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Constellation's
MARKET INTEL NEWSLETTER
Energy Market Update for Commercial & Industrial Customers

September 2018

Fuels

Natural Gas

- Natural gas production reached a new record 83.2 Bcf per day in September.
- September natural gas production is up about 10 Bcf per day, year-over-year.
- From September 4th through September 20th, prompt-month NYMEX has traded between $2.75 and $2.95 per MMbtu.
- The first three weeks of September were historically warm providing market support through strong power generation loads.
- This past summer was the fourth hottest since 1950 weighted for population.
- Hurricane Florence hit the Carolina Coast causing widespread flooding and power outages. The impacts to macro energy demand were limited.
- For the week of September 14th, the Energy Information Administration (EIA) reported an injection of 86 Bcf, 10 Bcf lower than the same period last year. Current inventories are 2,722 Bcf or -672 Bcf (20%) below year-ago levels.
- European liquefied natural gas (LNG) prices are trading at $9.99 per MMbtu November through March.
- Asian LNG prices are trading at $13.23 per MMbtu for January.

Coal

- Powder River Basin (PRB) coal for 2019 was unchanged at $12.34 per ton.
- Central Appalachian (CAPP) for rail for 2019 was trading at $64.51.
- 2019 API Rotterdam coal was trading at $97.60 per ton.

Oil

- WTI prompt-month crude oil was trading at $70.90 per barrel (September 20th), up from $65.38.
- Brent prompt-month crude oil was trading at $79.24 per barrel.
- Iran's oil exports started to fall noticeably in August as key customers in Asia began to comply with the U.S. efforts to bring Iranian exports to zero.
- Iran's crude oil and condensate exports averaged 1.69 million barrels per day (bpd) in September (Bloomberg).

Power

- Federal Energy Regulatory Commission (FERC) grants PJM permission to delay 2022/2023 capacity auction from May to August to account for tariff rule changes related to state carbon credits.
- Texas Summer 2019 strips move higher on potential revision to Operating Reserve Demand Curve (ORDC).

Economy

- Jobless claims for the week of September 14th were at 210,000, near historic lows.
- Existing home sales for August are expected in the 5.36 million seasonally adjusted range, considered to be strong performance.
- Equities posted their new all-time highs on September 20th, recovering all the ground lost in the stock sell-off in the first quarter of this year.

Weather

- Hurricane Florence rolled into the Carolina Coast causing widespread flooding through North and South Carolina.
- June 1st through September 20th is the fourth hottest such period on record.

Inside This Issue

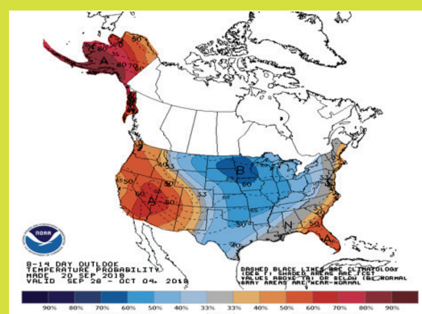
Prompt Month Settlements

	Aug. '18	30-Day Change
Nat Gas $/mmBTU	$2.977	-$0.013/ MMBTU
Crude Oil $/bbl	$70.78	+$3.43/BBL

As of 9/25/2018.

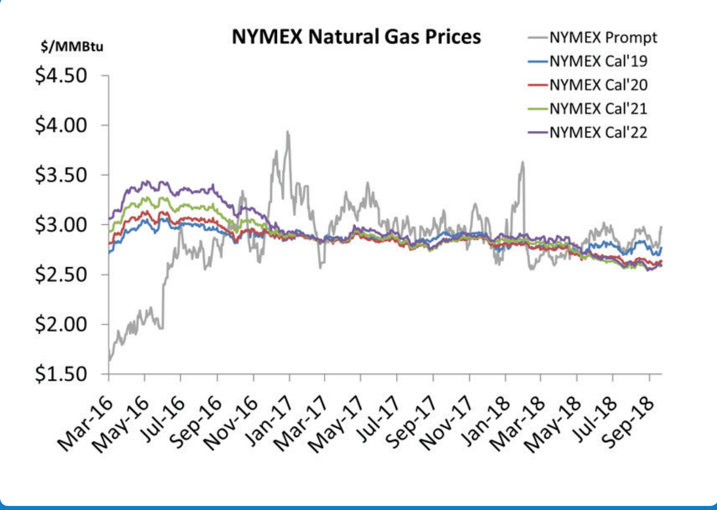
Temperature Outlook

Source: NOAA



Gas Report

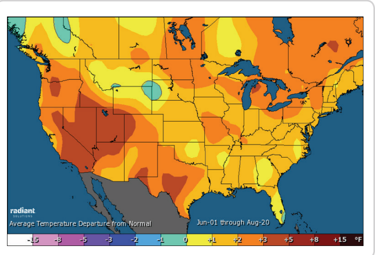
- NYMEX prompt month gas futures gained back roughly $.16/MMBtu to $2.90's as the market corrected for the large storage balance deficit, which appears it may be hard to overcome for the upcoming winter. The temperature factor is losing importance as we advance into the injection cycle.
- The natural gas market had lowered consumption surrounding Hurricane Florence as numerous power outages and demand for power fell, but as there were extended nuclear outages following the storm, natural gas consumption rose as generation from natural gas increased.
- Storage inventories are 2,722 Bcf. The EIA reported an injection of 86 Bcf for the week ending September 14th, which was within the expected range.
- Natural gas stocks are now 672 Bcf (-20%), lower than year-ago levels and 586 Bcf (-18%) below the five-year average.
- Natural gas production for the week ending September 19th has averaged over 83.9 Bcf/day, an all-time high. Gas production year-over-year is now up over 10% from last year.
- EIA estimates storage will finish at 3.47 Tcf, a 10-year low and -9% below the five-year average.
- Natural gas consumption the week of September 13th – September 19th was 63 Bcf/day, a 7 Bcf/day increase over last year, mostly made up of an increase in power generation consumption of 6.3 Bcf/day.



NYMEX Futures Pricing	Current Price	Last Month	M/M Change	Last Year	Y/Y Change
Prompt (Oct 18)	$2.977	$2.895	$0.082	$3.003	($0.026)
Winter (Nov18-Mar19)	$3.033	$3.026	$0.007	$3.005	$0.028
12 Month Strip	$2.832	$2.856	($0.024)	$3.069	($0.238)
2019	$2.766	$2.787	($0.021)	$2.815	($0.048)
2020	$2.636	$2.636	$0.000	$2.840	($0.204)
2021	$2.590	$2.569	$0.021	$2.943	($0.353)
2022	$2.595	$2.550	$0.045	$3.099	($0.504)

Temperature Outlook *Source: NOAA*

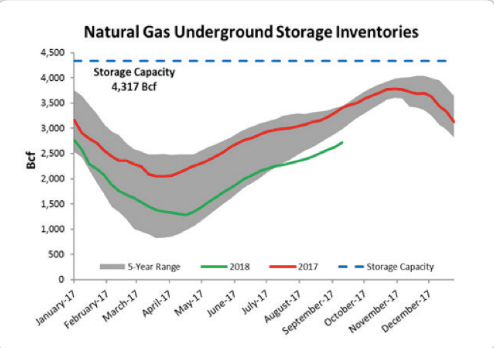
- Widespread warmth is still expected to dominate the South, most of the Midwest, and East through the second half of September.



- Meaningful cold air is building across most of Canada, however the positive no blocking is preventing cold air from moving south of the border.
- The summer of 2018 came in with almost 1,020 national cooling degree days (CDDs), good for the fourth hottest summer on record. This is only the fifth summer ever with over 1,000 CDDs, all of them occurring since 2010.
- The factors that are most likely going to affect the winter are blocking and the strength of the El Nino. In general, there were more cold signals than warm leaning indices. However, recent trends of warmth and a lack of blocking, particularly last year, have allowed cold air masses to come and retreat for extended periods of time.
- Blocking, cold leaning El Nino, more snow and ice growth, the approach to a solar minimum and the negative quasi-biennial oscillation (QBO) can lead to a colder outcome for the winter.

Natural Gas Storage *Source: NOAA*

- The EIA reported an injection of 86 Bcf for the week ending September 14th, compared to last year's injection of 96 Bcf and the five-year average of 76 Bcf.
- The 86 Bcf injection narrowed the five-year deficit by only 10 Bcf, bringing total underground inventories to 2,722 Bcf.
- The storage deficit is now 672 Bcf (-20%) below year-ago levels and 586 Bcf (-18%) below the five-year average level of 3,308 Bcf.
- Record production has helped keep NYMEX prices remain range-bound (Oct $2.972) so far, but continued narrowing of the deficit to a manageable level prior to the start of withdraw season could require further production growth.
- While the market seems to be receiving limited support from the temperature factor, the onset of shoulder season should increase focus of accumulation of total degree days where below-normal temperatures, especially in the northern tier states, could impact weekly storage swings.
- EIA forecasts inventories will total 3.3 Tcf at the end of October; -13% lower than 2017 levels and -14% below the five-year average. It would also be the lowest level since 2005.



Bulls vs. Bears

Bulls

Natural Gas

- Storage inventories at or near 3.2 Tcf.
- Crude oil prices move downward from current levels (near $70 per bbl).
- A major shift in the weather models pointing to a cold winter solution.

Crude Oil

- A weakening U.S. dollar.
- Iran export sanctions imposed by the U.S. scheduled to commence in November.
- Strong global gross domestic product (GDP) numbers.

Bears

Natural Gas

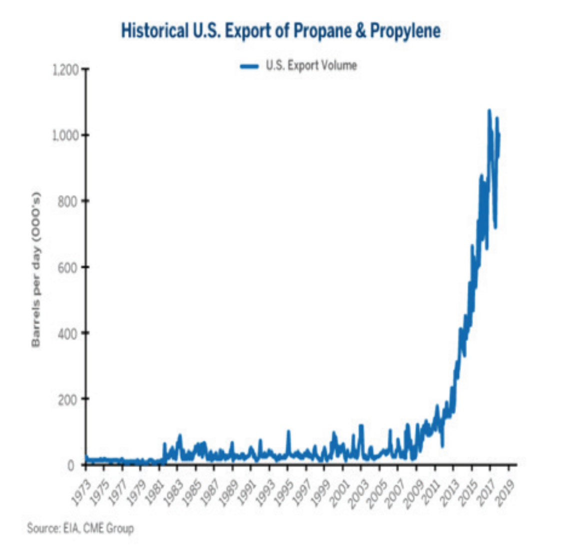
- Production continues upward trajectory.
- Higher crude oil prices – i.e., prices for WTI move above $70 per bbl.
- Cooler fall weather.
- Above average storage injections.

Crude Oil

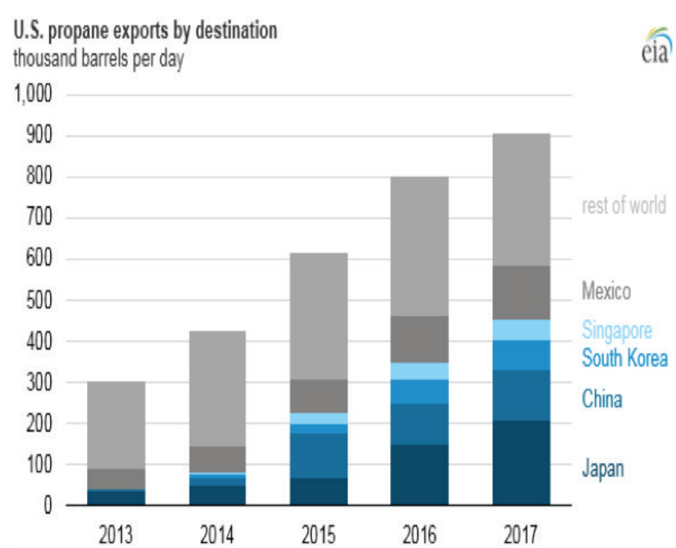
- Global GDP falters in last quarter.
- U.S. dollar strengthens.
- China and India circumvent U.S. sanctions on Iranian oil exports.

Natural Gas Specific Topics & Updates

- U.S. exports of propane began to expand dramatically in 2009.
- Since 2014, U.S. exports of propane have increased 500% from 200,000 barrels per day to over 1 million barrels per day.
- Today, the U.S. is the largest exporter of propane in the world.
- In 2019 it is expected that U.S. exports of propane will be more than 50% of domestic production.
- In 2013, U.S. exports of propane to Asia were less than 50,000 barrels per day.
- In 2018, U.S. exports of propane to Asia will exceed 600,000 barrels per day, a six-fold increase from five years ago.
- In 2019, U.S. exports of propane will exceed 50% of U.S. production.
- The market clearing price in Asia has become the key influence for U.S. propane prices.



Source: EIA



Source: EIA

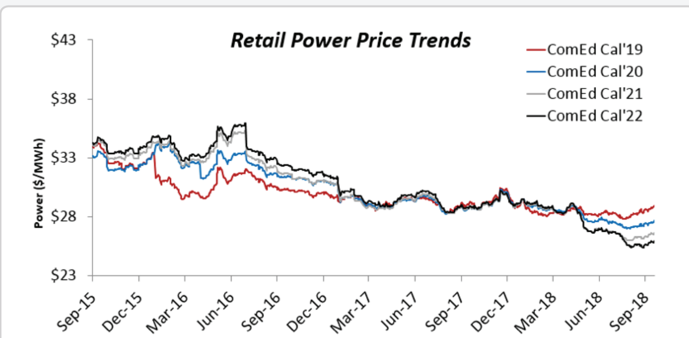
Great Lakes Electric Summary: Customer Takeaways

- 2019 and 2020 forward power prices across the Midwest continue to rally on support from hotter-than-normal weather forecasts and a lingering natural gas storage deficit that could impact natural gas prices this winter. The back end of the forward curve (2021-2022) has been pulled lower as record gas production weighs on long-term natural gas prices.
- Forward power prices in the Midwest markets remain backwardated with 2021 and 2022 strips trading at a discount to 2019 and 2020, making longer contract terms more favorable for energy buyers. Prices for 2021 and 2022 delivery are currently within 1%-2% of all-time contract lows.
- Day-ahead index prices in the Midwest markets this month are averaging 17% higher than year-ago levels due to higher natural gas prices and hotter August weather. Prices are down 2% on average versus July 2018, with a 1%-3% increase month-over-month in Illinois and Michigan, but a 2%-14% decline in the Ohio markets.

Great Lakes Retail Power Price Trends

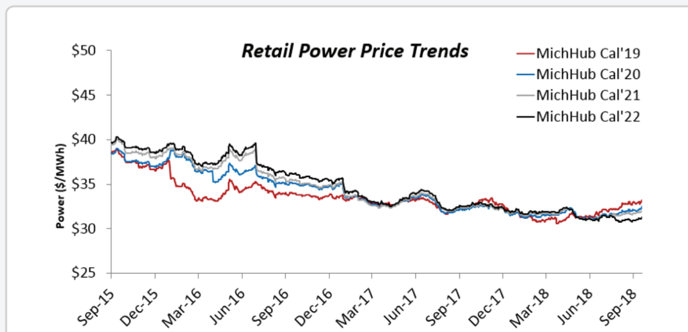
% Change in Forward Power	ComEd 2019-2020	ComEd 2021-2022	Mich Hub 2019-2020	Mich Hub 2021-2022	AEP-Day 2019-2020	AEP-Day 2021-2022	Ameren 2019-2020	Ameren DAY 2021-2022
Year-over-Year	-2%	-9%	1%	-3%	7%	0%	2%	-4%
Month-over-Month	2%	1%	2%	1%	2%	1%	2%	1%
Year-to-Date	-4%	-11%	3%	-1%	2%	-5%	4%	-2%
Compared to All-Time Low	3%	2%	7%	3%	10%	3%	8%	3%

ComEd



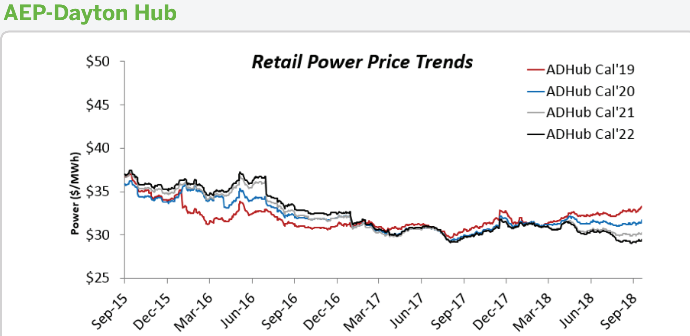
Note: *COMED is the electric territory that covers the greater Chicago market trends*

Mich Hub



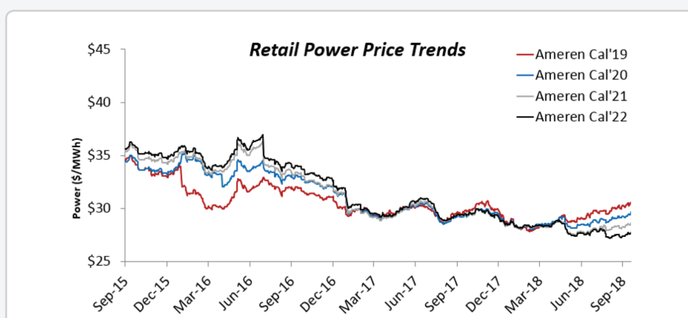
Note: *MichHub is a wholesale price point that represents Michigan market trends*

AEP-Dayton Hub



Note: *AEP-Dayton Hub is a wholesale price point that represents Ohio market trends*

Ameren



Note: *Ameren is the electric territory that covers central and downstate IL market trends*

Mid-Atlantic Electric Summary: Customer Takeaways

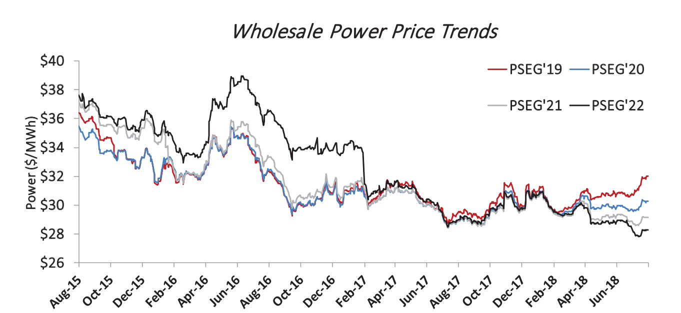
- NYMEX natural gas prompt month futures touched a three-month high on September 24th on continued concerns surrounding lower inventories into natural gas storage and a widening year-over-year deficit as a result. Strengthening power burns could be a big contributor to lower future injections and a larger deficit, as nuclear generation outages continue to build in the shoulder months. Most PJM forward prices are up about +1% over the past month, with the front part of the curve (2019-2020) continuing to climb with the movement of gas and the supply concerns heading into this winter.
- PJM forward energy prices, through 2023, are up slightly over the past month averaging +1% higher, but most of that increase was on the front end of the curve with 2019/20 prices +2% higher while the back end of the curve through 2023 was up only +1%. Compared to historical lows for each calendar year, the current prices for 2019 are, on average, +17% higher than the low set last year in August, while prices for 2023 are only +3% higher from that same point last year.
- Day-ahead index prices in PJM, on average, were +26% higher for August of this year compared to August 2017. DPL showed the highest percentage increase at +44%, while PEPCO came in with the lowest increase at +15%. The more congested zones in PJM, such as BGE and PEPCO, typically show less variability from one year to the next because they tend to be consistently elevated over an extended period of time.

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)	-$0.41	-$4.86	-$0.62	-$4.15	$0.00	-$1.31	-$0.78	-$4.23	-$2.48	-$0.48
vs Low ($/MWh)	$3.34	$0.80	$3.38	$0.84	$4.74	$2.00	$4.50	$1.42	$2.63	$3.29
vs High (%)	-1%	-14%	-2%	-13%	0%	-4%	-2%	-11%	-6%	-2%
vs Low (%)	12%	3%	13%	3%	16%	7%	14%	4%	9%	12%

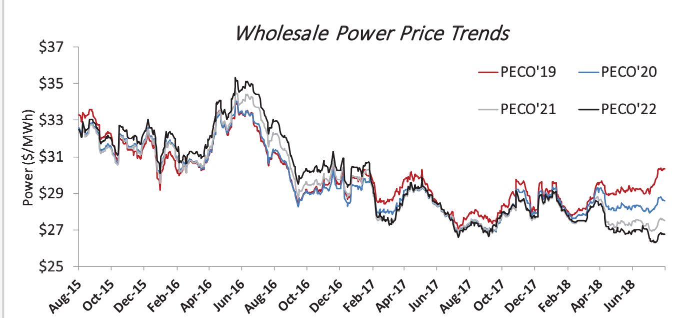
Index Pricing	AECO	APS	BGE	DPL	DUQ	JCPL	PEPCO	PPL	PSEG	MetEd	PECO	Penelec
August '17	$24.64	$27.35	$29.91	$25.25	$27.65	$24.95	$29.08	$23.90	$25.16	$24.56	$24.31	$26.14
August '18	$31.76	$32.74	$35.03	$36.33	$33.33	$31.39	$33.51	$30.40	$31.78	$32.67	$30.58	$32.33
% Change	29%	20%	17%	44%	21%	26%	15%	27%	26%	33%	26%	24%

PSEG



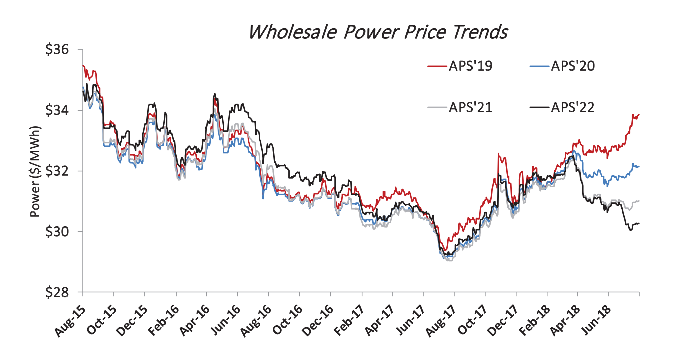
Note: *PSEG is the electric territory that covers the northern NJ market*

PECO



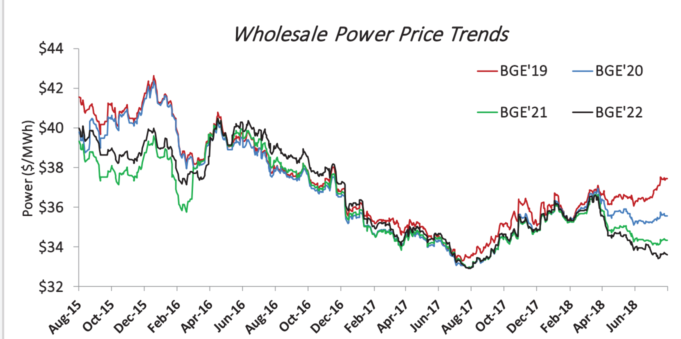
Note: *PECO is a wholesale price point that represents the greater Philadelphia area market*

APS



Note: *APS is a wholesale price point that represents the western PA market trends*

BGE

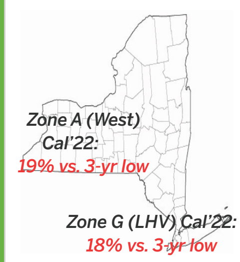


Note: *BGE is the electric territory that covers the greater Baltimore area market*

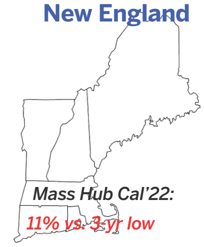
Northeast Electric Summary: Customer Takeaways

- On September 3rd, the ISO New England (ISO-NE) declared an OP-4 event (action during a capacity deficiency) and Capacity Scarcity Condition.
  - o The event was caused by two primary factors: 1) significant generation outages and reductions totaling ~1,650 MW during the dispatch day and 2) higher than forecasted temperatures and humidity resulting from large load forecast deviations.
  - o Real-time prices reached a high of $2,400/MWh at one point during the day at the Mass Hub with the daily average coming in at $262/MWh.
- The year-to-date ISO-NE peak hour and demand value is currently from August 29th, hour ending 6pm, which registered a load of 25,763 MW, surpassing the previous value from the previous day by ~400 MW.
- The peak hour and value was also hit on August 29th for the New York ISO (NYISO), but for hour ending 5pm at 31,861 MW.
- Despite the OP-4 event in New England, September index prices as of September 18th are averaging only $36/MWh, a $3 decrease from August.
- NY index prices for September are also either at or slightly below August prices for zones A, G and J at $34, $35, and $37/MWh, respectively.

New York



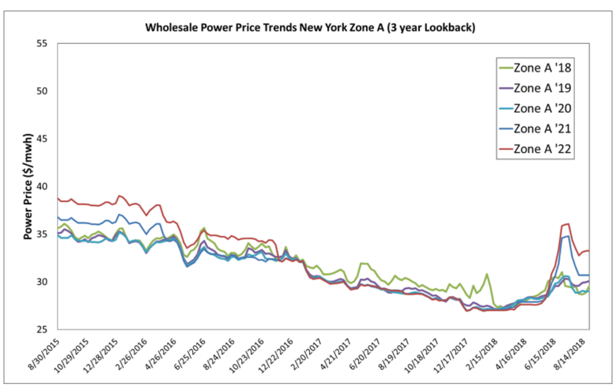
New England



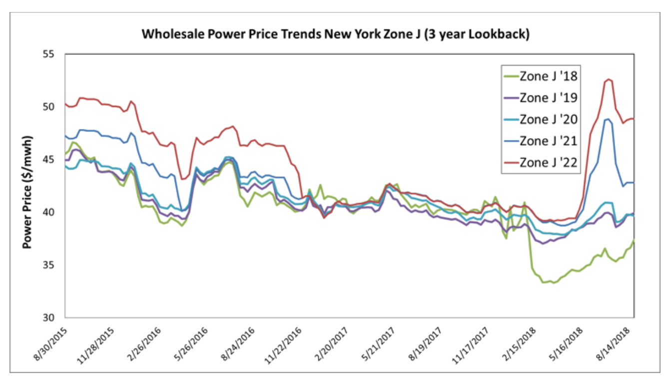
Northeast Retail Power Price Trends

3-Year Price Trend	New England Mass Hub 2018	New England Mass Hub 2019	New England Mass Hub 2020	New England Mass Hub 2021	New England Mass Hub 2022	New York Zone J 2018	New York Zone J 2019	New York Zone J 2020	New York Zone J 2021	New York Zone J 2022
Current Price vs 3-Year Average	11%	9%	5%	2%	1%	-1%	1%	-4%	1%	9%
Current Price vs 3-Yeat Maximum	-2%	-2%	-7%	-14%	-19%	-16%	-12%	-14%	-14%	-8%
Current Price vs 3-Year Minimum	27%	14%	13%	11%	11%	16%	10%	5%	10%	19%

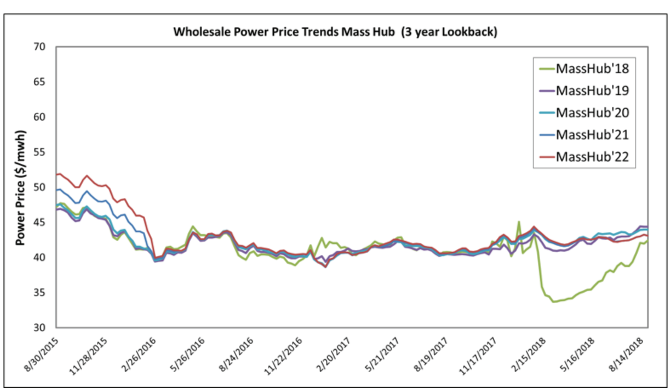
New York Zone A



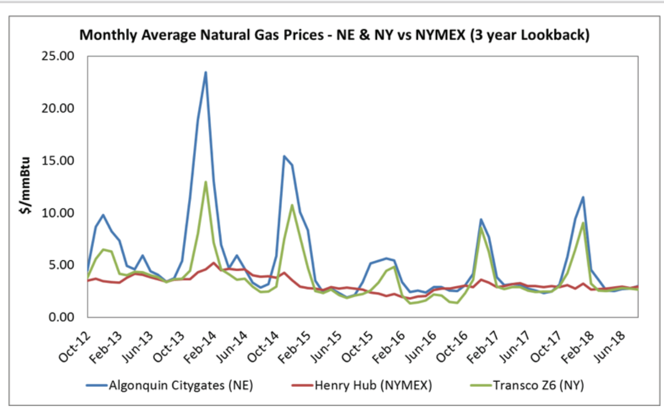
New York Zone J



Mass Hub



NE & NY v.s. NYMEX



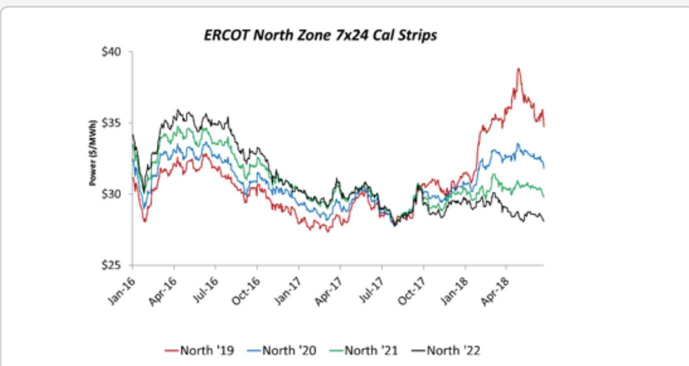
Texas Electric Summary: Customer Takeaways

- Regional gas exports continue to grow via Mexican exports reaching 5 Bcf/day and Sabine Pass Train #5 taking feed stock gas for testing.
- Real time prices were moderate in August, averaging \$31-\$33/MWh on lower loads from July and higher wind production month-over-month.
- Public Utility Commission of Texas (PUCT) considering proposal to change Operating Reserve Demand Curve (ORDC), to increase the rate of scarcity pricing via the "slope" of the curve as reserves drop from 5 GW to 2 GW.

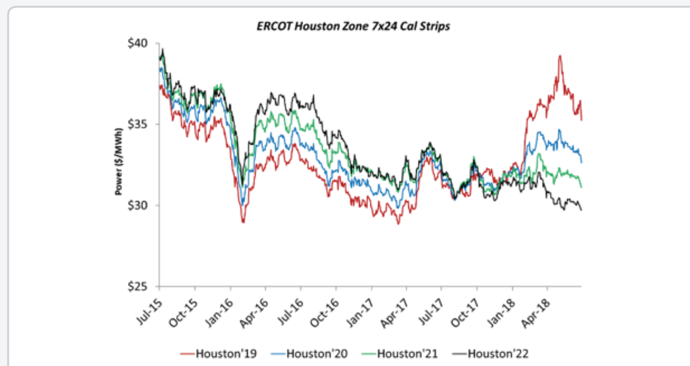
Texas Retail Power Price Trends

% 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	10%	-3%	17%	2%	13%	-1%	18%	0%
Month-over-Month	0%	0%	0%	0%	0%	0%	0%	0%
Year-to-Date	10%	-6%	12%	-6%	13%	-4%	8%	-13%
Compared to All-Time Low	16%	1%	21%	4%	18%	2%	19%	3%

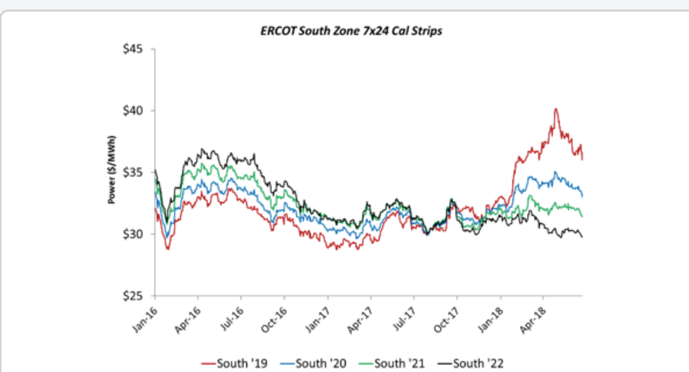
ERCOT North Zone



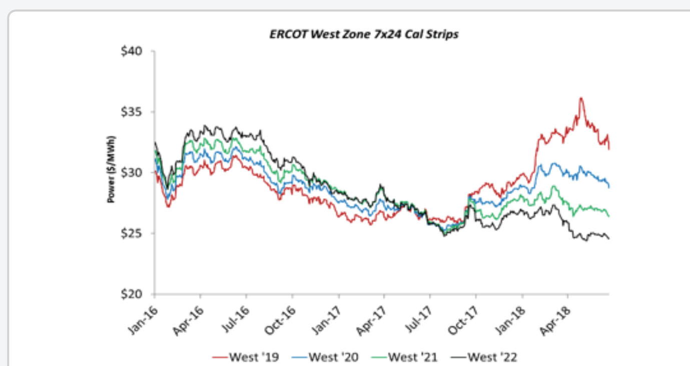
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



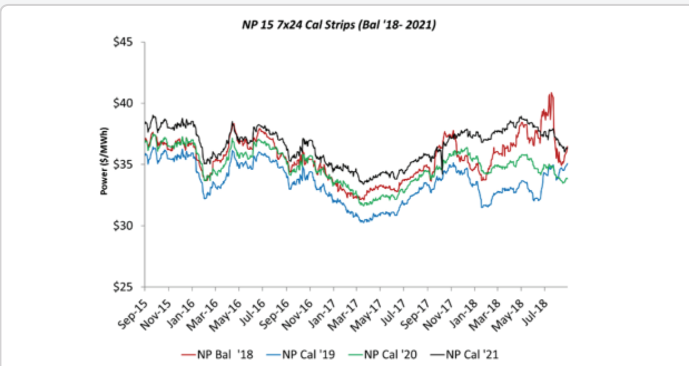
California Electric Summary: Customer Takeaways

- Southern California Gas Company (SoCalGas) announced they had increased storage at Aliso Canyon from 22 to 34 Bcf, the new threshold as permitted by state regulators.
- SoCalGas Citygate prices for July 24th reached a new all-time high of $39/MMBtu and averaged $9.03/MMBtu for the month of July.

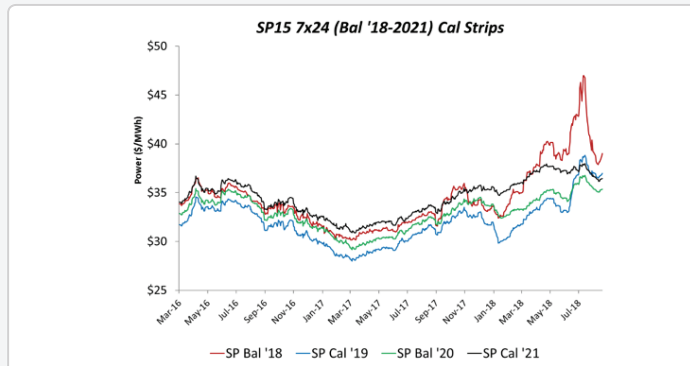
California Retail Power Price Trends

% 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	4%	5%	-2%	1%	18%	17%	9%	8%	3%	-2%	2%
Month-over-Month	-2%	2%	-1%	-3%	-9%	-3%	-2%	-3%	0%	0%	0%
Year-to-Date	2%	1%	-7%	-4%	14%	12%	3%	2%	5%	-3%	0%
Compared to All-Time Low	14%	16%	7%	9%	29%	32%	21%	18%	17%	5%	6%

NP 15 7X24



SP 15 7X24



Mid C 7x24