ERCOT Heat Continues

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Dan Grunwald
Associate, Power and Gas
+1 312 244-7135
daniel.grunwald@morningstar.com

Data Sources Used in This Publication
ERCOT

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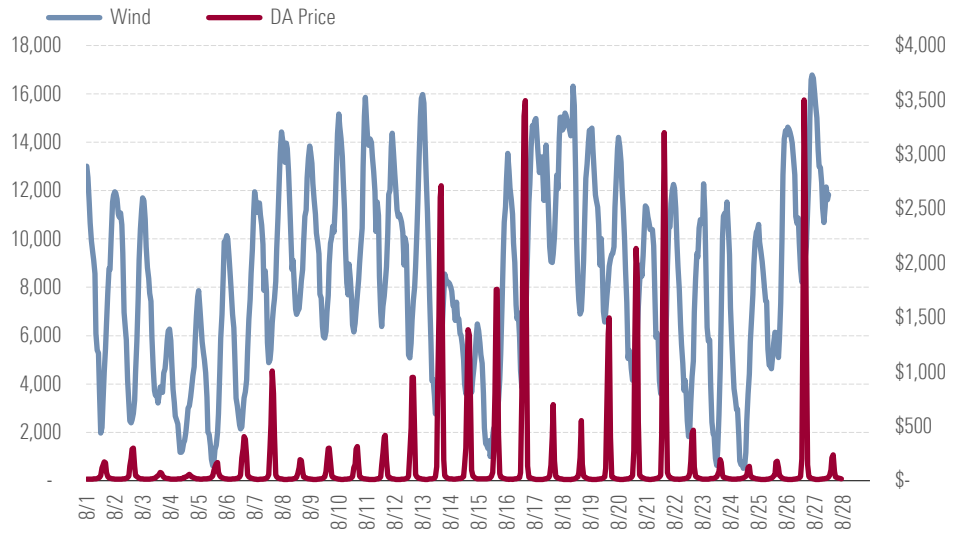
ERCOT Skew

Over 50% of the day-ahead hours in ERCOT ISO for the month of August so far have been under $20 per megawatt-hour, and over 75% have been under $40/MWh. Yet, we are currently sitting at a monthly average price of $139.57/MWh at the beginning of this week (Aug. 26). The outsize average is mostly due to 25 hours priced at over $1,000/MWh. These spikes happened this year when ERCOT's peak load hours overlapped with periods of low wind. They show how ERCOT needs additional at-will generation or generation with a sympathetic output curve that matches low wind periods. Either way, this August has proved what the ISO's potential for tight capacity can yield in high price events. This note details what drives ERCOT price spikes.

Where the Wind Goes

Wind is clearly a factor because the high price spikes tend to correspond with the low point in the day for wind. That isn't the whole picture, though. The correlation factor between low wind and high prices for August is only a weak -0.2. That's because plenty of low wind generation barely moves the needle on price. Exhibit 1 shows that some of the lowest wind days of the month (blue line, left axis) do correspond to some of the highest price days (red line, right axis), but the reverse is not always true. So, while low wind is a factor in these high price events, it is not enough by itself to kick off a high price event.

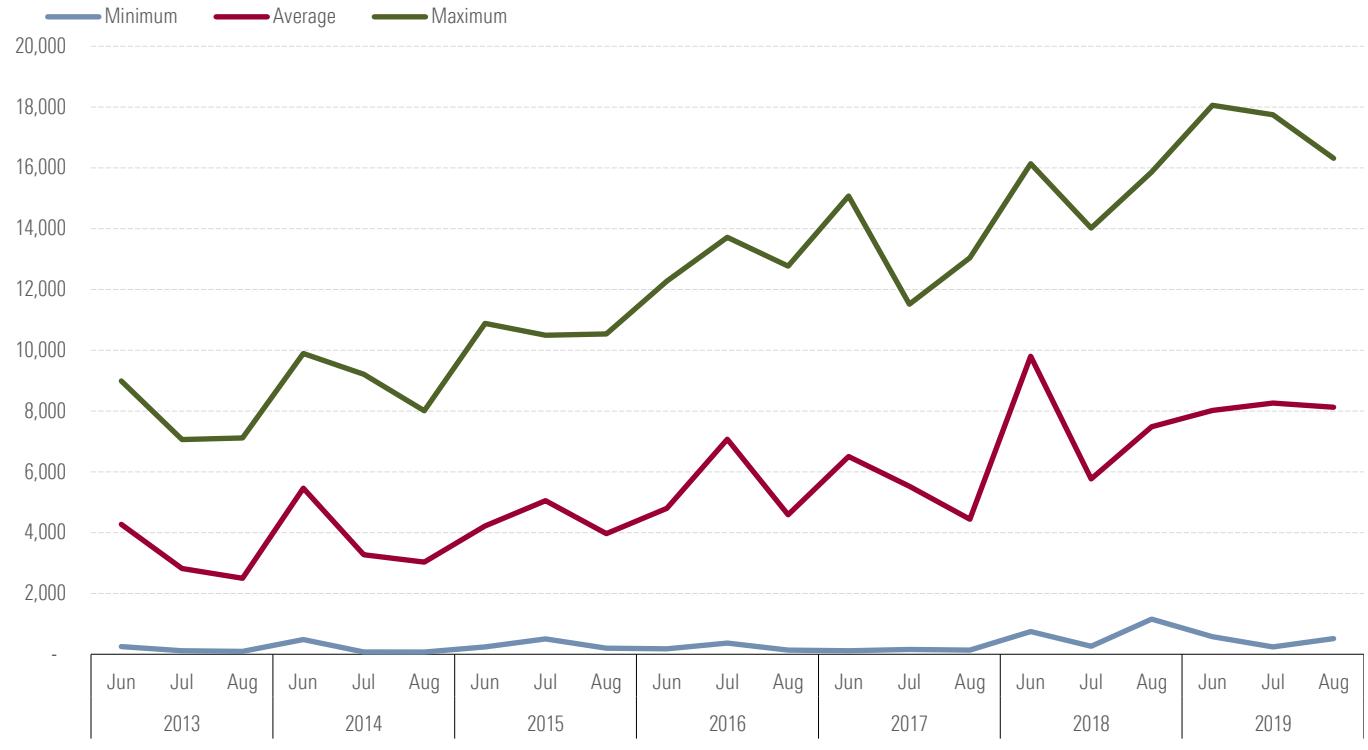
Exhibit 1 Wind Generation vs. Day Ahead Average ERCOT Hub Price (August 2019)



Source: ERCOT, Morningstar.

A big challenge for ERCOT with wind generation is the near zero floor that tends to occur in the midday heat when load is highest. The skew in ERCOT prices is in large part due to wind—not in the total level, but in the delta between the daily maximum and minimum wind generation. Gas or other fuel generation needs to make up for that gap as well as for high increasing load in the middle of the day. That creates a steeper midday ramp as load is climbing while underlying wind generation is dropping. This masked steep ramp period is the double speculation factor behind ERCOT summer spikes when reserve capacity is tight over the peak hours. There is a similar masked ramp during the evening in CAISO as solar drops out of the stack to produce the now characteristic duck curve in that market, or in Northern U.S. markets during morning winter ramping for heat. Exhibit 2 shows daily high (green line), average (red line), and low (blue line) wind generation in ERCOT during the past six years. While average and maximum daily wind generation are sizable—topping out at 18,000 MW per hour last July—the problem comes with the depth of the near zero lows. Although these minimum wind generation values do appear to be creeping above zero this year and last, they don't come close to solving the generation shortfall over the peak load hours that causes spikes.

Exhibit 2 Hourly High, Low, and Average Wind Profiles in ERCOT

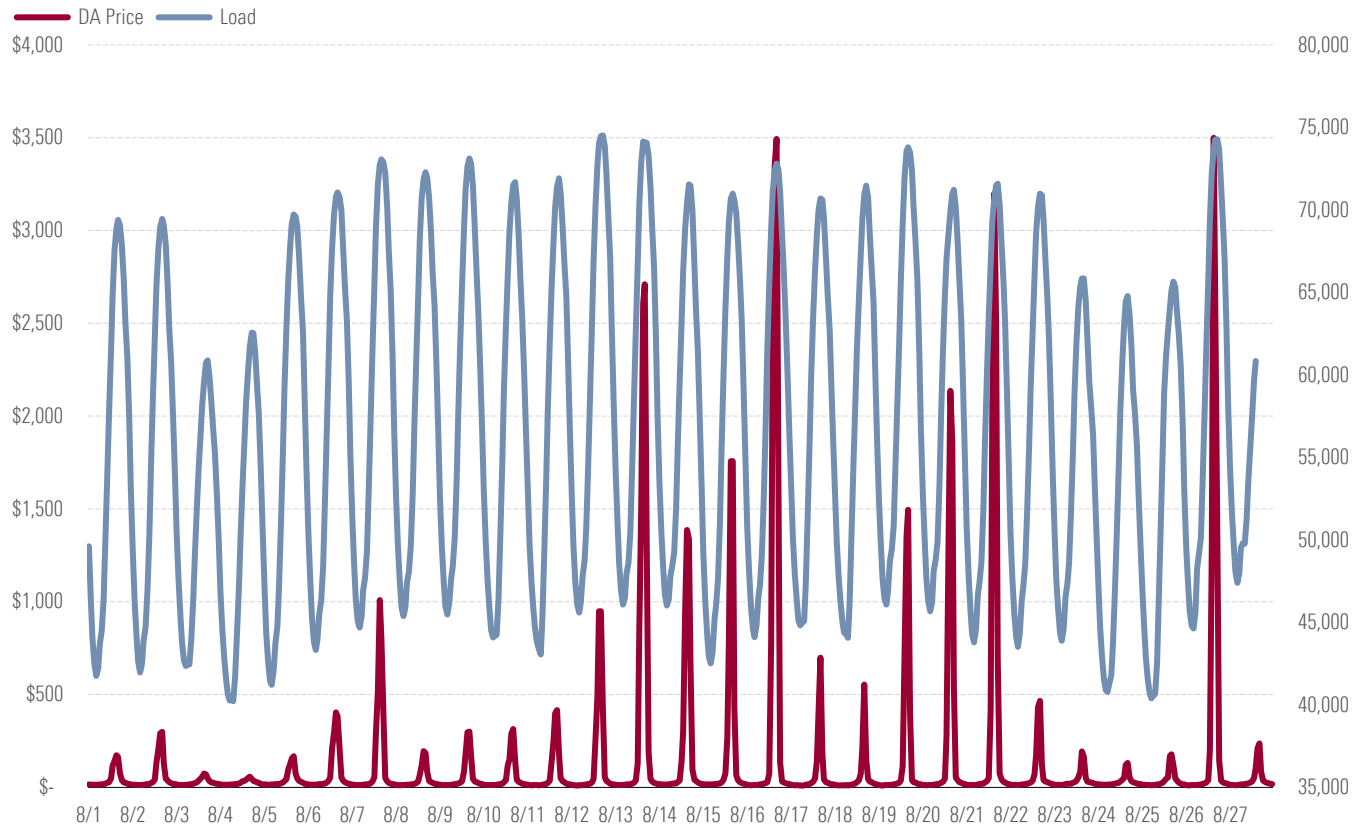


Source: ERCOT, Morningstar.

Demand Highs

Record ERCOT demand is also certainly a factor in price spikes. The correlation coefficient for load to price this month is 0.42, a sizably stronger indicator of when price will spike compared with the weak low wind signal we just discussed. The lowest load for an hour when day ahead prices spiked over $1,000/MWh is 68,478 MW, but almost all quadruple price hours occurred during hours with over 70,000 MW of load, including a record-breaking 74,156 MW on Aug. 13. Once again, though, like wind, we see that high loads do not necessarily lead to a $1,000 price tag. Exhibit 3 shows that most days in ERCOT this month have experienced load over 70,000 MW, but extreme prices do not always result. Even weekends—which are designated off peak because industrial demand shuts down and rarely, if ever, see price spikes—have seen peak loads above 70,000 MW. So ERCOT's major on peak pricing events cannot be explained by load alone either.

Exhibit 3 Load vs. Day Ahead Hub Average Price for August 2019



Source: ERCOT, Morningstar

The Combo Effect

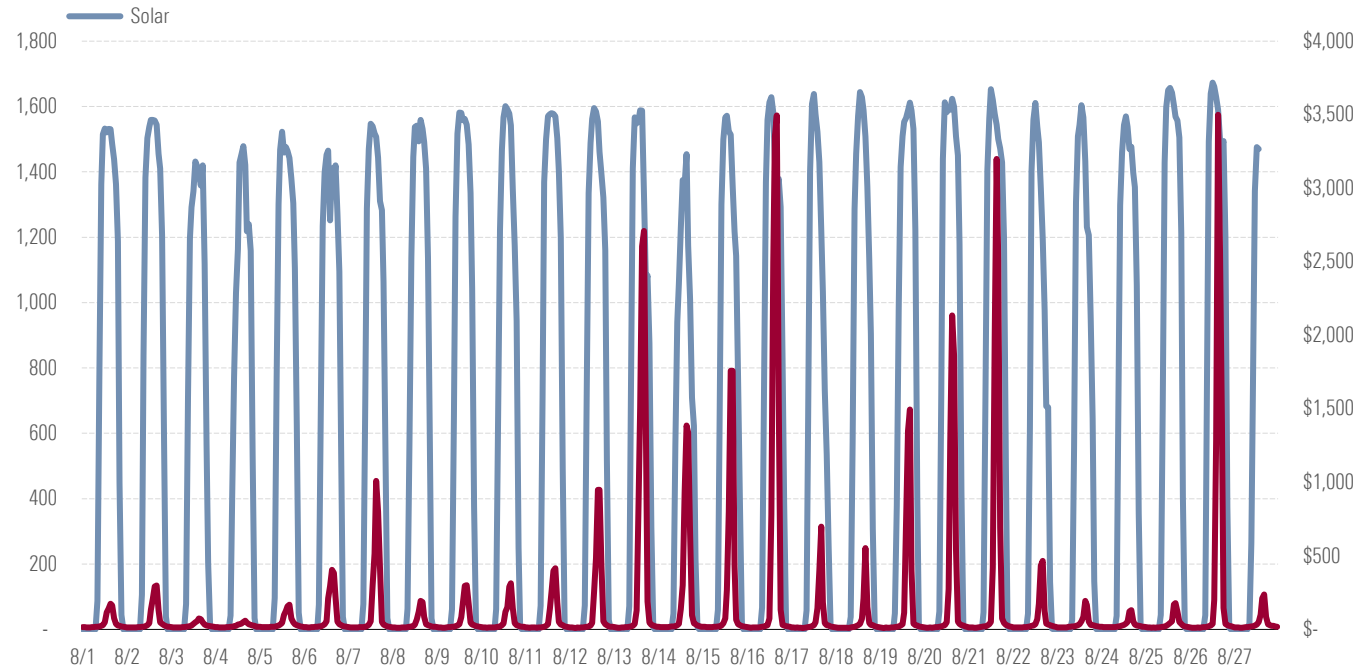
As we detailed last year, (see ERCOT and the End of Summer), it is not just low wind or high demand scenarios that will drive ERCOT prices higher from now on; it is the combination of low wind and high load that is most likely to cause major pricing events. This combination is prime during August in Texas, when lingering heat fronts cause dead wind and high cooling demand. So far this combo only affects

five hours of the day, resulting in price spikes during hours ending 13 through 17. During these hours, the ISO isn't in dire need of new baseload gas-fired generation or missing the retired baseload coal plants but instead is in need of additional peaking generation to meet ramping demand.

Solar vs. Gas

ERCOT summer extreme spikes will continue if load keeps increasing without needed additional peaking generation. In Texas, solar capacity is on its way that may take out this midday summer heat spike in the future. Exhibit 4 shows that the current peak solar generation occurs over the major price events of the month so far. In most levelized (daylong) cost analysis, we see combined cycle and renewables giving each other a run for the money, but solar has for some time been a better alternative to basic peaking natural gas combustion plants. Even with ERCOT seeing zero to negative natural gas prices in the West, the long-term play still points to solar to capture the peak.

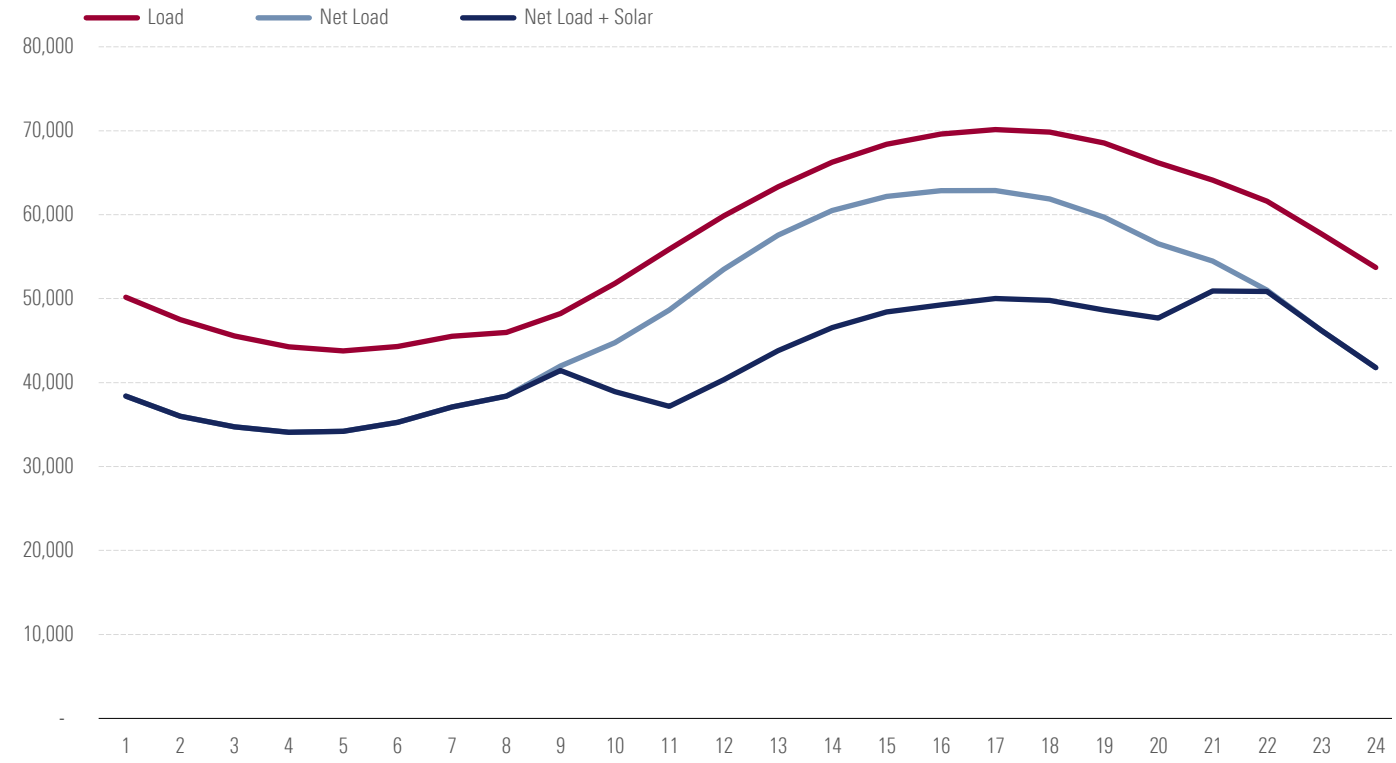
Exhibit 4 Solar vs. Day Ahead Hub Average Price (August 2019)



Source: ERCOT, Morningstar

As previously discussed (see ERCOT Solar Set to Climb), solar capacity is growing rapidly in ERCOT . If solar grows to similar levels as wind capacity, the impact will be significant. In Exhibit 5, we see the ERCOT average load this month (red line) together with the impact of wind renewables (light blue line) and solar (dark blue line) on the net load. If solar capacity increases to current wind levels, then the net load significantly drops and increases the generation capacity over the very hours that are causing power consumers grief in ERCOT this summer. The ERCOT interconnection queue has plenty of solar in the works, and it seems likely those projects will move forward to capture the prime price spikes next summer. Also, we see a continuation of the trend with more solar additions on the way beyond 2020.

Exhibit 5 August Average Load and Net Load Profiles



Source: ERCOT, Morningstar

The End Effect

The electric power industry is rife with high price events. Whether a big nuclear or coal plant goes out or a low wind and high load scenario presents itself, the price curve is heavily skewed. While most prices land below $40/MWh in ERCOT, much of the risk is in the tails. Although a heavy wind generation build-out has suppressed off-peak prices in ERCOT, summer spikes continue. Tackling those spikes requires the ISO to build out more solar or gas peaker units to even out low wind generation during ERCOT's biggest demand periods in the summer afternoons. Until that happens, the potential remains for price blowups like we've seen this month.

Morningstar Commodities and Energy's evolving ERCOT load and price forecast model is designed to help you navigate Texas summers with transparent insight into fundamental drivers. For more information, please contact Matt Hong (matthew.hong@morningstar.com**) or Michael O'Leary (**michael.oleary@morningstar.com**).**

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For More Information

+1 800 546-9646 North America
+44 20 3194 1455 Europe
commoditydata-sales@morningstar.com

MORNINGSTAR®

22 West Washington Street
Chicago, IL 60602 USA