

Constellation's MARKET INTEL NEWSLETTER

Energy Market Update for Commercial & Industrial Customers

January 2019

Fuels

Natural Gas

- The December warm-up continued into the second half of January 2019 placing downward pressure on prompt-month and winter natural gas pricing.
- Well-below-normal cold has returned to the eastern two thirds of the U.S. at the end of January lending some support to the natural gas market.
- The 11-15 day forecast calls for a very cold start to February particularly in the Great Lakes, followed by a warm up in the first week of the month, followed by a return to normal February temperatures.
- Natural gas storage inventories are now about par with the same period last year but remain over 300 Bcf below the five-year average.
- The weather will play the major role in the coming weeks as to the pricing action in natural gas.
- Deferred NYMEX natural gas prices have held steady despite the run-up in the near-term winter. Calendar years 2020, 2021, 2022 and 2023 are all trading near \$2.65 per MMBtu, very close to their historic all-time lows.
- Natural gas production has been fluctuating between 84 and 85 Bcf per day in January.
- As of January 25, Socal Citygate was \$3.98, Algonquin was \$8.59, Tennessee Zone 6 was \$8.66, and Chicago Citygate was near \$3.15.
- UK (National Balancing Point) liquefied natural gas (LNG) for prompt month is trading \$7.319, prompt TTF gas is trading at \$6.909, the February Japan/Korea Market (JKM – the LNG benchmark price) is \$9.175, and the March JKM is \$8.03.

Coal

- PRB coal for 2020 is unchanged at \$12.35, 2021 was at \$12.30, unchanged; CAPP for Rail was \$70.65 for 2020, down \$0.25; 2021 was down \$0.20 at \$68.50. API #2 (Rotterdam delivered coal) was \$84.35 for 2020, down \$2.00. API #4 (South Africa delivery) was down \$2.00 at \$90.35 for 2020. Newcastle coal (i.e., Australian coal) for 2020 was down \$1.45 to \$94.05. Ocean freight rates for the Route C4 (capsize vessels from Richards Bay South Africa to Rotterdam) was \$9.85 per ton in 2020 and 2021.

Oil

- WTI Nymex prompt-month crude oil settled at \$53.13 per barrel on Thursday, January 24, up over \$8 per barrel from late December 2018.
- Political turmoil in Venezuela is threatening crude oil exports from that country and has played a role in rising oil prices over the past month.
- Concerns over the global economic outlook for 2019 are largely credited with keeping a lid on the crude oil market as we enter the first quarter of 2019.

Power

- Markets have continued their premium in near-term pricing over outer years or "backwardation" except for NYISO, where a pending cost of carbon law has raised forward prices for 2022 and 2023.
- ERCOT is facing a generation reserve margin of 7.4% for this coming summer due to additional coal retirements and lack of new builds.
- CAISO is facing a bankruptcy filing by utility Pacific Gas and Electric over wildfire liabilities.
- PJM and ISO-NE are both considering measures to address fuel security and capacity market changes to account for a growing dependence on gas-fired generation demand.

Economy

- The partial government shutdown is reportedly having a negative effect on the U.S. economy with some analysts calling for near-zero GDP growth in the first quarter if the shutdown continues.
- The U.S. Federal Reserve has signaled that it may temper its appetite for raising its benchmark interest rate in 2019 as fears of a slowing global economy weigh on the decision-making of the central bank going forward.
- The U.S. stock market has been mostly moving to the upside through the month of January, largely recovering the losses incurred during the month of December 2018.

Weather

- The first ten days of February 2019 will be very cold in the eastern two-thirds of the U.S. A small break in the pattern is forecast mid-month followed by a return to blocking and colder-than-normal air for the remainder of the month.
- There is some disagreement between the European model and the American model as to how quickly the current pattern will weaken, however both call for a "re-loading" of cold in February in the second half of the month.

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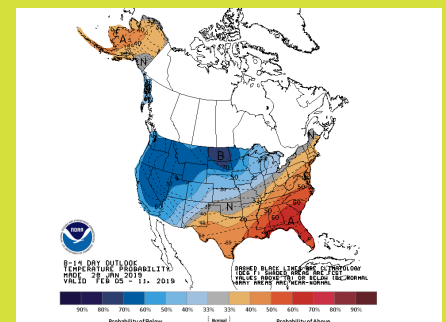
Prompt Month Settlements

| | Jan. '19 | 30-Day Change |
|------------------|----------|---------------|
| Nat Gas \$/mmBTU | \$3.726 | -\$1.03/MMBTU |
| Crude Oil \$/bbl | \$47.20 | -\$9.56/BBL |

As of 12/19/2018 & 30 Day change

Temperature Outlook

Source: NOAA



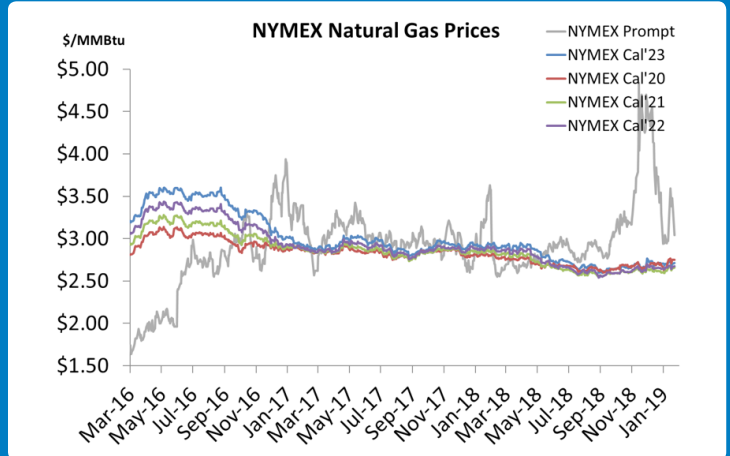
NYMEX Prompt Month Chart



Gas Report



- NYMEX Prompt month gas futures were extremely volatile this month, gaining over \$.60/MMBtu to the \$3.50s as the market adjusted for frigid temperatures at the end of January, but then dropping back down to \$3.05 at the end of the month as the February forecast warmed slightly.
- The 12-month strip increased \$.10/MMBtu and Cal'20 also increased \$.13 /MMBtu to \$2.75/MMBtu; Cal'20-22 are still trading in the \$2.65s as the market is still valuing rising production as a major factor keeping a lid on prices.
- Natural gas production increased year-over-year at 11.1 Bcf/day. For the week that ended January 16 natural gas production averaged 88 Bcf/day.
- Natural gas consumption (January 10-January 16) was 97.2 Bcf/day, a 2.8 Bcf/day increase over last year—changes mostly made up of an increase in residential and commercial consumption of 2.6 Bcf/day—and liquefied natural gas (LNG) pipeline receipts to LNG import terminals increased 2.2 Bcf/day.

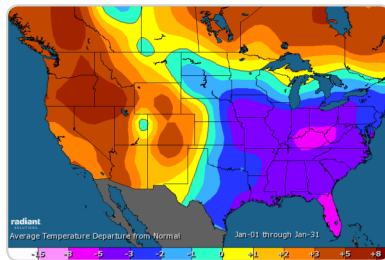


| NYMEX Futures Pricing | Current Price as of 1/22/19 | Last Month | M/M Change | Last Year | Y/Y Change |
|-----------------------|-----------------------------|------------|------------|-----------|------------|
| Prompt (Feb 19) | \$3.040 | \$3.737 | (\$0.697) | \$3.185 | (\$0.145) |
| Winter (Feb19-Mar19) | \$3.006 | \$3.453 | (\$0.447) | \$3.013 | (\$0.007) |
| 12 Month Strip | \$2.941 | \$2.977 | (\$0.036) | \$2.910 | \$0.031 |
| 2020 | \$2.748 | \$2.699 | \$0.049 | \$2.797 | (\$0.050) |
| 2021 | \$2.659 | \$2.616 | \$0.043 | \$2.835 | (\$0.176) |
| 2022 | \$2.675 | \$2.665 | \$0.020 | \$2.867 | (\$0.191) |

Temperature Outlook



- The cold finish to January looks like it will have a brief pause in early February then turn colder again for the balance of the month giving us a Top 20 cold month.



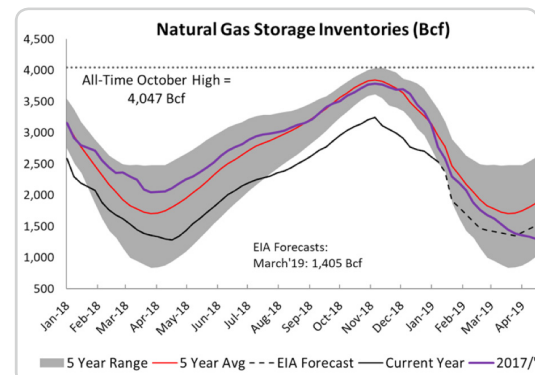
Source: NOAA

- Shorter-term models are in good agreement with a piece of the polar vortex moving down into the eastern half of the nation, however, the pattern makes a dramatic swing in the opposite direction with cold air lifting north and west into Canada.
- Despite this brief shift to much more moderate temperatures, the models still show a lot of blocking across the Arctic and even across parts of the north Atlantic which will likely mean that cold air will return into the pattern.
- The timing and track of this cold air will be the biggest challenge. We think cold air moves far enough west into Canada and takes a longer track back into the United States, resulting in slower timing for the return of cold in the eastern United States.
- Our research suggests that March could come in warmer than normal as El Niño winters tend to be mild during the early spring. Cold may linger across the Northeast during the first week of March, however warmer trends are seen thereafter.

Storage Report



- The Energy Information Administration (EIA) reported a withdrawal of 163 Bcf for the week ending January 19, above the market consensus of 158 Bcf but within the wide range of 138 to 180 Bcf.
- The 163 Bcf withdrawal is much lower than last year's 273 Bcf draw but closer to the five-year average of -185 Bcf.
- Storage stands at 2,370 Bcf, or -33 Bcf (1.4%) above year-ago levels and -305 Bcf (11.4%) below the five-year average. The storage deficit has narrowed significantly in past month after peaking at -722 Bcf (-20%) for the week of December 7.
- The narrowing of the storage deficit has reduced the risk of very tight supplies for end of March, with the EIA January Short-Term Energy Outlook (STEO) forecasting the end of March underground storage to be 1.4 Tcf, just above last year's 1.35 Tcf.
- NYMEX prices retraced in January as warm weather allowed the deficit to narrow. The market is turning its attention to end of January/February weather that will likely see the storage deficit expand again in February.



Bulls vs. Bears



Bulls

Natural Gas

- Cold winter temperatures in the eastern half of the U.S.
- Above-average withdrawals from natural gas storage.
- Storage inventories falling below 1.3 Tcf at the end of the season.
- Oil prices below \$50 per barrel.

Crude Oil

- Trade deal is struck with China.
- OPEC announces further production cuts.
- Venezuela output collapses to zero.

Bears

Natural Gas

- A warmer-than-normal February.
- Higher crude oil prices – i.e., prices for WTI move above \$60 per bbl.
- Below-average withdrawals from natural gas storage.

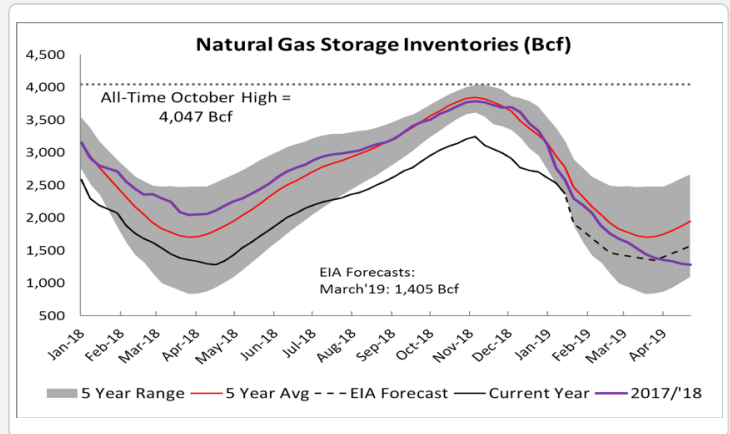
Crude Oil

- OPEC fails to cut production.
- Continued and increasing trade concerns with China.
- Global GDP shows growing weakness.

Natural Gas Specific Topics and Updates

The Storage Deficit Flips to Small Surplus in January

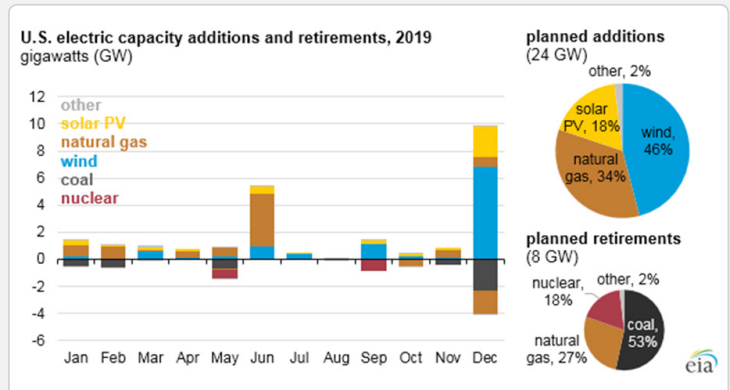
- The second half of December and first half of January ended up providing the gas market with a significant period of breathing room. The year-over-year storage deficit narrowed from a mid-December level of -725 Bcf or (20%) to a surplus of 33 Bcf (1.4%) by the week of January 18.
- The storage deficit to the five-year average shrank as well but still remains at -11% and will likely widen out to some degree with the return of colder temperatures in the later part of January to early February. Storage now likely to end March at 1.4 Tcf, close to last April's 1.3 Tcf.



Source: The Energy Information Administration (EIA)

Gas-Fired and Renewable Generation to Continue Expanding in 2019

- Gas generation is expected to continue expanding in 2019, while coal and nuclear remain under pressure from low-cost gas and growing renewable capacity. 2019 will see 7.5 GW of new capacity come online by this summer with most of that capacity in the Northeast and Southeast.
- There will be 8 GW of coal and nuclear retirements in 2019, down from 14 GW in 2018. Besides gas additions, 11 GW of new wind and 8 GW of new solar will come online to replace older coal units that were operating at lower capacity factors.



Source: The Energy Information Administration (EIA)

Great Lakes Electric Summary: Customer Takeaways

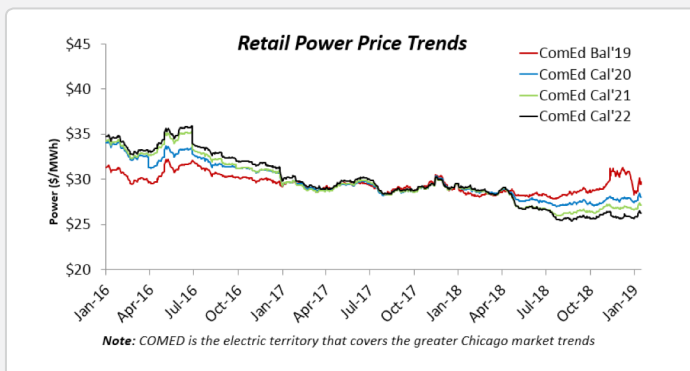


- Forward power prices for the balance of 2019 staged a strong retreat amid mild temperatures in late December and early January; however, a colder shift in forecasts for late January into early February has pushed near-term power prices higher once again.
- Bullish near-term fundamentals have had a muted impact on longer-term forward prices, with prices for 2021-2022 delivery still trading within 6% of market lows. Extending contract terms into these outer years can mitigate the 2019 budget impact of this winter's energy price rally.
- On a month-to-date basis, day-ahead index power prices in the Midwest markets are down 15% compared to December as a result of generally mild temperatures to start 2019. Day-ahead prices are down over 40% year-over-year in January 2019 due to the frigid temperatures we saw during the same month a year ago. Energy buyers should look for higher index prices in late January and February due to forecasts calling for periods of Arctic cold.
- PJM generation retirements totaled 5.6 GW in 2018, a 170% increase year-on-year, as 3.3 GW of coal-fired units left the supply stack. Of the 10.4 GW of new capacity added in PJM last year, 9.3 GW was fueled by natural gas, while 950 MW was renewable wind and solar generation.

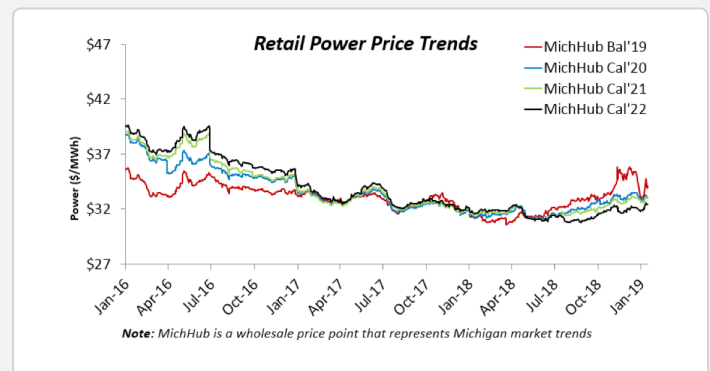
Great Lakes Retail Power Price Trends

| % Change in Forward Power | ComEd 2019-2020 | ComEd 2021-2022 | Mich Hub 2019-2020 | Mich Hub 2021-2022 | AEP-Day 2019-2020 | AEP-Day 2021-2022 | Ameren 2019-2020 | Ameren DAY 2021-2022 |
|---------------------------|-----------------|-----------------|--------------------|--------------------|-------------------|-------------------|------------------|----------------------|
| Year-over-Year | 1% | -8% | 8% | 4% | 10% | -1% | 10% | 3% |
| Month-over-Month | -2% | 1% | -2% | 0% | -2% | 1% | -1% | 1% |
| Year-to-Date | 2% | 2% | 1% | 1% | 2% | 2% | 2% | 2% |
| Compared to All-Time Low | 5% | 4% | 9% | 6% | 16% | 7% | 10% | 5% |

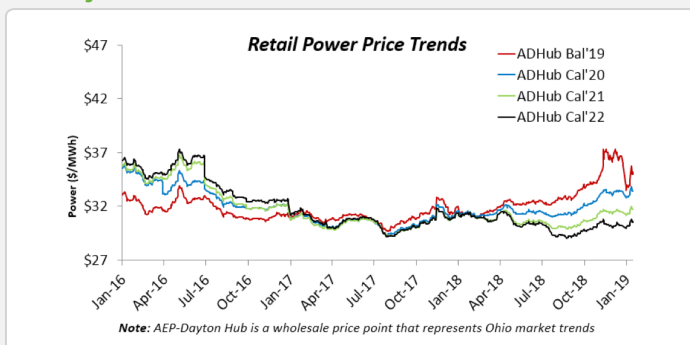
ComEd



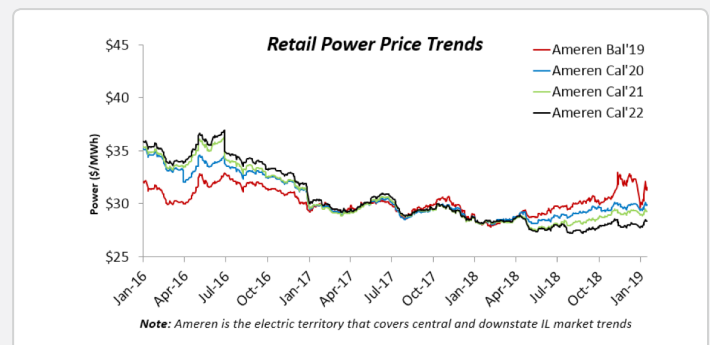
Mich Hub



AEP-Dayton Hub



Ameren



Mid-Atlantic Electric Summary: Customer Takeaways

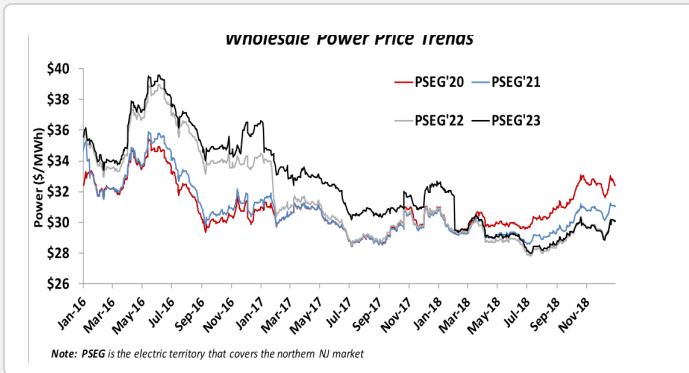


- After resurging above \$3.60/MMBtu in mid-January, colder weather forecasts for the balance of the month have caused NYMEX prompt-month gas to decrease in the low-\$3.00 - \$3.20 range. Some of the longer-term temperature models have begun to shift in favor of significant moderation next month while extreme cold during the next couple of weeks has apparently been priced in already. The persistently wide storage deficit has narrowed significantly over the past month as warmer temperatures have kept more gas in the ground.
- After peaking back in mid-November, PJM forward prices have followed the ebb and flow of the gas prices, hitting a recent low in early-January after a monthly period of moderate temperatures. Changing forecasts calling for a return to below-average temperatures for the second half of January caused forward prices to peak back up to previous highs. Since then, a moderation in temperatures for early February, along with the fact that we are in the second half of winter, have caused forward prices to soften again as prices through 2023 are averaging about 11% off all-time lows.
- Day-ahead index prices in PJM were, on average, -12% lower for the month of December 2018 compared to those prices for the same month in 2017 and -7% lower from the previous month of November 2018. Some of the more congested zones in eastern PJM showed a month-to-month decrease of about -16%, while the less congested zones saw only a -1% drop.

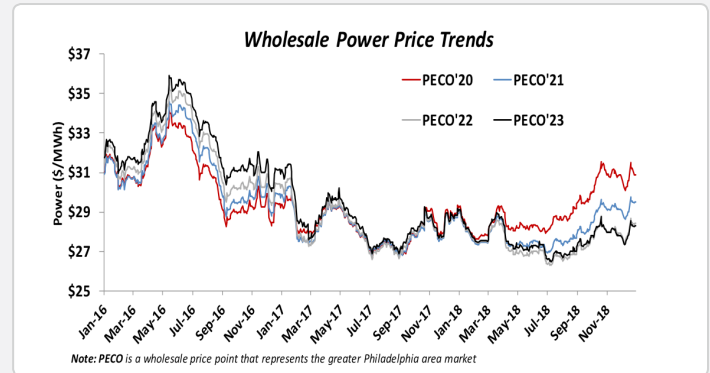
Mid-Atlantic Retail Power Price Trends

| Index Pricing | AECO | APS | BGE | DPL | DUQ | JCPL | PEPCO | PPL | PSEG | MetEd | PECO | Penelec |
|---------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Dec '17 | \$39.47 | \$35.88 | \$41.59 | \$43.73 | \$33.15 | \$39.34 | \$40.64 | \$39.34 | \$41.69 | \$39.84 | \$39.60 | \$34.55 |
| Dec '18 | \$36.16 | \$32.22 | \$33.85 | \$38.37 | \$32.94 | \$33.12 | \$33.59 | \$31.31 | \$33.61 | \$33.47 | \$33.59 | \$36.14 |
| % Change | -8% | -7% | -19% | -12% | -1% | -16% | -17% | -20% | -19% | -16% | -15% | 5% |

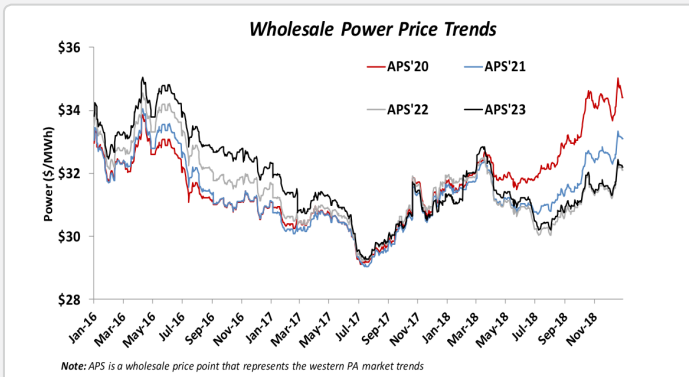
PSEG



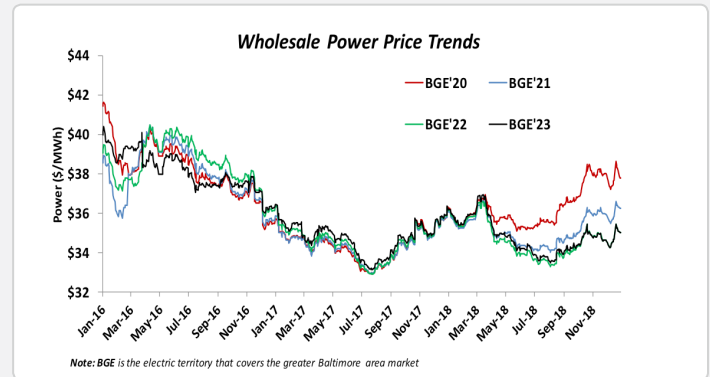
PECO



APS



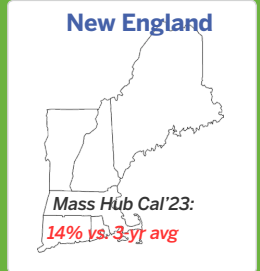
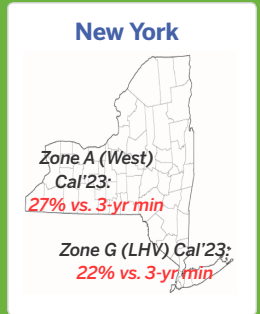
BGE



Northeast Electric Summary: Customer Takeaways



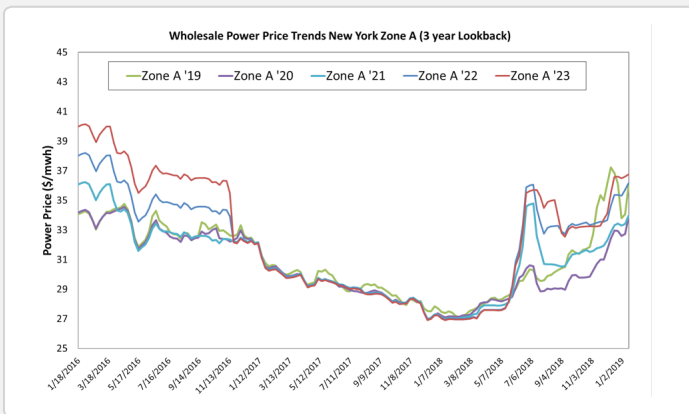
- On December 3, the Federal Energy Regulatory Commission (FERC) approved ISO-NE's request to retain resources critical to reliability with out-of-market compensation. Costs are expected to be allocated to real-time load obligation (load-serving entities) beginning June 2022 through May 2024.
- Also stemming from the December 3 decision was the request for the addition of a longer-term market-based fuel security solution, as well as an interim program.
 - The interim program is currently in the works and is being called "Winter Energy Security." This can be analogous with the now defunct "Winter Reliability Program" with LSEs also shouldering the burden of additional costs.
 - The longer-term solution could be implemented as early as winter 2024 and is expected to bring additional costs to LSEs as well; program specifics still to be determined.
- The coldest day of winter thus far has been January 22, which saw daily index prices jump to ~\$116/Mwh in New England, while NY zones ranged between \$85-116/Mwh.



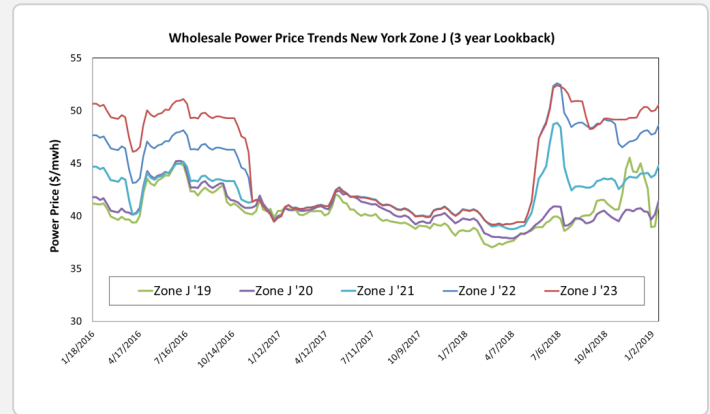
Northeast Retail Power Price Trends

| 3-Year Price Trend | New England Mass Hub 2019 | New England Mass Hub 2020 | New England Mass Hub 2021 | New England Mass Hub 2022 | New England Mass Hub 2023 | New York Zone J 2019 | New York Zone J 2020 | New York Zone J 2021 | New York Zone J 2022 | New York Zone J 2023 |
|---------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Current Price vs 3-Year Average | 8% | 8% | 7% | 6% | 5% | 2% | 2% | 6% | 9% | 11% |
| Current Price vs 3-Year Maximum | -14% | -3% | -3% | -3% | -8% | -10% | -9% | -9% | -8% | -4% |
| Current Price vs 3-Year Minimum | 14% | 16% | 15% | 14% | 14% | 10% | 9% | 13% | 19% | 22% |

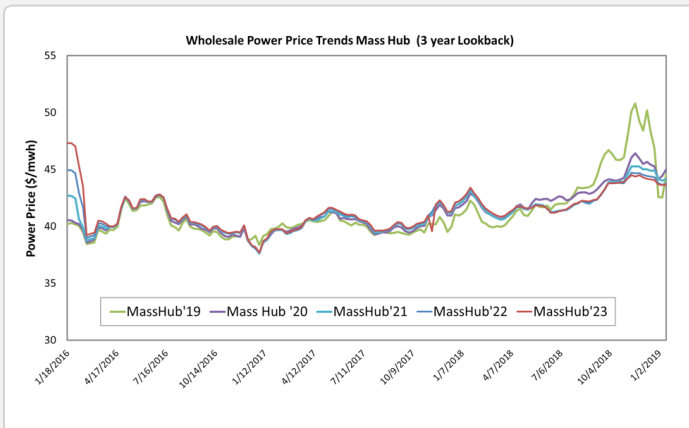
New York Zone A



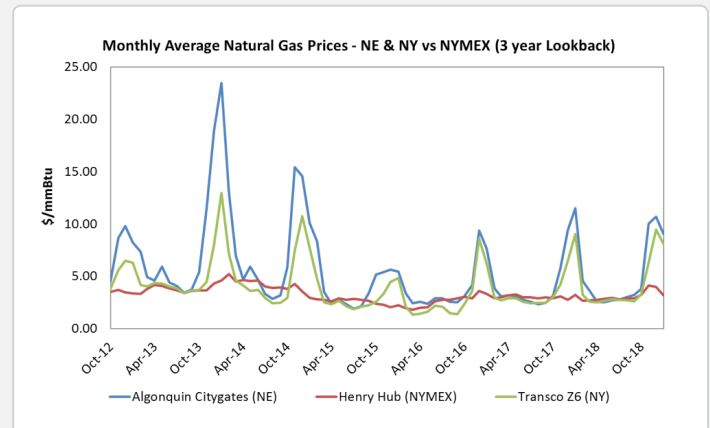
New York Zone J



Mass Hub



NE & NY v.s. NYMEX



Texas Electric Summary: Customer Takeaways

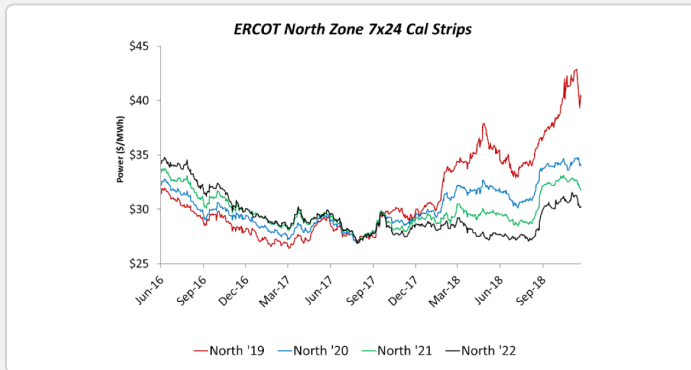


- ERCOT confirmed the retirement of the 470 MW Gibbons Creek coal plant in January 2019. It has previously been listed in mothball status, which will lower the reserve margin for this summer from 8.1% to 7.4%, well below the NERC recommended target of 13.75% for reserve margins.
- The Public Utility Commission of Texas (PUC) reached a decision on January 17 to amend the Operational Reserve Demand Curve (ORDC) calculation for summer 2019 by increasing it by a 0.25 standard deviation and another 0.25 increase for 2020.
- The ORDC curve is intended to account for the cost of scarcity pricing as available generation reserves (those that can be called upon within 30 minutes) decline below ~5 GW. This change by the PUC is intended to increase real time prices in periods of peak conditions over time and bring new generation to market.

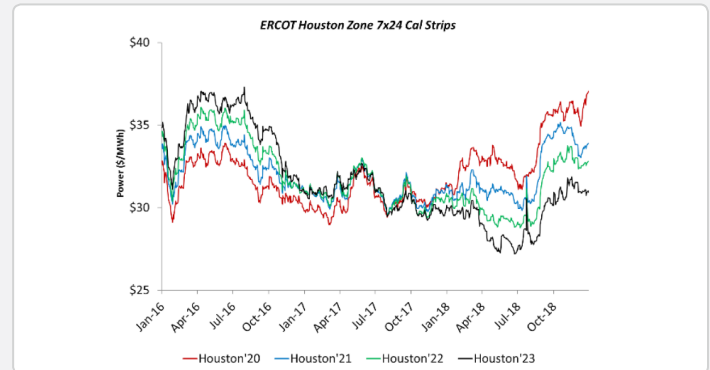
Texas Retail Power Price Trends

| % 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 | 13% | 5% | 12% | 2% | 9% | 1% | 9% | -3% |
| Month-over-Month | 2% | -1% | 1% | -2% | 1% | -2% | 2% | -2% |
| Year-to-Date | 15% | 1% | 12% | -4% | 12% | -2% | 7% | -13% |
| Compared to All-Time Low | 21% | 14% | 24% | 10% | 18% | 9% | 25% | 11% |

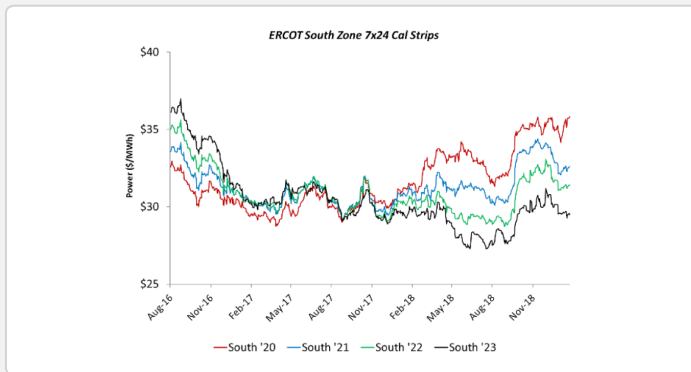
ERCOT North Zone



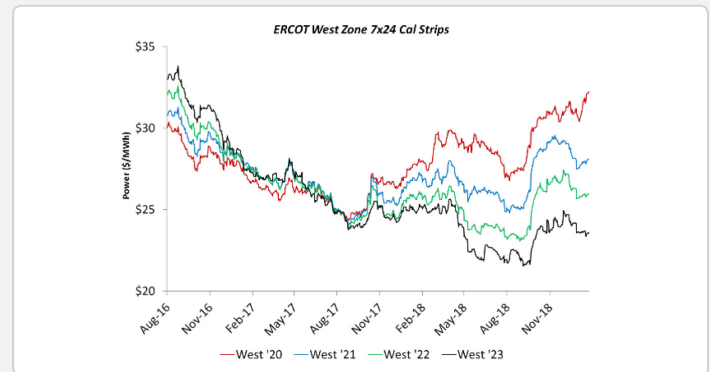
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



California Electric Summary: Customer Takeaways

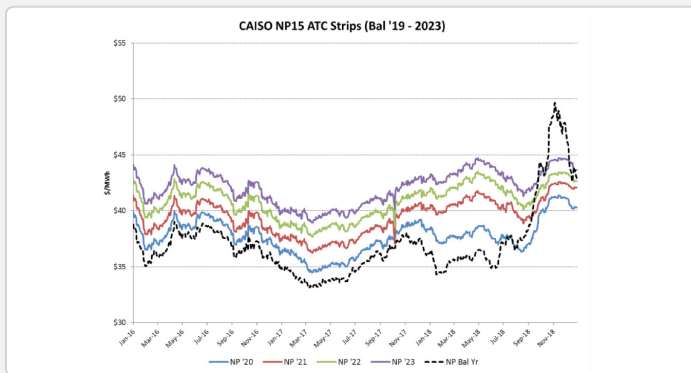


- On January 29th, Pacific Gas and Electric (PG&E) filed for Chapter 11 bankruptcy protection due to liabilities from California wildfires in 2017 and 2018. Under state law, if its deemed a utility's equipments was the cause of the fire, the utility is liable for the damages.
- PG&E is facing an estimated \$30 billion in pending liabilities from fires in 2017 and 2018, after the state of California experienced its worst drought in state history.
- Down in the southern part of California, SoCal Gas pipeline repairs are still "to be determined." This could leave limited gas supply into the Los Angeles basin for this coming summer.

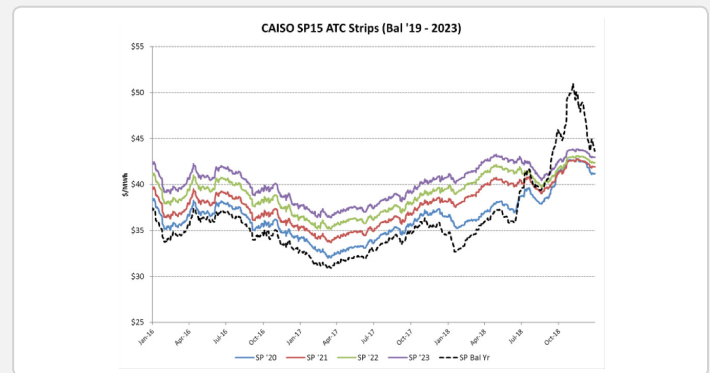
California Retail Power Price Trends

| % 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 | 5% | 5% | 2% | 2% | 18% | 13% | 10% | 7% | 5% | 26% |
| Month-over-Month | -2% | -1% | -2% | -2% | -11% | -3% | -2% | -2% | -2% | -11% |
| Year-to-Date | -1% | 0% | -1% | -2% | -5% | -2% | -1% | -1% | -1% | -5% |
| Compared to All-Time Low | 17% | 16% | 13% | 12% | 29% | 29% | 24% | 21% | 18% | 42% |

NP 15 7X24



SP 15 7X24



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