Fuels

Natural Gas
- Natural gas production resumed its upward trend in July, getting just above 81 Bcf/day – a new record.
- Hotter-than-average summer temperatures have been the norm since the beginning of June, but a break in the heat is occurring in the second half of July, particularly in the Midwest.
- Natural gas demand for power generation is up 14% from the same period one year ago.
- Natural gas pricing action has been flat for prompt-month NYMEX through most of July despite the heat and air conditioning load throughout much of the country.
- Inventories of natural gas in storage are significantly below the same period last year. EIA estimates 3.5 trillion cubic feet of inventory at the end of October, a four-year low.

Coal
- PRB coal for 2019 is trading at $12.35 per ton, unchanged from a month ago.
- Q4 CAPP for rail is trading at $65 per ton.
- API Rotterdam coal is trading at $86.75 per ton.

Oil
- During the past month, prompt month WTI crude oil prices have traded between $68 and $74 per barrel.
- President Trump has traded barbs with Iran, creating some geopolitical tensions for the oil markets.
- U.S. crude oil production hit 11 million barrels per day for the week ending July 13th, an all-time record placing the U.S. in a tie with Russia as world’s largest producer.
- U.S. sanctions on Iranian oil exports are set to commence in November.

Power
- Heat has been concentrated in Texas and CAISO in late July, with both regions either recently set or close to setting new all-time peak loads in July.
- PJM, NYISO, ISONE and MISO ISO’s all reached peak loads so far this summer over the week of July 4th on an extensive heat wave.
- Power generation burns have reached 39 Bcf/day, the highest level to date this summer for the week ending July 18th, and are ~3 Bcf/day higher year-over-year so far this summer.

Economy
- The consumer price index for June was 2.9%, above the Federal Reserve target rate of 2%.
- The national unemployment rate rose to 4% in June, up slightly from 3.8% the prior month.
- U.S. housing starts fell 12% in June to a seasonally adjusted annual rate of 1.173 million units, signaling potential weakness in this important economic vertical.

Weather
- Weather models favor heat in the West with normal to above-normal over the Eastern U.S. driven by heat ridge over northern Rockies and developing El Nino in equatorial Pacific.
- The 11-15 day term shows a persistent below normal pattern for middle of country with warmth in the West and heat coming into the Northeast.
- A slow developing El Nino will keep the West warm in August putting Summer 2018 in top five warmest category.

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Power Burns High Year-over-Year .... 3
Summary and Regional Trends ...... 4 – 8

Prompt Month Settlements

<table>
<thead>
<tr>
<th></th>
<th>July '18</th>
<th>30-Day Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nat Gas $/mmBTU</td>
<td>$2.732</td>
<td>-$0.189/MMBTU</td>
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<tr>
<td>Crude Oil $/bbl</td>
<td>$68.52</td>
<td>+$0.44/BBL</td>
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As of 7/25/2018.

Temperature Outlook
Source: NOAA

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Gas Report

- NYMEX prompt month gas futures edged down during the past month from $3.00 per MMBtu and have found near-term support at $2.75.
- Prompt-month EU LNG prices are trading at $7.63 per MMBtu while winter EU LNG is $8.63 per MMBtu.
- Natural gas production for the month of July has averaged 80.8 Bcf/day, an all-time high. Northeast production approaching 28 Bcf/day.
- Natural gas demand for power generation averaged 39 Bcf/day for the week ending July 18th, up 9% from one year ago.
- Strong power generation demand will be most consistent in the West due to a persistent heat ridge over Northern Rockies states. Spot SoCal Citygate gas prices reached $39/MMBtu for July 24th.
- Storage inventories are 2,249 Bcf or 710 Bcf (24%) below year-ago levels and -19% below the 5-year average.
- EIA estimates storage will finish at 3.47 Tcf, a 10-year low and -9% below the 5-year average.

August Temperature Outlook to Round Out Summer

- Broad warmth has been seen for most of June and some of July across the interior Southwest, Texas, Plains and Midwest. Cooler trends seen in the Midwest for the rest of July into August will likely push this summer out of the top spot from a cooling demand standpoint.
- The current Drought Monitor shows most of the extensive drought over the interior Southwest and into parts of Texas. Some drought areas have popped up over the Northeast, however the pattern is expected to turn much wetter along the East Coast.
- The tropical Pacific water temperatures keep warming up, with the current anomaly around +0.4 degrees C.
- This temperature reading is on the edge of a weak El Nino, which can produce cooler risks across the East during the summer months.
- The atmosphere can have a delayed response to water temperature changes, which seems to be the case this summer. However, some of the weekly models are starting to show more normal/below temperatures across the Midwest and East during the final week of July. Stronger heat is shown to stay over the West.

Natural Gas Storage Source: NOAA

- For the week ending July 13th, the EIA reported an injection of +46 Bcf versus consensus of +59 Bcf and an expected range of +49 to +63 Bcf.
- The +46 Bcf injection realized well below the five-year average of +62 Bcf, but was stronger than last year’s build of +31 Bcf.
- Storage stands at 2,249 Bcf, representing a 24.0% deficit to year-ago levels and a 19.2% deficit versus the five-year average.
- Despite record gas production, the storage deficit versus the five-year average has remained nearly unchanged during the first half of the injection season.
- Since April 1st, total injections have trailed the five-year average pace by nearly 15%.
- The EIA expects October 31st levels to reach 3,500 Bcf, which would be the lowest since 2008 and -9% lower than the five-year average.

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<th>NYMEX Futures Pricing</th>
<th>Current Price</th>
<th>Last Month</th>
<th>M/M Change</th>
<th>Last Year</th>
<th>Y/Y Change</th>
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<td>Prompt (Aug 18)</td>
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<td>$3.419</td>
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<td>Winter (Nov 18 - Mar 19)</td>
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Bulls vs. Bears

**Bulls**

**Natural Gas**
- Above-normal summer temperatures persist in key population centers.
- Storage inventories remain at a four-year low through September.
- Crude oil prices move downward from current levels (near $68 per bbl).
- Natural gas production flattens through Q3.

**Crude Oil**
- Iran export sanctions imposed by the U.S. scheduled to commence in November.
- Iranian and U.S. military/ naval confrontation.
- Venezuela production continues decline through the second half of the year.
- Libya production fails to return as expected.
- Strong global GDP numbers.

**Bears**

**Natural Gas**
- Production ramps up significantly in the second half of the year.
- Higher crude oil prices – e.g., 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 the second half of the year.
- U.S. dollar strengthens.
- Tensions between the U.S. and Iran de-escalate.
- Libyan production rises faster than expected.
- U.S. production rises faster than expected.

---

**Appalachian, Haynesville and Permian Shales Driving Production Growth**

- Overall Lower 48 production is estimated to have reached a new high of 81 Bcf/day for the week ending July 11th, and has risen recently in July after being flat since April at 79-80 Bcf/day.
- Production was 72 Bcf/day this time one year ago, and is 6-7 Bcf/day higher on a year-over-year basis. However, a storage deficit of 710 Bcf will require ~7 Bcf/day to eliminate the storage deficit by the end of October.
- Northeast production will reach 28 Bcf/day by August per EIA, higher by 4 Bcf/day year-over-year; Haynesville will grow from 6.5 to 9.1 Bcf/day, and Permian basin will reach 10.8 versus 8.6 Bcf/day one year ago. These three shale plays remain key growth drivers in 2018.

![Natural gas production](source:EIA)

**Power Burns Higher Year-over-Year**

- Power burns remain ~3 Bcf/day (15% higher year-over-year) on the warmest start to June-July 16th, the mid-point of summer since 1950.
- For the week ending July 18th, power burns jumped to 39 Bcf/day, up from 35.7 Bcf/day from the prior week, up or 9% higher week-over-week, and comparing to 35 Bcf/day for the same week one year ago.
- Look for strong heat in Texas and California to support burns while the Midwest will see a cool down in the 11-15 day term through early August.

![Gas fired power burns](source:EIA)

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Great Lakes Electric Summary: Customer Takeaways

- Forward power prices in the Midwest markets remain backwardated with 2021 and 2022 strips trading at a discount to 2019 and 2020, making longer-term contracts more favorable for energy buyers.
- Forward power prices in ComEd have fallen to new lows this summer with help from weak natural gas prices. Power prices in Ameren, Michigan and Ohio have been better supported, but are still within ~5% of contract lows. In 2017, Midwest forward prices put in seasonal lows in the August time frame.
- Day-ahead index prices in the Midwest markets are up 14% month-to-date compared to June 2018 due to hot summer weather. Index prices are 18% higher than year-ago levels so far this month.
- PJM’s year-to-date summer system peak load of 148 GW occurred on June 18th from 4-5 p.m. ET. Daily peak loads have exceeded 140 GW on multiple days this summer, four of which occurred during the heat wave in late June/early July. MISO’s summer-to-date peak load of 121 GW occurred on June 29th from 5-6 p.m. ET.

Great Lakes Retail Power Price Trends

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<td>2%</td>
<td>7%</td>
<td>3%</td>
<td>5%</td>
<td>2%</td>
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ComEd

Retail Power Price Trends

Mich Hub

Retail Power Price Trends

AEP-Dayton Hub

Retail Power Price Trends

Ameren

Retail Power Price Trends

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

Note: Mich Hub is a wholesale price point that represents Michigan market trends

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

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

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Mid-Atlantic Electric Summary: Customer Takeaways

- Forward energy prices in PJM have continued to consolidate and bounce sideways over the past month. NYMEX prompt-month gas prices have trended down over $0.25/MMBtu since the middle of June and have currently reached a firm price support level at $2.74/MMBtu. It would take strong storage injections and moderate weather to breach that point and sustain down through that level.
- PJM forward energy prices through 2022 are unchanged to slightly lower over the past month and are, on average, about 5% off the historical low prices established at the end of summer 2017. The front of the curve through 2020 is about 8% off those lows, while the 2021-2022 portion is lower, around 3% off those lows.
- Compared to the day-ahead index prices in eastern PJM for June 2017, June 2018 index prices settled 8% higher, while some of the more congested zones like BGE, PEPCO, DPL and APS (western Pennsylvania) are averaging about 14% higher than last year at this time.

### Mid-Atlantic Retail Power Price Trends

<table>
<thead>
<tr>
<th>Index Pricing</th>
<th>AECO</th>
<th>APS</th>
<th>BGE</th>
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<th>PEPCO</th>
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<td>3%</td>
<td>-2%</td>
<td>7%</td>
<td>10%</td>
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</tbody>
</table>

### PSEG

Wholesale Power Price Trends

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

### PECO

Wholesale Power Price Trends

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

### APS

Wholesale Power Price Trends

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

### BGE

Wholesale Power Price Trends

**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 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 July 5th hour ending 18 with demand reaching 24,188 MW,
    ~680 higher than last year’s June 13th peak hour.

• Mass Hub month-to-date July locational marginal prices currently sit just over $34/MWh, ~$7.50/MWh higher than the
  June average of $26.88/MWh.

• New York zones are also seeing higher July index prices as Zones A, G and J are up $7-9/MWh from June averages at
  $42.50, $35.20 and $38.87 respectively.

• We’ve seen New York calendar forwards pull back from early July 2018 highs to late June levels near where last month’s
  June newsletters prices were shown.

• New England forwards have been much tighter through late spring and early summer, currently only 8-11% above three-year
  lows.

Northeast Retail Power Price Trends

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<td>5%</td>
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<td>4%</td>
<td>4%</td>
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New York Zone A

New York Zone J

Mass Hub

NE & NY vs. NYMEX

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Texas Electric Summary: Customer Takeaways

- On July 19th, ERCOT set a new all-time peak load of 73.3 GW in hour ending 17, far surpassing the prior 71 GW record from 2016. Load could peak on Monday July 23rd at 76 GW.
- Five-minute real time index prices reached $2,000/MWh on July 18th and July 19th for approximately 20 minutes in HE 1700 both days.
- August “on peak” (5x16) prices have risen again to $150/MWh after pulling back earlier in the month.
- Wind output the week ending July 20th has averaged 2.5-3.0 GW or higher in late afternoon hours this week, supporting reserve margins above 2,700 MW.

Texas Retail Power Price Trends

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<td>21%</td>
<td>-4%</td>
<td>18%</td>
<td>2%</td>
<td>19%</td>
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</tbody>
</table>
CAISO could see some of its hottest temperatures this year during the week of July 23-27 as strong above-normal temperatures will be widespread across the west.

SoCal City gas prices have moved above $12/MMBtu in cash market prices for the week ending July 20th, and balance of July could trade as high as $18/MMBtu for SoCal.

Pipeline maintenance, strong weather-driven cooling demand as well as a forest fire that has reduced a transmission line from NP to SP in CAISO has lifted Southern California gas and power prices for balance of July and balance of year 2018.

**California Retail Power Price Trends**

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