45/MWh mark on April 5th and has since remained elevated.



Where are index prices trending?

- Rising natural gas prices pushed the average DA settlement in March to settle at $35.21/MWh.
- March 2022 spot pricing was ~144% above the average spot price from March 2021, and ~71% above the five-year average for March.

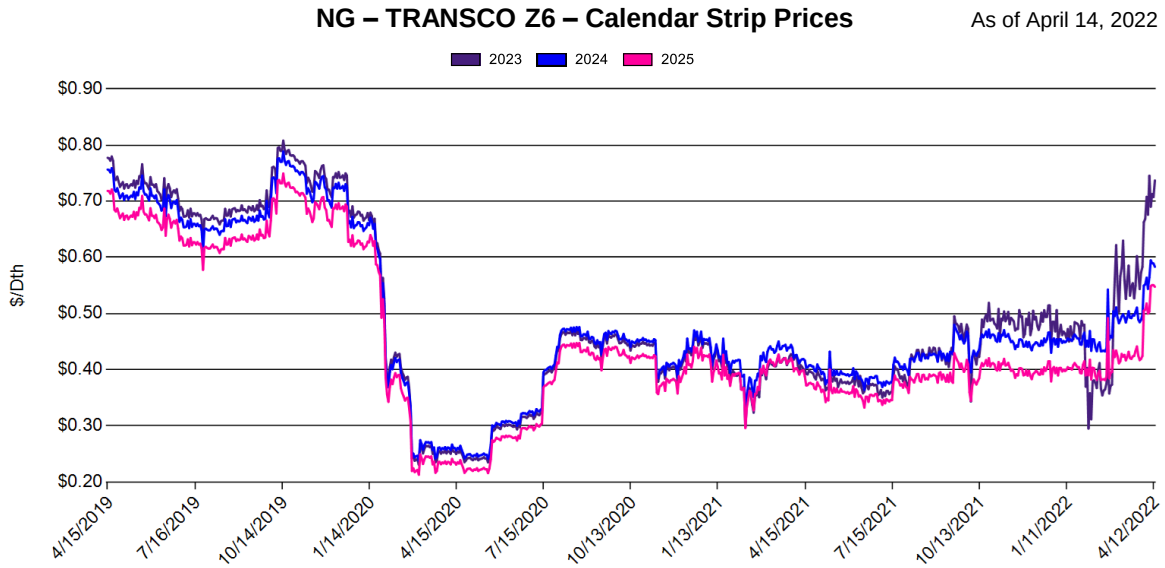
Average Monthly Day Ahead LMP - NYISO - Zone C									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$121.65	$37.81	$21.50	$29.68	$62.19	$35.02	$16.57	$23.96	$96.30
Feb	$80.31	$75.58	$17.63	$24.98	$23.91	$25.74	$16.36	$38.58	$66.26
Mar	$85.79	$37.35	$12.58	$24.47	$22.14	$27.67	$13.99	$14.43	$35.21
Apr	$40.38	$22.80	$22.01	$20.86	$28.14	$21.82	$11.87	$10.15	
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**	**$65.92**

New York – Gas Prices

Transco Z6 NY basis forwards jump to $0.74/MMBtu

Where are forwards trending?

- Transco Z6 NY basis-only CY2023 strip jumped significantly in the first two weeks of April, peaking at $0.74/MMBtu.
- The CY2024 and CY2025 strips are trading notably lower around $0.58/MMBtu and $0.55/MMBtu, respectively.
- The CY2023 strip's widening premium to CY2024/25 is mainly due to near term concerns over natural gas supply.



Where are index prices trending?

- Daily prices averaged $4.48/MMBtu in March 2022, equating to a ~$1.69/MMBtu decrease month-over-month.
- March 2022 spot pricing is 73% above the five-year average for March and 100% higher than March 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	
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	$7.27

Mid-Atlantic

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Insight of the Month

FERC Order No. 2222 is a monumental step towards remaking the electrical grid, but aggregation plan causing objection among some

Background: For the past 70+ years, electricity has been produced mainly by the same sources: coal, oil, natural gas, nuclear, and hydro, with some other small contributors. With new technologies potentially able to become significant contributors, the need to revolutionize the entire grid has become apparent. This new dynamic also means that small users can participate in the market in new ways.

Benefits of Order 2222:

- FERC Order No. 2222 is designed to eliminate barriers to entry for these technologies and has the potential to impact users all the way down to the residential level.
- Small “generators” can participate in the wholesale market, taking advantage of ancillary service savings and capacity revenue opportunities, two components that are currently bundled into your electricity supply costs.
- Increased price competition resulting in lower energy costs for consumers.
- Increased grid flexibility and resilience through enhanced control of usage by both individual customers and DER aggregators.

Distributed Energy Resources (DERs):

- *Battery Storage*
- *Energy Efficiency*
- *Demand Response*
- *Electric Vehicles*
- *EV Chargers*
- *Small Solar Installations*

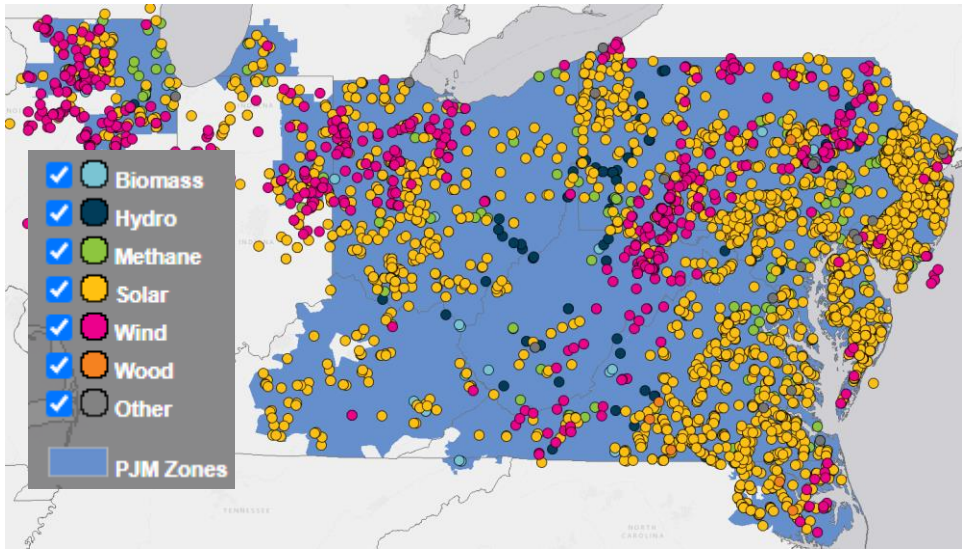
Source: PJM

Insight of the Month (continued)

FERC Order a monumental step towards remaking the electrical grid, but aggregation plan causing objection among some

Shortfalls of Order No. 2222:

- Requirement of 100kW minimum generation capability seen as a limiting factor where sufficient aggregation may be difficult to reach for many smaller users such as residential and small commercial.
- An aggregation will be required to gather onto a single pricing node, which many argue ignores the benefits/disadvantages of an individual source (ex: controllable demand response vs. intermittent solar generation) and prevents a customer served by this pricing node from joining another aggregation that has greater potential benefits.
- Potential for DERs to receive "double counting" in terms of benefits; in other words, they may see a reduction of costs (due to offset of usage) as well as revenues from their DER installation. Some argue this could cause low capacity bids that would affect generation supply for the rest of the region.
- Approval process that has potential to halt the entire effort due to establishment of requirements and implementation across hundreds of individual utilities.
- While this order is widely seen as a step forward, it has yet to take off with next to no applications in the works. Renewable companies, cooperatives and some retail entities are attempting to shed light on the shortfalls in an effort to effect change at the federal level, thereby opening up the opportunities that Order 2222 offers to millions more.



PJM has a massive amount of renewable projects in the works, with some states (NJ and Virginia) potentially able to take advantage of order 2222

Source: PJM

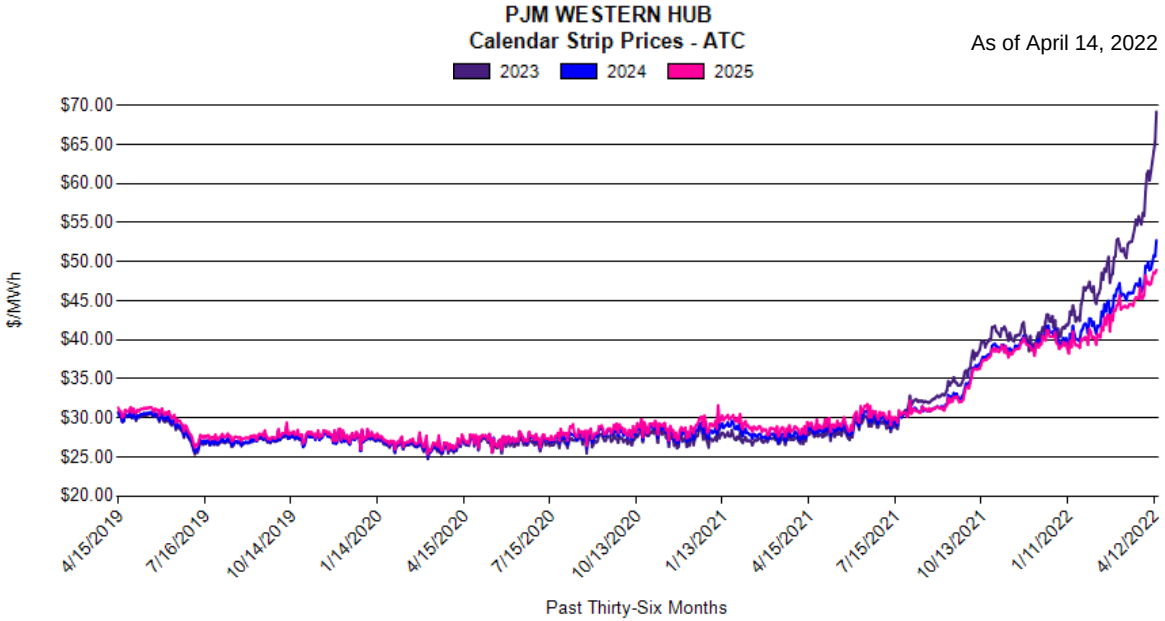
KEY TAKEAWAY: Customers in PJM, with its diverse array of geography and population densities, stand to benefit immensely from FERC Order No. 2222 by lower energy prices, increased availability of distributed energy and a more modernized grid. While the order is undoubtedly a positive, changes are needed in the near term to maximize the benefits to PJM stakeholders.

PJM – Power Price

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

Where are forwards trending?

- PJM West Hub forwards have seen volatility and upward price movement not seen since 2009 with near term spread to outer years showing a much higher premium.
- Late March and April have seen colder than normal temperatures, increasing demand and exacerbating natural gas storage concerns.



Where are index prices trending?

- Average Day Ahead monthly prices at PJM West Hub settled at $51.25/MWh for February 2022, trending the highest in 7 years.
- Continued high gas prices were the main driver of elevated LMPs, although February saw a sharp decline from January due to a warmer than normal weather pattern.

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	$45.93
Apr	$39.76	$41.45	$32.99	$30.00	$29.41	$35.25	$25.76	$17.38	$26.95	
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	$55.31

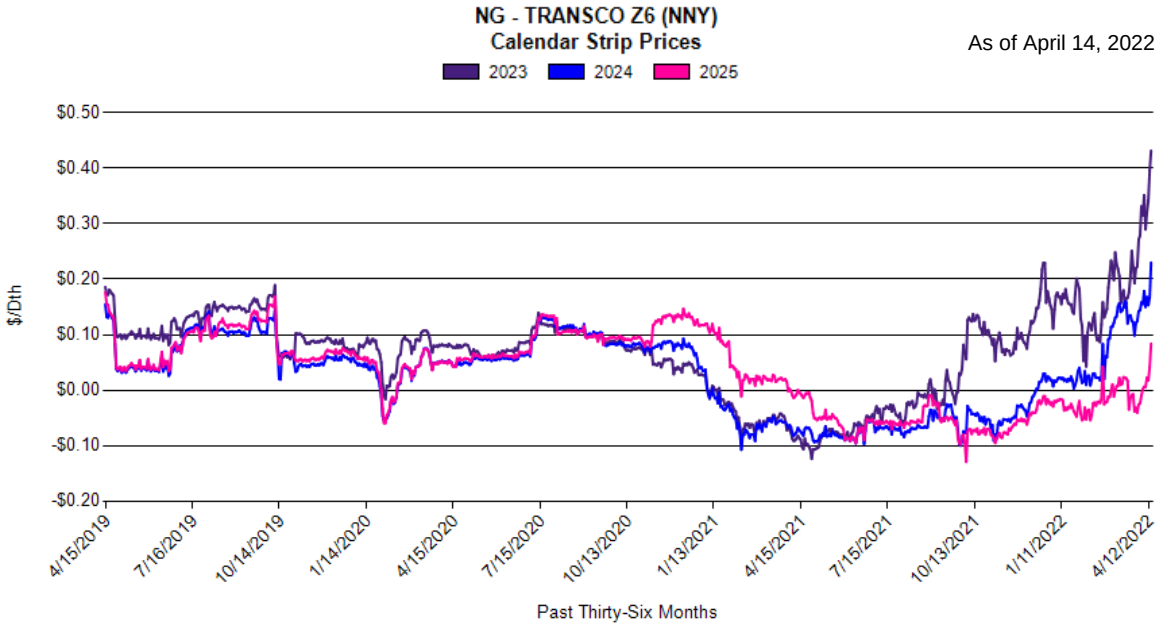
PJM – Gas Price

Transco Zone 6 basis prices begin to follow NYMEX price surge

Where are forwards trending?

– Transco z6 xNY calendar basis strips saw an unabated rise in March and early April.

– Near term 12-month strip prices are beginning to pull away from outer year strips as risk is perceived to be very high for the remainder of the year and hedging is at a premium.



Where are index prices trending?

– Transco Zone 6 xNY reached a "low" in March (the highest since the polar vortex year of 2014) but has since bounced as purchase volumes have risen substantially, a unique situation in a typically low-demand shoulder month.

– Basis continues to be at recent lows, settling at ($.41) in March and averaging ($.31) so far in April.

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	$5.71
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	$6.29

Midwest

April 2022

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Insight of the Month

Results for Planning Reserve Auction (PRA) for upcoming planning year

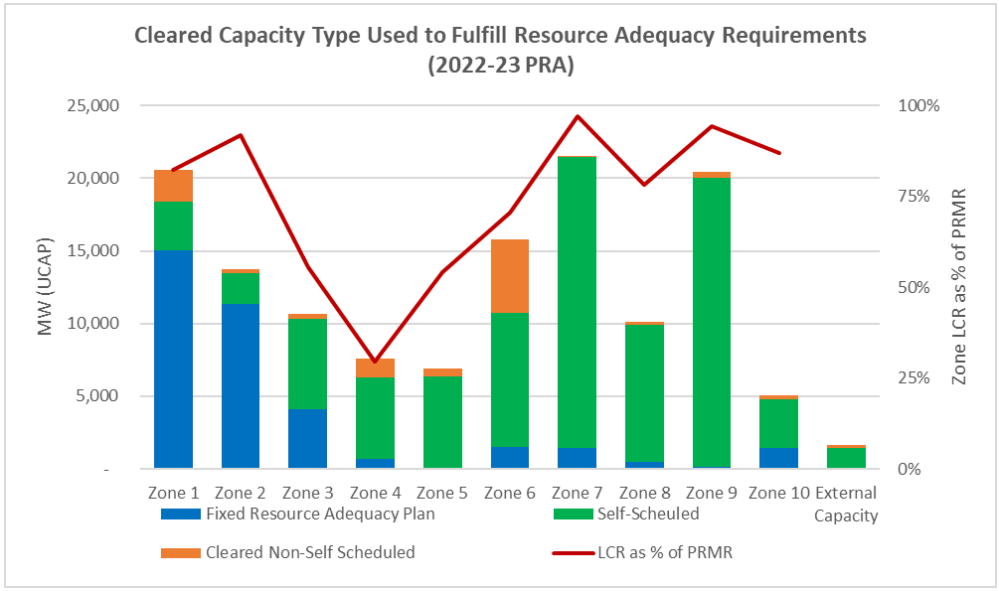
PRA results for the June 1, 2022 – May 31, 2023 Planning Year (PY) cleared considerably higher than in past years in MISO North and Central Regions (Zones 1-7) (see table). For this year's auction:

- The System-wide Planning Reserve Margin Requirement (PRMR) (i.e., capacity required by LSEs to maintain system reliability) increased 1.1% to 135.3 GW from PY 21/22;
- Total capacity offered into the PRA decreased 2.6% to 137.0 GW from PY 21/22; and
- While the total amount of capacity offered was greater than the system PRM, internal and boundary transmission limits meant that not all the offered capacity was deliverable to MISO North and Central Zones 1-7 and, therefore, some of the offered capacity did not clear, resulting in the clearing price reaching the price cap of net CONE.

Load Serving Entities continue to procure most of their capacity requirements through capacity they own or contract for under Fixed Resource Adequacy Plans (FRAPs) or self-scheduling into the PRA (see stacked bars in chart for zonal breakouts).

- FRAP and self-scheduled capacity accounted for 27.1% and 64.7% of total PRA cleared capacity, respectively, with non-self-scheduled capacity accounting for the remaining 8.1% of cleared capacity.
- FRAP and self-scheduled capacity are offered into the PRA at $0/MW-Day, thus clearing prices are determined by bids received from the small minority of non-self-scheduled participating capacity, adding to potential market volatility as supply is expected to tighten further in MISO in the coming years.

Zonal Local Clearing Requirements (LCR) (i.e., cleared capacity that must be located within a zone) are within 90+% of PRMR in Zones 2, 7 and 9, highlighting the potential for continued price separation in these zones all else equal going forward. (see red line in the chart)



MISO Planning Resource Auction Clearing Prices ($/MW-Day)

PY	Z1	Z2	Z3	Z4	Z5	Z6	Z7	Z8	Z9	Z10
2017-18	$1.50									
2018-19	$1.00	$10.00								
2019-20	$2.99						$24.30	$2.99		
2020-21	$5.00						$257.53	$4.75	$6.88	$4.75
2021-22	$5.00							$0.01		
2022-23	$236.66							$2.88		

KEY TAKEAWAY: MISO's use of a vertical demand curve in the PRA can lead to significant clearing price changes in response to relatively small changes in reserve requirements and capacity bidding into the market. This could be exacerbated in the coming years by future load growth, generation retirements, increased renewables on the system, and changes to market rules currently under contemplation.

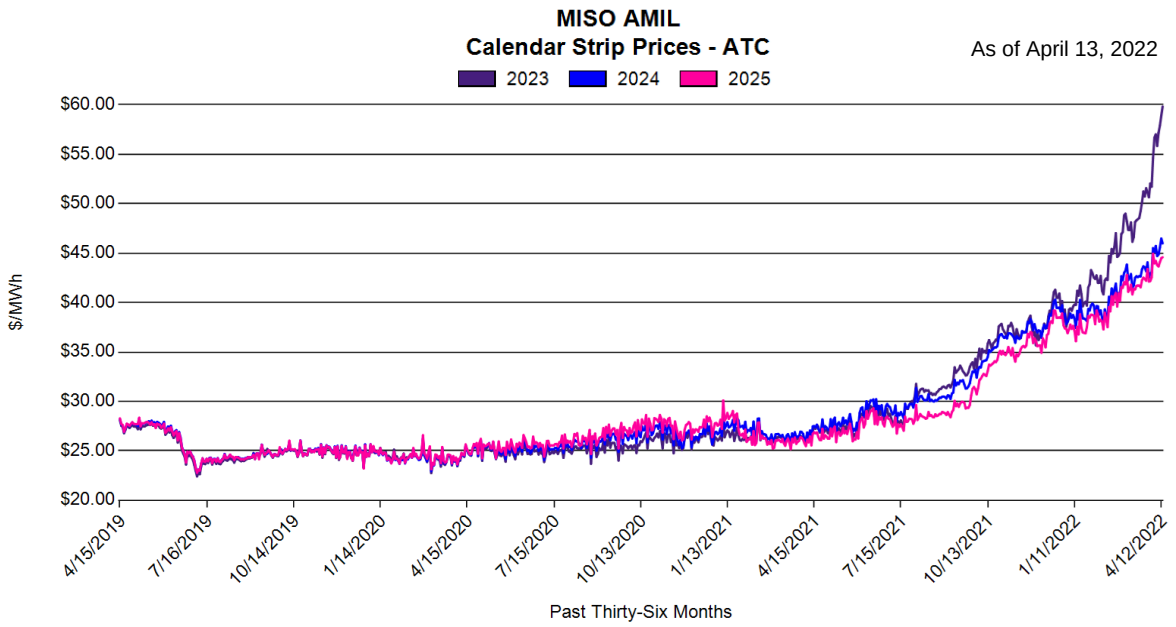
MISO – Power Price

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?

– March prices maintained high levels due to robust natural gas prices in the month, a trend that was exacerbated in April due to cooler than anticipated temperatures.

– April prices (through the 14th) are trading at the highest level since Oct. 2021 and are 108% higher than April 2021.

Average Monthly Day-Ahead LMP - Illinois Hub									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$ 51.83	$ 27.04	$ 22.84	$ 28.17	$ 34.55	$ 30.25	$ 23.52	$ 24.91	$ 44.81
Feb	$ 54.44	$ 30.18	$ 22.76	$ 24.05	$ 23.73	$ 25.80	$ 21.60	$ 61.94	$ 44.85
Mar	$ 41.18	$ 27.83	$ 22.16	$ 25.20	$ 23.66	$ 27.08	$ 19.24	$ 23.04	$ 40.10
Apr	$ 34.38	$ 25.86	$ 24.84	$ 25.51	$ 30.26	$ 25.77	$ 18.29	$ 26.78	$ 55.57
May	$ 40.86	$ 27.60	$ 25.32	$ 29.11	$ 31.36	$ 24.28	$ 19.35	$ 26.77	
Jun	$ 34.83	$ 25.43	$ 26.49	$ 29.01	$ 29.76	$ 22.98	$ 21.61	$ 32.88	
Jul	$ 31.68	$ 28.11	$ 30.91	$ 29.57	$ 30.38	$ 27.69	$ 26.90	$ 36.81	
Aug	$ 31.33	$ 27.30	$ 32.33	$ 26.65	$ 31.38	$ 24.35	$ 25.65	$ 42.72	
Sep	$ 30.96	$ 28.82	$ 29.20	$ 29.39	$ 30.65	$ 25.29	$ 20.47	$ 44.17	
Oct	$ 31.51	$ 27.19	$ 28.71	$ 25.53	$ 33.08	$ 23.60	$ 22.50	$ 57.87	
Nov	$ 34.06	$ 23.07	$ 23.71	$ 25.51	$ 34.11	$ 25.67	$ 18.16	$ 55.06	
Dec	$ 28.56	$ 21.80	$ 30.34	$ 25.28	$ 31.56	$ 23.40	$ 24.60	$ 35.29	
Avg	$37.13	$26.69	$26.63	$26.92	$30.37	$25.51	$21.82	$39.02	$46.33

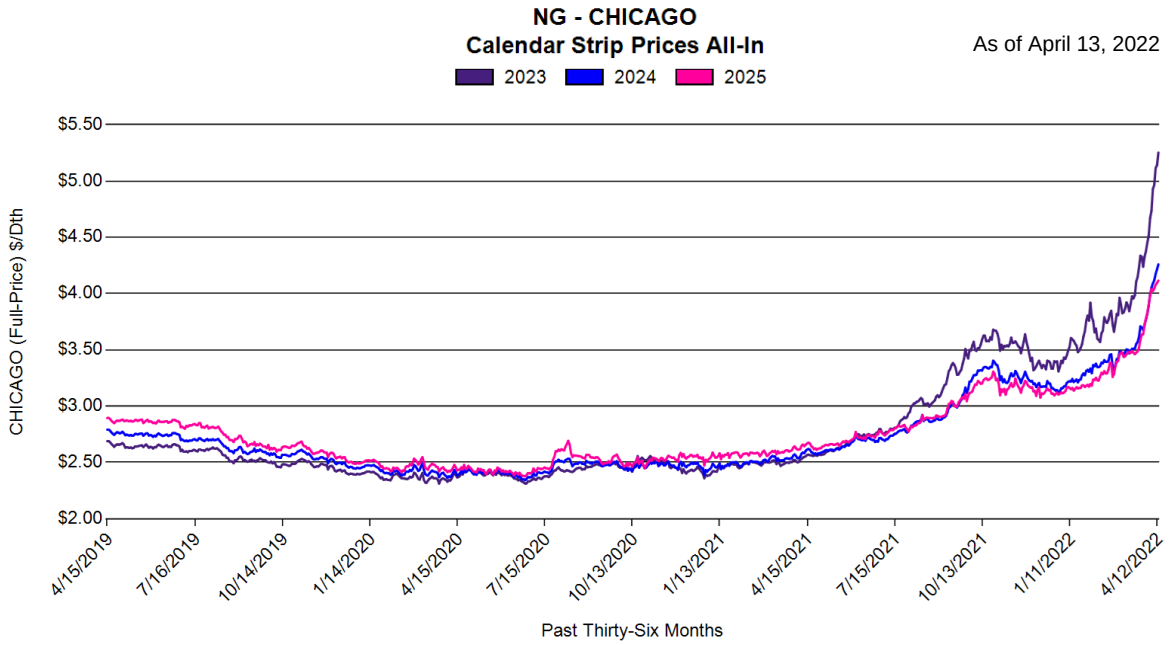
Chicago – Gas Prices

Midwest gas prices have steadied at a new elevated level

Where are forwards trending?

– Forward prices are responding to questions about the ability to refill inventories and increased Midcon Market demand forecasted for summer 2022 and beyond in response to a wave of coal power generation closures.

– US Midwest storage sits at a 20% deficit to the 5-year average as the region enters injection season.



Where are index prices trending?

– Lingering winter weather in late March and early April has maintained high prices and led to a higher than anticipated draw down of stored gas during the historical start of the storage injection season.

– April prices (through the 14th) have continued the month-on-month growth trajectory that started in January and are trading at a 134% premium to April 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	$ 5.95
May	$ 4.59	$ 2.81	$ 1.91	$ 3.02	$ 2.49	$ 2.36	$ 1.67	$ 2.75	
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	$4.80

California

April 2022

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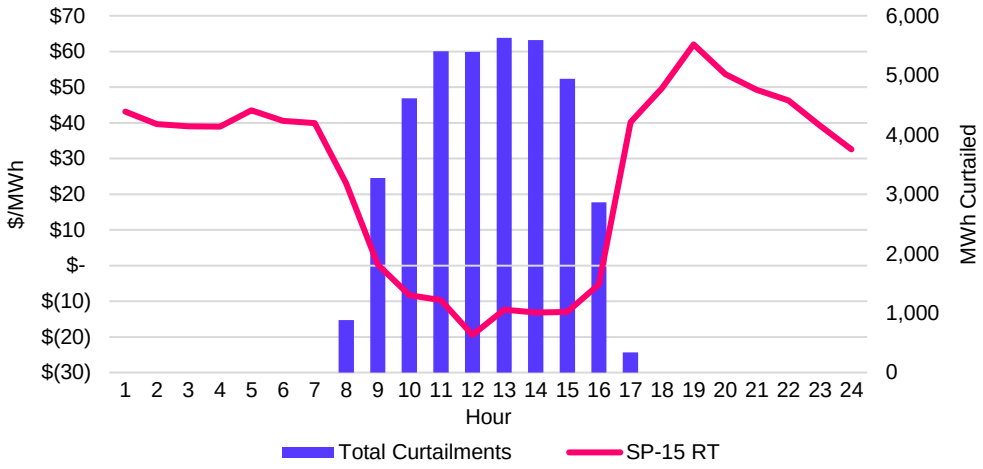
Insight of the Month

California curtails record number of renewables in March

- As renewable generation additions to the California grid accelerate, the state grid operator (CAISO) has been forced to curtail renewable output due to oversupply conditions. CAISO curtailed a record amount of renewable energy in March 2022 (463 TWh), and through the first quarter has exceeded 2021 curtailments by 44%.
- One of the notable impacts of oversupply conditions due to intermittent renewables is negative spot market hourly prices. Through the first half of April 2022, there have been 99 hours of negative real time prices for SP-15, up 40% compared to the same period in 2021. Negative prices mid-day quickly turn to elevated prices during peak demand hours as solar output wanes, creating greater volatility and grid instability.
- On February 20, SP-15 real time prices averaged $-12/MWh from 10AM to 4PM, during the same period CAISO curtailed roughly 39 TWh of renewable generation, pictured in the chart to the right.
- The continued rise of curtailments in CAISO solidifies the grid's need for battery storage to smooth out the generation provided by renewable resources. Without greater deployment of storage, California will continue to lose out on greater renewable energy utilization.
- Consumers with fixed block hedge agreements should consult their procurement advisor to ensure they are not overedged during on peak periods to avoid additional settlement cost during hours of negative prices.

CAISO Total Curtailments (MWh)		
	Monthly Total	Year to Date
March 2021	341,959	542,020
March 2022	463,315	782,858
YoY Variance	35%	44%

Feb 20, 2022: SP-15 Real Time Hourly Price Vs. MWh Curtailed



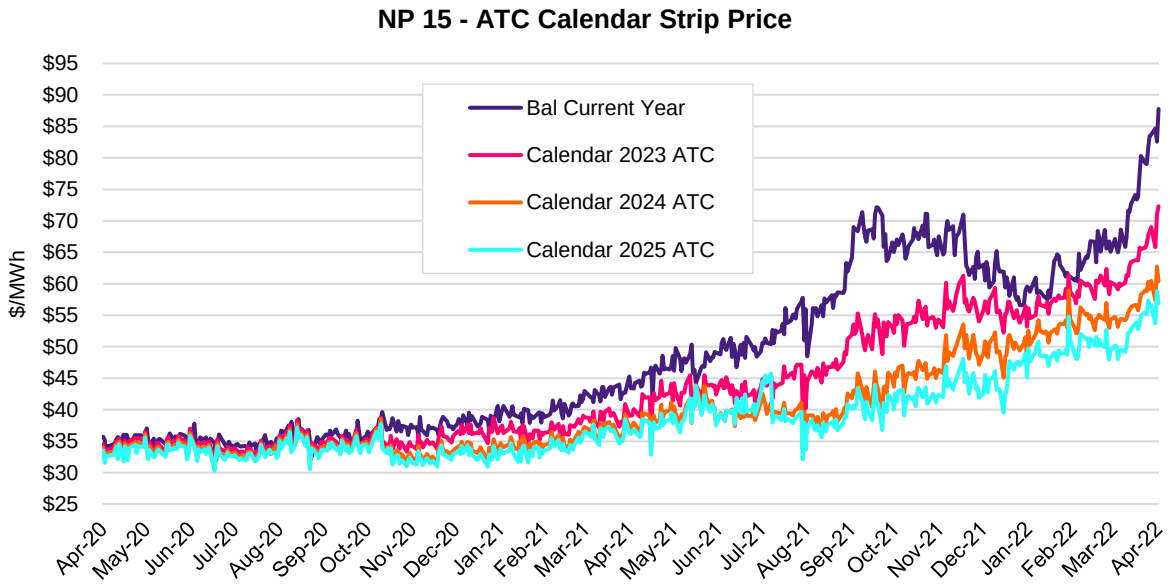
Source: CAISO Wind and Solar Curtailment totals by Month

KEY TAKEAWAY: Record curtailments of renewable generation in 2022 have led to more negative pricing events in California, but have continued to drive greater volatility in hourly spot market prices. CAISO will need to continue prioritizing battery storage additions in order to reduce future curtailment and fully utilize renewables to meet its clean energy goals.

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 85% 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 $12/MWh (20%) discount compared to the 2023 calendar year price.



Where are index prices trending?

- March 2022 Day Ahead spot prices averaged roughly $47/MWh, down slightly from the month prior but the highest since 2014 and 58% higher than the 5-year average.
- As of April 14, prices are on pace to average the highest since December, as national natural gas prices continue to rise putting pressure on electric spot prices. 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.

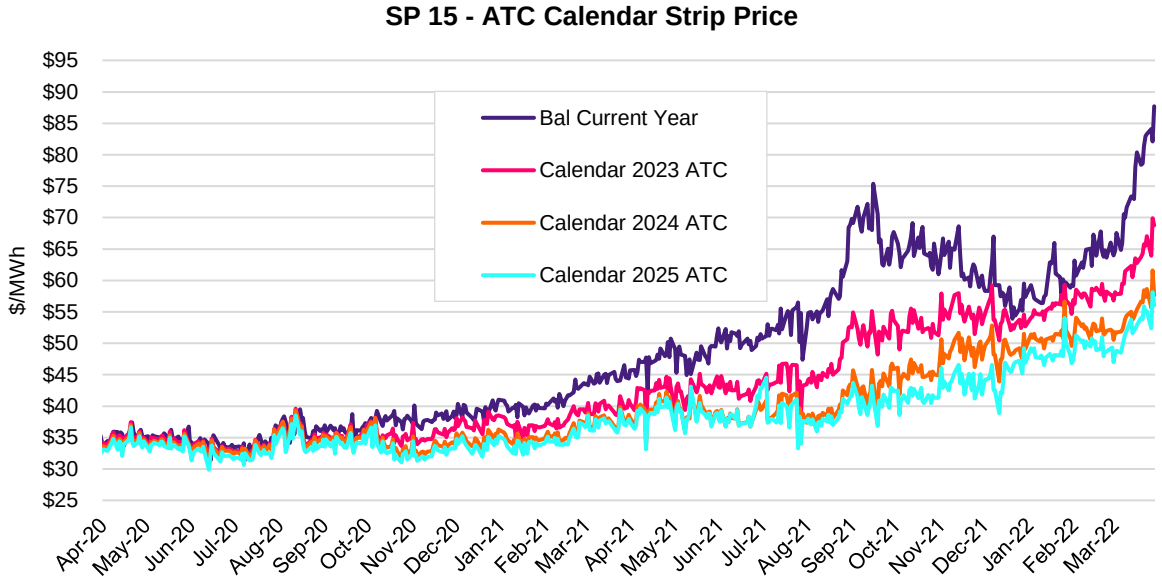
Average Daily Price - NP 15									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$ 46.07	$ 33.40	$ 28.54	$ 34.90	$ 32.94	$ 41.09	$ 31.19	$ 33.61	$ 52.71
Feb	$ 61.99	$ 30.71	$ 24.01	$ 29.23	$ 30.47	$ 75.58	$ 26.34	$ 59.48	$ 47.63
Mar	$ 47.63	$ 30.72	$ 19.60	$ 22.12	$ 30.06	$ 36.63	$ 26.58	$ 33.04	$ 46.90
Apr	$ 47.48	$ 32.27	$ 21.23	$ 22.13	$ 24.91	$ 22.25	$ 21.61	$ 35.58	$ 59.30
May	$ 46.67	$ 32.69	$ 20.76	$ 29.28	$ 20.75	$ 18.46	$ 18.43	$ 35.95	
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	$ 51.63

Southern CA – Power Prices

Where are forwards trending?

SP-15 forward prices have continued to trend upwards through the first half of March. Prices for the CY 2023 strip are now 65% higher than last year and 36% 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 16% discount compared to 2023.



Where are index prices trending?

Southern California DA average spot prices for March 2022 ($46.90/MWh) were the lowest since May 2021 but the highest March average since 2014.

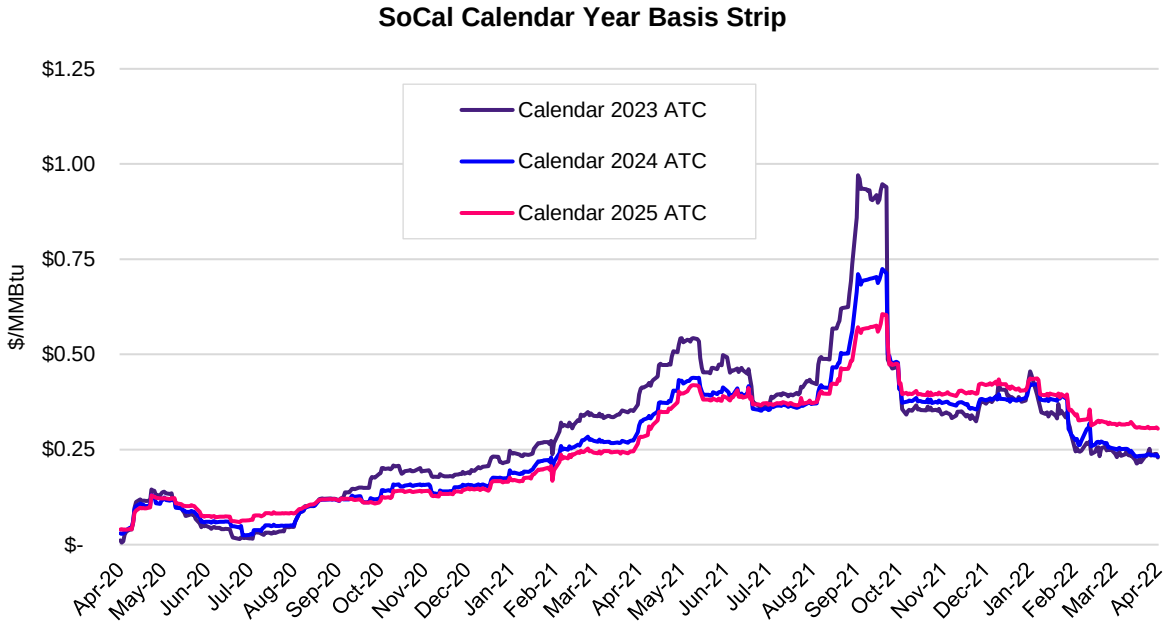
Day Ahead hourly prices in the first half of April have returned to the level of second half of 2021. High temperatures to start the month coupled with drought conditions have driven prices higher. Expectations are for the monthly average price to remain above the $50/MWh as demand in Southern California climbs.

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	$ 59.30
May	$ 46.67	$ 32.69	$ 20.76	$ 29.28	$ 20.75	$ 18.46	$ 18.43	$ 35.95	
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	$ 51.63

California – Gas Prices

Where are forwards trending?

Calendar Year 2023 strip prices for SoCal gas basis declined 11% through the month of March. Prices over the past two months have moved into contango as the 2024 CY strip prices is trading lower than the 2025 equivalent. Customers with open basis hedge positions in 2023 and 2024 should consider hedging before the summer as prices are now in trading in the 41st percentile compared to the past 2 years.



Where are index prices trending?

SoCal Basis spot prices declined for the 3rd straight month, averaging $-0.50/Dth in March the lowest monthly average since June 2019. PG&E monthly average spot basis prices increased month over month but at $0.59/Dth were 40% below 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	$0.45
May	$0.65	$0.83	$0.96	
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	($0.27)
May	($0.82)	($0.06)	$0.26	
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

April 2022

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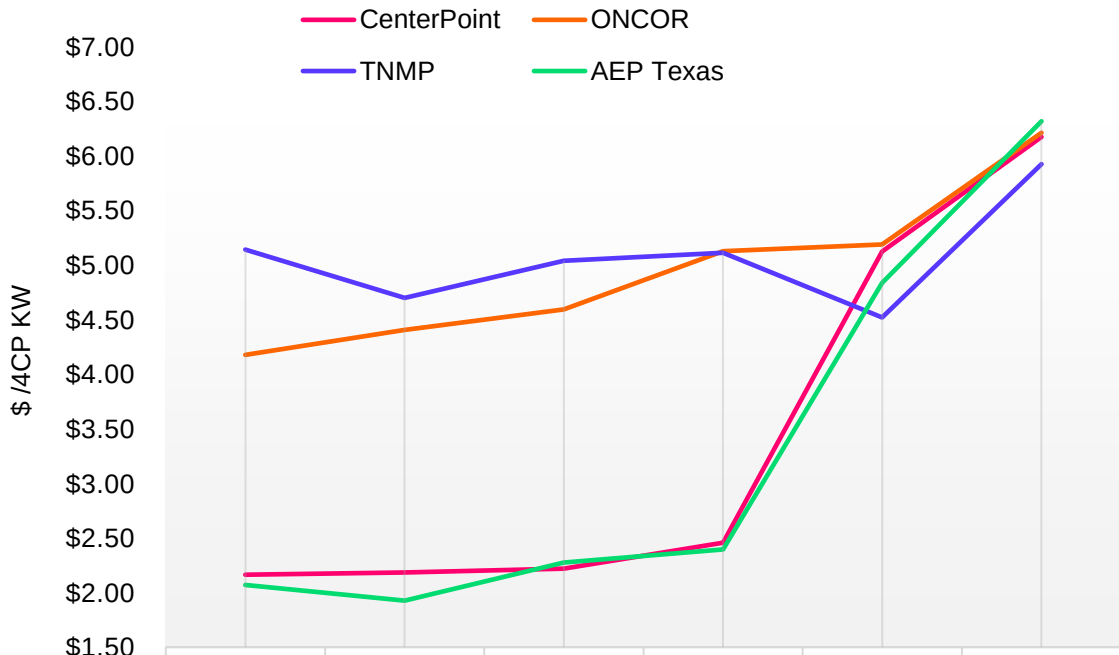
Insight of the Month

Transmission costs based on 4CP tags increase YoY across utilities in March 2022

- The Transmission Cost Recovery Factor (TCRF) charge covers the cost of changes to the transmission system in Texas. The rate is set by the utility and approved by the PUCT twice a year (Mar and Sept). As shown to the right, the TCRF has increased considerably over the past 5 years across the four major utilities in Texas.
- For large customers with IDR meters based in Houston on "secondary service with demand greater than 10 kW", the TCRF annual cost has increased from ~$25,984/MW in 2017 to ~$74,079/MW, as of March 2022.
- Although the increase in transmission costs is influenced by multiple factors including the expected increase of overall demand, integration of new renewable assets in the region, and the need to address congestion issues, large commercial customers can still manage and reduce these costs by reducing their 4CP tags.

KEY TAKEAWAY: For summer 2022, a large customer in North Hub that can curtail 1 MW on average across the four highest 15-minute intervals during June-Sep could save ~$74,000 for the period Feb 2023 – Jan 2024. Enel X delivers the tools and guidance you need to assess eligibility and predict system peaks during the summer months and minimize costs.

Transmission Cost Recovery Factor (TCRF)
Monthly Rate for Secondary Service > 10KW



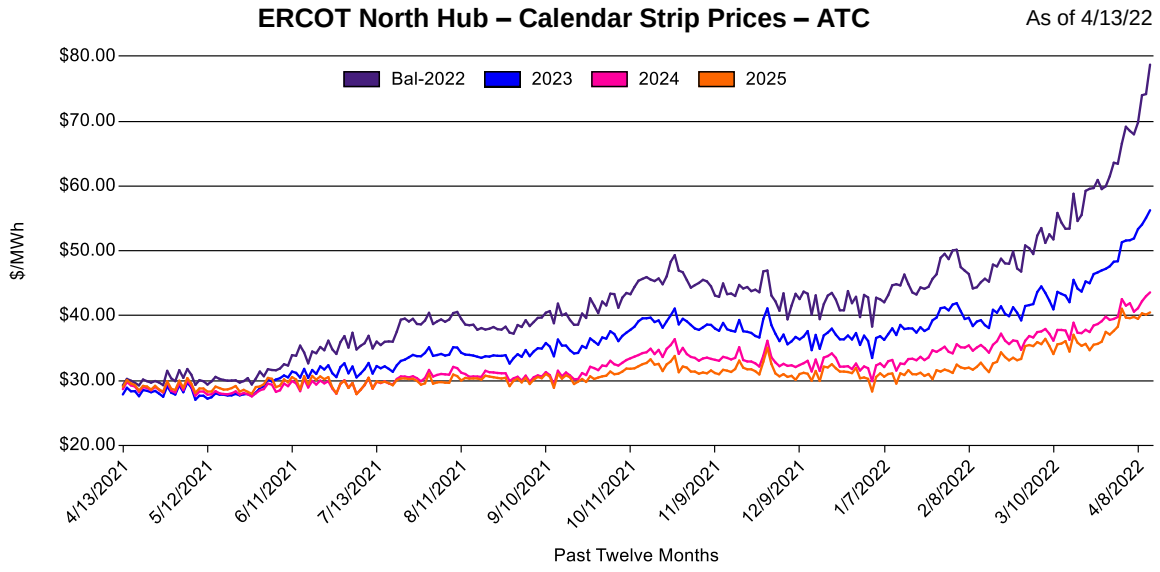
	Mar 17	Mar 18	Mar 19	Mar 20	Mar 21	Mar 22
CenterPoint	$2.17	$2.19	$2.22	$2.46	$5.12	$6.17
ONCOR	$4.18	$4.41	$4.59	$5.13	$5.19	$6.21
TNMP	$5.14	$4.70	$5.04	$5.11	$4.52	$5.92
AEP Texas	$2.07	$1.93	$2.27	$2.39	$4.84	$6.32

ERCOT – Power Price Update

The Bal-22 strips are trading at almost ~$80/MWh as a result of high summer forwards

Where are forwards trending?

- Bal-22 forwards reached $79.72/MWh the second week of April, 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 $33/MWh.
- CY 2024 & 2025 were most recently seen trading close to $40/MWh, which is $5/MWh up compared to a month ago.



Where are index prices trending?

- North Hub Day-Ahead prices averaged $38.49/MWh in March, down ~2.2% month-over-month.
- Year-to-date, 2022 North Hub spot prices have averaged $39.02/MWh.
- During the second week of April, wholesale electricity prices traded in triple digits during evening peak hours. Price spikes across regions were driven by strong demand.

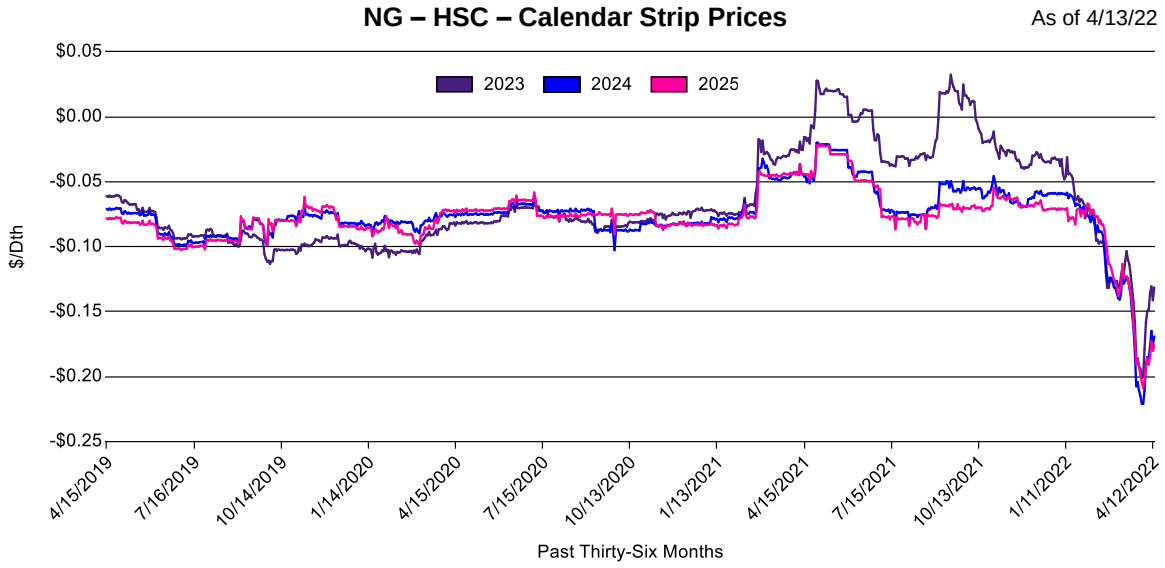
Average Monthly Day Ahead LMP - North Hub										
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Jan	$26.19	$36.71	$25.00	$19.13	$22.99	$37.59	$24.32	$16.96	$21.54	$33.65
Feb	$25.12	$51.30	$23.93	$15.29	$19.45	$21.77	$20.86	$17.72	$1,485.49	$39.39
Mar	$30.73	$49.91	$26.24	$16.86	$21.23	$22.61	$28.10	$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	$51.37
May	$33.05	$35.77	$23.79	$17.91	$23.42	$35.31	$23.98	$18.23	$24.23	
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**	**$39.02**

ERCOT – Gas Price Update

HSC basis is traded at ~$(0.20)/Dth, lowest level in the last 3 years

Where are forwards trending?

- HSC basis prices for CY 2023-2025 are up month-over-month due to a slight decline in production in April. While the CY 23 basis strip is up ~ 5 cents from March lows, it's still down ~7 cents from a year ago. It is still a great opportunity for customers to lock the basis.
- CY 2024-2025 strips remained trading in tandem during March and reached the lowest level in the last 3 years at around ~$(0.20). Prices are now slightly up and were most recently seen trading at around ~$(0.17)/Dth.



Where are index prices trending?

- March 2022 HSC basis averaged $(0.38)/Dth, the deepest discount relative to Henry Hub seen since 2013.
- This time last year, HSC City Gates traded above Henry Hub, with a basis value of $(0.20) for the calendar month of March.
- HSC basis is down 15% month-over-month.

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)	($0.03)	($0.02)	$0.00	($0.03)	$ 50.19	$ (0.33)
Mar	($0.04)	($0.02)	($0.11)	($0.01)	$0.04	$0.03	($0.01)	($0.06)	$ (0.20)	$ (0.38)
Apr	($0.02)	($0.03)	($0.02)	($0.03)	$0.04	$0.07	($0.04)	($0.03)	$ (0.04)	
May	$0.02	($0.10)	($0.03)	($0.04)	$0.11	$0.04	($0.06)	$0.00	$ (0.00)	
Jun	($0.04)	$0.04	($0.05)	($0.07)	$0.12	$0.07	($0.04)	($0.00)	$ (0.12)	
Jul	($0.01)	$0.01	($0.00)	($0.08)	$0.01	$0.09	($0.06)	$0.00	$ (0.15)	
Aug	($0.01)	$0.06	($0.03)	($0.05)	($0.01)	$0.08	($0.07)	$0.01	$ (0.09)	
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	$0.05	$0.25	($0.05)	$0.14	$ (0.20)	
Nov	($0.07)	($0.07)	($0.02)	$0.00	($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)	
Avg	($0.02)	($0.01)	($0.04)	($0.03)	$0.01	$0.09	($0.06)	$0.00	$4.07	$ (0.34)

Mexico

April 2022

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Insight of the Month

Energy reform updates

- On June 30, 2021, the Presidency of the Republic published an initiative to Congress that proposed amendments to the Electric Industry Law. The initiative was supposed to be voted on by Congress at the end of last year, but the vote was postponed until April 2022.
- Last Monday, April 4, the PRI party announced its intention to vote against this reform. This announcement, along with the previously announced "no" votes from the PAN and PRD parties, made it clear that the majority will vote against and the motion will fail, however, the official deliberation in Congress is yet to come.
- In the international arena, the United States government recently reiterated its concern about the energy reform proposal. John Kerry and Ambassador Ken Salazar have stated that the reform proposal violates international treaties and investments between both nations.
- On April 7, the Supreme Court of Justice of the Nation (SCJN) submitted to a vote some points of the electrical reform proposed by the president that had been considered unconstitutional.
- One of the points discussed is the order that would designate how power generators supply the market. Currently they are ordered by economic priority, meaning the cheapest generating source gets prioritized. In the president's proposal, it is proposed that CFE, a government company, would receive this priority automatically. This proposal has been criticized as unconstitutional because it threatens free competition and the environment (considering that CFE generates energy with high-polluting fossil fuels).
- On this point, the SCJN voted in favor of the president's reform -- that is, they did not consider it unconstitutional to give priority to the supply of CFE to the grid.

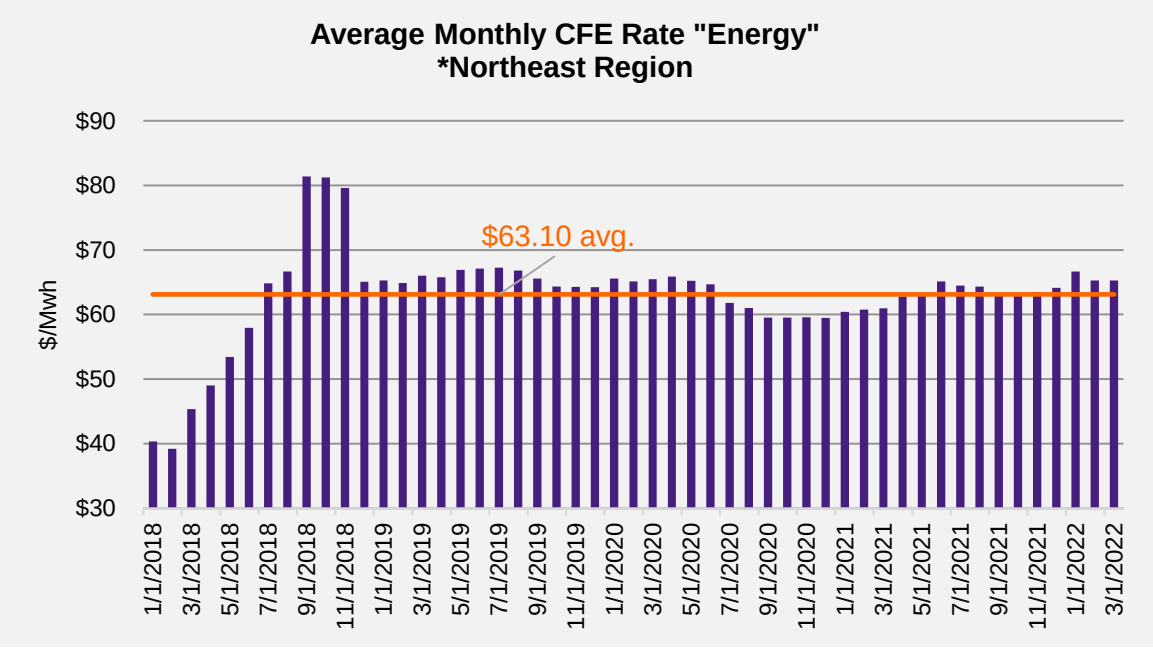
KEY TAKEAWAY: Despite the SCJN decision to consider the president's proposal constitutional, the reform must still be voted on in Congress to decide whether it will be approved or rejected. With the votes of the PAN, PRI and PRD opposition parties against the reform, it would be difficult to reach the necessary majority in Congress for the reform to be approved. Voting is expected to occur in April.

Monthly CFE[1] Rates

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

Where are index prices trending?

In March 2022, Northeast[2] region GDMTH[3] energy prices had an increase of 0% month-over-month and 7.07% year-over-year.



Where are capacity prices trending?

Monthly GDMTH capacity prices increased 0% month-over-month and ~8.5% year-over-year in the West[4] region.

Average Monthly CFE GDMTH Capacity- West* USD/MW					
	2018	2019	2020	2021	2022
Jan	$ 9,341	$ 17,326	$ 17,376	$ 16,157	$ 17,537
Feb	$ 9,859	$ 17,208	$ 17,247	$ 16,265	$ 17,688
Mar	$ 11,328	$ 17,546	$ 17,358	$ 16,304	$ 17,688
Apr	$ 12,456	$ 17,482	$ 17,469	$ 16,915	
May	$ 13,823	$ 17,825	$ 17,279	$ 17,003	
Jun	$ 15,203	$ 17,894	$ 17,114	$ 17,655	
Jul	$ 17,327	$ 17,931	$ 16,706	$ 17,446	
Aug	$ 19,718	$ 17,789	$ 16,453	$ 17,413	
Sep	$ 22,387	$ 17,407	$ 15,985	$ 17,013	
Oct	$ 22,334	$ 17,033	$ 15,988	$ 16,968	
Nov	$ 21,835	$ 17,016	$ 15,992	$ 17,127	
Dec	$ 17,362	$ 17,010	$ 15,971	$ 17,343	
Avg	**$ 16,081**	**$ 17,456**	**$ 16,745**	**$ 16,967**	**$ 17,637**

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 $19.86 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.*

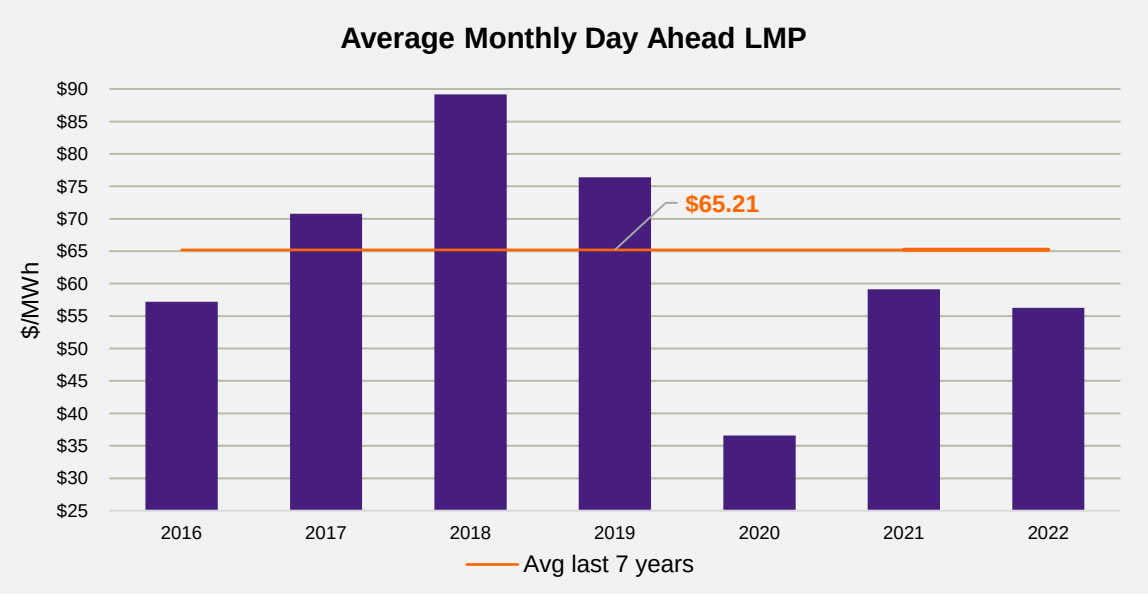
Average Monthly Day Ahead LMP

Where are index prices trending?

– Day Ahead LMPs averaged $58.19/MWh in February, which is 3% higher month-over-month and 19% lower year-over-year.

– In the 1Q-2022, LMPs averaged $57.24/MWh, down 3% compared to the previous year when prices averaged $59.16/MWh.

– This variation follows the high temperatures in the region.



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	
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	$ 57.24

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.

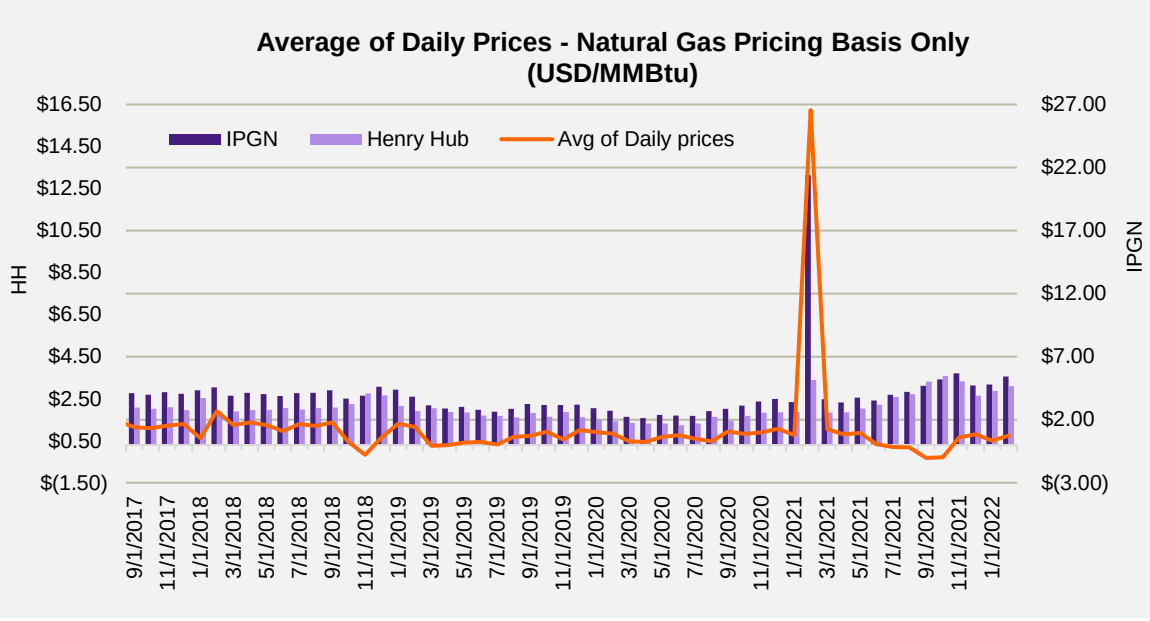
Natural Gas Price Index (IPGN)

Where are index prices trending?

– NGPI daily prices averaged $0.74/MMBtu in February—down ~95% year-over-year.

– In Q1 2022, prices averaged $0.62 USD/MMBtu, 65% 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 reduction 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	
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	$ 0.62

Sources: NGI, S&P Global Platt

Natural Gas

April 2022

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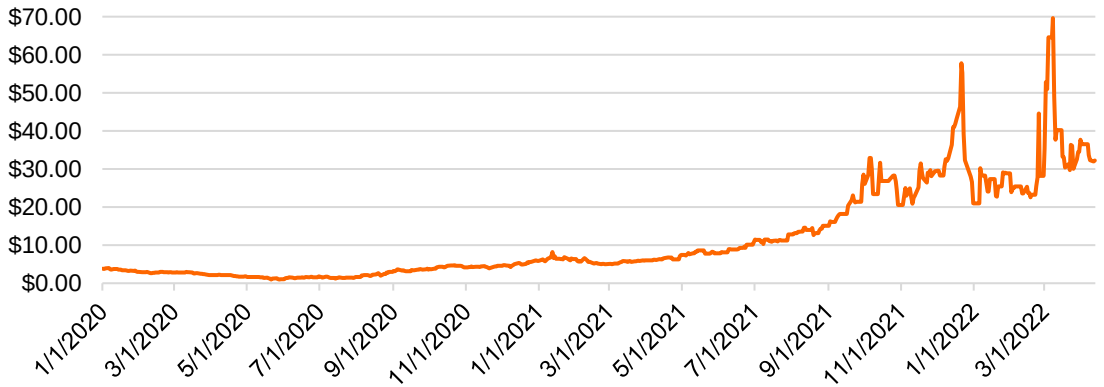
Further Market Volatility from International Events

It's been over a month since Ukraine was invaded by Russia, and some stability has occurred throughout the market:

- Dutch TTF (dominant European gas hub) prompt month prices have consolidated at around €100/Mwh (or mid $30's/mmbtu).
- WTI and Brent have stabilized somewhat to about $100/bbl and $105/bbl respectively.
  - Barrels from the Strategic Petroleum Reserve have been released, which has helped contributed to market stability(SPR).
  - Lockdowns from COVID-19 in China have caused decreased demand which has caused downward pressure on this commodity.
  - There exists potential for European countries to ban Russian oil which would add additional bullish momentum to oil prices.

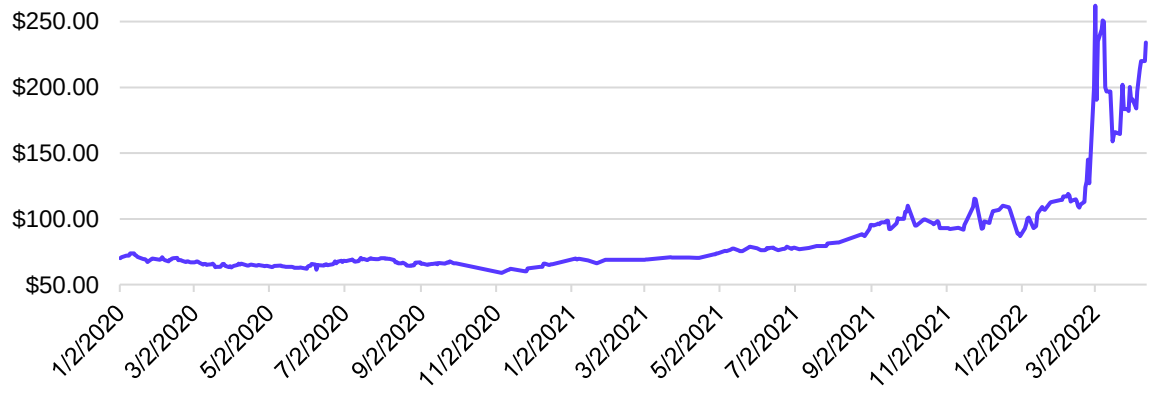
TTF Prompt Month (US$/MMBTU)



Coal prices continue to spike with prompt month reaching $300/t and the 2023 calendar year fluctuating in the low $200's/t.

- Increased volatility in coal futures was observed after the European Union banned Russian coal imports.
- Japan has also issued a ban on Russian coal, which it plans to do in phases.
  - Replacing Japan's supply may not be as easy as Europe has already caused an increased in demand from other supply sources after banning Russian coal exports.
  - The quantity of coal imported from Russia was equivalent to 3 GW of gas fired power generation that LNG could replace.

2023 Calandar Year Coal Futures (US$/t)

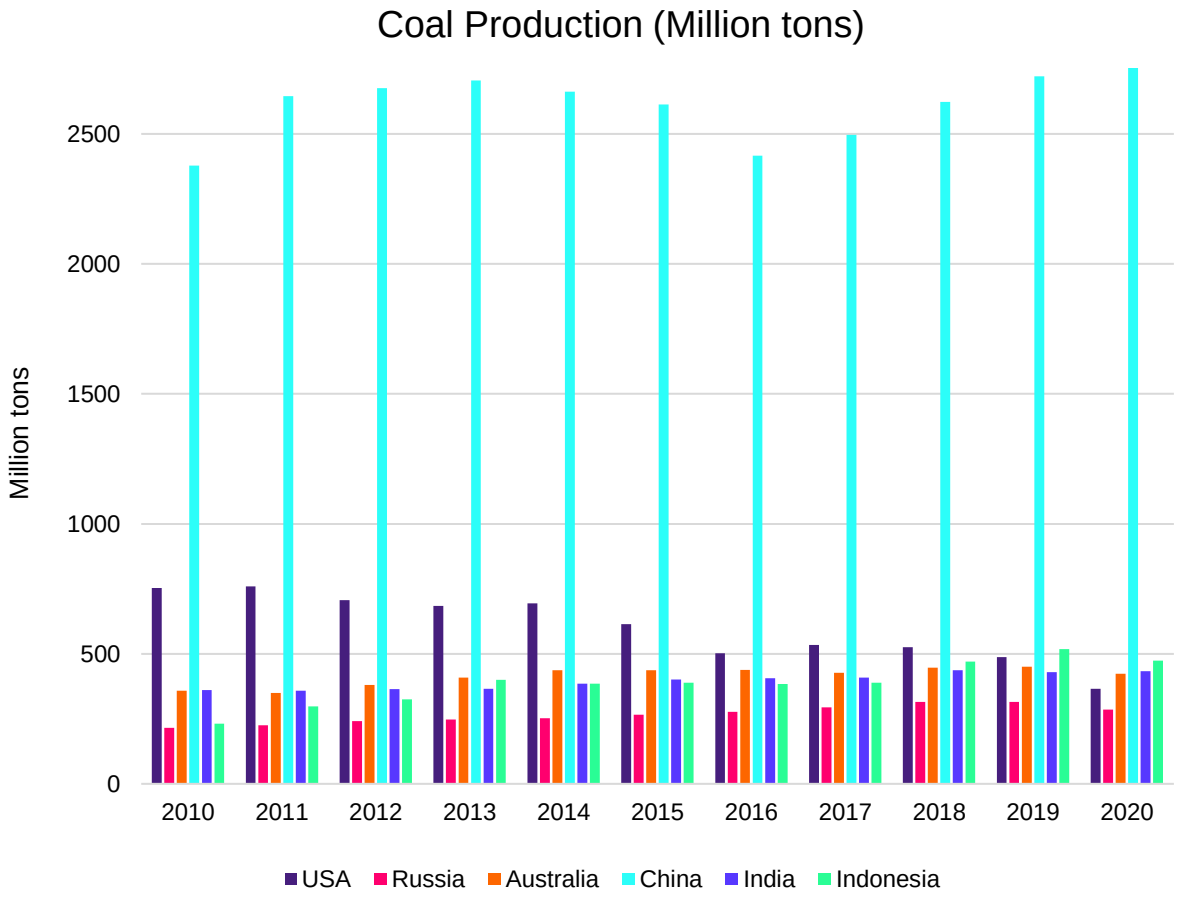


Key Takeaway: Increased actions and sanctions countries are taking towards Russia will continue to add volatility in the energy commodity markets.

Coal Price's Effect on Gas Prices

Russia was only the 6th largest coal producer in the world in 2020, producing 280 million tons of coal, as we see on the chart to the right that shows the top 6 coal producing nations 2010-2020.

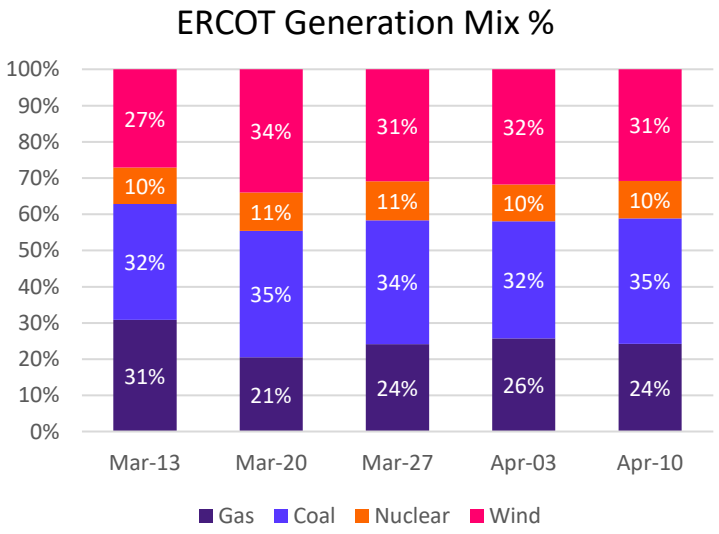
- Despite being only 6th in the world for production, Russia was the 3rd largest exporter behind Australia and Indonesia.
- The top importers are Europe, Japan, South Korea, India and China.
  - Although on the decline in the past 10 years, Europe's coal consumption is still high, and they rely on more than just Russian coal for its coal supply.
  - Further upward pressure will occur if South Korea bans Russian coal.
- In time, it's possible global trades routes can rearrange as both India and China have not shown interest in sanctioning Russia's energy exports in any way, despite international calls for this.
- The increased international demand on coal has caused upward pressure on the commodity in the US, and is causing power generation operators to switch supply from coal to the less expensive (though still high-priced) natural gas option (where switching options exist).

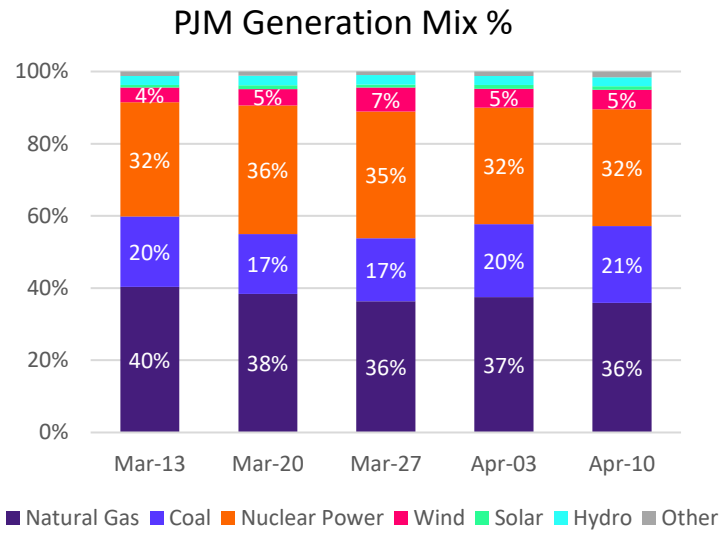


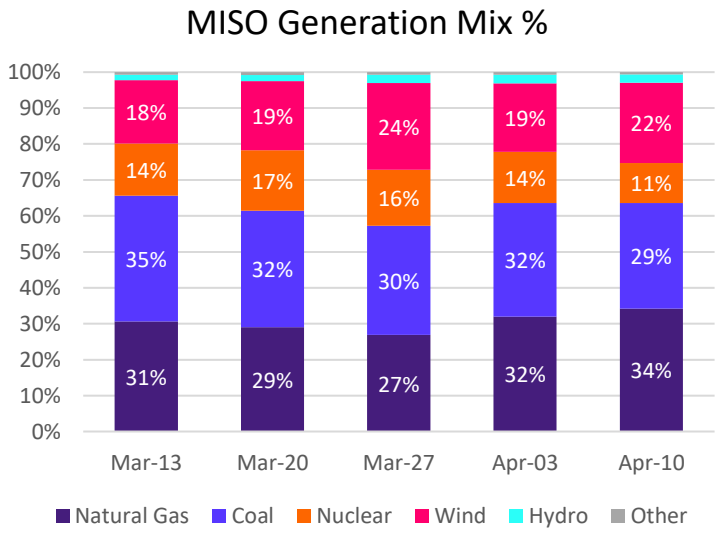
Source: BP Statistical Review of World Energy 2021

Coal Price's Effect on Gas Prices (continued)

- A great deal of supply is fueled by coal on large ISOs.
- The bottom left shows the % mix for the past five weeks of the most coal dependent ISOs, where ERCOT averaged 33.6% coal, PJM averaged 19% coal, and MISO averaged 31.6% coal.
- A decrease in coal for that % mix, without a corresponding increase in renewables, results in a proportional increase in natural gas demand (where switching is available).
- ISO's, unable to switch to gas, will inevitably pass the high costs of coal to the utility, which will trickle down to the consumer.



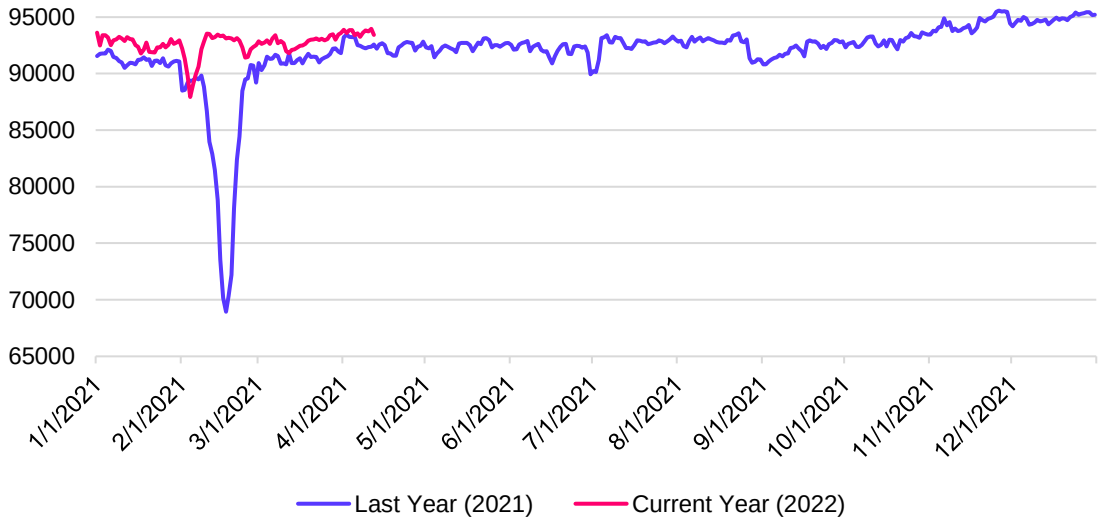




Natural Gas – Supply

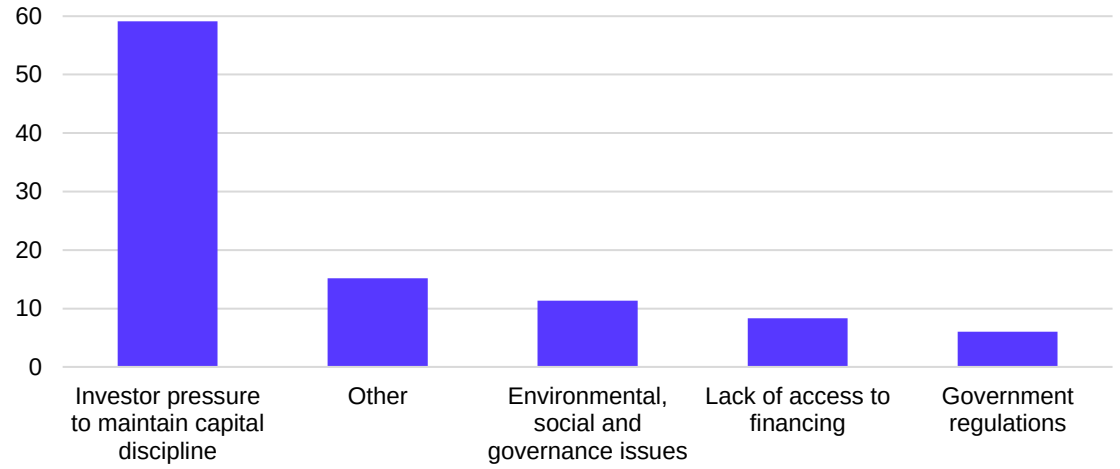
- Natural Gas production continues its sluggish growth in 2022.
- Daily gas production has slowly risen and remains higher than 2021 at this time.
- Natural gas rigs are rising, and production is expected to be “on the way,” but there is at least an 8- to 12-month lag time between rig deployment and marketable production.
- The industry looks to publicly traded producers like EQT, Range Resources and Southwestern, as the public sector comprises about 2/3 of natural gas production in the US.

Dry Gas Production (Mcf/day)



- Public traded exploration and production (E&P) companies continue to practice capital discipline and are increasingly careful on the deployment of capital expenditures on E&P.
- These public E&P companies are deploying this capital in other ways, by rewarding shareholders, increasing value and cleaning up their balance sheets to obtain higher credit ratings.
- An energy survey of 132 participants conducted by the Dallas Federal Reserve shows the different logic oil producers are offering for why they choose to restrain growth in production.

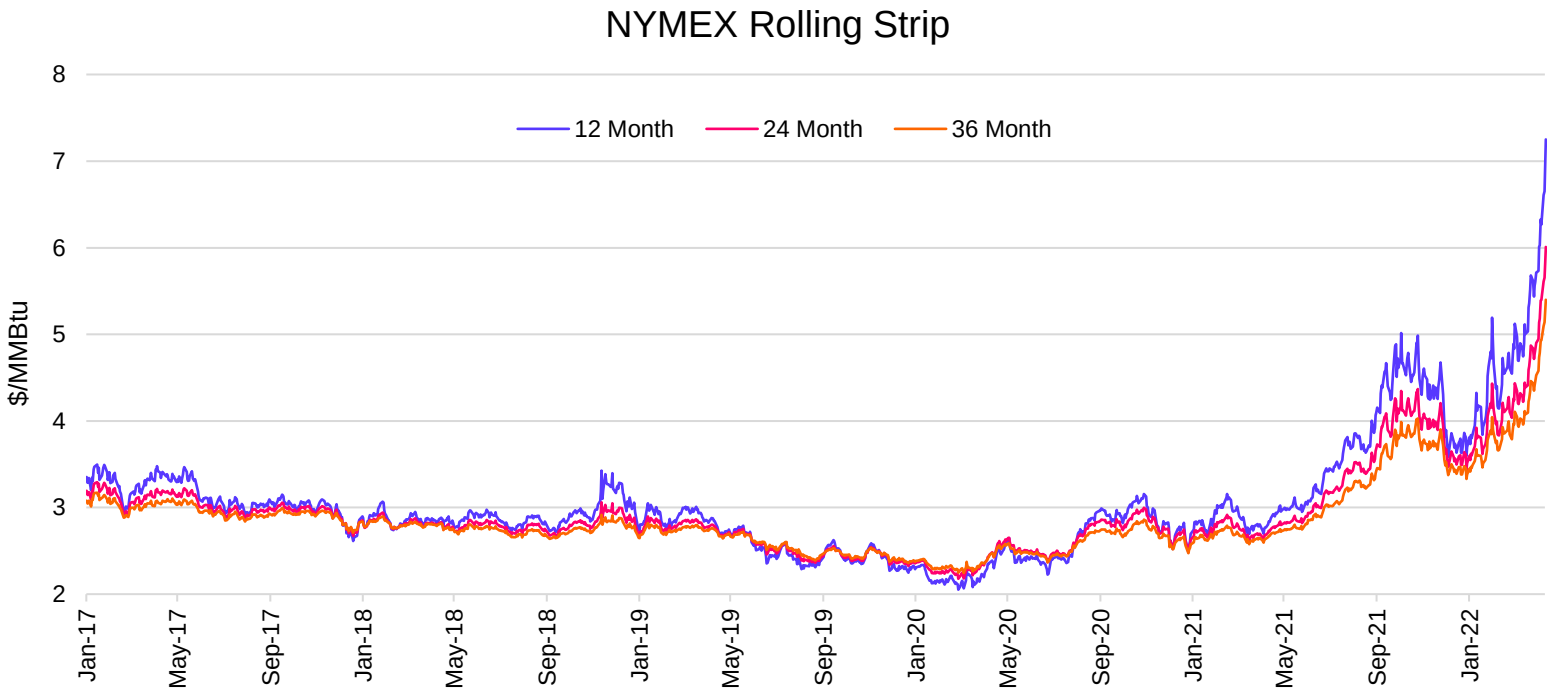
Survey of primary reason that publicly traded oil producers are restraining growth despite high oil prices



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

Natural Gas – Pricing

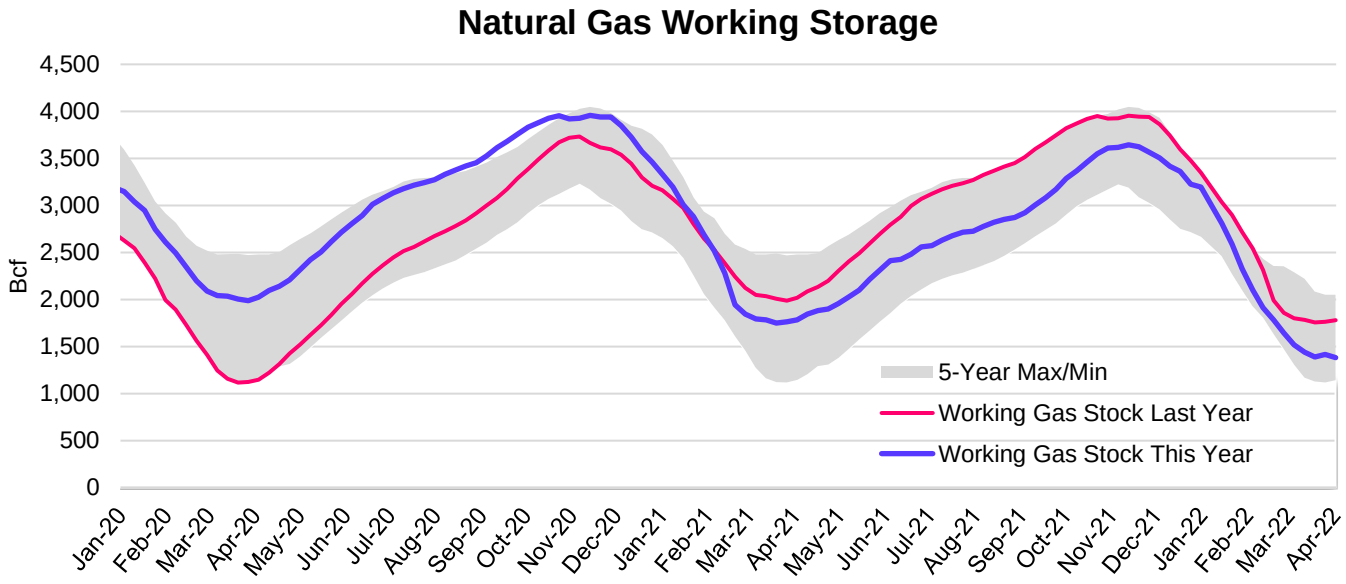
Term	12 month	24 month	36 month
Price ($/MMBtu)	**$7.25**	**$6.01**	**$5.40**
Variance to last week	14.60%	11.43%	9.58%
Variance to last year	147.96%	116.43%	99.20%

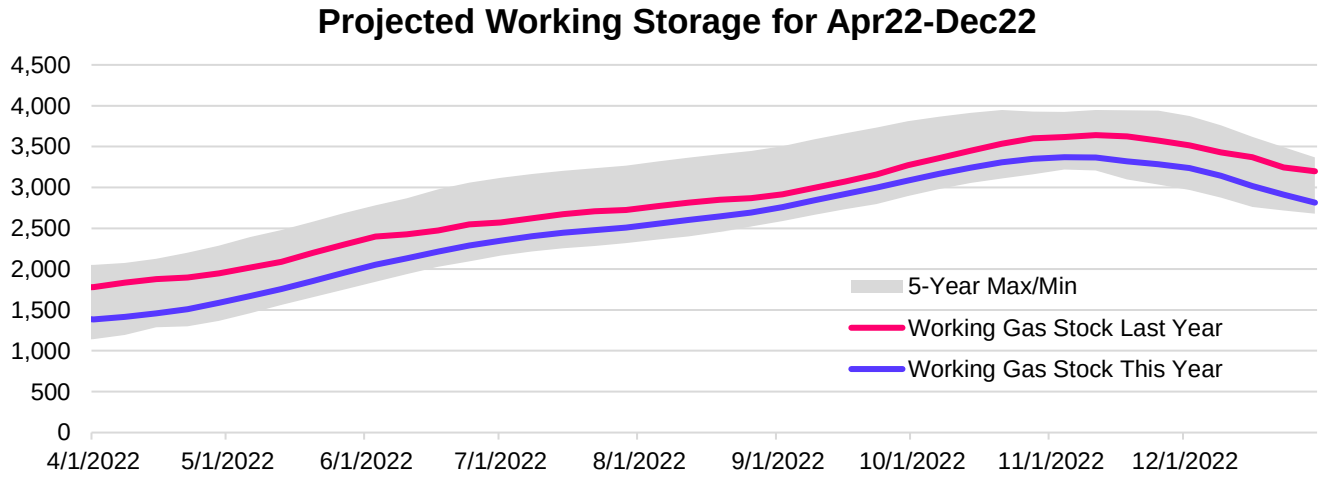


Rolling strip price data points refer to NYMEX futures 1, 2 and 3 years out respectively. Pricing updated as of 4/14/22 close.

- The Henry Hub 1 year rolling strip is up 14.6% from last week, and 147% up from last year.
- The Henry Hub is facing bullish fundamentals right now from:
  - Sluggish production growth
  - Low storage inventories
  - Increased gas demand for power generation amid high coal prices
  - Robust export market

Natural Gas – Storage





EIA Weekly Storage Report

1397

Bcf as of 04/08

Variance to Current Year	
5YA	**1YA**
1,700	**1,836**
-17.82%	-23.91%

- Current working stocks are 1397 Bcf , which is -439 Bcf less than storage levels 1 year ago at this time, and -303 Bcf less than the storage level's 5-year average.
- The East Region had the largest change from last week increasing 4.99% , while the South Central Region had the smallest change at 4.75% more than last week at this time.
- We project end of season storage levels to be about **3.1 BCF**, based on average pulls coupled with increased export capacity available this summer.
- End of season projection of 3.1 BCF would be bullish against the previous year and the five year average.