

Constellation's MARKET INTEL NEWSLETTER

Energy Market Update for Commercial & Industrial Customers

June 2019

Fuels

Natural Gas

- Prompt-month natural gas prices (July 2019) traded below \$2.20 per MMBtu on June 20, a decrease of nearly \$.30 per MMBtu during the past month.
- The month of June has been mild with largely below-normal temperatures throughout much of the country. The national weather pattern was dominated by a lot of rain in most parts of the eastern half of the U.S., which kept air conditioning loads and associated electric power demand well in check.
- The Energy Information Administration (EIA) reported an injection of 115 Bcf for the week ending June 14.
- Inventories of natural gas are 2203 Bcf, 195 Bcf greater than the same period last year and (-191) Bcf below the five-year-average.
- The EIA has adjusted its year-end storage inventory to near 3.8 Tcf, a 6% increase from its previous estimate.
- Natural gas production remains stalled at approximately 88 Bcf per day, the EIA reported.
- Natural gas production has been flat for the first half of 2019.

Coal

- Coal in the PRB for June 2019 is \$12.30 per ton, Quandl reported.
- CAPP coal for June 2019 delivery is \$59.25 per ton, Quandl reported.
- Northern Appalachian coal for June delivery is \$53.40 per ton, Quandl reported.
- Illinois Basin coal for June delivery is \$39.10 per ton, Quandl reported.

Oil

- Crude oil prices were up sharply on June 20 as reports of Iran having shot down a U.S. military drone over the Straits of Hormuz bumped WTI to \$57.50 per bbl (June 21), up 10 percent from earlier in the week.
- On June 13, two oil tankers were attacked by Iran in the Straits of Hormuz, according to the State Department. Both ships sustained heavy damage.
- Tensions are high in the oil markets as events between Iran and the U.S. unfold.
- The Organization of the Petroleum Exporting Countries (OPEC) and Russia agreed to meet on July 1–2 to talk about extending production cuts through the remainder of the year.
- Despite the geopolitical events, oil prices are well below their year-to-date highs posted in May when WTI traded near \$65 per barrel.

Power

- CAISO saw some of the strongest above-normal temperatures in June, with San Francisco reaching 100 °F the week of June 10–14 as a heat ridge brought temperatures +15–20 °F above normal to California.
- The New York Senate is working on legislation that would phase out gas-fired generation in NYISO beginning in 2040. Maryland raised its renewable portfolio standards (RPS) requirements, but Ohio is considering eliminating its RPS in favor of nuclear and coal subsidies and needs to act by June 30.
- Forward power prices in most markets (with the exception of NYISO) have been declining over the past month as forward gas prices for 2020–2022 have been pulling back.

Economy

- The Federal Reserve kept rates unchanged at its much-anticipated meeting on June 19.
- Stocks rallied to new all-time highs in the wake of what is perceived as easing in the Fed's interest rate policies.
- The U.S. economy added 75,000 new jobs in May, well below expectations, the Bureau of Labor Statistics (BLS) reported.
- The unemployment rate was 3.6% in May, BLS reported.
- The Consumer Price Index (CPI) and the Producer Price Index (PPI) both increased by 0.1%, indicating low inflation.
- Productivity in the first quarter of 2019 rose at 3.4%, a marked increase over past quarters.
- U.S. existing home sales moved up 2.5% in May.

Weather

- A change in the pattern from below normal and wet throughout most of the country is ongoing. However, the 15-day outlook does not look overly hot in most parts of the country. A "normal" (i.e., 30-year average) outlook is presenting itself for the month of July in most parts of the country.

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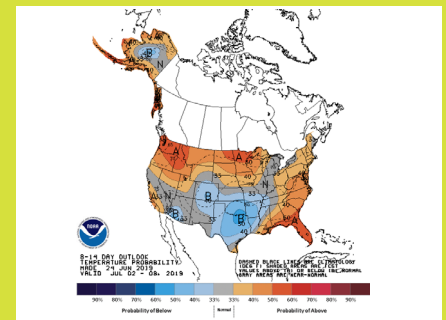
Prompt Month Settlements

	July '19	30-Day Change
Nat Gas \$/mmBTU	\$2.19	-\$0.42/MMBTU
Crude Oil \$/bbl	\$57.43	-\$5.58/BBL

As of 6/21/2019 and 30-Day change

Temperature Outlook

Source: NOAA



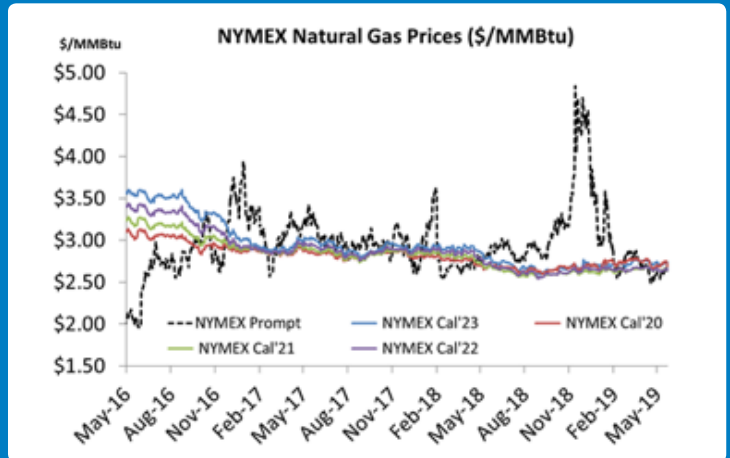
NYMEX Prompt Month Chart



Gas Report



- The July NYMEX contract spent the week teetering on its heels, slipping to a multiyear low below \$2.20/MMBtu. Traders pushed prompt-month prices along with the 2020 strip down following a surprisingly bearish Energy Information Administration (EIA) report on Thursday.
- The EIA reported an injection into storage of 115 Bcf that increased natural gas stockpiles to 2,203 Bcf. The previous week's 189 Bcf surplus against last year increased by 20 Bcf or nearly 11% to 209 Bcf or 10.5% above last year. The 230 Bcf deficit against the five-year average plunged by 31 Bcf or nearly 14% to 199 Bcf or 8.3% below the five-year average.
- With 2020 NYMEX futures trading below \$2.50/MMBtu, we are watching production levels carefully. Year-to-date 2019 has not seen production levels follow last year's production growth trends. Sub-\$2.50/MMBtu levels historically have seen producers slow activity, an outcome all the more likely in this era of professed austerity by most producers.
- Expectations are for another significant injection next week as this week's weather trended below normal. The mild start to summer appears set to stretch into the July 4 holiday week coupled with a time period that historically sees reduced demand given the nature of the holiday. The soft pricing environment may continue.

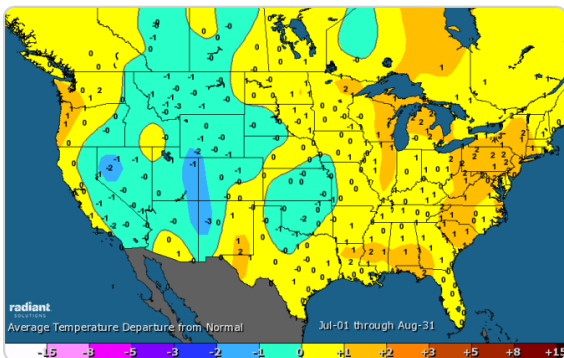


NYMEX Futures Pricing	Current Price as of 6/23/19	Last Month	M/M Change	Last Year	Y/Y Change
Prompt (July 19)	\$2.186	\$2.613	(\$0.427)	\$2.975	(\$0.789)
(Nov2019/Mar2020)	\$2.522	\$2.908	(\$0.386)	\$3.097	(\$0.575)
12-Month Strip	\$2.362	\$2.745	(\$0.383)	\$2.943	(\$0.581)
2020	\$2.506	\$2.726	(\$0.220)	\$2.678	(\$0.172)
2021	\$2.612	\$2.662	(\$0.050)	\$2.628	(\$0.016)
2022	\$2.638	\$2.660	(\$0.022)	\$2.664	(\$0.027)

Temperature Outlook



- The Niño 3.4 area (i.e., where they calculate subsurface sea temperatures in the equatorial Pacific) tends to have the most influence on the weather pattern across North America.
- The current El Niño-Southern Oscillation (ENSO) 3.4 reading (central tropical Pacific) is at +0.7 degrees C warmer than normal, which is on the borderline of neutral/weak El Niño conditions. We expect temperatures to remain in the +0.5 to +1.0 range for the rest of the summer.
- If El Niño continues through the summer, the temperature correlation tends to be warmer than normal across the Midwest, parts of the Northeast and Mid-Atlantic. Temperature correlation typically is the hottest over the northern Plains and parts of the Rockies.
- Some meaningful heat is still possible, if not likely, in the Midwest into the East and Northeast with an emphasis on the second half of summer.
- Warm-to-hot ridging is forecast to develop in the Four Corners area of the Southwest with the Bermuda ridge in the Southeast. A weakness in-between the ridges will keep the Midwest on the wetter side of normal in the short term. The West Coast should continue to be mild.

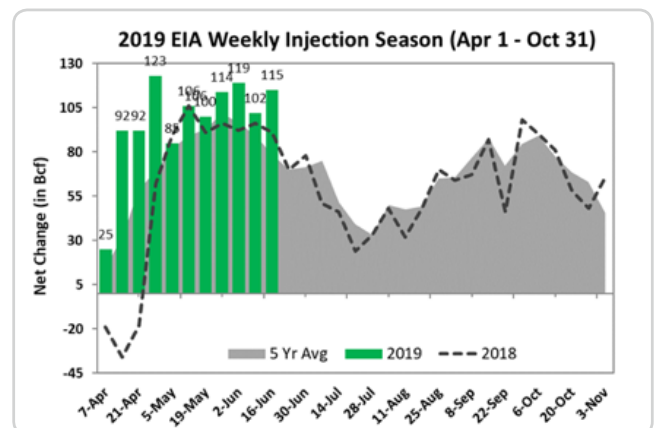


Source: Radiant

Storage Report



- Strong injections in May and June have helped rebuild underground storage. Each week's fill has tied or surpassed both prior year and five-year average injections.
- Just one-third of the way through injection season, the refill pace has surpassed 2015 with the highest rate ever at 97.5 Bcf/week.
- For the week ending June 14, the Energy Information Administration (EIA) reported an injection of +115 Bcf, marking the sixth consecutive triple-digit injection of the season and seventh overall.
- Current inventories stand at 2,203 Bcf with the year-over-year surplus at +209 Bcf (+10.5%) and the deficit to the five-year average at -199 Bcf (-8.3%).
- We are on pace to end the season at or near the EIA's latest forecast, which at 3,792 Bcf is just north of the five-year average.



Source: The Energy Information Administration

Bulls vs. Bears



Bulls

Natural Gas

- Flattening natural gas production.
- Summer arrives in key electric power load markets.
- Falling crude oil prices.

Crude Oil

- U.S. military action against Iran.
- U.S. and China reach trade agreement.



Bears

Natural Gas

- Gas production exceeding forecasts.
- Higher crude oil prices.
- Higher-than-average injections into underground storage.
- Below-normal summer temperatures.

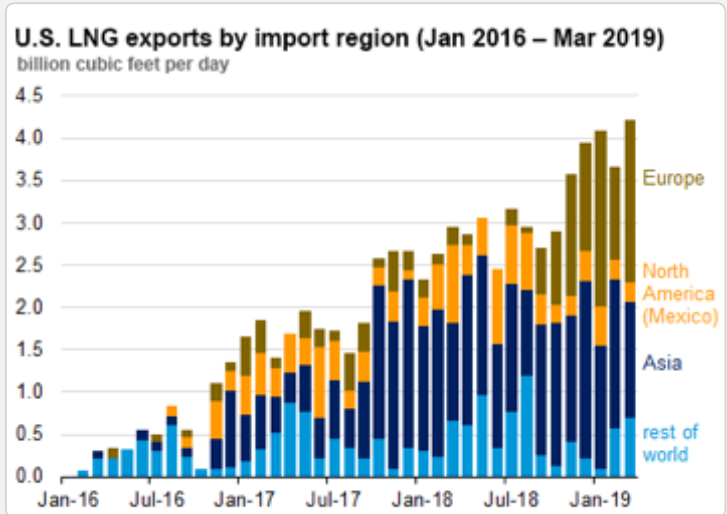
Crude Oil

- Continued and increasing trade concerns with China.
- Global GDP shows growing weakness.

Natural Gas Specific Topics and Updates

U.S. Liquefied Natural Gas Exports to Europe Grow as Asia Sees Price Declines

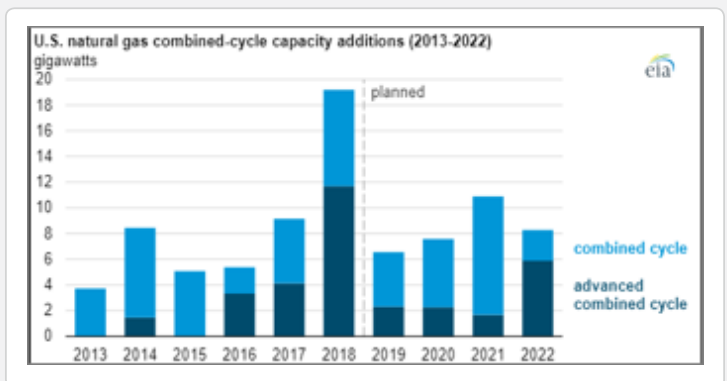
- Since the fourth quarter of 2018, U.S. exports to Europe have increased substantially, averaging 1.9 Bcf/day from December to March 2019 versus almost nothing a year ago.
- U.S. liquefied natural gas (LNG) exports increased to Europe primarily because of a mild winter in Asia that saw steady price declines that made it uneconomical to transport spot gas to Asia as well as new LNG trains 4 and 5 coming online at Sabine Pass, Louisiana last year.
- Exports to Europe accelerated from February on as a mild winter in Asia pushed the prices between the UK and Japan to less than \$1 per MMBtu.



Source: The Energy Information Administration (EIA)

Gas-Fired Generation Increasingly Using Advanced Design

- Since 2016, there has been approximately 35 GW of new combined-cycle generation added in the U.S., and per the Energy Information Administration, 31% use advanced natural gas-fired combined-cycle (ANGCC) technology. These units have been able to incorporate economies of scale and efficiency to bring down the cost of generation.
- The PJM reported in April 2018 that the cost per unit of ANGCC units in the next forward capacity auction (PY 2022/2023) would be 25% to 30% lower than older conventional NGCC units.
- The expected growth in ANGCC units will increase gas demand for power generation as gas displaces coal, and provide more baseload gas generation that will compete with coal and nuclear.



Source: The Energy Information Administration (EIA)

Great Lakes Electric Summary

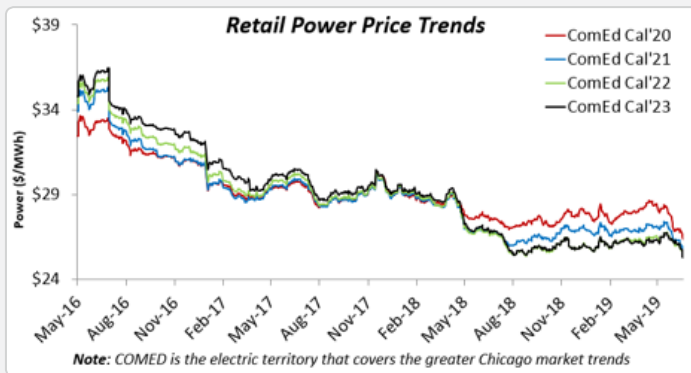


- Midwest forward power prices have declined 5–7% month-over-month as a lack of fundamental support has caused prices to plummet. Mild weather, record gas production and a quickly shrinking gas storage deficit have put downward pressure on energy prices.
- Forward power prices for 2020-2023 are at or within striking distance of three-year lows in the early stages of summer. However, there is plenty of time left for hot weather and index volatility to push prices higher. For energy buyers with open positions, this market pullback is an opportune time to take some risk off the table.
- An unusually mild and rainy June has limited volatility in the Midwest index power markets at the start of the summer season. On average, day-ahead index prices have fallen 11% month-on-month, while prices are down nearly 30% compared to the same month a year ago. Longer-term forecasts suggest that a pattern change could occur in July, which could bring hotter weather and higher index prices.
- As a reminder for energy buyers in PJM, the base residual capacity auction for the 2022-2023 planning year has been delayed from May 2019 to August 2019 as the grid operator awaits a Federal Energy Regulatory Commission (FERC) ruling on its proposed capacity market reforms. Barring a FERC order in the next few weeks, PJM will hold the auction in August under current market rules.

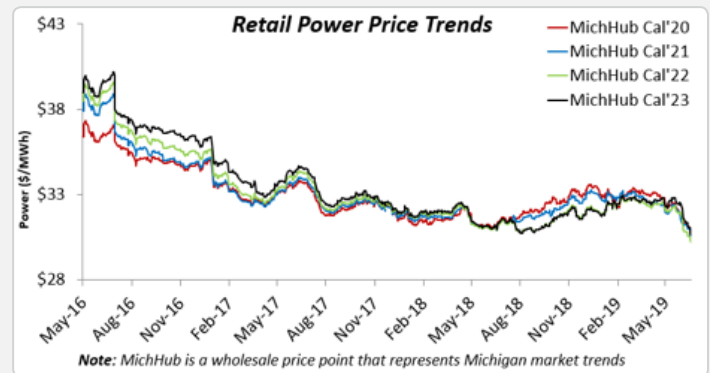
Great Lakes Retail Power Price Trends

% Change in Forward Power	ComEd 2020-21	ComEd 2022-2023	Mich Hub 2020-2021	Mich Hub 2022-2023	AEP-Day 2020-2021	AEP-Day 2022-2023	Ameren 2020-2021	Ameren DAY 2022-2023
Year-over-Year	-4%	-5%	-1%	-2%	-3%	-3%	-1%	-1%
Month-over-Month	-7%	-5%	-6%	-7%	-6%	-4%	-6%	-5%
Year-to-Date	-4%	-1%	-7%	-4%	-7%	-2%	-6%	-2%
Compared to All-Time Low	0%	0%	0%	0%	2%	1%	0%	1%

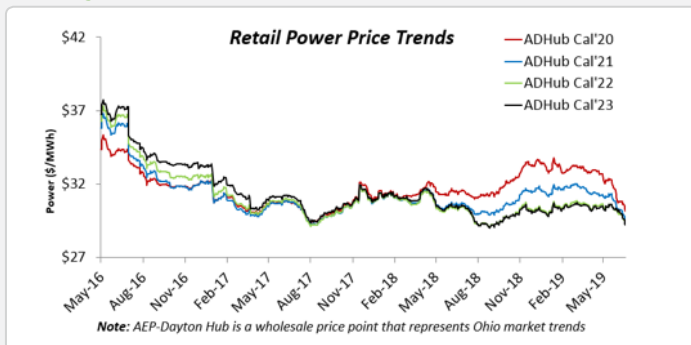
ComEd



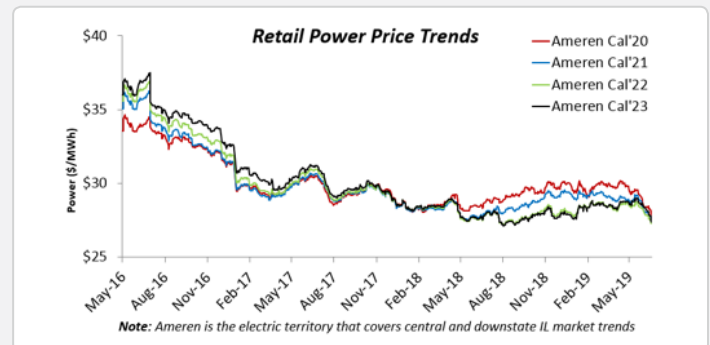
Mich Hub



AEP-Dayton Hub



Ameren



Mid-Atlantic Electric Summary



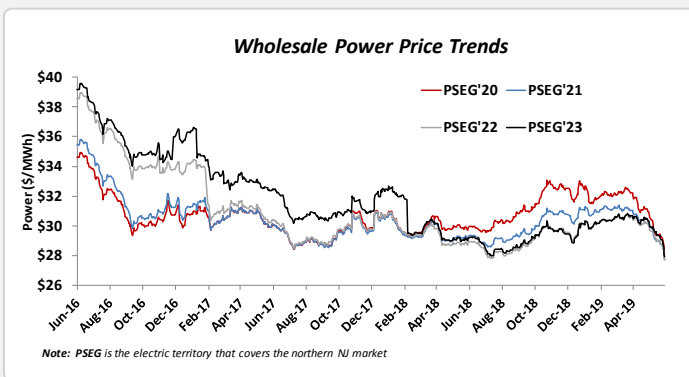
- The NYMEX July 2019 prompt-month contract price continues to tumble as bearish market fundamentals have driven it to levels not seen in over three years. The current price for the nearest term monthly contract is more than \$1.25/MMBtu lower than the year-to-date high of \$3.59/MMBtu set in January. Natural gas prices continue to receive significant downward pressure due to high production, historically large gas injections into storage and milder temperatures in the spring and to start the summer. Prices have sustained below the firm support price of \$2.50/MMBtu over the past month as the storage deficit to the five-year average continues to narrow as the season progresses.
- Forward power prices have reflected a similar trend as natural gas, as forward electricity prices in PJM through 2024 have plummeted over the same period. Most zones in PJM have seen forward energy prices through 2024 drop 7% over the past month. Most all the zones and terms of any forward price in PJM are trading at all-time lows, meaning that each term has never been priced lower than they currently are now, in the start of the last week of June.
- Day-ahead index prices in PJM for May 2019 were 23% lower than the same index prices a year ago in May 2018. Much of the decrease can be attributed to the milder temperatures this past May along with natural gas prices tumbling due to the extraordinary refill rate of the natural gas storage inventory coming out of winter. The average May 2019 index price across all the zones in the table below was \$22.96, compared to the five-year average of \$31.50 for the month of May. This comparison represents a -27% lower price this year compared to the average price for all the last five months of May.

Mid-Atlantic Retail Power Price Trends

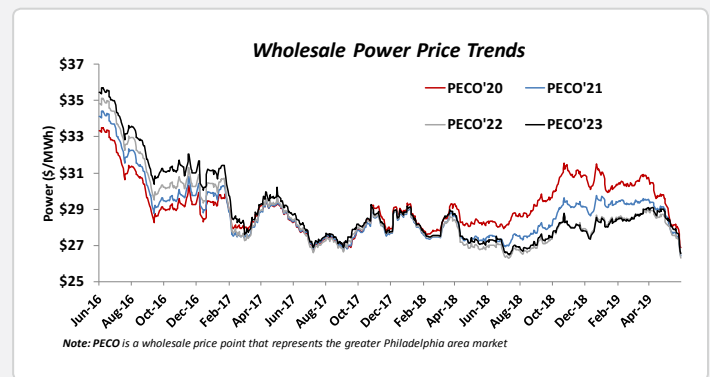
24-Month Fwd Trading Range	PSEG 2020-2021	PSEG 2022-2023	PECO 2020-2021	PECO 2022-2023	APS 2020-2021	APS 2022-2023	BGE 2020-2021	BGE 2022-2023	PPL 2020-2021	PPL 2022-2023
vs High (\$/MWh)	-\$4.34	-\$4.00	-\$3.99	-\$2.78	-\$4.80	-\$3.56	-\$5.26	-\$4.90	-\$4.94	-\$4.30
vs Low (\$/MWh)	\$0.00	\$0.00	\$0.08	\$0.05	\$0.30	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
vs High (%)	-13%	-13%	-13%	-10%	-14%	-14%	-11%	-13%	-15%	-14%
vs Low (%)	0%	0%	0%	0%	1%	0%	0%	0%	0%	0%

Index Pricing	AECO	APS	BGE	DPL	DUQ	JCPL	PEPCO	PPL	PSEG	MetEd	PECO	Penelec
April 5-Yr Avg	\$29.01	\$33.05	\$38.08	\$31.45	\$33.09	\$28.90	\$36.56	\$28.52	\$29.39	\$28.94	\$28.53	\$32.47
March '19	\$20.90	\$25.06	\$27.88	\$20.75	\$24.94	\$20.88	\$27.06	\$20.90	\$20.95	\$21.85	\$20.51	\$23.89
5-Year Avg Comparison	-28%	-24%	-27%	-34%	-25%	-28%	-26%	-27%	-29%	-25%	-28%	-26%

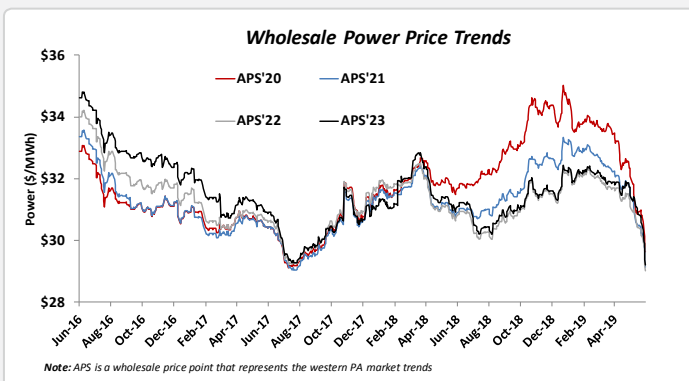
PSEG



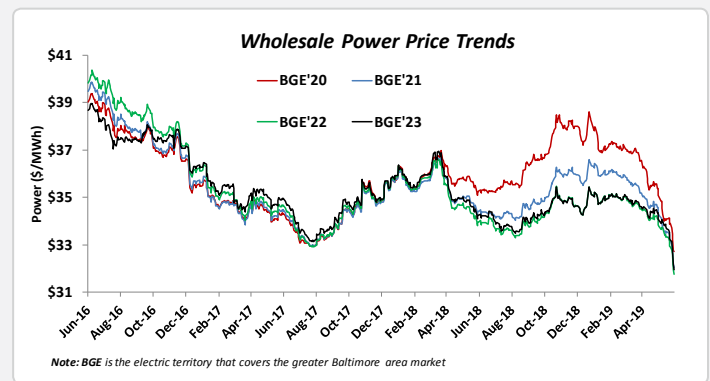
PECO



APS



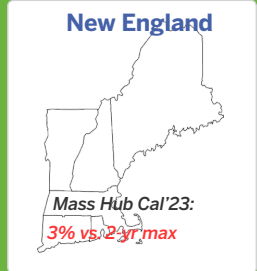
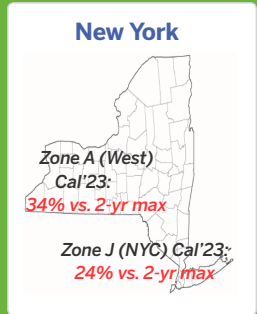
BGE



Northeast Electric Summary



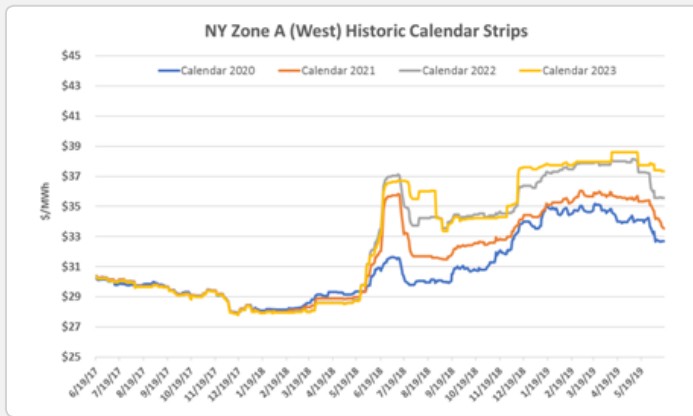
- ISO New England’s summer readiness assessment revealed that the grid operator expects sufficient operating capacity available (i.e., 32,000 MW) to handle a “typical summer demand forecast” (i.e., 25,323 MW) as well as have ~15% in additional resources if the “extreme demand forecast” (i.e., 27,212 MW) is realized.
- NYISO is also “well-equipped” to handle this summer’s demand forecast of 32,382 MW as well as the extreme scenario of 34,186 MW with 42,056 MW of capacity resources available.
- NYISO continues with its progression on its carbon pricing plan to incorporate the social cost of carbon into wholesale energy markets. The next milestone is a study from the Analysis Group outlying the overarching state impacts of such a plan due out in August/September.



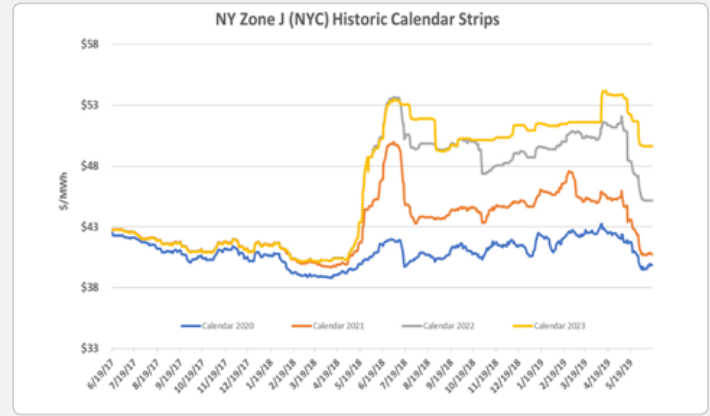
Northeast Retail Power Price Trends

2-Year Price Trend	New England Mass Hub 2020	New England Mass Hub 2021	New England Mass Hub 2022	New England Mass Hub 2023	New York Zone J 2020	New York Zone J 2021	New York Zone J 2022	New York Zone J 2023
Current Price vs 2-Year Average	-1%	0%	-2%	-2%	-3%	-6%	-1%	6%
Current Price vs 2-Year Maximum	-10%	-8%	-9%	-9%	-8%	-18%	-16%	-8%
Current Price vs 2-Year Minimum	7%	7%	3%	3%	3%	3%	13%	24%

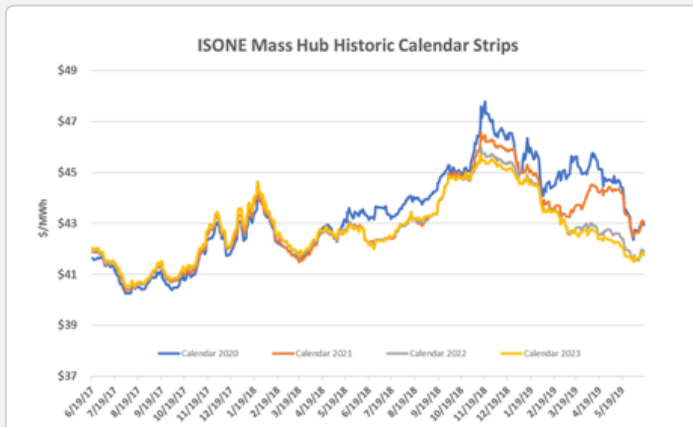
New York Zone A



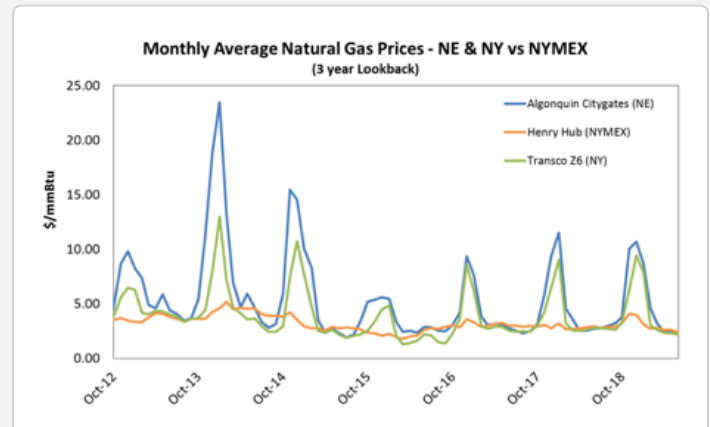
New York Zone J



Mass Hub



NE & NY v.s. NYMEX



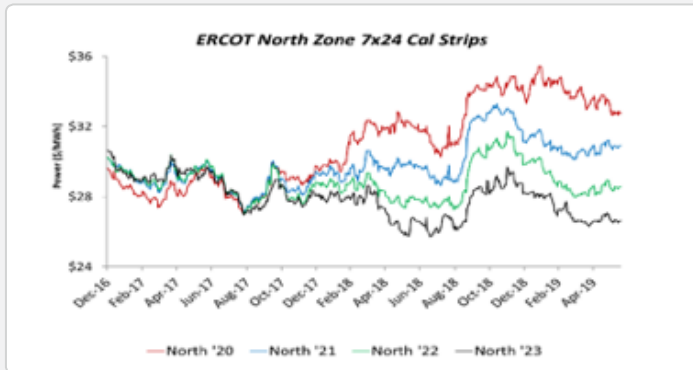
Texas Electric Summary

- ERCOT summer forwards (July/August) for 2019 continue to weaken as forecasts do not show significant heat in Texas for July and August at this stage and rain continues to impact Texas at an above-normal rate.
- Forward calendar strips for 2020-2023 continue to monitor reserve margin levels and are trading close to year-ago levels based on lack of summer heat.
- Solar and wind capacity are expected to increase to 24 GW for wind and ~3.5 GW for solar by end of 2019.
- Drought conditions in Texas remain minimal this summer.

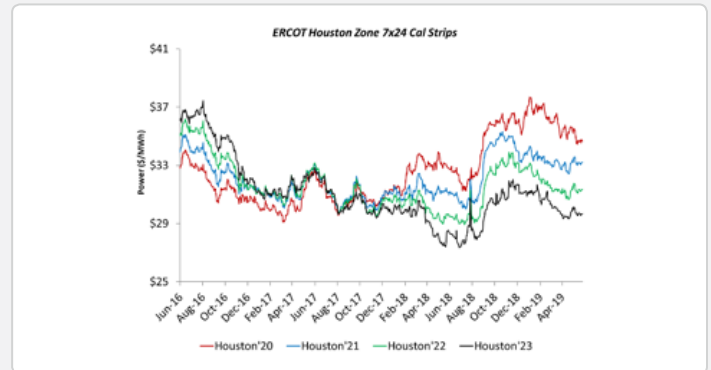
Texas Retail Power Price Trends

% Change in Forward Power	Houston 2020-2021	Houston 2022-2023	North Zone 2020-2021	North Zone 2022-2023	South Zone 2020-2021	South Zone 2022-2023	West Zone 2020-2021	West Zone 2022-2023
Year-over-Year	6%	5%	3%	1%	0%	-3%	8%	6%
Month-over-Month	-1%	-1%	-1%	-1%	-3%	-3%	-1%	0%
Year-to-Date	9%	-4%	7%	-9%	4%	-11%	5%	-13%
Compared to All-Time Low	15%	8%	18%	5%	10%	0%	22%	11%

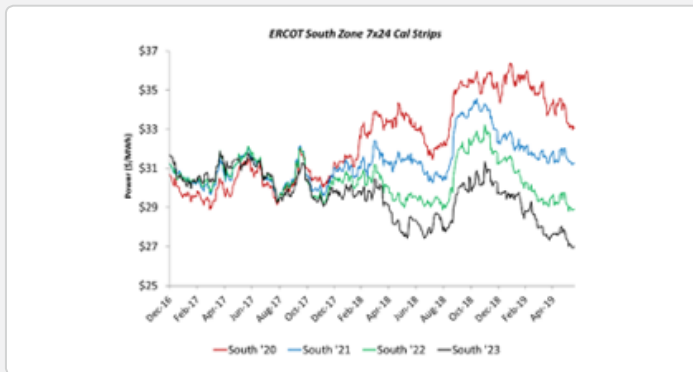
ERCOT North Zone



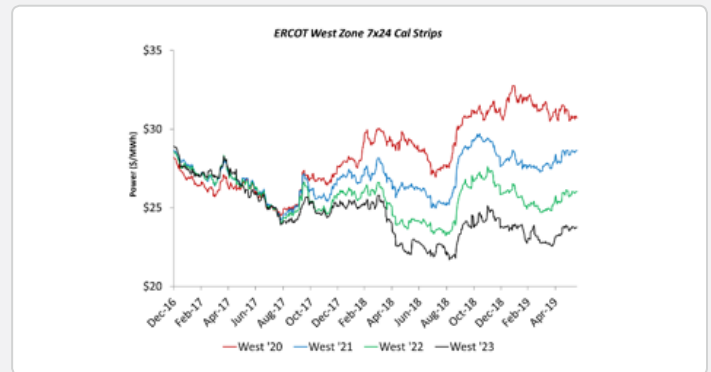
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



California Electric Summary

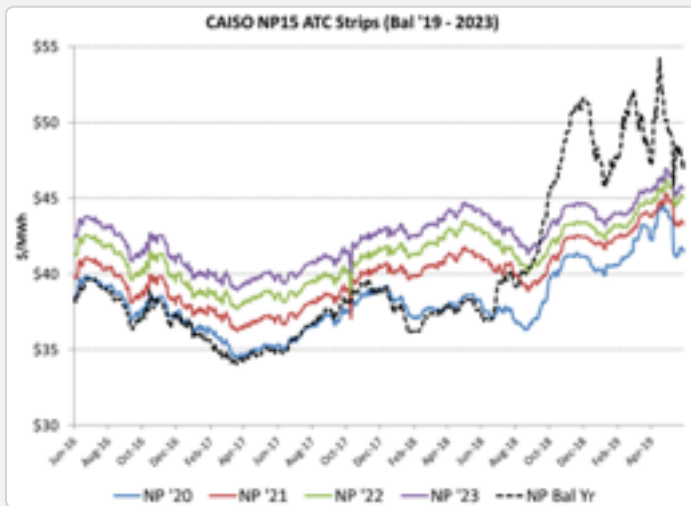


- SoCal Gas pipeline again pushed the preliminary return to partial service of its Line 235-2 to July 29 based on SoCal Gas finding two additional non-hazardous leaks in remote desert areas on June 18. After Line 235 is repaired, work can begin on Line 4000. This is likely to keep gas prices elevated as little new net capacity will be available in the summer.
- Hydro flows will remain above normal in California through June and into early July as snow pack continues to melt at higher elevations, but the Pacific Northwest is a mixed picture with flows north of the Columbia river below normal at only ~80%.

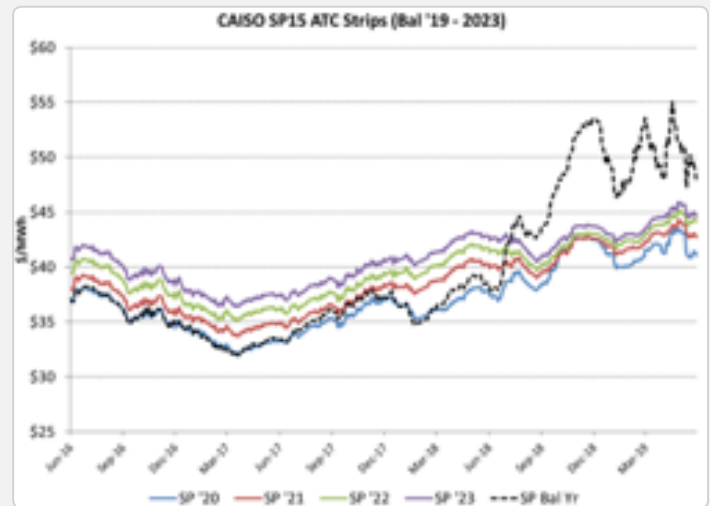
California Retail Power Price Trends

% Change in Forward Power	NP Cal 2020	NP Cal 2021	NP Cal 2022	NP Cal 2023	NP Bal Yr	SP Cal 2020	SP Bal 2021	SP Cal 2022	SP Cal 2023	SP Bal Year
Year-over-Year	10%	6%	6%	4%	25%	9%	6%	6%	5%	24%
Month-over-Month	-4%	-3%	-1%	-1%	-5%	-5%	-3%	-1%	-2%	-6%
Year-to-Date	2%	3%	5%	3%	-8%	-3%	1%	3%	3%	-9%
Compared to All-Time Low	21%	20%	20%	18%	38%	28%	27%	26%	23%	50%

NP 15 7X24



SP 15 7X24



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