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

August 2018

Fuels

Natural Gas

- Natural gas production has been steady during the past month, slightly above 81 Bcf/day.
- Gas production is up 8 Bcf/day, an 11% year-over-year increase.
- Prompt-month NYMEX natural gas pricing has been hovering just below $3 per MMbtu.
- Summer 2018 has been the fifth hottest on record, prompting record amounts of power demand and demand for natural gas-fired electric generation.
- A strong hotter-than-normal temperature solution is presenting itself for the end of August and the beginning of September.
- Natural gas storage inventories are 2.39 Trillion Cubic Feet (TCF), a year-over-year deficit of 23%.
- End-of-season gas inventories may post a ten-year low somewhere near 3.2 TCF.
- Exports of natural gas to Mexico hit an all-time-record 5 Bcf/day in August as new cross-border pipelines became operational.

Coal

- Powder River Basin (PRB) coal for Q4 2018 is trading at $12.55 per ton, unchanged from one month ago.
- Q4 2018 Central Appalachian (CAPP) for rail is trading at $65.58 per ton, up $.58 per ton from one month ago.
- 2019 API Rotterdam coal is trading at $89.00 per ton.

Oil

- Crude oil prices have decreased almost $3 per barrel over the past two months.
- A strong dollar, concerns over Non-OECD growth and high product inventories have provided downward pressure on the market.
- West Texas Intermediate (WTI) October contract is trading at $65.79 per bbl, down about $3 per barrel from last month.
- Brent October contract is trading $72.66 per bbl.

Power

- ISONE set a year-to-date load high of 24.2 GW (August 6th) and NYISO 31.3 GW (July 2nd), but both could set new highs the last week of August.
- NYISO continues to experience volatility in the forward price curves (2021/2022) as the states' policy to implement carbon into the wholesale market continues to be vetted.
- MISO markets, on average, are within 4% of all-time lows through 2023, with the exception of 2019 in Ameren, which is at 8% above lows set one year ago.
- CAISO saw Southern California Edison (SCE) & SP15 real time prices average $55/MWh for July as elevated Southern California Gas Company (SoCalGas) prices doubled real time prices.
- Texas saw load reach a new record high of 73.3 GW on July 19th.
- In PJM, four of the five current load peaks that set customer's capacity factor for next year, were set in July; 2019 forward prices have moved-up about 4% over the past month, while prices further out in 2022-2023 were unchanged.

Economy

- July retail sales increased 0.5%, considered a strong performance.
- New orders for durable goods increased $2.5 billion in June, a 1% increase from May.
- Construction spending fell 1% in June from the prior month at $1.32 trillion.

Weather

- June 1st through August 21st is the fifth hottest such period on record.
- The last week of August into the first week of September features a hotter-than-normal solution for much of the U.S.
- The tropics have been quiet this summer, but are likely to begin to show some activity as late August and the first half of September are typically the peak of "hurricane season."

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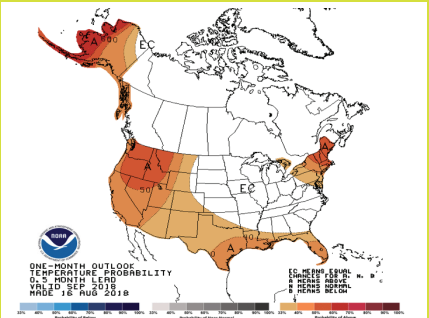
Prompt Month Settlements

	July '18	30-Day Change
Nat Gas $/mmBTU	$2.732	-$0.189/ MMBTU
Crude Oil $/bbl	$68.52	+$0.44/BBL

As of 7/25/2018.

Temperature Outlook

Source: NOAA



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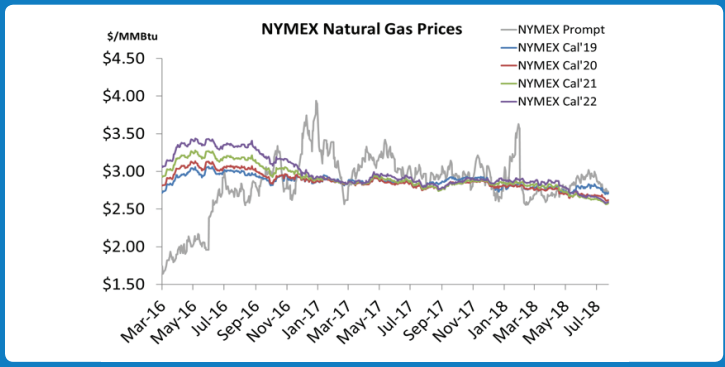
Gas Report

- NYMEX prompt month gas futures gained back roughly $.15 to $2.90's as the temperature forecast turned warmer for the middle of the country across to the Northeast for the end of August to the first third of September.
- Storage inventories are at 2,435 Bcf, according to the EIA report. Net injections have been lower than the five-year average for seven straight weeks. Natural gas stocks are now 684 Bcf (-21.9%) lower than year-ago levels, and 599 Bcf (-19.7%) below the five-year average. Sotrage inventories have not been below 2,500 Bcf this late in the injection season since 2003.
- Natural gas production for the month of August has averaged over 81 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 5-year average.
- Prompt-month UK natural gas is trading $8.77/MMBTU, Algonquin basis for January/February is $8.12/MMBTU.
- Natural gas consumption the gas week (8/16/18 - 8/22/18) was 77 Bcf/day with residential/commercial demand being up 1 Bcf/day year-over-year, and liquefied natural gas (LNG) exports were up 1.4 Bcf/day year-over-year.

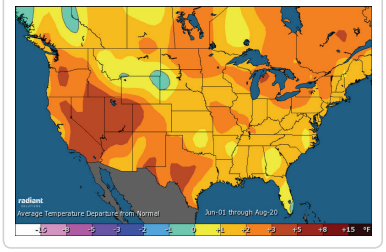


NYMEX Futures Pricing	Current Price	Last Month	M/M Change	Last Year	Y/Y Change
Prompt (Sep18)	$2.876	$2.775	$0.101	$2.892	($0.016)
Winter (Nov18-Mar19)	$2.993	$2.932	$0.061	$3.078	($0.085)
12 Month Strip	$2.775	$2.734	$0.041	$3.005	($0.230)
2019	$2.623	$2.621	$0.003	$2.827	($0.204)
2020	$2.552	$2.580	($0.028)	$2.745	($0.194)
2021	$2.560	$2.606	($0.046)	$2.736	($0.176)
2022	$2.626	$2.667	($0.042)	$2.757	($0.131)

- Cheniere Energy developer of the Corpus Christi liquefication terminal received a Federal Energy Regulatory Commission (FERC) order granting permission for activities on Train 1, the first cargo is forecast to begin shipments at the end of 2018.

Temperature Outlook *Source: NOAA*

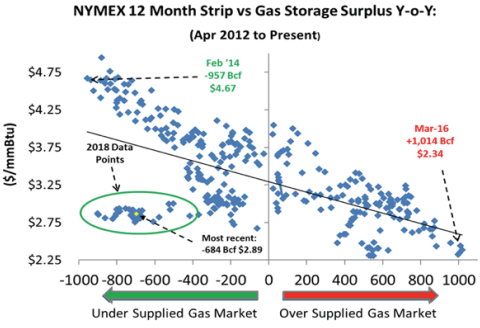
- Strong warmth has dominated most of the nation since June 1st.



- June 1st through August 20th (summer to date) cooling degree days (CDDs) are at 904, which is good enough for fifth hottest since 1950. Overall this summer is running about 75 CDDs warmer than last summer at this time.
- Strong warmth is expected to develop in the last week of August across the Midwest and East, with record heat possible in some locations. Heat could remain strong across the Midwest and East into early September.
- The tropical Pacific water temperatures are starting to slowly warm, with the current anomaly around +0.4 degrees C.
- This temperature reading is still in the neutral category, as +0.5 degrees C and warmer constitutes an El Nino. The warming across the tropical Pacific has come in weaker than our original expectations, which could extend the heat across the Plains, Midwest, Texas, and East through early September.
- Bottom line: Slower warming of the tropical Pacific may lead to continued warmer risks for August and September (lingering La Nina effects).

Natural Gas Storage *Source: NOAA*

- For week ending August 17th, the Energy Information Administration (EIA) reported an injection of +48 Bcf versus consensus of +49 Bcf and an expected range of +40 to +55 Bcf.
- The +48 Bcf injection realized slightly under the 5-year average of +52 Bcf and was slightly larger than last year's injection of +45 Bcf.
- Storage stands at 2,435 Bcf or 684 Bcf less (22%) than one year ago and 599 Bcf (20%) below the 5-year average, and is 7.5% below 2014 levels, which was previously the lowest level since 2006.



- The storage deficits have been reduced very little over the past few weeks as strong cooling load demand has boosted power burns, which is the electric generation fueled by natural gas.
- In the most recent Short-Term Energy Outlook (STEO), the EIA revised their end of October storage level down to 3,342 Bcf, which would be the lowest since 2008.
- Despite the year-over-year deficit, the 12-month rolling NYMEX gas strip remains well below the correlation trendline between the deficit and price.

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Bulls vs. Bears

Bulls

Natural Gas

- Well-above-normal summer temperatures into the middle of September.
- Storage inventories at or near 3.2 TCF.
- Crude oil prices move downward from current levels (near $65 per bbl).
- Natural gas production flattens in Q4.

Crude Oil

- A weakening U.S. dollar.
- Iran export sanctions imposed by the U.S. scheduled to commence in November.
- A potential collapse of Venezuelan production or country-collapse.
- Strong global gross domestic product (GDP) numbers.
- Strong global GDP numbers.

Bears

Natural Gas

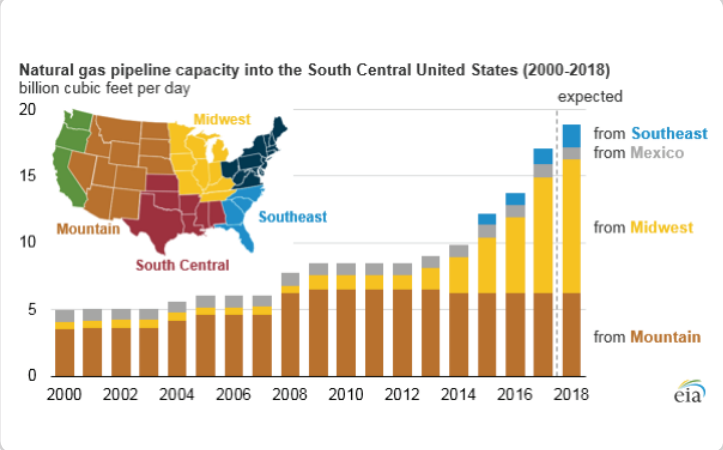
- Production continues upward trajectory.
- Higher crude oil prices – i.e., prices for WTI move above $70 per bbl.
- A significant shift in the summer weather pattern to a cooler-than-expected solution.
- An active tropical pattern that brings moisture to the gulf coast and mid-continent.

Crude Oil

- Global GDP falters in second half of year.
- U.S. dollar strengthens.
- Libya production surprises to the upside.
- Inventories rise above expectations.
- U.S. production rises faster than expected.

Growing Demand for Gas in South Central Region

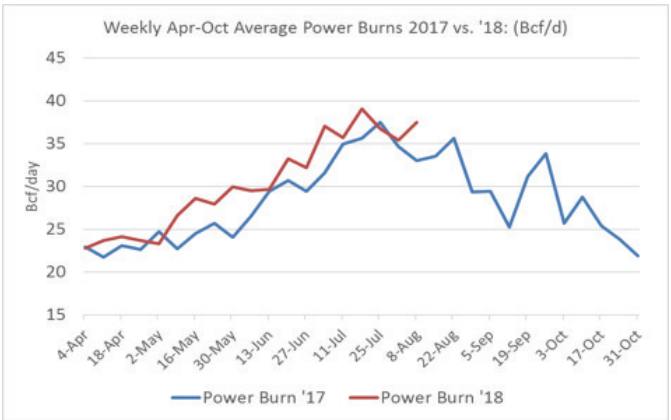
- The South Central region has historically been a key supply region for natural gas supply along with the Rockies and western Canada. The growth in exports (Mexico & LNG) and industrial/power generation demand in the Gulf Coast has made the South Central a growing importer of gas from the Northeast (Marcellus/Utica). The EIA estimates that by the end of 2018, there will be 19 Bcf/day of capacity bring gas into the South Central region.
- Of the additional 6.4 Bcf/day of Northeast capacity planned to come online in 2018, more than 2.8 Bcf/day reaches the South Central region directly through three projects that transport natural gas through the Midwest and Southeast: Rayne Xpress, Gulf Xpress and Atlantic Sunrise.
- Natural gas pipeline projects scheduled to come online in 2018 will bring additional supply to the Gulf Coast and support growing export markets.



Source: EIA

Power Burns Higher Year-Over-Year

- Summer 2018 is on track to be the fifth warmest summer on record and has lifted power burns versus summer 2017, which averaged ~36.75 Bcf/day in July versus 34.75 Bcf/day one year ago.
- Power burns in summer months reduce injection levels of gas into storage as gas-fired generation is called upon to meet higher power generation load.
- Higher burns this summer are one key factor in the 20% year-over-year storage deficit. This is important in key storage markets, such as the Midwest and Northeast.



Source: EIA

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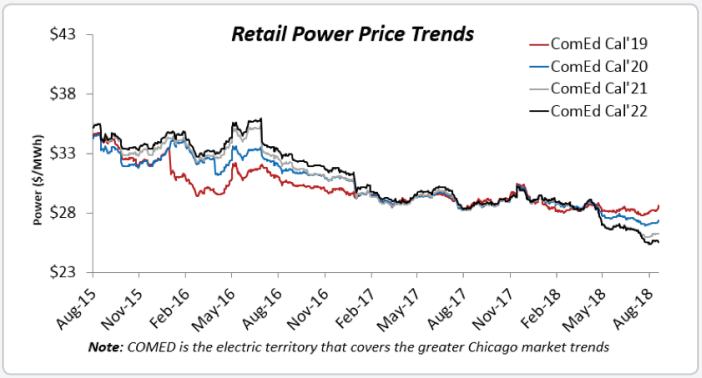
Great Lakes Electric Summary: Customer Takeaways

- 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

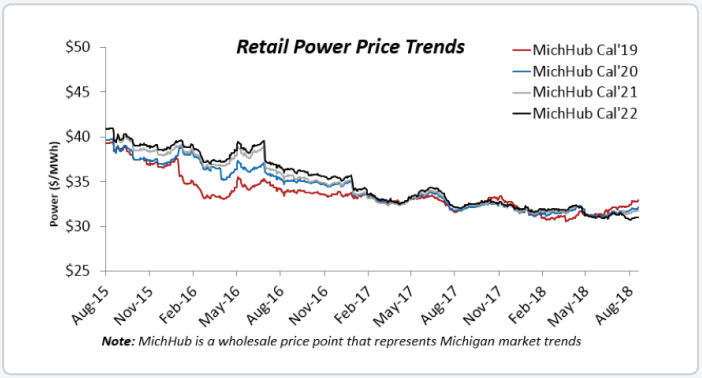
% Change in Forward Power	ComEd 2019-2020	ComEd 2021-2022	Mich Hub 2019-2020	Mich Hub 2021-2022	AEP-Day 2019-2020	AEP-Day 2021-2022	Ameren 2019-2020	Ameren DAY 2021-2022
Year-over-Year	-3%	-9%	2%	-2%	7%	1%	1%	-4%
Month-over-Month	2%	0%	2%	0%	2%	-1%	1%	-1%
Year-to-Date	-5%	-12%	2%	-2%	1%	-5%	3%	-3%
Compared to All-Time Low	2%	1%	6%	2%	9%	2%	6%	2%

ComEd



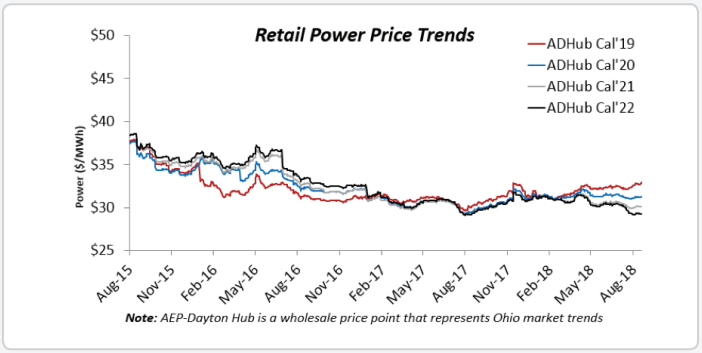
Note: *COMED is the electric territory that covers the greater Chicago market trends*

Mich Hub



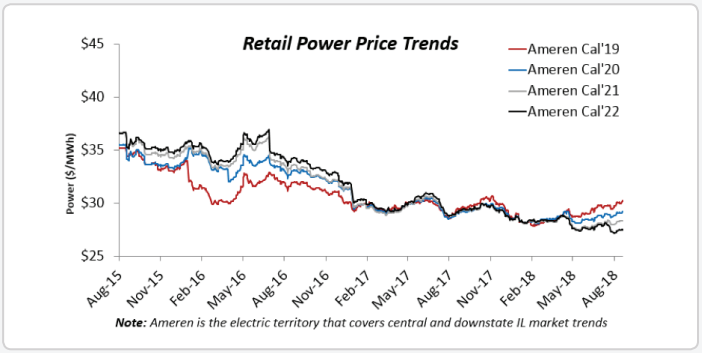
Note: *MichHub is a wholesale price point that represents Michigan market trends*

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*

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Mid-Atlantic Electric Summary: Customer Takeaways

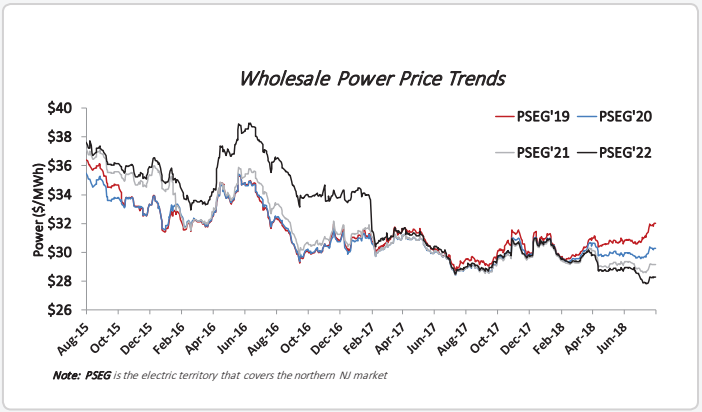
- Since hitting a low back in mid-July, the NYMEX prompt-month contract has found price support to the tune of $0.25/MMBtu on the backs of above-average temperature projections to round-out August, as well as a looming storage deficit heading into the winter. The front part of the power curve in PJM (2019) has followed these prices up a bit as the storage situation could have an impact on the deliverability of that power contract heading into next year.
- PJM forward energy prices, through 2023, are up slightly over the past month averaging about 1% higher, but most of that increase was on the front-end of the curve with 2019 prices 4% higher. The back-end of the curve with 2022-2023 unchanged. Compared to historical lows for each calendar year, the current prices for 2019 are, on average, 13% higher than the low set last year in August, 2017, while the current prices for 2023 are only 2% higher from that same point last year.
- Day-Ahead index prices in eastern PJM for July 2018 settled, on average, 5% than last July. BGE, PEPCO and MetEd were only 2% higher year-over-year, while Penelec, Duquesne and DPL were over 8% higher year-over-year.

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)	-$1.35	-$6.30	-$1.93	-$5.55	-$0.26	-$2.01	-$1.63	-$4.88	-$3.14	-$1.60
vs Low ($/MWh)	$2.56	$0.59	$2.56	$0.62	$3.76	$1.50	$3.39	$1.05	$1.93	$2.42
vs High (%)	-4%	-18%	-6%	-17%	-1%	-6%	-4%	-13%	-8%	-5%
vs Low (%)	9%	2%	10%	2%	13%	5%	10%	3%	7%	9%

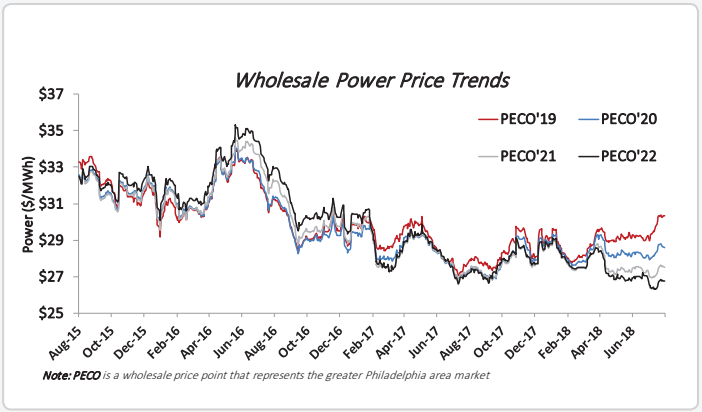
Index Pricing	AECO	APS	BGE	DPL	DUQ	JCPL	PEPCO	PPL	PSEG	MetEd	PECO	Penelec
July '17	$29.29	$31.74	$34.98	$30.98	$31.72	$29.50	$33.71	$28.17	$29.69	$30.74	$28.93	$29.47
July '18	$31.38	$32.76	$34.90	$33.65	$34.18	$31.24	$34.08	$30.16	$31.20	$31.37	$30.62	$31.74
% Change	7%	3%	0%	9%	8%	6%	1%	7%	5%	2%	6%	8%

PSEG



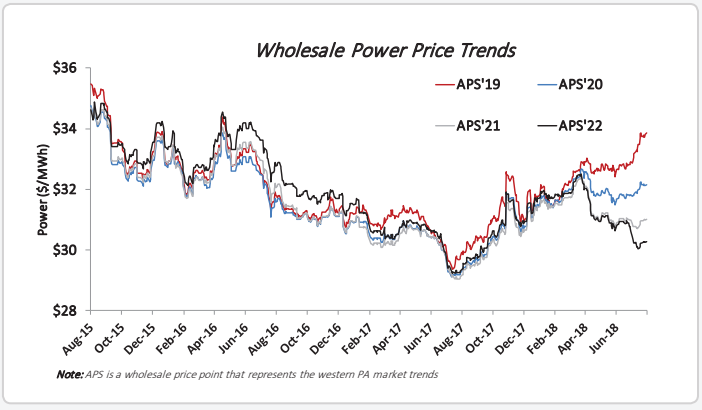
Note: ***PSEG*** *is the electric territory that covers the northern NJ market*

PECO



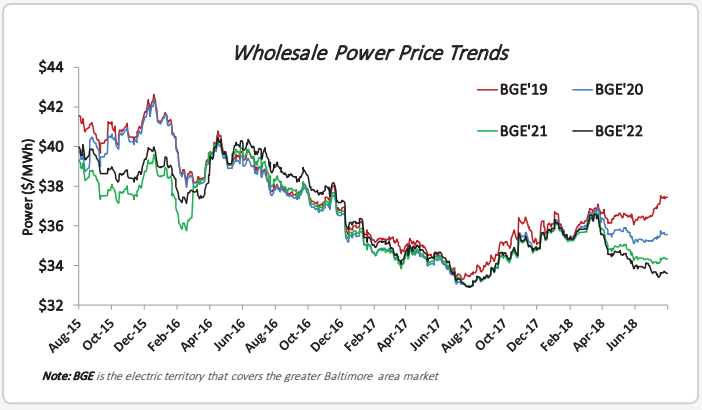
Note: ***PECO*** *is a wholesale price point that represents the greater Philadelphia area market*

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*

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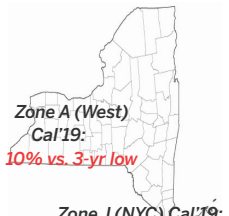
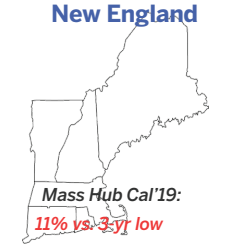
Northeast Electric Summary: Customer Takeaways

- Early July heat in both New England and New York set calendar 2018 peak demand and their respective day/hours.
  - o Current unofficial peak this summer for NYISO occurred on July 2nd hour ending (HE) 16 at 31,293 MW, which was over 1,500 MW the 2017 peak value.
  - o New England's year-to-date peak was unofficially set on August 6th HE 18 with demand reaching 24,685 MW, ~1,177 higher than last year's June 13th peak hour.
- Mass Hub month-to-date August locational marginal prices currently sit just under ~$36/MWh, ~$4/MWh higher than the July average of $32.75/MWh.
- Most New York zones are also seeing higher August index prices; zones G and J are up ~$2/MWh from their July averages at $35.21 and $38.95, respectively. Zone A is the outlier and August index prices have been almost $5/MWh less than July.
- With near record heat expected in the region for the balance of August, we could see some volatility in index prices to close out the summer.
- New York calendar forwards are mixed; Cal 2019 and 2020 have seen support in August and are up ~3% while Cal 2021 and 2022 have fallen ~2% since July. Cal 2021 and 2022 remain volatile as the NYISO continues vetting its carbon policy.
- New England forwards saw support earlier in August but have since flattened and are currently 10-12% above 3-year lows.

New York



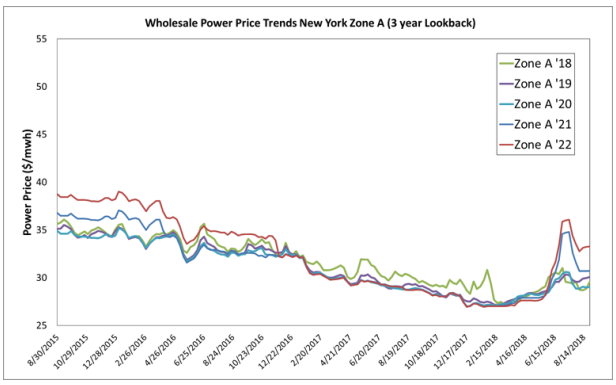
New England



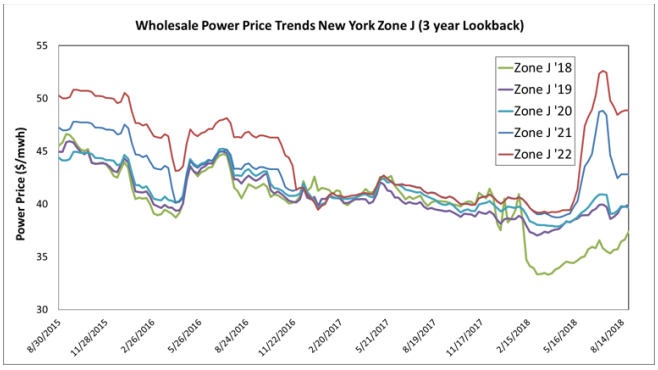
Northeast Retail Power Price Trends

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	3%	6%	4%	1%	0%	-8%	-2%	-4%	0%	9%
Current Price vs 3-Yeat Maximum	-13%	-6%	-8%	-15%	-20%	-25%	-15%	-14%	-14%	-8%
Current Price vs 3-Year Minimum	21%	11%	12%	10%	10%	11%	7%	4%	9%	20%

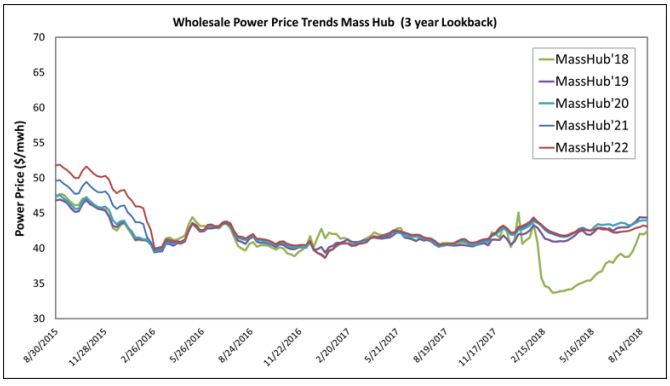
New York Zone A



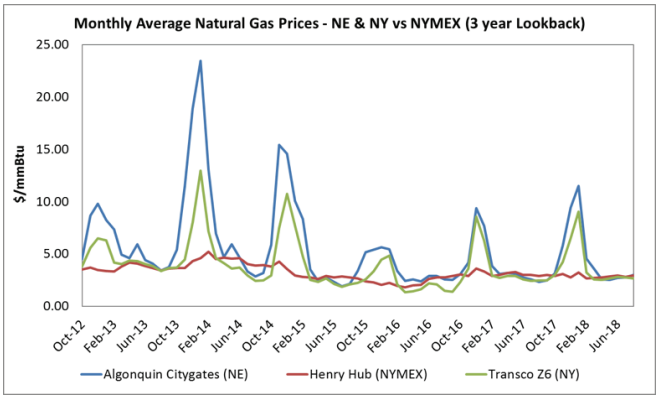
New York Zone J



Mass Hub



NE & NY v.s. NYMEX



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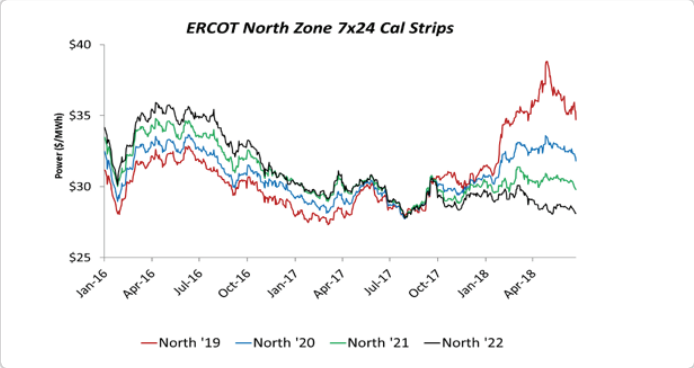
Texas Electric Summary: Customer Takeaways

- ERCOT set a new all-time record load of 73.3 GW on July 19th, surpassing the previous high of 71.1 GW set in August 2016.
- Real time prices reached $2,000/MWh for several 5-minute intervals in hour ending (HE) 17 on the 19th. However, wind production of 3-5 GW the week of July 16 -30th, in late afternoon hours HE 17-19 (5-7 pm), provided enough generation to keep reserves above 2 GW.

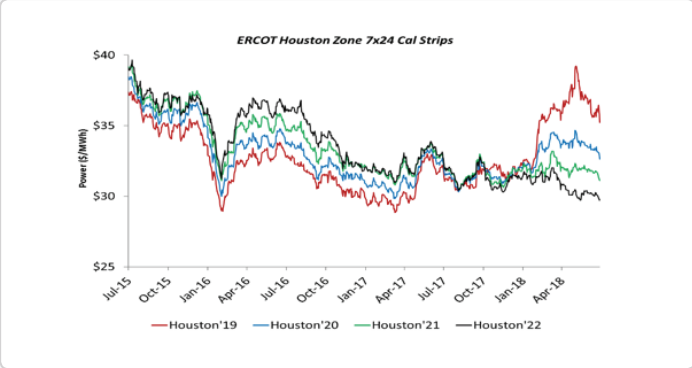
Texas Retail Power Price Trends

% 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	11%	-2%	19%	2%	15%	0%	18%	1%
Month-over-Month	-1%	0%	-1%	0%	-1%	0%	-1%	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%

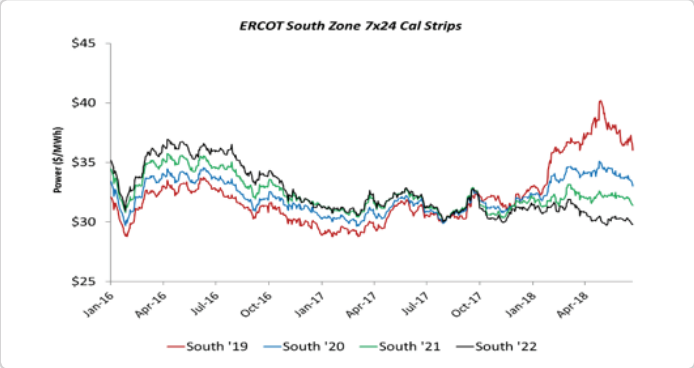
ERCOT North Zone



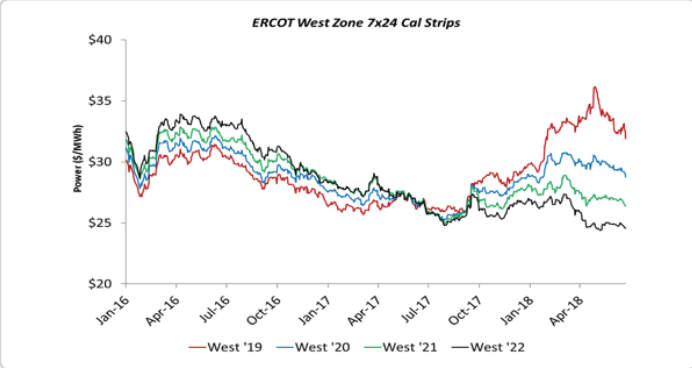
ERCOT Houston Zone



ERCOT South Zone



ERCOT West Zone



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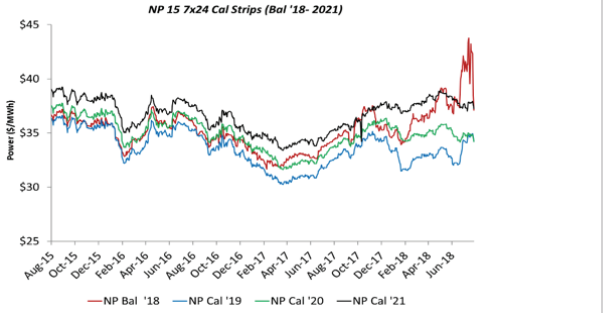
California Electric Summary: Customer Takeaways

- Above-normal temperatures of +90-100 F the second half of July, pushed gas demand to approximately 3 Bcf/day, forcing withdrawals of gas from storage to meet power generation demand levels.
- SoCal City Gate prices for July 24th reached a new all-time high of $39/MMBtu and averaged $9.03/MMBtu for the month of July.

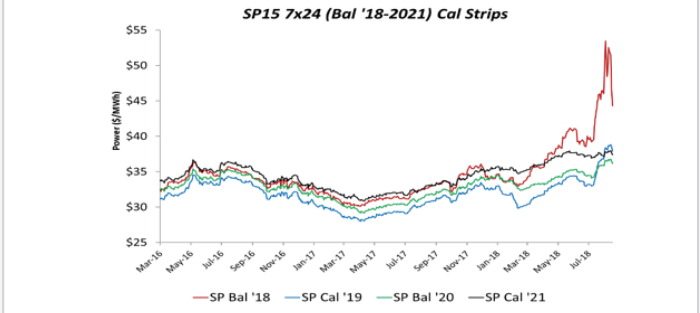
California Retail Power Price Trends

% 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	8%	5%	2%	6%	35%	23%	14%	13%	5%	-2%	4%
Month-over-Month	-10%	1%	-1%	0%	-2%	6%	2%	0%	3%	1%	1%
Year-to-Date	4%	-1%	-6%	-2%	28%	15%	5%	5%	5%	-3%	1%
Compared to All-Time Low	17%	13%	8%	12%	47%	35%	24%	21%	17%	5%	6%

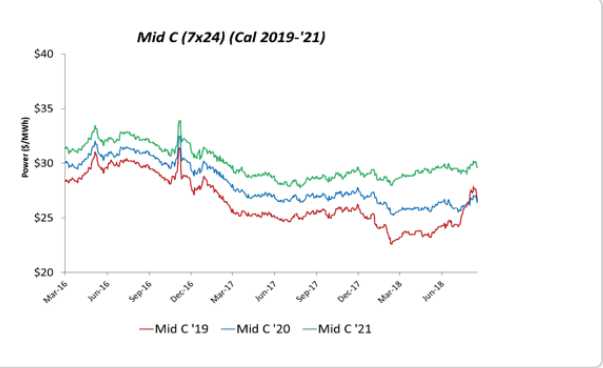
NP 15 7X24



SP 15 7X24



Mid C 7x24



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