

Constellation's MARKET INTEL NEWSLETTER

Energy Market Update for Commercial & Industrial Customers

March 2018

Fuels

Natural Gas

- Natural gas production continued its upward momentum in March getting above 78 Bcf per day and hit a series of new production records.
- The second U.S. LNG export terminal (Cove Point, MD) dispatched its first cargo on March 2.
- Below-normal temperatures and four significant winter storms on the east coast were largely supportive of NYMEX in March.
- Natural gas demand for electric-power generation is up 14% year-over-year driven by colder-than-normal temperatures in January and March respectively.
- Prompt month NYMEX (April) traded in a tight range through the month of March (high of \$2.78/MMBtu to low of \$2.60/MMBtu).

Coal

- Central Appalachian coal prices for March delivery were \$63 per ton, a year-to-date increase of 5.3%, Quandl reported.
- Powder River Basin coal prices were \$12.40 per ton, a year-to-date increase of 2.5%, Quandl reported.

Oil

- Saudi Oil Minister Khalid al-Falih said he expected OPEC to extend production cuts into next year, Reuters reported.
- U.S. crude oil production hit a new record high of 10.4 million bbls per day, and production is up 1.28 million bbls per day or 14% year-over-year.
- Crude oil prices are near their highs for the year with the prompt-month trading at \$65.57 per barrel.
- Baker Hughes reported the oil-directed rig count at 800, up from 169 from the same time last year.

Power

- The fourth Nor'easter storm in a month brought real time volatility to various Northeast markets. For example, NYISO Zone J reached \$257/MWh between 11-12pm on March 31.
- Forward power markets remain within 10% of all-time lows, except ERCOT and CAISO, which are facing supply constraints.

Economy

- The Trump Administration announced tariffs on steel and aluminum in a move that has created concerns over the potential for a broader trade war with China and the EU.
- U.S. orders for durable goods rose 3.1 percent in February – excluding defense, new orders increased 2.5 percent.
- The U.S. Federal Reserve raised interest rates a quarter of a percentage point to 1.75%.

Weather

- Recent weather patterns in March brought four consecutive Nor'easter storms over the last month to the East, boosting heating load demand.
- April forecasts call for below-normal temps in the Upper Plains and normal temps extending east to Chicago. The rest of the country should see above-normal temperatures.
- Severe drought conditions are developing in the four corner Southwest states and extending east through the Oklahoma/Texas Panhandle.

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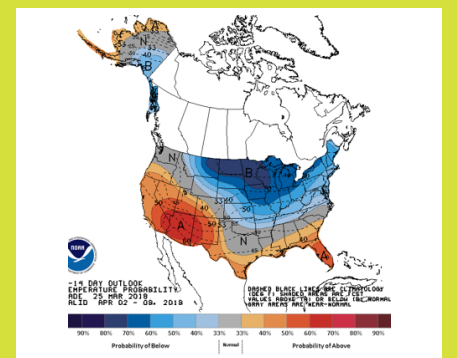
Prompt Month Settlements

	Apr '18/ May '18	30-Day Change
April Nat Gas \$/mmBTU	\$2.588	-\$0.07/MMBtu
May Crude Oil \$/bbl	\$65.97	+\$2.42/bbl

As of 3/27/2018.

Temperature Outlook

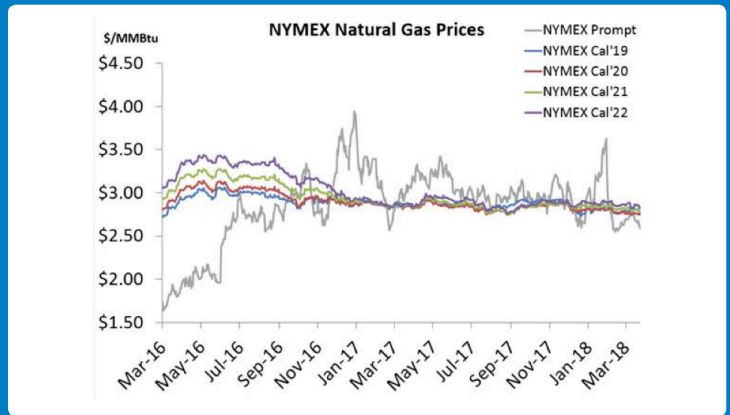
Source: NOAA



Natural Gas



- NYMEX prompt month gas futures fell to a six-week low of \$2.59/MMBtu. Short-term gas prices rose to a high of \$2.80 earlier this month due to colder-than-normal weather forecasts.
- NYMEX calendar strip prices traded in a tight range with Cal'19-Cal'22 strips trading at \$2.74-\$2.82. Record gas production is weighing on prices while structural demand growth provides floor support.
- Residential and commercial gas consumption is holding above 30 Bcf/day as chilly weather has driven heating demand in the Midwest and East.
- Storage inventories stand at 1,446 Bcf, a 329 Bcf (-19%) deficit to the five-year average and 667 Bcf (-32%) lower than year-ago levels. Stocks are on pace to end March at the second lowest levels since 2010.
- Near-term gas prices may find support this spring as power sector and storage injection demand compete for gas supply.
- Gas production regained an upward trajectory, growing to an all-time high of 79.1 Bcf/day. Average weekly gas production is 10% higher than year-ago levels.
- The first LNG export cargo from Cove Point liquefaction facility in Maryland arrived in the U.K. on March 21. The cargo was diverted from Asia to Europe as gas prices in the U.K. spiked.
- The California PUC has directed So Cal Gas to maximize storage injections this summer to avoid future service disruption for customers. Due to ongoing restrictions at the Aliso Canyon storage facility, in combination with strong withdrawals this winter, working gas storage inventories are at critically low levels (~48 Bcf) in Southern California.

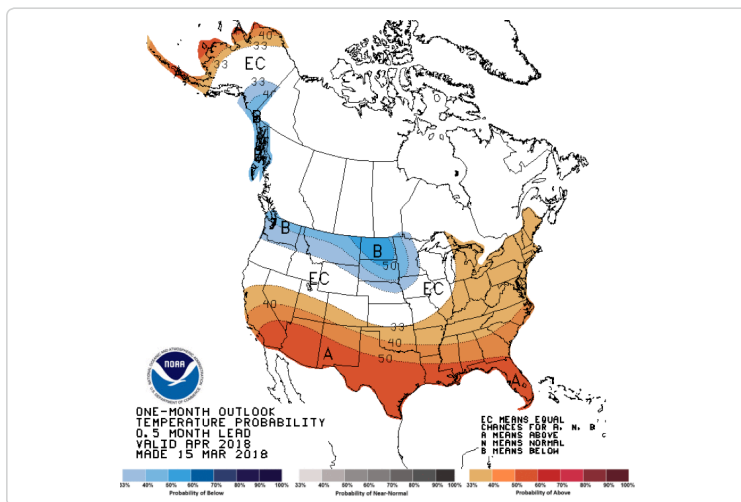


NYMEX Futures Pricing	Current Price	Last Month	M/M Change	Last Year	Y/Y Change
Prompt (Apr18)	\$2.591	\$2.625	(\$0.034)	\$3.051	(\$0.460)
Winter (Nov18-Mar19)	\$2.938	\$2.945	(\$0.007)	\$3.080	(\$0.141)
12 Month Strip	\$2.806	\$2.797	\$0.009	\$3.312	(\$0.506)
2019	\$2.759	\$2.783	(\$0.024)	\$2.867	(\$0.108)
2020	\$2.745	\$2.775	(\$0.030)	\$2.857	(\$0.112)

Month Temperature Outlook *Source: NOAA*



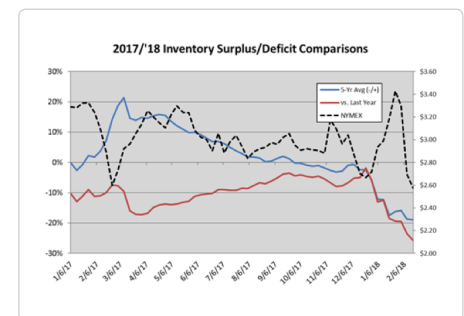
- Colder to much colder changes are expected for the Midwest, East and parts of the South for the beginning of April. Meaningful blocking is expected to develop over Alaska (-EPO index) and Greenland (-NAO index), which should allow cold air from Canada to spill into the eastern two-thirds of the U.S.
- La Nina conditions are expected to gradually fade this spring and a weak/neutral La Nina summer is expected overall. As a result, our internal research suggests a normal to cooler east and south for the summer with above average temperatures potentially over the drought regions of the Rockies and parts of the West.



Natural Gas Storage *Source: NOAA*



- For the week ending March 16, the EIA reported a withdrawal of 86 Bcf. This was lower than last year's 137 Bcf withdrawal, but larger than the five-year average of withdraw of 53 Bcf.
- Natural gas storage inventories currently stand at 1,446 Bcf, a 32% deficit to year-ago levels and 19% lower than the five-year average. Recent cold in the Midwest and East should support draws that are above the five-year average for the next report.
- Stocks are on track to end March at the second-lowest level since 2015. In 2015, storage finished winter at 1,461 Bcf but refilled to 3,931 Bcf by end of October.
- The NYMEX 12-month rolling strip price will likely be inversely related to the storage deficit; the chart below illustrates this correlation. In March 2017, we saw a surplus of 21% and prices declined while in January 2018 a widening of the deficit to 30% pushed prices higher before correcting.
- The market will look for storage to refill to ~3.8 Tcf by end of October. Summer weather and the pace of production growth will be key in refilling depleted storage stocks and shrinking the storage deficit though robust production is helping to offset lower storage year over year.



Bulls vs. Bears



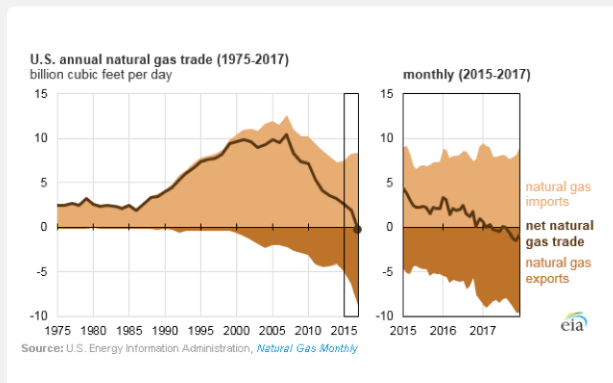
Bulls

- Late winter blocking provides the eastern two-thirds of the country with some below-average cold temperatures eliciting some above-average heating demand from March and April.
- Impending early summer forecasts calling for warmer-than-average temperatures would push gas and power forwards higher ahead of June.
- Underground storage deficits hold or widen further from current levels of 30 and 16% versus last year and the five-year average, respectively.
- The first shipment of LNG was sent out of the freshly-commissioned Cove Point export terminal in Maryland on March 2. Expected normal operations will liquify and take away ~0.66 Bcf/day of supply moving forward.
- Overall delays in new power generator projects have led to potentially tighter resource availability in some ISOs across the country, especially the ERCOT region. The potential for future supply/demand constraints has pushed up forward prices in affected areas.

Bears

- Lower 48 natural gas production has reached the robust level of 78 Bcf/day for the past four weeks, which is almost 8 Bcf/day higher than 2017 equating to a 10% increase.
- Crude oil prices above \$60 per barrel will bring more associated gas supply to the market.

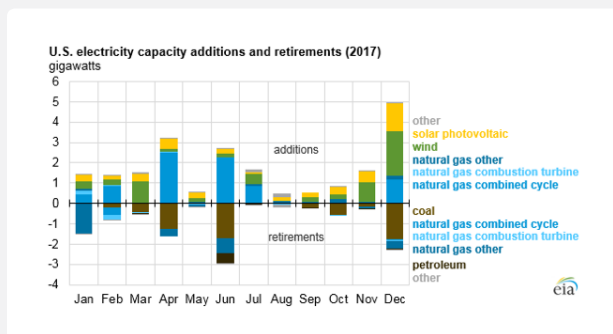
The U.S. Becomes a Net Exporter of Natural Gas



Source: EIA

- Due to record gas production, the U.S. has become a net exporter of natural gas for the first time since 1957. The U.S. is exporting more gas via pipelines to Mexico, as well as LNG to Mexico and other countries in Asia, Europe and South America. These increased exports are offsetting pipeline imports from Canada.
- The top four countries for U.S. exports in 2017 were Mexico, South Korea, China and Japan.

Retirements and Additions to U.S. Generating Capacity in 2017



- In 2017 total U.S. generation declined by -1.5% because of lower weather demand year-over-year, but renewables (hydro, wind and solar) all gained market share from coal and gas.
- In 2017, 6.3 GWs of coal generation was retired, while 9.3 GWs of new gas-fired capacity was brought online.
- A majority of the new gas generation was added in the Northeast (Pennsylvania, Ohio, West Virginia) and Texas where plants could be close to sources of natural gas.

Great Lakes Electric Summary: Customer Takeaways

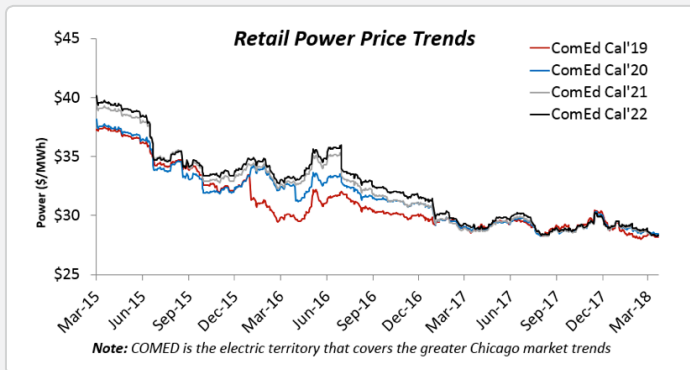


- Forward power prices in the Illinois and Michigan markets are currently trading within 2% of the new contract lows set this winter. Buyers should look for buying opportunities as Midwest forward power prices have put in seasonal lows in the late February to mid-April timeframe over the past three years.
- Ohio forward power prices have traded largely sideways since the beginning of February and have found support at 5-10% above the contract lows achieved in August 2017. Forward prices in the Ohio market have become backwardated once again, making longer contract terms more favorable for energy buyers.
- Colder-than-normal temperatures expected across the Midwest and East through mid-April may provide some support for index and forward power prices in these regions during the shoulder season.
- Midwest day-ahead index power prices increased 16% on average from February to March as colder-than-normal weather and a series of Nor'easters along the East Coast kept natural gas prices and power demand at elevated levels.

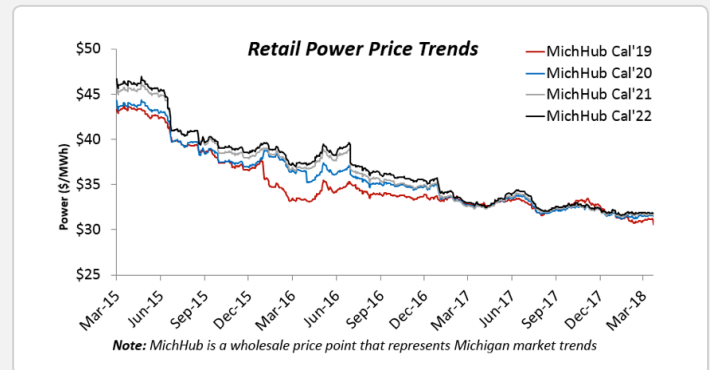
Great Lakes Retail Power Price Trends Chart

% Change in Forward Power	ComEd 2018-2019	ComEd 2020-2021	Mich Hub 2018-2019	Mich Hub 2020-2021	AEP-Day 2018-2019	AEP-Day 2020-2021	Ameren 2018-2019	Ameren DAY 2020-2021
Year-over-Year	-2%	-1%	-5%	-3%	2%	2%	-4%	-3%
Month-over-Month	-1%	-1%	-1%	0%	-1%	-1%	0%	0%
Year-to-Date	-5%	-6%	-8%	-9%	-1%	-3%	-5%	-9%
Compared to All-Time Low	1%	2%	0%	1%	6%	6%	1%	1%

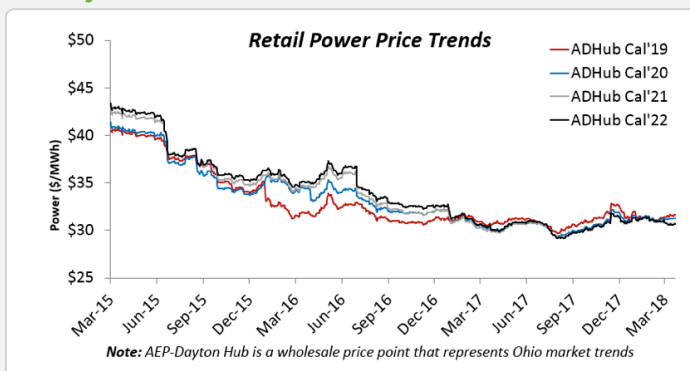
ComEd



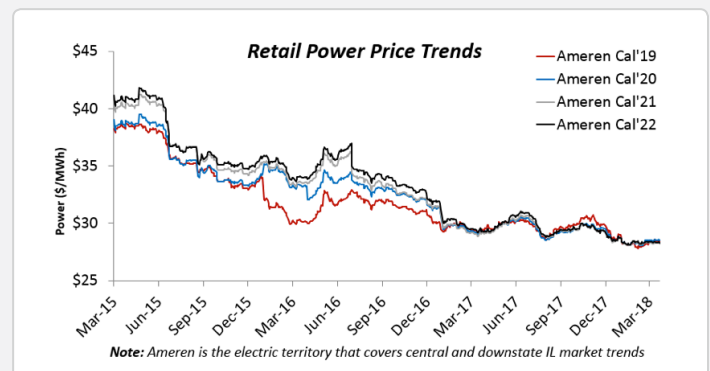
Mich Hub



AEP-Dayton Hub



Ameren



Mid-Atlantic Electric Summary: Customer Takeaways

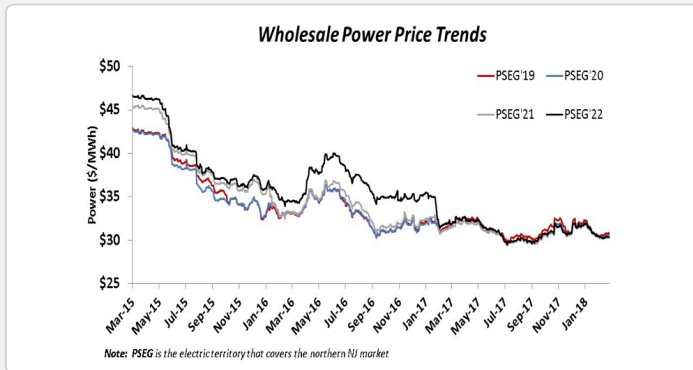
- PJM forward energy prices, through 2022, are trading roughly 1% higher month-over-month on the front end of the curve (2019-2020) and are unchanged on the back end of the curve (2021-2022).
- Day ahead index prices in Eastern PJM settled 2% higher this February versus last February.

Mid-Atlantic Retail Power Price Trends

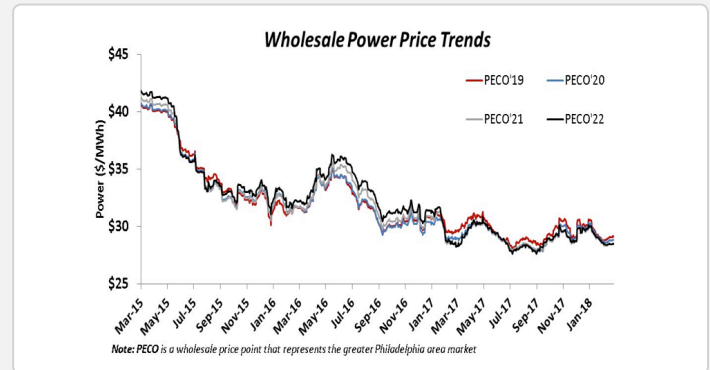
24-Month Fwd Trading Range	PSEG 2019-2020	PSEG 2021-2022	PECO 2019-2020	PECO 2021-2022	APS 2019-2020	APS 2021-2022	BGE 2019-2020	BGE 2020-2021	PPL 2019-2020	PPL 2021-2022
vs High (\$/MWh)	-\$5.76	-\$8.13	-\$6.09	-\$7.47	-\$2.02	-\$2.49	-\$4.43	-\$4.68	-\$5.07	-\$5.65
vs Low (\$/MWh)	\$1.09	\$0.85	\$1.11	\$0.82	\$2.87	\$2.68	\$3.01	\$2.86	\$2.02	\$1.10
vs High (%)	-16%	-21%	-17%	-21%	-6%	-7%	-11%	-11%	-14%	-16%
vs Low (%)	4%	3%	4%	3%	9%	9%	9%	8%	6%	4%

Index Pricing	AECO	APS	BGE	DPL	DUQ	JCPL	PEPCO	PPL	PSEG	MedEd	PECO	Penelec
February '17	\$24.62	\$26.54	\$29.04	\$30.68	\$26.04	\$25.50	\$28.26	\$24.88	\$25.85	\$24.75	\$24.26	\$25.88
February '18	\$25.50	\$27.77	\$29.45	\$27.82	\$27.38	\$25.31	\$28.89	\$24.51	\$26.02	\$26.08	\$25.67	\$28.65
% Change	4%	5%	1%	-9%	5%	-1%	2%	-1%	1%	5%	6%	11%

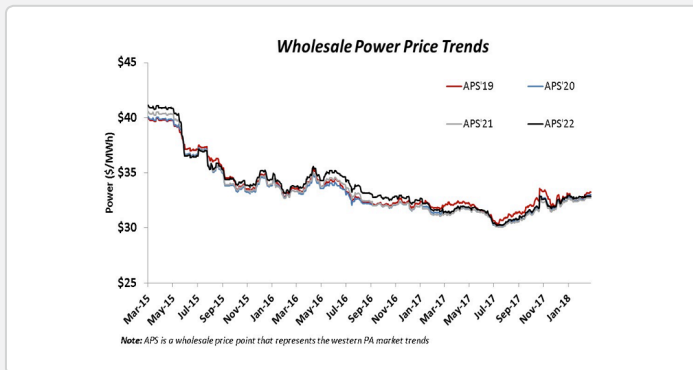
PSEG



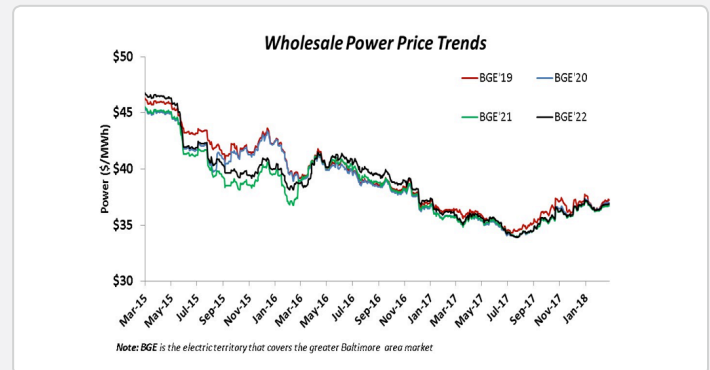
PECO



APS



BGE



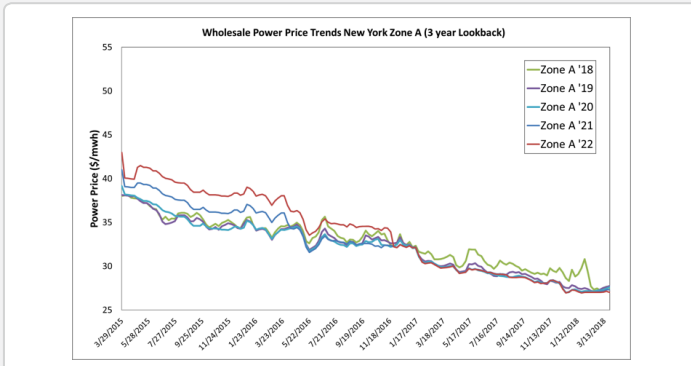
Northeast Electric Summary: Customer Takeaways

- The Federal Energy Regulatory Commission approved the ISO New England's newly-proposed capacity auction structure on March 9.
- The substitution auction would be made up of state-sponsored resources that would offer to take on obligations at a potentially lower clearing price.
- The new structure will take effect at the February 2019 forward capacity auction which would correspond for the capacity year June 2022–May 2023.
- New York forward prices remain attractive for all calendar strips through 2022 and are currently just 1-2% above all time lows.
- Calendar 2019–2022 for New England zones hold steady at 7% above three-year lows.

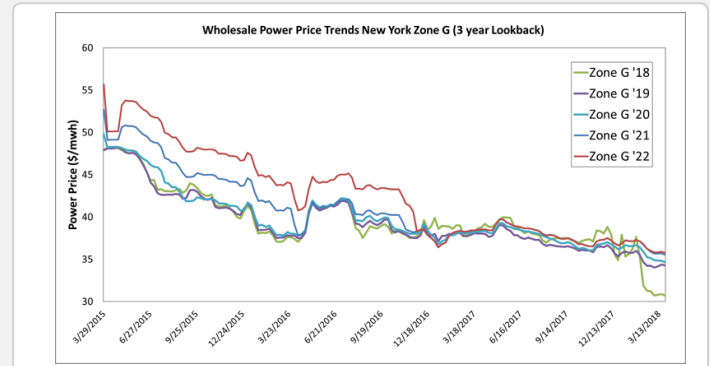
North East Retail Power Price Trends

% Change in Forward Power	NP Cal 2018	NP Cal 2019	NP Cal 2020	NP Cal 2021	SP Bal 2018	SP Cal 2019	SP Bal 2020	SP Cal 2021	Mid Cal 2019	Mid Cal 2020	Mid Cal 2021
Year-over-Year	18%	6%	7%	10%	22%	11%	12%	14%	-9%	-6%	-2%
Month-over-Month	6%	4%	2%	2%	6%	5%	2%	2%	2%	1%	1%
Year-to-Date	9%	1%	3%	8%	13%	4%	5%	9%	-18%	-14%	-8%
Compared to All-Time Low	19%	8%	10%	13%	23%	13%	14%	16%	4%	3%	4%

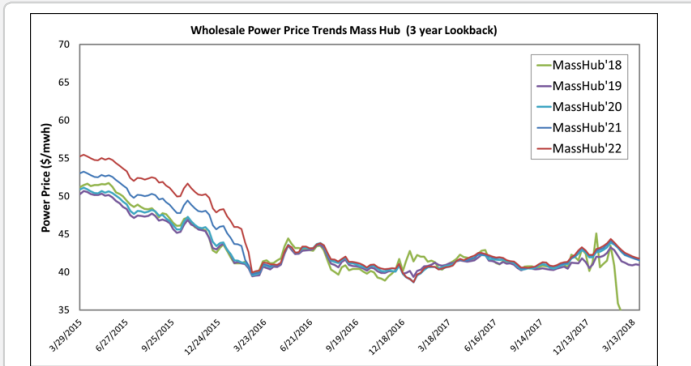
New York Zone A



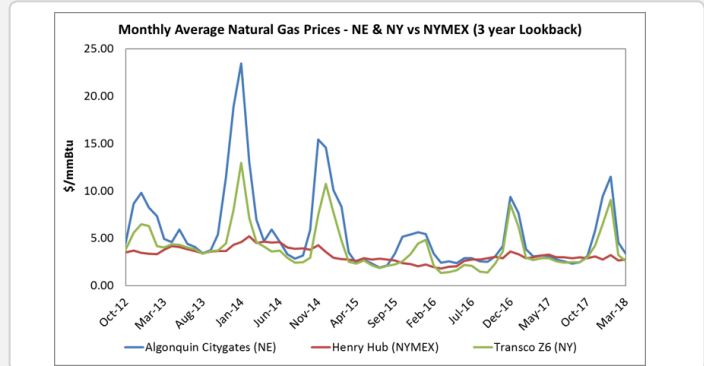
New York Zone G



Mass Hub



NE & NY vs. NYMEX



Texas Electric Summary: Customer Takeaways

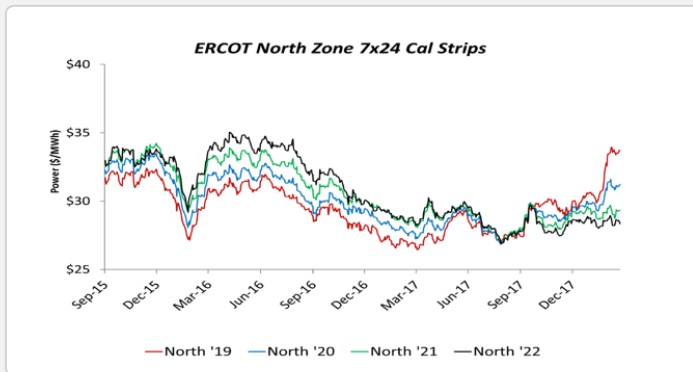


- ERCOT forwards continue to move higher for Bal '18 and Cal '19 as reserve margins continue to tighten.

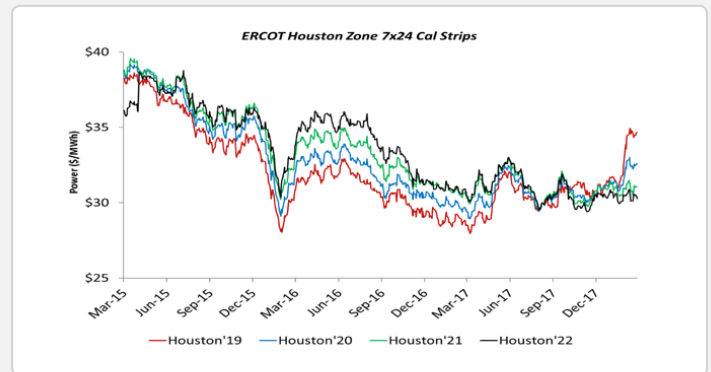
Texas Retail Power Price Trends

% Change in Forward Power	Houston 2018-2019	Houston 2020-2021	North Zone 2018-2019	North Zone 2020-2021	South Zone 2018-2019	South Zone 2020-2021	West Zone 2018-2019	West Zone 2020-2021	PPL 2019-2020	PPL 2021-2022
Year-over-Year	16%	0%	19%	1%	18%	1%	18%	-2%	-\$5.44	-\$5.80
Month-over-Month	5%	0%	6%	0%	5%	0%	5%	0%	\$1.64	\$0.94
Year-to-Date	12%	-2%	13%	-4%	14%	-1%	11%	-7%	-15%	-17%
Compared to All-Time Low	18%	4%	22%	7%	20%	5%	24%	10%	5%	3%

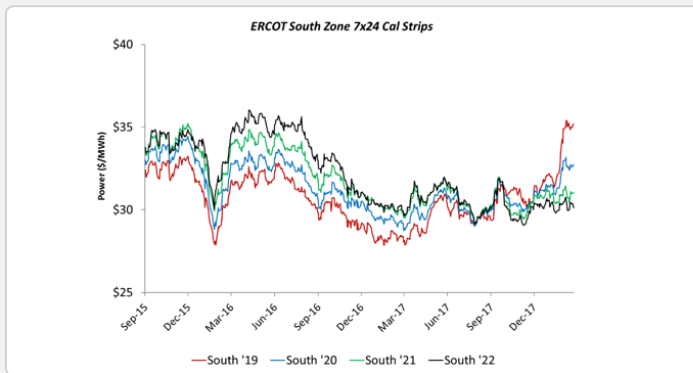
ERCOT North Zone



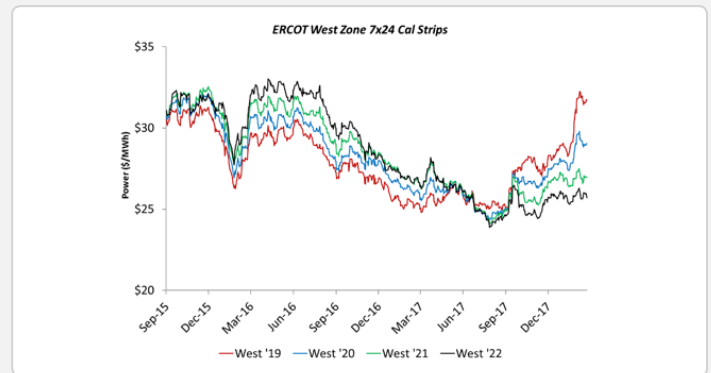
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



California Electric Summary: Customer Takeaways

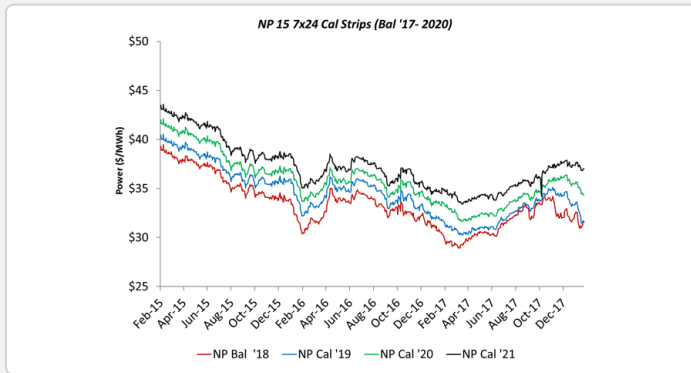


- Hydro snow water equivalent has improved dramatically in California moving from 30% of normal to 60-80% of normal in March.
- Forward power prices in CAISO (SP/NP15) have moved higher since last summer, but are still 14% above historic lows.

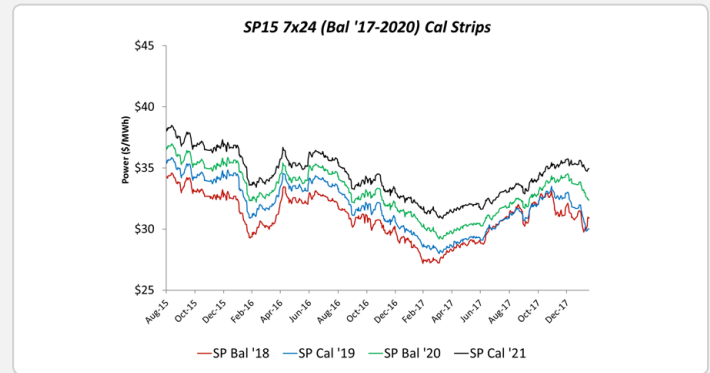
California Retail Power Price Trends

% Change in Forward Power	NP Cal 2018	NP Cal 2019	NP Cal 2020	NP Cal 2021	SP Bal 2018	SP Cal 2019	SP Bal 2020	SP Cal 2021	Mid Cal 2019	Mid Cal 2020	Mid Cal 2021
Year-over-Year	6%	0%	3%	6%	12%	4%	7%	11%	-12%	-10%	-4%
Month-over-Month	-1%	-5%	-3%	-1%	1%	-5%	-3%	0%	-5%	-3%	1%
Year-to-Date	0%	-3%	1%	6%	6%	-1%	3%	7%	-20%	-16%	-9%
Compared to All-Time Low	10%	4%	8%	11%	15%	8%	12%	14%	2%	1%	3%

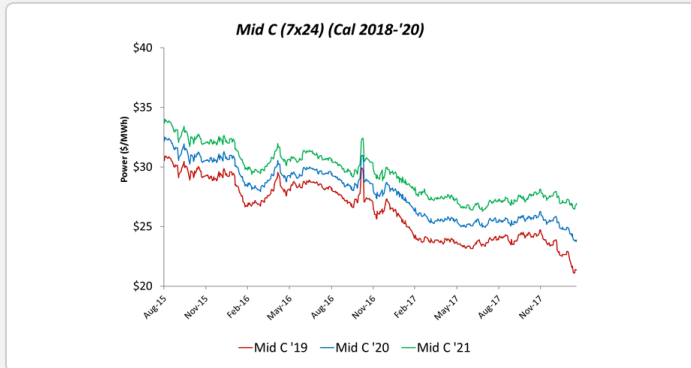
NP 15 7x24



SP 15 7x24



Mid C 7x24



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