

Constellation's MARKET INTEL NEWSLETTER

Energy Market Update for Commercial & Industrial Customers

October 2018

Fuels

Natural Gas

- Prompt month NYMEX natural gas prices broke above the \$3 per MMBtu level early in October, as a colder-than-normal September removed the possibility of a late season storage inventory recovery.
- October 2018 month-to-date natural gas production averaged 85 Bcf/day, nearly 11 Bcf/day more than the same period last year.
- Inventories of natural gas are projected to end the injection season at approximately 3.2 Tcf, a 15-year low.
- Early forecasts for winter point to a weak El Niño, a condition usually associated with a somewhat colder-than-normal winter.
- European liquified natural gas (LNG) National Balancing Point (NBP) for November through March is trading at \$9.05 MMBtu. Asian LNG (Japan-Korea Marker (JKM) is trading at \$11.40 for January.
- Crude oil prices have tumbled more than \$9 per barrel since October 3rd, trading at \$67.31 per barrel (October 25, 2018).

Coal

- PRB coal for 2019 was unchanged at \$12.30 per ton.
- CAPP for rail for 2019 was trading at \$68.25 per ton.
- 2019 API Rotterdam coal was trading at \$97.25 per ton.

Oil

- WTI prompt month crude oil was trading at \$67.30 per barrel (October 25, 2018), down over \$9 per barrel from earlier in the month.
- Saudi Arabia's energy minister signaled that the country would be inclined to move to support crude oil prices in the fourth quarter potentially curtailing some production, Reuters reported.
- The murder of journalist Jamal Khashoggi continues to weigh on the global crude oil market.
- The U.S. is set to begin to sanction Iranian oil in November. *Financial Times* reports that "No one is sure about how much oil (Iranian) will be removed from the market once the sanctions start." It is widely expected that the amount will be in the neighborhood of 2 million barrels per day.

Power

- The Federal Energy Regulatory Commission's (FERC) winter assessment (2018/2019) highlighted pipeline constraint issues this winter for CAISO, ISONE and NYISO, and the limited availability of natural gas in high-demand periods.
- Higher gas prices for 2019 caused by the current low inventory have raised forward power prices with ISONE, CAISO and ERCOT, up the most at 20–50% from all-time lows.

Economy

- Sales of existing homes fell 3.4% in September as mortgage rates hit a seven-year high.
- The unemployment rate in September was 3.7%, *Financial Times* reported.
- Consumer inflation for September was 2.3% with Core inflation at 1.96, *Financial Times* reported.

Weather

- The six-to-ten-day outlook (from October 25, 2018) for the U.S. calls for 30-year normal temperatures throughout the country, except in the Great Plains region which is showing a below-normal outlook.
- The winter forecast favors a weak El Niño, which is often associated with a modestly colder-than-normal solution.

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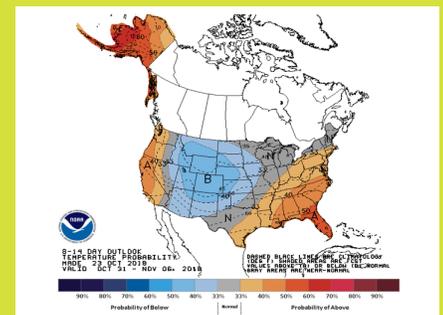
Prompt Month Settlements

	Oct. '18	30-Day Change
Nat Gas \$/mmBTU	\$3.185	+\$0.161/MMBTU
Crude Oil \$/bbl	\$67.59	-\$3.98/BBL

As of 10/29/2018.

Temperature Outlook

Source: NOAA



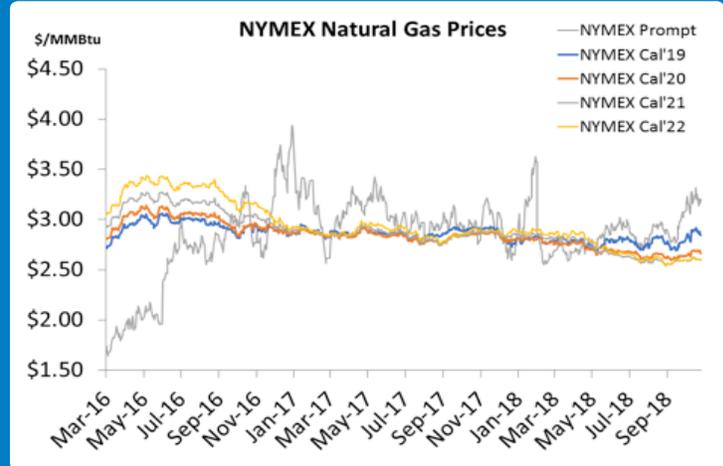
NYMEX Prompt Month Chart



Gas Report



- NYMEX prompt month gas futures gained \$.30/MMBtu to the \$3.20s as the market corrected for the large storage balance deficit, which is now projected to be at a 13-year low.
- Natural gas stocks are now 601 Bcf (-16.5%) lower than year-ago levels, and 605 Bcf (-16.6%) below the five-year average.
- Natural gas production for the week that ended October 17th averaged 85.5 Bcf/day. Gas production year-over-year is now up over 14% from last year.
- The Energy Information Administration (EIA) estimates storage will finish the injection season at 3.26 Tcf, the lowest balance since 2005.
- Natural gas consumption the week of October 11–17th was 85.5 Bcf/day, which is an 8.5 Bcf/day increase over last year, mostly made up of an increase in residential and commercial consumption of 8.1 Bcf/day.

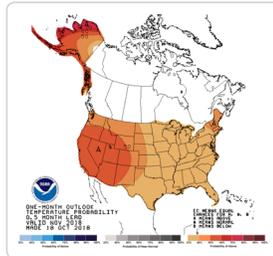


NYMEX Futures Pricing	Current Price	Last Month	M/M Change	Last Year	Y/Y Change
Prompt (Aug18)	\$3.202	\$2.977	\$0.225	\$2.991	\$0.211
Winter (Nov18-Mar19)	\$3.198	\$3.033	\$0.165	\$3.203	(\$0.005)
12 Month Strip	\$2.908	\$2.832	\$0.076	\$3.082	(\$0.174)
2019	\$2.845	\$2.766	\$0.079	\$2.915	(\$0.070)
2020	\$2.667	\$2.636	\$0.031	\$2.849	(\$0.182)
2021	\$2.596	\$2.590	\$0.006	\$2.880	(\$0.283)
2022	\$2.602	\$2.595	\$0.008	\$2.910	(\$0.308)

Temperature Outlook



- While there could be brief cold shots for November, similar to October, our research suggests that December may come in quite warm throughout most of the nation.
- The coldest period this winter may occur in late January and February, very similar to our top analog winter of 2006–2007.
- The factors that are most likely going to affect the winter are blocking and the strength of the El Niño (current strength at +0.9 degrees C). However, we consider other indices when selecting appropriate analog years to the upcoming winter.
- Our winter forecast takes many indices into consideration. Weak El Niños (i.e., water temperature anomalies between +0.5 and +1.0 degrees C) tend to result in colder-than-normal winters across the Midwest, South and East, while moderate El Niños (i.e., water temperature anomalies between +1.0 and +1.5 degrees C) tend to result in colder-than-normal winters across the southern Plains, Ohio Valley, South and parts of the East. The northern tiers of the Midwest and Northeast tend to come in a bit warmer.
- Typically, developing El Niños tend to be warm during the late fall and early winter. Our top analog year suggests a warm December, followed by a transition to cold in late January. This may set the stage for a cold February.

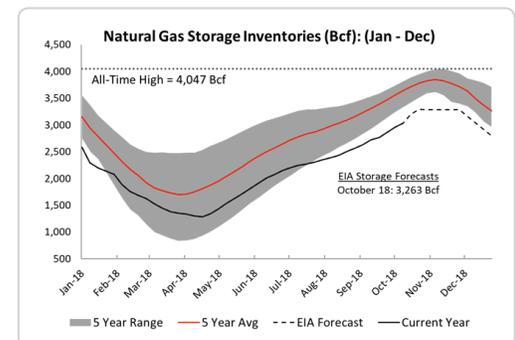


Source: NOAA

Natural Gas Storage



- The Energy Information Administration (EIA) reported an injection of +58 Bcf, slightly above the market consensus of 54 Bcf for the week ending October 19th. NOTE: There was a reclassification in the South-Central Region of 5 Bcf of base gas to working gas, increasing the net injection to 63 Bcf.
- The 58/63 Bcf injection compares to a 63 Bcf injection a year ago and a five-year average of 77 Bcf.
- Storage stands at 3,095 Bcf or 606 Bcf (-16%) below year-ago levels and 624 (17%) below the five-year average.
- In its October Short-Term Energy Outlook (STEO), the EIA forecasts that natural gas inventories will end October at 3.26 Bcf.
- While the storage deficit failed to offer much support during the summer period, it's become a bullish consideration with the start of the withdrawal season only a couple of weeks out and end of October levels expected to finish at a 13-year low.



Bulls vs. Bears



Bulls

Natural Gas

- Storage inventories at or near 3.2 Tcf.
- Crude oil prices move downward from current levels (near \$67 per bbl.)
- A major shift in the weather models pointing to a cold winter solution.

Crude Oil

- A weakening U.S. dollar.
- The Organization of the Petroleum Exporting Countries (OPEC) announces production cuts.
- Strong global GDP numbers.

Bears

Natural Gas

- Production continues upward trajectory.
- Higher crude oil prices – i.e., prices for WTI move above \$70 per bbl.
- A warm winter weather scenario develops.

Crude Oil

- Global GDP falters in last quarter.
- U.S. dollar strengthens.
- OPEC offers increasing production to offset Iranian sanctions.

Natural Gas Specific Topics and Updates

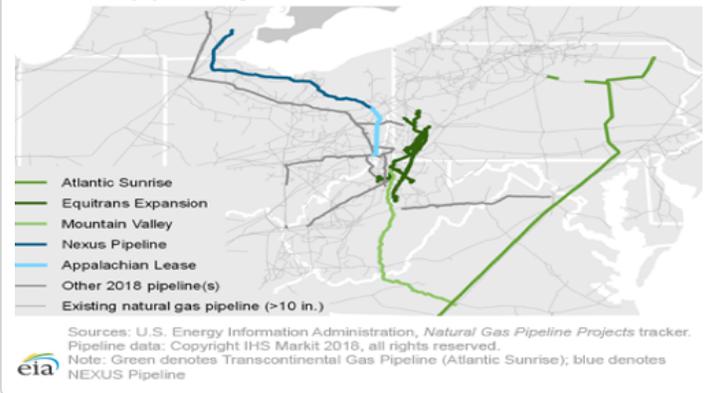
Northeast Pipeline Expansions in October: Two large pipelines in the Northeast either entered full service or began partial service in October, increasing takeaway capacity from the Northeast.

Rover Pipeline: 1 Bcf/day out of 1.5 Bcf began partial service in Ohio in October after FERC granted approval, increasing the supply of gas available to the Michigan, Illinois, Indiana and Ontario markets.

Atlantic Sunrise: The 1.7 Bcf/day pipeline entered full service in early October, bringing additional Northeast Pennsylvania supply to the Maryland connection and bypassing the New Jersey/Pennsylvania/Maryland portion of the existing Transco pipeline.

Mountaineer Xpress: The 2.7 Bcf/day pipeline in West Virginia began operations on October 9th and will supply additional gas to the Columbia pipeline.

Northeast pipeline system

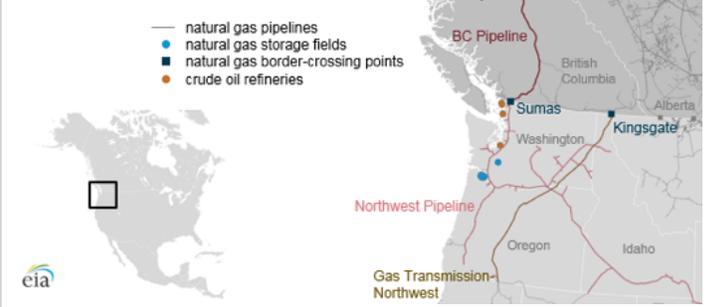


Source: EIA

Pipeline Explosion in British Columbia Impacts U.S. Gas Markets

On October 9th, an explosion on Canadian pipeline operator Enbridge's BC Pipeline forced the closure of a 36-inch pipeline. This reduced gas that flows south to the Sumas import point on the U.S. side of the border to essentially zero. Flows had averaged 1.1 Bcf/day in the first half of 2018. Supplies to the Northwest pipeline were reduced significantly and this has lifted gas prices in the Pacific Northwest (Mid C), California, (PGE and SoCal CG) as well as Rockies prices due to supply there being the closest source. Supply there is now flowing northwest through Idaho into Oregon and Washington, and has reduced Rockies supply flowing east on REX to Zone 3 in the midwest (Nebraska/Illinois). Enbridge announced that work to repair the pipeline could take until mid-November.

Select energy infrastructure in Canada and the Pacific Northwest



Source: EIA

Great Lakes Electric Summary: Customer Takeaways

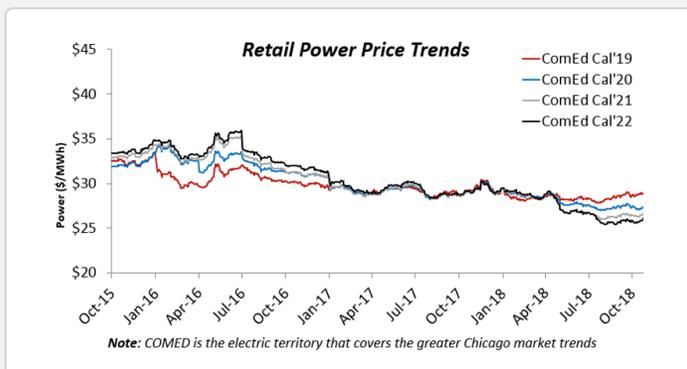


- A chilly October and a lingering gas storage deficit have kept upward pressure on forward power prices in the Midwest market ahead of winter. 2019-2020 prices are now as much as 13% above their prior market lows, while 2021-2022 strips remain within 5% of all-time contract lows.
- 2019 forward prices continue to trade at a premium to the rest of the forward curve as bullish fundamentals have had a larger impact on near-term prices.
- Colder-than-normal weather across the Midwest this month and higher natural gas prices have driven a 20% increase in day-ahead power prices compared to the same month a year ago. Index price changes were mixed month-over-month on a zonal basis, but prices increased 4% on average across the Midwest versus September.
- PJM published its official Summer 2018 RTO Coincident Peaks (5CP) that will be used to determine customer-specific Peak Load Contributions (PLC). PJM's system load peaked at 150,454 MW on August 28th hour ending 17 EPT. The four other peak days in PJM were September 4th HE 17, June 18th HE 17, September 5th HE 17, and August 27th HE 17.

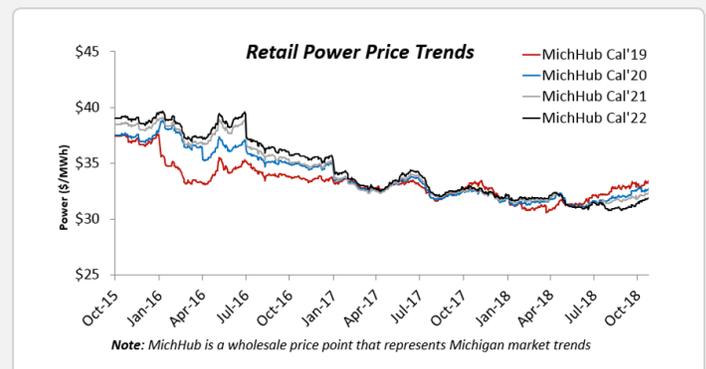
Great Lakes Retail Power Price Trends

% 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	-3%	-9%	1%	-2%	8%	0%	-1%	-4%
Month-over-Month	-1%	1%	1%	2%	2%	2%	0%	2%
Year-to-Date	-4%	-10%	4%	0%	5%	-3%	4%	-1%
Compared to All-Time Low	3%	3%	7%	4%	13%	5%	8%	4%

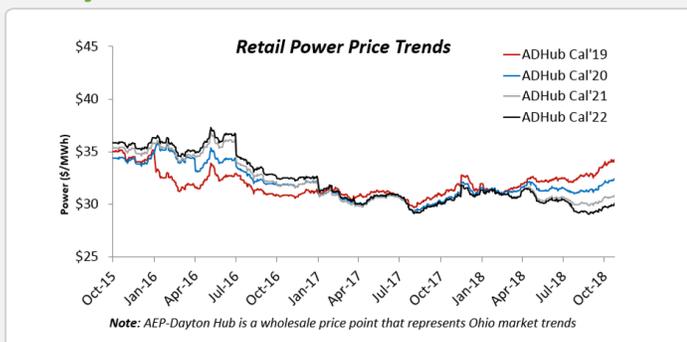
ComEd



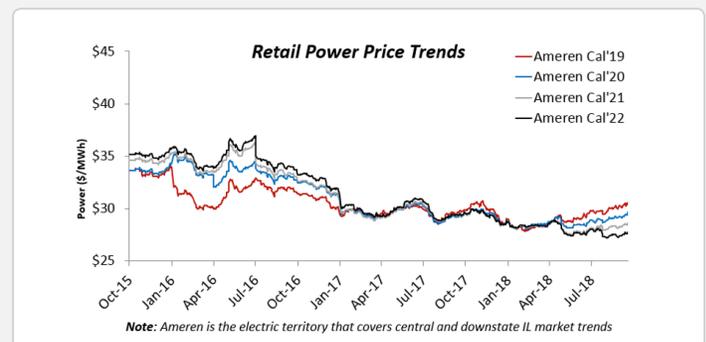
Mich Hub



AEP-Dayton Hub



Ameren



Mid-Atlantic Electric Summary: Customer Takeaways

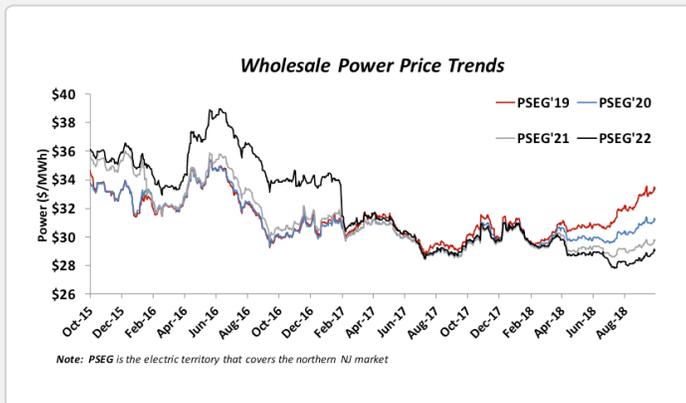
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 • NYMEX natural gas prompt-month futures surged past the \$3.00/MMBtu resistance level and moved up over 50 cents over the past month as continued concerns surrounding lower inventories and wider year-over-year storage deficits heading into the winter has the market spooked a bit of late. As a result, most PJM forward prices are up about +2% over the past month, with the entire power price curve (through 2023) continuing to climb with the movement of gas, particularly on the front-end of the curve (through 2020).
- PJM forward energy prices, through 2023, are up about +2% over the past month for 2019, 2022 and 2023, while 2020-2021 were only up about +1%, on average. Compared to historical lows for each calendar year, the current prices for 2019/2020 are, on average, +15% higher than the lowest that they have ever traded, while the average prices for 2021-2023 are only +5% off the lows for that period.
- Day-ahead index prices in PJM, on average, were -12% lower for September of this year compared with September of 2017. MetEd showed the largest percentage decrease at -28% along with PPL in second at -21% decrease, while DPL was the only zone that showed a year-over-year increase at +1%. The more congested zones in PJM, such as BGE and PEPCO, came in slightly higher than the average decrease at -15%.

Mid-Atlantic Retail Power Price Trends

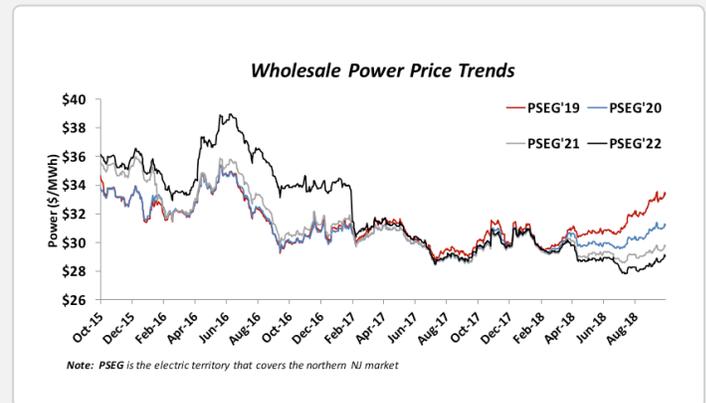
24-Month Fwd Trading Range	PSEG 2019-2020	PSEG 2021-2022	PECO 2019-2020	PECO 2021-2022	APS 2019-2020	APS 2021-2022	BGE 2019-2020	BGE 2021-2022	PPL 2019-2020	PPL 2021-2022
vs High (\$/MWh)	-\$0.29	-\$4.03	-\$0.36	-\$3.35	-\$0.16	-\$1.23	-\$0.67	-\$3.95	-\$2.36	-\$0.31
vs Low (\$/MWh)	\$3.75	\$1.28	\$3.90	\$1.19	\$4.89	\$2.08	\$4.76	\$1.57	\$3.04	\$3.81
vs High (%)	-1%	-12%	-1%	-11%	0%	-4%	-2%	-10%	-6%	-1%
vs Low (%)	13%	5%	14%	4%	17%	7%	14%	5%	11%	14%

Index Pricing	AECO	APS	BGE	DPL	DUQ	JCPL	PEPCO	PPL	PSEG	MetEd	PECO	Penelec
Sep '17	\$29.17	\$38.66	\$41.71	\$31.79	\$39.25	\$31.06	\$41.06	\$33.95	\$31.83	\$38.47	\$29.64	\$34.80
Sep '18	\$27.48	\$33.97	\$35.76	\$32.14	\$36.87	\$27.38	\$34.55	\$26.90	\$27.70	\$27.67	\$26.74	\$32.13
Year-over-Year % Change	-6%	-12%	-14%	1%	-6%	-12%	-16%	-21%	-13%	-28%	-10%	-8%

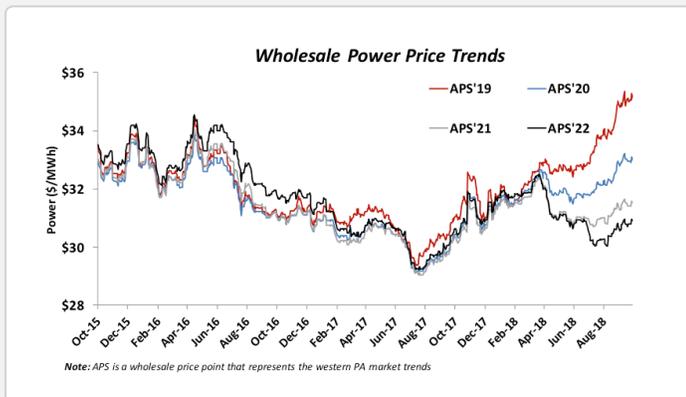
PSEG



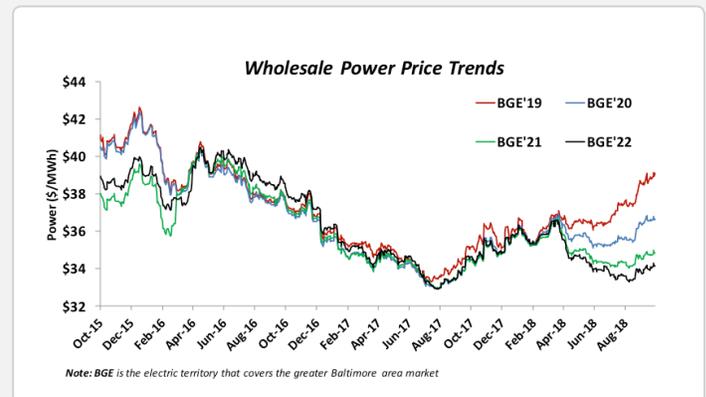
PECO



APS



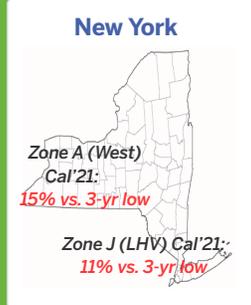
BGE



Northeast Electric Summary: Customer Takeaways



- ISO New England released its preliminary system peak information on October 22th, which revealed a change in the hour from the previous August 29th, hour ending (H.E.) 18 to H.E. 17 at 25,528 MW. For the NYISO, the peak hour remains August 29 H.E. 17 at 31,861 MW.
- New England day ahead (DA) index prices have averaged \$38.96/MWh thus far in October after September's monthly average of \$33.89.
- New York index prices for October have been mixed. Zone A DA index prices so far in October have averaged \$28.87/MWh, slightly lower than September. Zone J DA index prices are also lower month-over-month, averaging \$34.45/MWh for October so far. Zone G is the outlier, with prices up slightly for October averaging \$33.14/MWh to date.
- New York forwards for 2021 and 2022 have corrected since the carbon pricing proposal from the ISO in early May led to a massive rally. Prices are still elevated above pre-May levels, with Cal 2022 trading ~20% higher than a year ago.



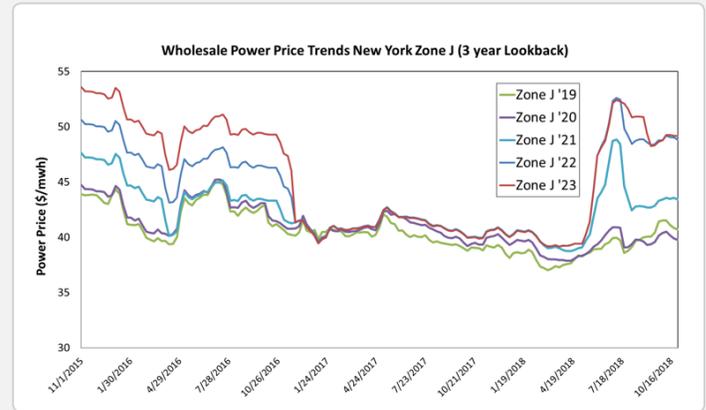
Northeast Retail Power Price Trends

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	10%	7%	6%	5%	4%	0%	-3%	2%	10%	8%
Current Price vs 3-Year Maximum	-2%	-4%	-9%	-14%	-19%	-10%	-14%	-13%	-8%	-9%
Current Price vs 3-Year Minimum	16%	14%	14%	14%	14%	9%	5%	11%	20%	20%

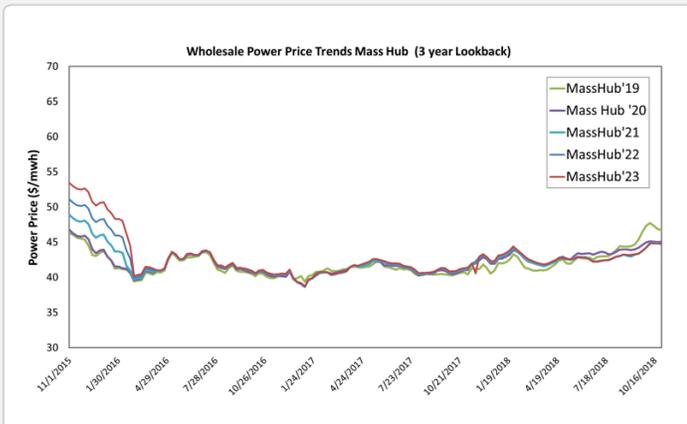
New York Zone A



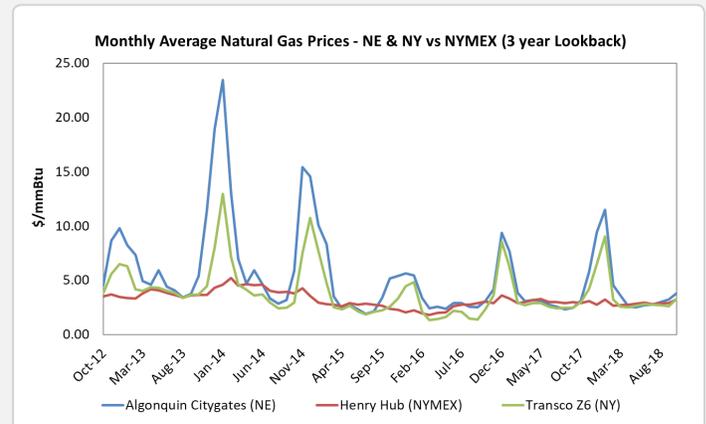
New York Zone J



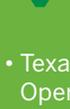
Mass Hub



NE & NY v.s. NYMEX



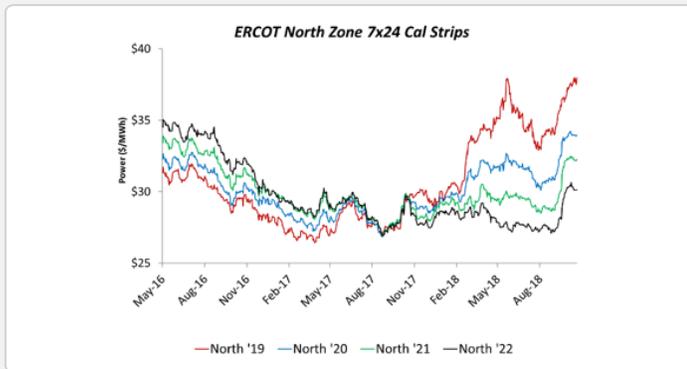
Texas Electric Summary: Customer Takeaways

-  American Electric Power (AEP) announced it would retire its 650 MW Okalunion coal plant located in north Texas by October 2020 based on current market economics. The Okalunion plant can serve both ERCOT and SPP markets. The plant represents 4.4% of ERCOT summer capacity.
-  ERCOT's Independent Market Monitor, the Brattle Group, released a study on the economically optimal reserve margin, which was determined to be 9%, and market equilibrium margin was determined to be 10.25%.
-  Texas PUCT is holding additional public meetings in late October to discuss a Summer 2018 recap and possible changes to the Operating Reserve Demand Curve (ORDC).

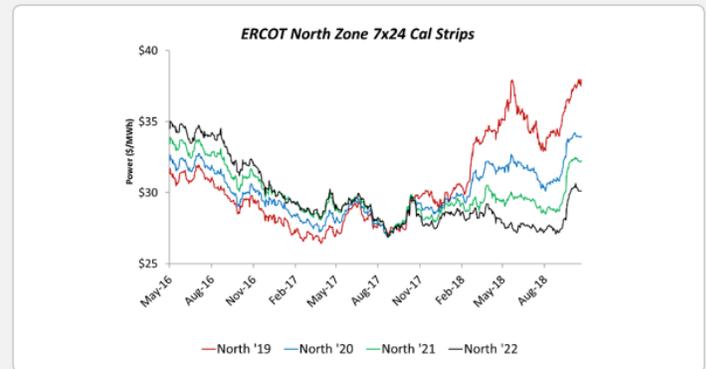
Texas Retail Power Price Trends

% Change in Forward Power	Houston 2019-2020	Houston 2021-2022	North Zone 2019-2020	North Zone 2021-2022	South Zone 2019-2020	South Zone 2021-2022	West Zone 2019-2020	West Zone 2021-2022
Year-over-Year	20%	6%	22%	6%	18%	3%	21%	4%
Month-over-Month	3%	5%	3%	4%	3%	4%	4%	6%
Year-to-Date	25%	6%	25%	4%	25%	5%	20%	-3%
Compared to All-Time Low	31%	14%	35%	16%	31%	13%	33%	16%

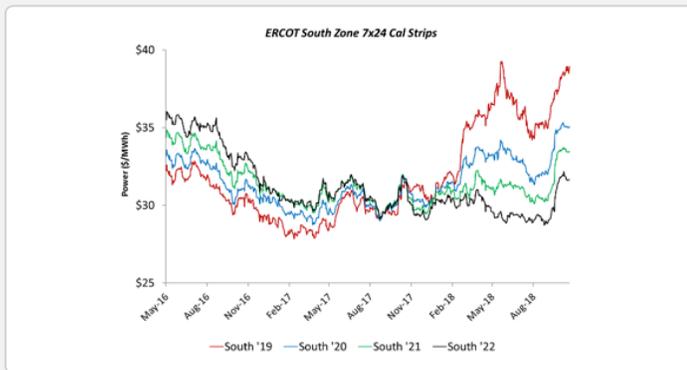
ERCOT North Zone



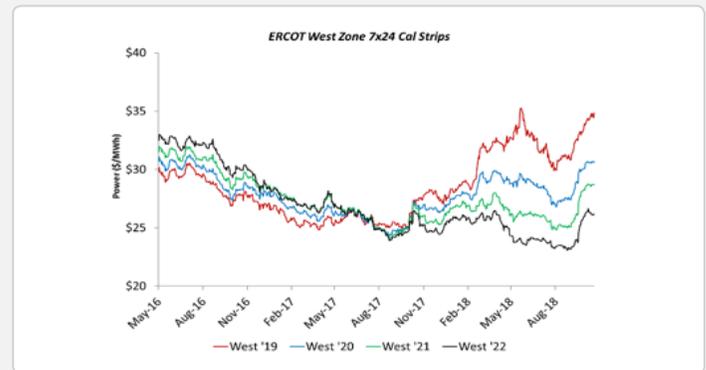
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



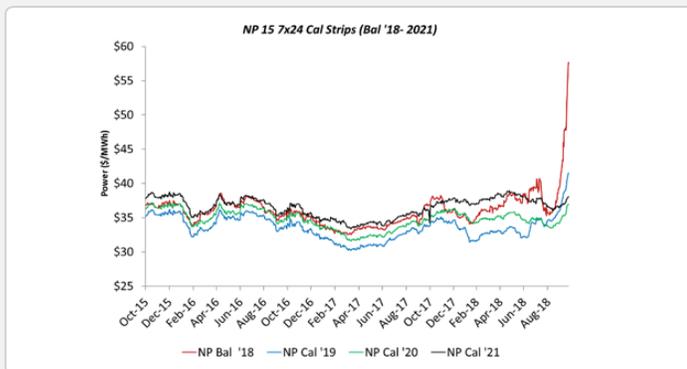
California Electric Summary: Customer Takeaways

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 • Enbridge's 36-inch BC Pipeline in British Columbia ruptured on October 9th, cutting 1.1 Bcf/day of Canadian imports to near 0 Bcf/day. Repairs are expected to be completed by mid-November, but flows will be 80% of normal initially.
- SoCal Gas system pipeline capacity is likely to only be 2.5 Bcf/day, down from ~4.5 Bcf/day of design capacity as ongoing pipeline maintenance will not likely be completed until April.
- SoCal City Gate basis versus SoCal Border continues to widen out for this winter on abovementioned pipeline concerns.
- California reservoirs are entering Winter 2018/2019 either at or below historical averages.

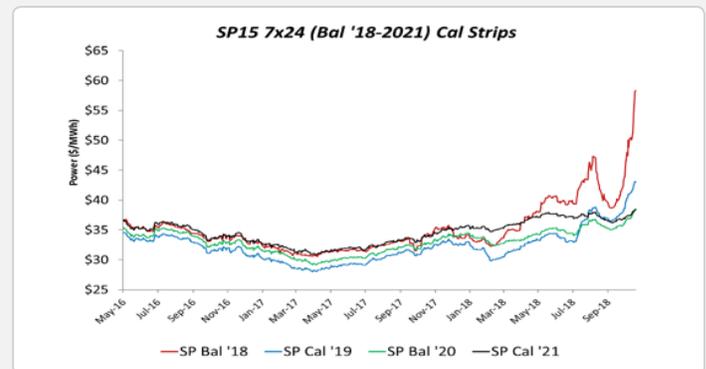
California Retail Power Price Trends

% 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	56%	22%	6%	5%	70%	34%	17%	13%	33%	9%	11%
Month-over-Month	55%	17%	8%	4%	46%	16%	8%	4%	30%	12%	8%
Year-to-Date	59%	20%	2%	1%	71%	31%	12%	7%	36%	9%	9%
Compared to All-Time Low	77%	37%	17%	14%	91%	54%	32%	24%	53%	19%	16%

NP 15 7X24 Note: Bal '18 reflects (Nov-Dec '18)



SP 15 7X24



Mid C 7x24



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