

Constellation's MARKET INTEL NEWSLETTER

Energy Market Update for Commercial & Industrial Customers

May 2019

Fuels

Natural Gas

- Prompt-month natural gas prices (June 2019) are trading near \$2.56 per MMBtu.
- The Energy Information Administration (EIA) reported a net injection of 100 Bcf for the week that ended May 17, in line with expectations.
- Natural gas storage inventories are 1753 Bcf. This is 124 Bcf higher than the same period last year and 264 Bcf below the five-year average.
- The EIA estimates end of injection season inventories of approximately 3.6 Tcf, in line with the five-year average.
- Natural gas production is near 89 Bcf per day. Production has been largely flat through this year.
- The Cameron Liquefied Natural Gas (LNG) export facility began official operations on May 14, with capacity from its first train of 1.7 Bcf per day.
- U.S. LNG export capacity is set to double in calendar year 2019, from approximately 4.5 Bcf per day to nearly 9 Bcf per day.
- After a very cool month of April and first half of May, the weather pattern across the continental U.S. has shifted to a much warmer solution for the eastern half of the country.

Coal

- Per Quandl, coal in the PR for May 2019 is \$12.40 per ton.
- CAPP coal for May delivery is \$76.45 per ton as reported by Quandl.
- Northern Appalachian coal for May delivery is \$61.35 per ton, Quandl reported.
- Also per Quandl, Illinois Basin coal for May delivery is \$36.50 per ton.

Oil

- WTI Crude oil prices carved out one of their biggest declines of the year on May 23, settling at \$57.91 per barrel, a 5.7% plunge.
- The EIA reported an upswing in oil inventories, with an increase of 4.7 million barrels from the previous week.
- Gasoline inventories also posted strong gains of 3.7 million barrels, adding bearish sentiment.
- Continued trade tensions with China and a strong U.S. dollar are much cited for recently-falling crude oil prices.
- OPEC and Russia continue to show discipline on the supply side, adding some measure of support to the market as the week closes out.
- Iran sanctions and falling Venezuelan supplies are also supportive of the crude market into the summer season.

Power

- The Federal Energy Regulatory Commission (FERC) released its 2019 Summer Outlook and highlighted that U.S. Independent System Operators (ISO) should have sufficient generation reserves except for ERCOT. FERC also highlighted its concern with SoCal gas supply for power generation.
- ERCOT published a final summer 2019 reserve margin of 8.6%, slightly higher than previously projected as one gas unit came back from mothball status and ERCOT increased its import limits from neighboring states.
- New York City blocked a permit required for Williams County to build a 23-mile extension from New Jersey to Brooklyn to increase regional gas supply to New York City.

Economy

- The Commerce Department reported that housing starts in April increased 5.7% to an annually-adjusted 1.235 million units, and that retail sales in April fell 0.2% from a month earlier.
- According to the Federal Reserve, U.S. manufacturing output fell 0.5% in April from the prior month.
- U.S. jobless claims remain low and were reported at 228,000 for the week ending May 4.
- U.S. hiring remains robust and the unemployment rate fell to 3.6%, a 50-year low and down from 3.8 percent in April.
- U.S. worker productivity rose at its fastest rate in nearly a decade, the Labor Department reported. The productivity of non-farm workers rose by 3.6% in the first quarter of 2019. This rising productivity is playing a key role in muting the effect of rising wages on inflation.

Weather

- The overall pattern continues to feature a warmer-than-normal eastern half of the U.S. and a cooler-than-normal western half of the country.
- The strength of the Southeast ridge will lift the storm track farther north in the coming days. This added some more heat from the Mid-Atlantic into the South for the middle of next week.
- In the West, a small storm will drop south along the West Coast later this weekend and lower temperatures for a couple of days on Sunday and Monday.

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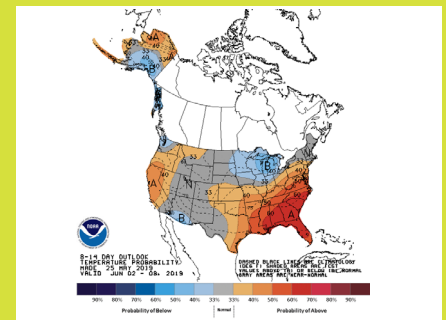
Prompt Month Settlements

| | June '19 | 30-Day Change |
|------------------|----------|---------------|
| Nat Gas \$/mmBTU | \$2.58 | +\$0.13/MMBTU |
| Crude Oil \$/bbl | \$57.95 | +\$8.35/BBL |

As of 5/22/2019 and 30-Day change

Temperature Outlook

Source: NOAA



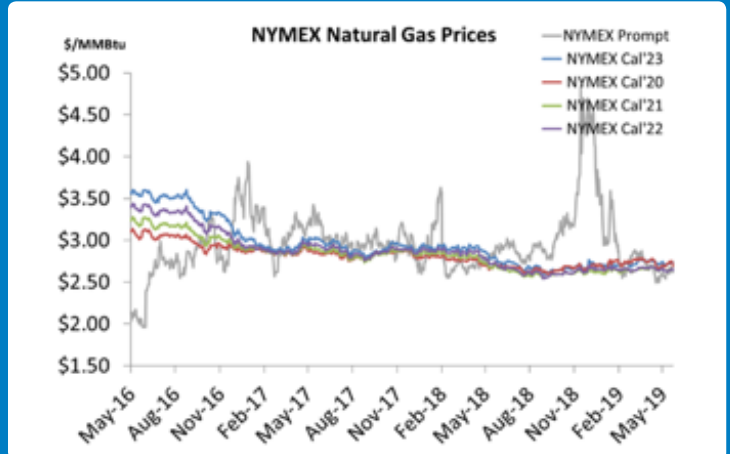
NYMEX Prompt Month Chart



Gas Report



- The NYMEX prompt-month gas futures have been trading up near \$2.60 but have traded in a tight \$.10/MMBtu band over for the month as mild temperatures continue and near-record gas production pushes forward.
- The 12-month strip decreased \$.04/MMBtu to \$2.70/MMBtu and Cal'20 decreased \$.03/MMBtu to \$2.69/MMBtu. Cal'21-22 also dropped a couple pennies to \$2.65s as the market is still valuing rising production as a major factor keeping a lid on prices and in backwardation.
- Storage inventories are 1,753 Bcf. The Energy Information Administration reported an injection of +100 Bcf for the week ending May 17th, which was in the lower end of the range estimate of +97 to +111 Bcf.
- Natural gas stocks are now -274 Bcf (-13.5%) lower than the five-year average, and the year over year is now at a surplus of +8.5%.
- Natural gas production for the week that ended May 22 averaged 93.6 Bcf/day. Gas production increased year-over-year 7.2 Bcf/day.
- Natural gas consumption from May 16–22, 2019, was 75 Bcf/day, a 3.8 Bcf/day increase over last year, driven by an increase of liquefied natural gas receipts of 3.8 Bcf/day.

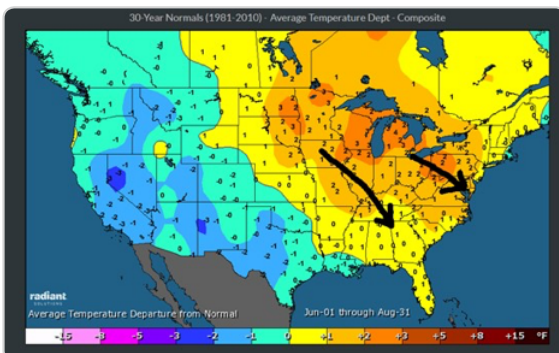


| NYMEX Futures Pricing | Current Price as of 5/23/19 | Last Month | M/M Change | Last Year | Y/Y Change |
|-----------------------|-----------------------------|------------|------------|-----------|------------|
| Prompt (June 19) | \$2.657 | \$2.613 | \$0.044 | \$2.810 | (\$0.153) |
| (Nov2019/Mar2020) | \$2.864 | \$2.908 | (\$0.044) | \$2.994 | (\$0.130) |
| 12-Month Strip | \$2.702 | \$2.745 | (\$0.043) | \$2.897 | (\$0.165) |
| 2020 | \$2.698 | \$2.726 | (\$0.029) | \$2.692 | \$0.006 |
| 2021 | \$2.654 | \$2.662 | (\$0.008) | \$2.696 | (\$0.042) |
| 2022 | \$2.657 | \$2.660 | (\$0.003) | \$2.736 | (\$0.079) |

Temperature Outlook



- The Niño 3.4 region (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 (i.e., central tropical Pacific) is at +0.5 degrees C warmer than normal, which is on the threshold of a neutral/weak El Niño.
- The latest long-term model update has shown slightly weaker trends for this summer's El Niño; there is still a 65% chance that the El Niño pattern will persist (weak) through the summer, and a 55% chance it will persist through autumn.
- 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 correlations typically are the hottest over the northern Plains and parts of the Rockies.

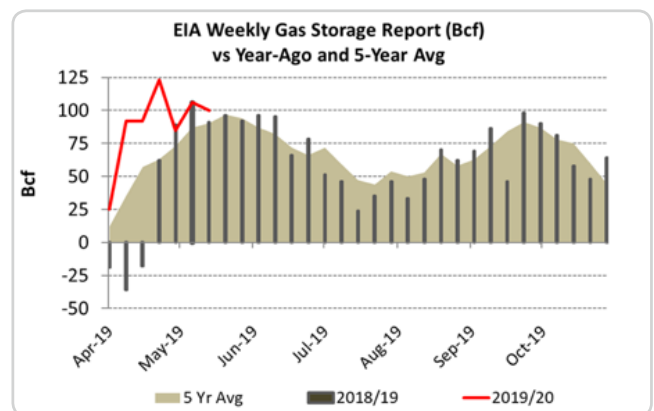


Source: Radiant

Storage Report



- Strong injections for the first three weeks of May have helped cut the deficit to the five-year average in half since the start of injection season. The EIA reported a 100 Bcf injection for the week ending May 17, which is in line with market consensus.
- Storage stands at 1,753 Bcf, representing a 137 Bcf (8.5%) surplus to year-ago levels and a -274 Bcf (-13.5%) deficit to the five-year average. Although this week's injection narrowed the deficit versus the five-year average by only 12 Bcf, we expect further contraction this month.
- The EIA's May Short-Term Energy Outlook forecasts inventories finish October at 3.7 Tcf. Higher year-over-year injections though the balance of May should further narrow the deficit before we reach summer cooling load, making 3.7 Tcf to start withdrawal season a real possibility.



Bulls vs. Bears



Bulls

Natural Gas

- Flattening natural gas production.
- Below-average injections into storage.
- Falling crude oil prices.
- Hotter-than-normal temperatures through June.

Crude Oil

- Dollar reverses direction and begins to weaken.
- U.S. and China reach trade agreement.
- The Organization of the Petroleum Exporting Countries (OPEC) and Russia announce maintenance of production cuts through the year.

Bears

Natural Gas

- Gas production exceeding forecasts.
- Higher crude oil prices.
- Higher-than-average injections into underground storage.
- A cooler weather pattern mid-June for the eastern half of the U.S.

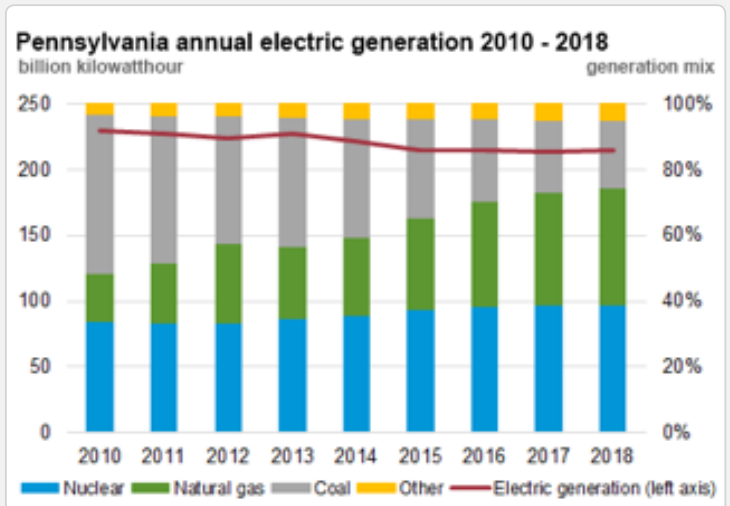
Crude Oil

- Continued and increasing trade concerns with China.
- Global GDP shows growing weakness.
- Dollar continues to strengthen.

Natural Gas Specific Topics and Updates

Growth of Gas-Fired Generation Capacity in Pennsylvania Follows Growth in Production

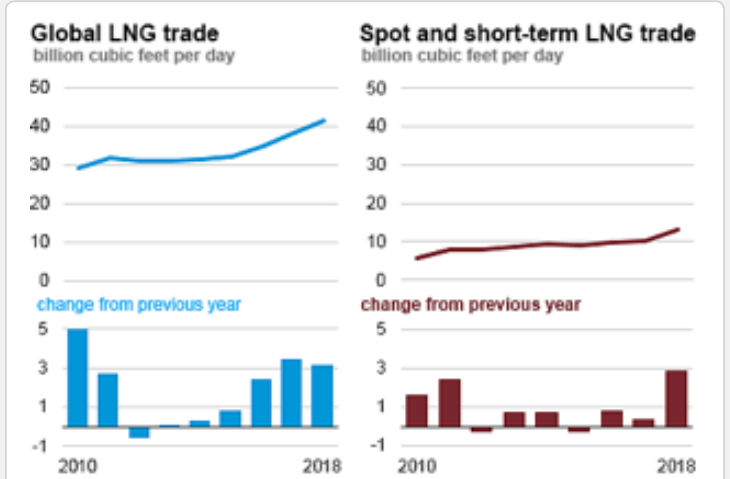
- The development of shale gas in Pennsylvania from 2 Bcf/day in 2010 has climbed to 18.6 Bcf/day this February, or 19% of Lower 48 gas production.
- Gas-fired power generation has risen from 15% in 2010 to 36% in 2018, while coal-fired generation declined from 50% in 2010 to 21% in 2018, or a 60% overall decline in generation.
- For 2019 a total of 2.8 GW of coal and nuclear capacity will retire, while EIA estimates that from 2019-2022 Pennsylvania will see 17 new gas-fired power plants potentially come online with a total capacity of 8.5 GW.



Source: The Energy Information Administration (EIA)

Global Liquefied Natural Gas (LNG) Trade Rose in 2018

- The volume of global LNG trade grew by 3.2 Bcf/day in 2018 to 41.3 Bcf/day. This represented an 8% increase over 2017 levels as both global capacity and demand expanded in 2018.
- 2018 saw the spot and short-term contract market expand by 2.9 Bcf/day, its largest annual increase on record according to an LNG industry Association (GIIGNL) report.
- Global liquefaction capacity increased 4.8 Bcf/day in 2018, of which the U.S. was 1.9 Bcf/day of that capacity.



Source: The Energy Information Administration (EIA)

Great Lakes Electric Summary

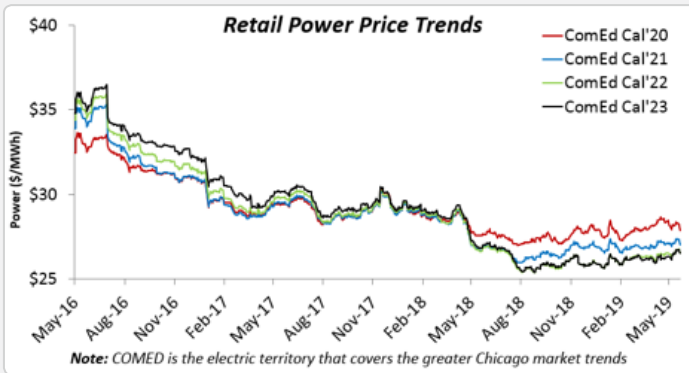


- Midwest forward power prices have been flat to slightly lower month-over-month amid relatively low demand conditions, however calendar strip prices for 2020-2023 have held on to year-over-year gains and are currently trading about 5% above prior market lows.
- Relatively mild spring weather will soon give way to summer warmth and stronger power demand, increasing the potential for volatility in the forward and index power markets. Now is a good time for buyers to review their procurement strategies to mitigate the risk of higher energy spend this summer.
- Day-ahead index power prices in the Midwest markets are down 6% month-over-month due to declining natural gas prices while prices are down 24% year-on-year as a result of generally milder weather compared to last May, which was the warmest on record.
- MISO anticipates having 149 GW of capacity available to meet its summer peak demand forecast of 125 GW during hotter-than-normal conditions. MISO's base reserve margin for this summer of 19.3% has increased thanks in part to growth in demand response, wind, solar and behind-the-meter generation.
- PJM is prepared to meet peak demand this summer, which is expected to bring hotter-than-normal temperatures to the Midwest and Mid-Atlantic. Load is forecast to peak at 151.4 GW this summer, slightly higher than last year's peak of 150.8 GW but still far below the all-time summer peak load of 165.6 GW set in 2006.

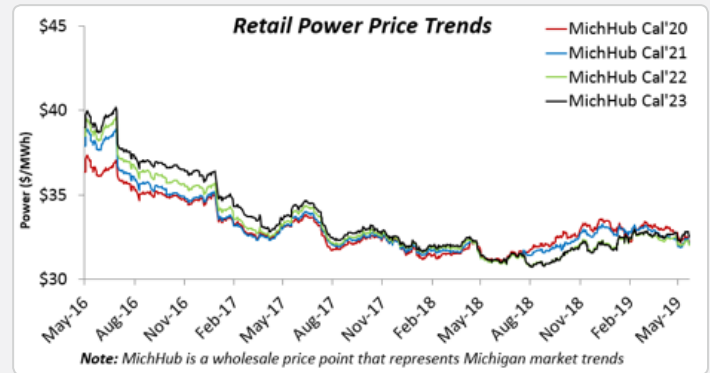
Great Lakes Retail Power Price Trends

| % 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 | 1% | -1% | 3% | 4% | 2% | 1% | 4% | 4% |
| Month-over-Month | -2% | 1% | -2% | -1% | -2% | 0% | -2% | -1% |
| Year-to-Date | 1% | 3% | -2% | 1% | -2% | 2% | -1% | 3% |
| Compared to All-Time Low | 4% | 5% | 4% | 5% | 7% | 5% | 5% | 5% |

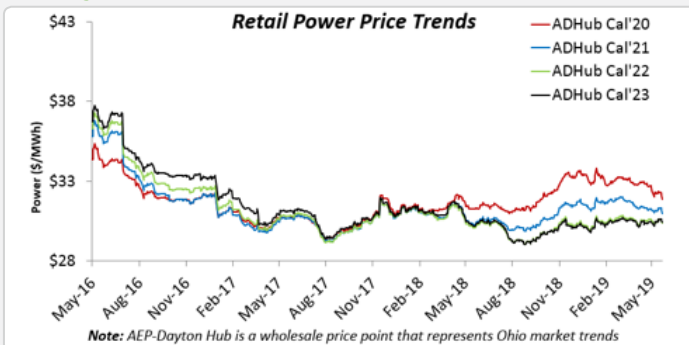
ComEd



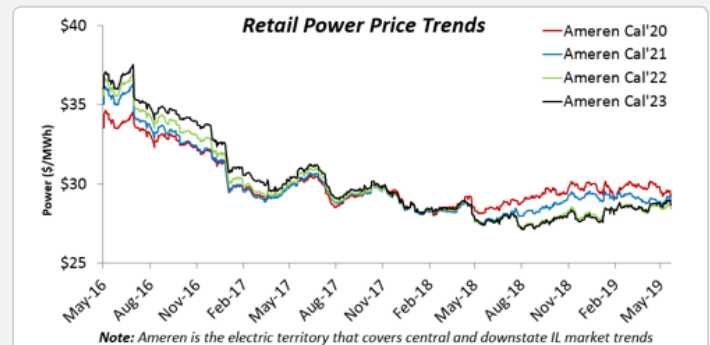
Mich Hub



AEP-Dayton Hub



Ameren



Mid-Atlantic Electric Summary



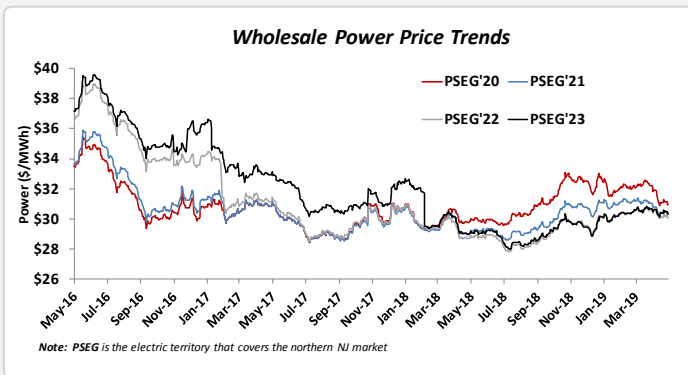
- The NYMEX June 2019 prompt-month contract continued to trade within a very tight 12-cent range over the past week, trading at a five-week high of \$2.676/MMBtu and at a low of \$2.549/MMBtu. Natural gas prices continue to receive downward pressure on them as production remains high, and favorable conditions in April and May have helped cut the natural gas storage deficit to the five-year average in half.
- Forward power prices have reflected a similar trend as natural gas as forward electricity prices in PJM through 2024 have either been holding steady or trending slightly downward over the past month. Most zones in PJM have seen about a 1% drop since the end of the winter, with 2020 dropping the most at 3% while the outer years (2023-2024) have dropped only 1%. When comparing the current forward power prices in PJM to the lowest that they have ever traded, years 2020-2021 are averaging about 10% higher than those lows while the longer-term years from 2022-2024 are trading about 7% higher. Combined, all these terms average about a 10% increase in price above the lowest prices ever offered.
- Day-ahead index prices in PJM for April 2019 are 25% lower than the same index prices a year ago in April 2018. Much of the decrease can be attributed to the lingering cold that we experienced a year ago compared to the milder temperatures that we had this past April. The average April 2019 index price across all the zones in the table below was \$25.20, compared to the five-year average for that same month of \$32.22. This comparison represents a -22% lower price this year compared to the average price for all the last five April months.

Mid-Atlantic Retail Power Price Trends

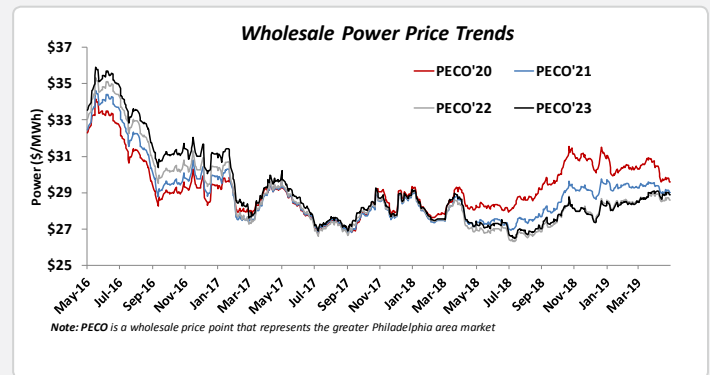
| 24-Month Fwd Trading Range | PSEG 2020-2021 | PSEG 2022-2023 | PECO 2020-2021 | PECO 2022-2023 | APS 2020-2021 | APS 2022-2023 | BGE 2020-2021 | BGE 2022-2023 | PPL 2020-2021 | PPL 2022-2023 |
|----------------------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|---------------|---------------|---------------|
| vs High (\$/MWh) | -\$1.61 | -\$2.12 | -\$1.37 | -\$1.30 | -\$2.16 | -\$1.14 | -\$2.66 | -\$2.56 | -\$2.38 | -\$1.67 |
| vs Low (\$/MWh) | \$2.20 | \$2.31 | \$2.56 | \$2.35 | \$2.95 | \$2.28 | \$2.04 | \$1.19 | \$1.85 | \$2.14 |
| vs High (%) | -5% | -6% | -4% | -4% | -6% | -3% | -7% | -7% | -7% | -5% |
| vs Low (%) | 8% | 8% | 10% | 9% | 10% | 8% | 6% | 4% | 6% | 8% |

| Index Pricing | AECO | APS | BGE | DPL | DUQ | JCPL | PEPCO | PPL | PSEG | MetEd | PECO | Penelec |
|-----------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| April 5-Yr Avg | \$29.95 | \$33.60 | \$38.45 | \$31.33 | \$32.78 | \$30.35 | \$36.80 | \$29.73 | \$31.59 | \$30.05 | \$29.91 | \$32.12 |
| March '19 | \$23.78 | \$26.37 | \$27.26 | \$24.42 | \$26.25 | \$24.24 | \$26.82 | \$24.20 | \$24.28 | \$24.94 | \$24.39 | \$25.40 |
| 5-Year Avg Comparison | -21% | -22% | -29% | -22% | -20% | -20% | -27% | -19% | -23% | -17% | -18% | -21% |

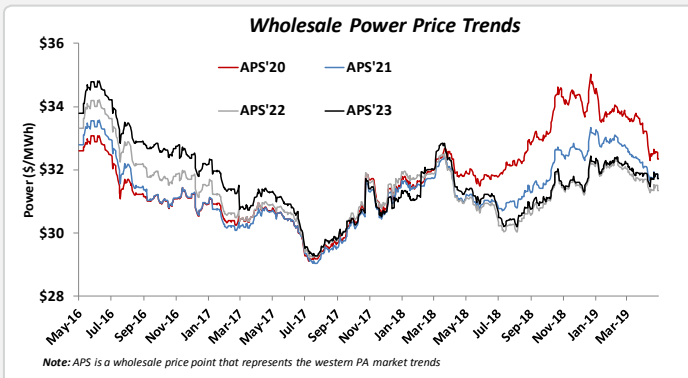
PSEG



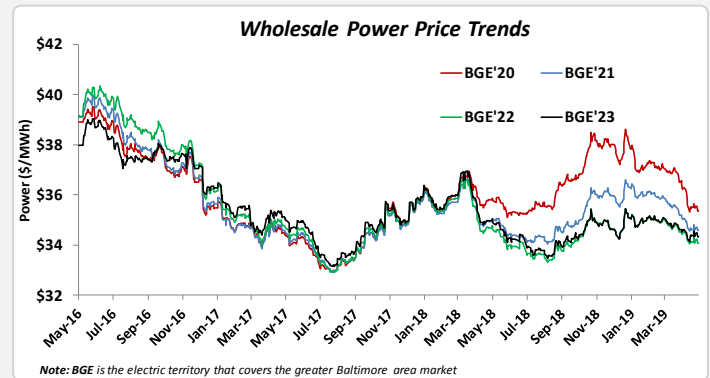
PECO



APS



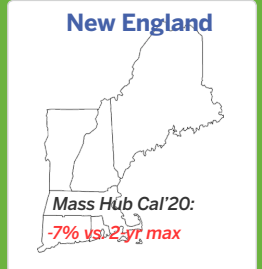
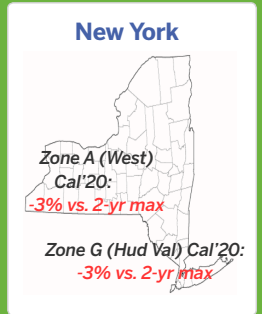
BGE



Northeast Electric Summary



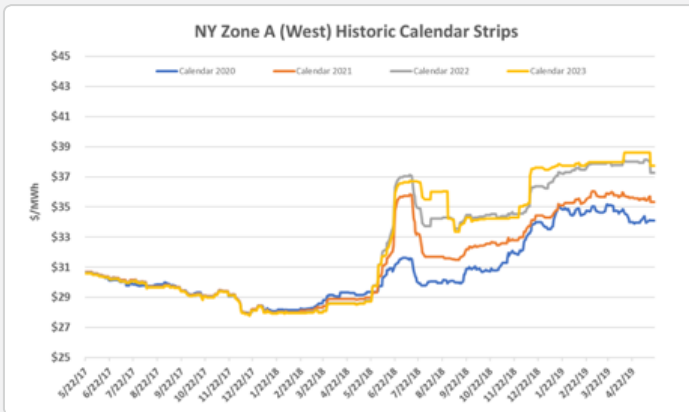
- New England power forwards (Calendar 2020-2023) now range from \$42-\$44.50/MWh after a warm April pushed prices down 1-4%.
- NY Zone A (West) calendar forwards haven't shown too much volatility this spring and hover from 10 – 16% above the two-year average while Zone G saw more of the mild post-April dip that New England saw; Zone G forwards range from \$38-\$47/MWh.
- NY month-to-date May Locational Marginal Pricing (LMPs) range from \$20-24/MWh with downstate zones showing a ~\$5 decrease from April, while upstate zones show less of a dip from April, only around \$2/MWh.
- New England has seen month-to-date May LMPs come off about \$2.50 from April's \$27/MWh.
- Massachusetts, Rhode Island and Connecticut have all recently approved legislature for procuring offshore wind for their respective states through electric utilities. Costs/risks would be passed through the utility (i.e., transmission/distribution) portion of the bill.



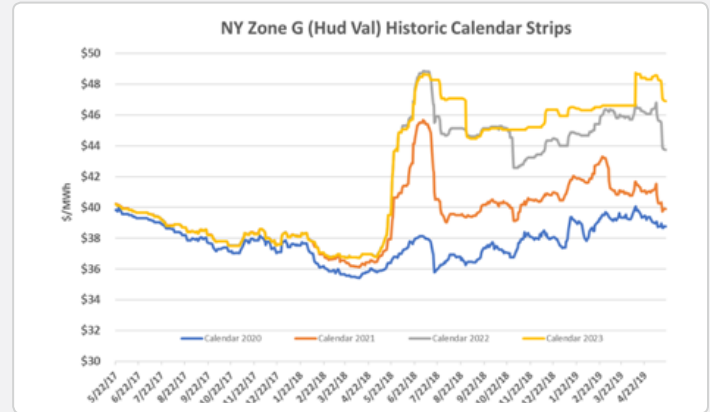
Northeast Retail Power Price Trends

| 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 | 3% | 3% | -1% | -2% | 11% | 12% | 15% | 16% |
| Current Price vs 2-Year Maximum | -7% | -5% | -8% | -8% | -3% | -2% | -2% | -2% |
| Current Price vs 2-Year Minimum | 10% | 9% | 5% | 4% | 22% | 27% | 34% | 36% |

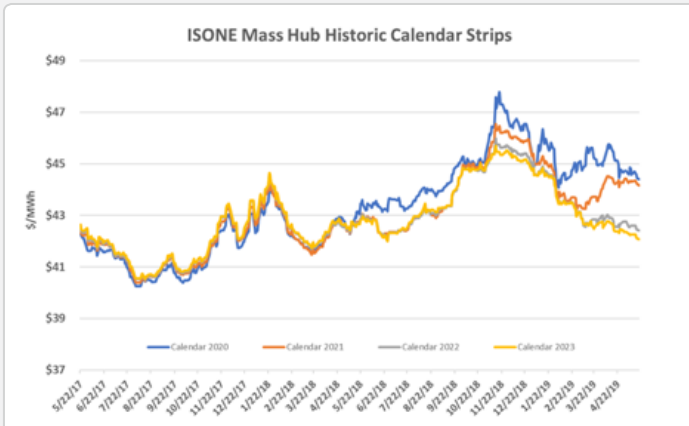
New York Zone A



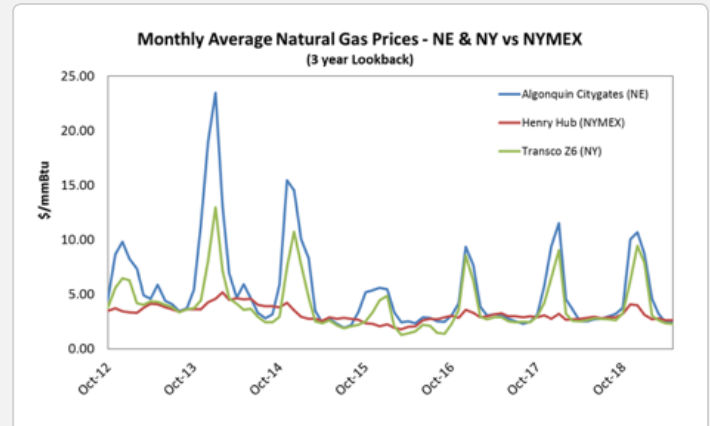
New York Zone G




Mass Hub



NE & NY v.s. NYMEX



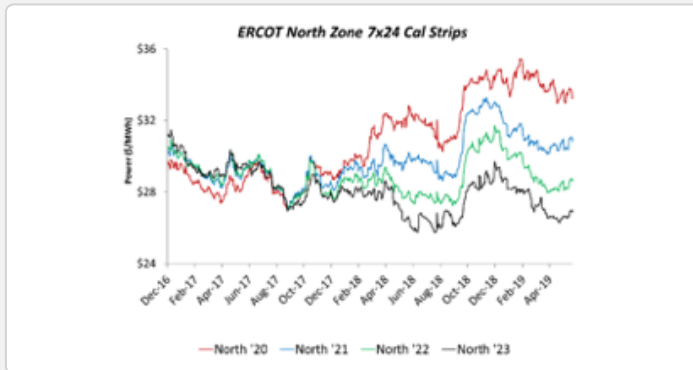
Texas Electric Summary

- 
 ERCOT released its final Seasonal Assessment of Resource Adequacy (SARA) on May 8 and the reserve margin increased to 8.6% from 7.4% as total reserved capacity increased from 3.3 GW to 4.1 GW on a return of a mothballed gas unit and a higher level of imports.
- ERCOT also released its biannual (i.e., May and December) Capacity, Demand and Reserve Report and listed the generation reserve margin as rising from 10.5% in 2020 and 15.2% in 2021 but then declining from 13.0% to 7.8% from 2022-2023. The growth in reserve margin was primarily based on increases in renewable capacity, which is intermittent in nature.
- Drought conditions in Texas remain minimal ahead of summer.

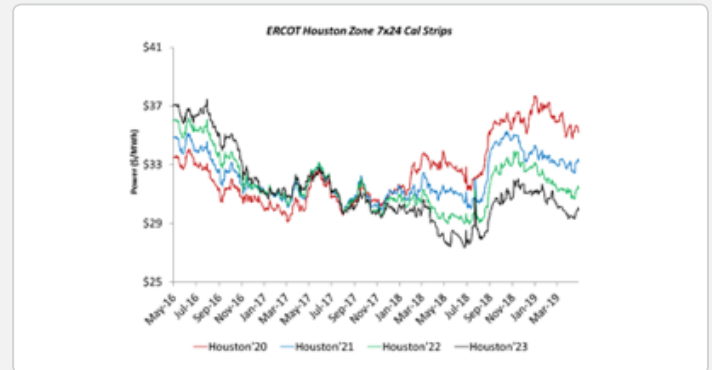
Texas Retail Power Price Trends

| % 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 | 4% | 6% | 2% | 1% | -1% | -2% | 5% | 5% |
| Month-over-Month | 1% | 1% | 1% | 2% | 1% | 1% | 2% | 4% |
| Year-to-Date | 10% | -4% | 8% | -8% | 7% | -9% | 5% | -13% |
| Compared to All-Time Low | 16% | 9% | 19% | 5% | 13% | 2% | 22% | 10% |

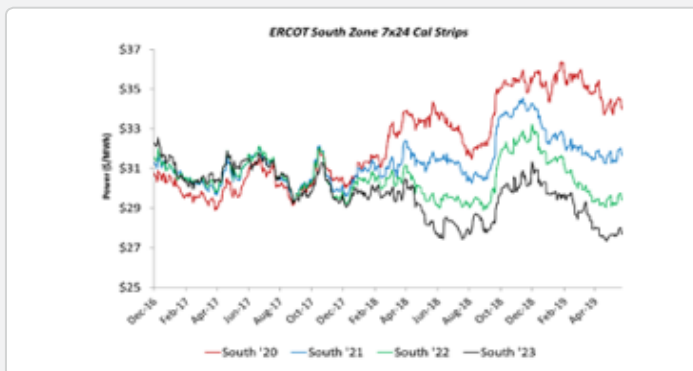
ERCOT North Zone



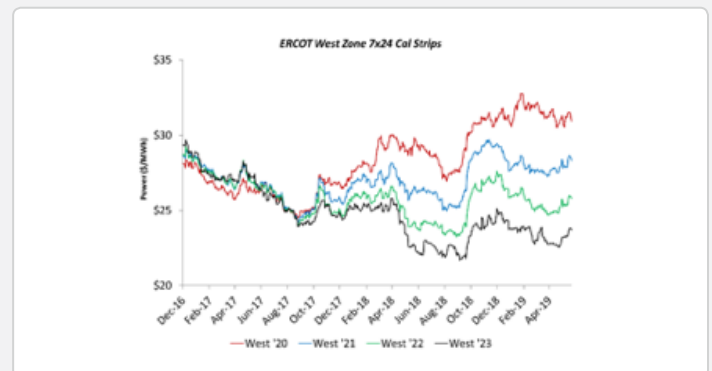
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



California Electric Summary

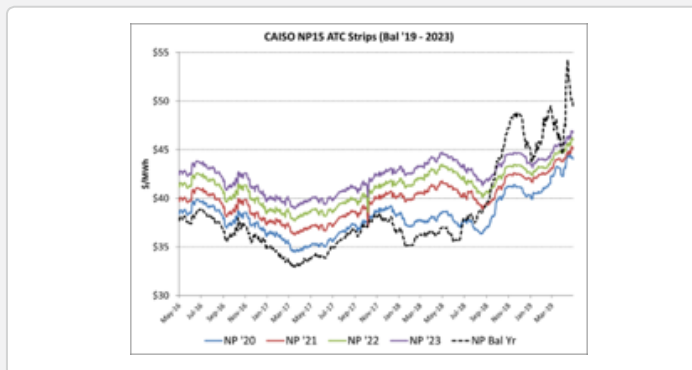


- Snowpack levels in the Sierra Nevada Range finished winter at +150% of normal, while the Pacific Northwest is at 85% of normal. Weekly injections into the Pacific Region for storage have been well above the five-year average, and regional storage has been reducing its storage deficit.
- SoCal Gas pipeline pushed repairs back on its Line 235-2 to June 8 based on the latest update from SoCal Gas. After Line 235 is repaired, work can begin on Line 4,000. This is likely to keep gas prices elevated as little new net capacity will be available the summer.

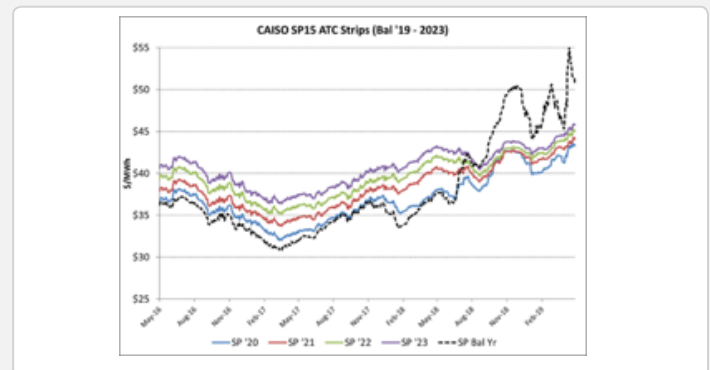
California Retail Power Price Trends

| % 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 | 12% | 6% | 4% | 3% | 28% | 13% | 8% | 7% | 5% | 30% |
| Month-over-Month | 0% | 2% | 2% | 2% | -5% | -1% | 1% | 2% | 2% | -5% |
| Year-to-Date | -1% | 0% | 0% | 0% | -5% | -1% | 0% | 1% | 1% | -5% |
| Compared to All-Time Low | 23% | 21% | 19% | 17% | 40% | 29% | 27% | 25% | 22% | 53% |

NP 15 7X24



SP 15 7X24



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