

California Summer

U.S. power and gas weekly.

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Data Sources Used in This Publication
National Oceanic and Atmospheric
Administration
CAISO

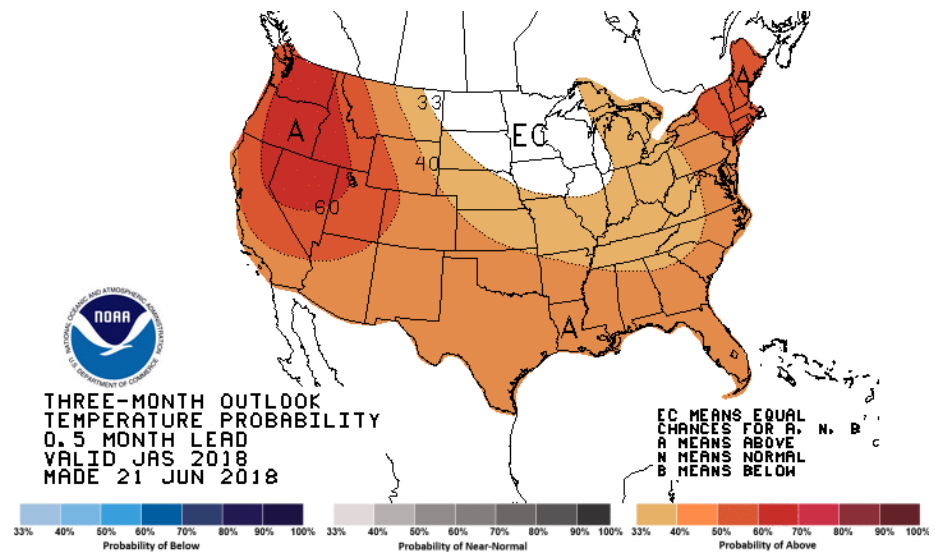
Kicking Off Summer in California

California started July with temperatures well above historical averages. June set higher-than-normal expectations for the remainder of summer—ending the month with 132 cooling-degree days, which was 13 higher than normal, but 53 cooling-degree days short of last year. Historically normal cooling-degree days for June in California are 119. All signs point to higher electricity demand for the California Independent System Operator this summer, though maybe less than last year. Whether this increased demand translates to stronger prices is more uncertain. This note presents our summer CAISO view.

Western Heat Forecast

The June 21, 2018, National Oceanic and Atmospheric Administration's long-term forecast shows a high probability of abnormal heat across most of the country between July and September (Exhibit 1). According to NOAA, the western third of the country has the highest probability of greater-than-normal heat. The California cooling-degree day forecast is 264 for July, 257 for August, and 160 for September, higher than normal by 23, 15, and 9, respectively.

Exhibit 1 Three-Month Outlook



Source: NOAA

Structural Changes

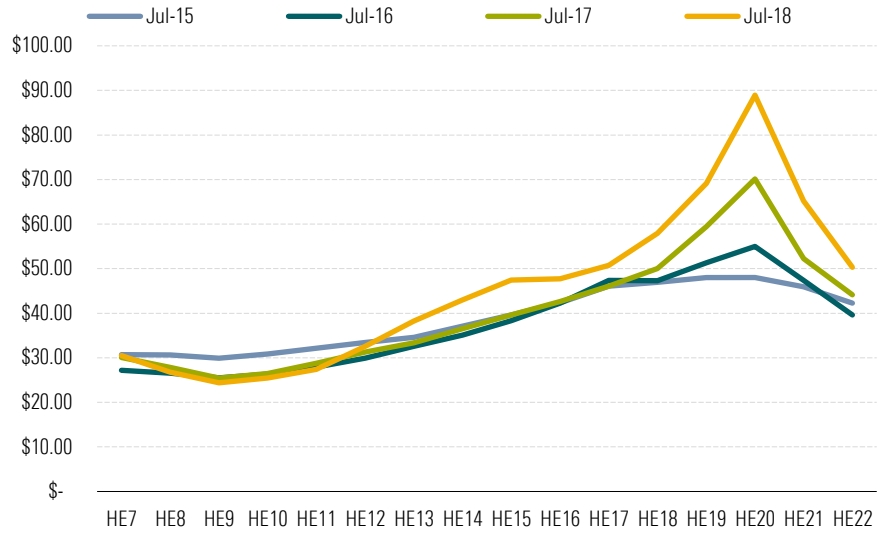
These elevated temperatures translate to strong power demand for cooling in the Golden State but no longer automatically result in stronger prices because of the impact of renewables. California is now in a unique position, as the state with the highest penetration of renewable generation. Between 2013 and 2017, total renewable capacity (solar, wind, and water) expanded by 37%, moving from a total summer capacity of 21,000 megawatts to roughly 29,000 MW in 2017. The largest growth is an expansion in CAISO utility solar generation capacity from roughly 4,000 MW in 2013 to 11,000 MW in 2017. An additional 1,200 MW of solar generation is expected on line in CAISO for 2018.

Over the same period, CAISO has seen significant natural gas fleet retirements. In 2013, the region had total natural gas summer capacity of around 39,000 MW. This year, that number is 6,000 MW lower at around 33,000 MW. Increases in solar generation coupled with gas retirements have fundamentally changed CAISO market behavior, where hourly prices are largely dictated by the marginal generating fuel. Price behavior now generally reflects tightening supply during the evening ramp hours as solar capacity fades. This trend should continue as more solar generators are added and natural gas generators are retired. Without distributed energy resources to smooth out intraday supply volatility, this behavior reflects a structural shift in California seasonal net loads.

Summer Prices at SP15

A look at July average on-peak day-ahead prices at SP15 from 2015 through 2018 month to date (Exhibit 2) shows this changing price relationship. Greater penetration of solar assets has created two general phenomena; depressed mid-day prices and steeper evening prices. The steeper evening ramp, which is when renewable generators have less output, requiring natural gas units to turn on, seems to peak in HE20 (8 p.m.). As more solar capacity enters the market, the evening ramps will get steeper, as can be seen with prices in July so far. However, the exacerbated ramp this year, compared with last, is more likely the result of exceptionally hot days in California earlier this month, when evening prices settled above \$100.00 per megawatt-hour on weather-related demand. As temperatures begin to cool in the latter half of this week and return toward their historical range, we expect prices to fall as well. Our expectation is that July on-peak day-ahead prices will settle at around \$44/MWh compared with the July 10, 2017, settlement of \$52.56/MWh.

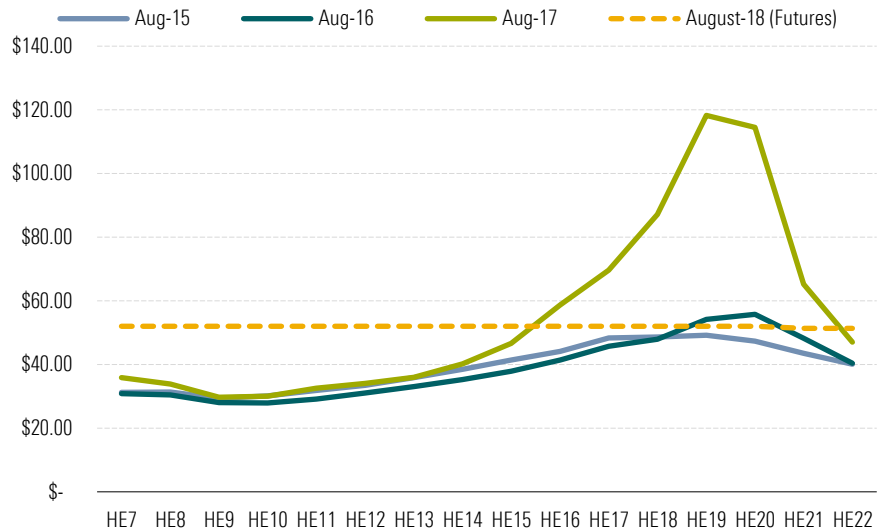
Exhibit 2 SP15 Day-Ahead On-Peak Prices July



Source: CAISO

August follows a similar path to July, with evening peaks showing even larger differences. In 2017, August average hourly prices exceeded \$100/MWh in the evenings compared with the 2016 August average price peak of \$55/MWh (Exhibit 3). A few hours in August 2017 exceeded \$300/MWh, with the monthly high hitting \$436/MWh in HE21 on Aug. 28. August 2018 futures prices are trading around \$51/MWh. Our expectation is that prices will continue moving up to settle around \$59/MWh.

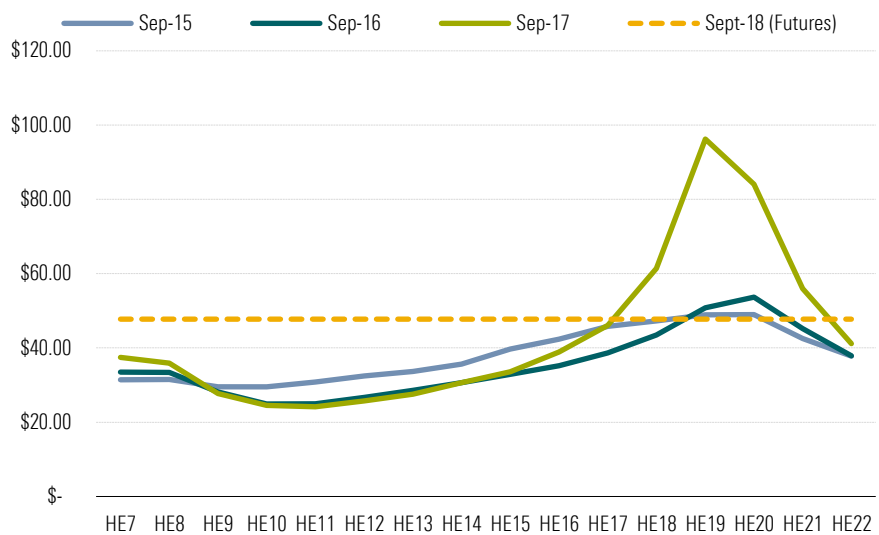
Exhibit 3 SP15 Day-Ahead On-Peak Prices August



Source: CAISO

September set the summer record last year, with the price hitting \$753/MWh on Sept. 1, 2017, in HE21. In aggregate, however, prices generally follow a similar summer trend with steeper prices in the evening ramp (Exhibit 4). The CAISO market rarely saw day-ahead prices above \$100/MWh for more than six consecutive hours during the summer months. On Sept. 1, 2017, when HE21 spiked up to \$753/MWh, the day's on-peak average settled at \$159/MWh, and the month eventually settled at \$43/MWh. The point being, it takes more than a few hours at extreme prices to really move the needle on where the month eventually settles. The likelihood of a price spike, like the one on Sept. 1, 2017, is low. Above-average temperature forecasts still fall short of last year's levels. Despite this, September 2018 SP15 on-peak futures are trading around \$47.75/MWh, with the expectation that prices will settle around \$50/MWh. This bullish expectation is tied less to demand and more to the changing supply stack.

Exhibit 4 SP15 Day-Ahead On-Peak Prices September



Source: CAISO

Tighter Natural Gas Supply

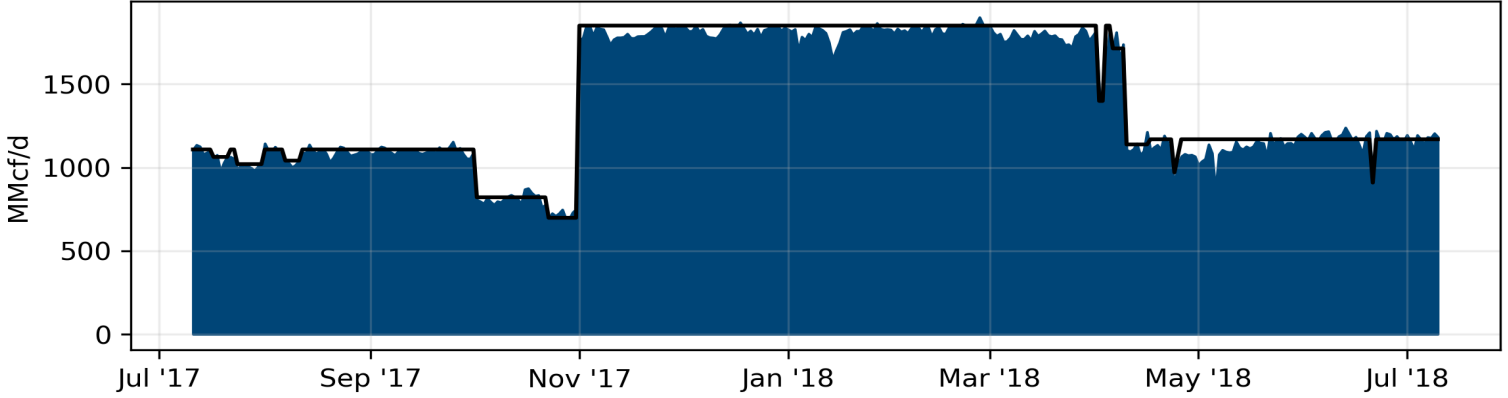
Another driver for power prices in CAISO this summer is tighter natural gas supply. Last year, California was working against two operational challenges: restrictions on Aliso Canyon storage and issues with pipelines delivering natural gas into the state. This led to higher prices at SoCal Citygate in August 2017, which settled around \$4.60 per million British thermal units. Because snowfall totals this year were 58% lower than in 2017, CAISO is generating less hydro power — increasing demand for baseload natural gas units. As a result, natural gas prices at SoCal Citygate for July, August, and September this year are similar to levels seen last August and are trading at \$4.48/mmBtu, \$4.30/mmBtu, and \$3.94/mmBtu, respectively. Those gas prices translate to higher heat rates than last year using SP15 on-peak power prices (11.2, 12.1, and 12.1, respectively). The stronger overall natural gas prices this year with fewer resources available at the lower end of the supply stack should mean higher power prices at SP15.

Conclusion

The SP15 market this summer is tightly related to natural gas prices and changes at the lower end of the supply stack. Higher electricity demand in Southern California may create challenges for generators looking to secure supply, placing risk to the upside in natural gas prices. This shortage may explain why imports from Mexico have slowly ticked up over the last few days, hitting 140 million cubic feet per day on July 6, which coincided with 108-degree temperatures in Los Angeles. If limitations connecting Southern California Gas and El Paso persist beyond July, natural gas prices at SoCal Citygate should move up, sending a bullish signal for prices at SP15. Additional solar capacity and fewer natural gas plants will continue to exacerbate differences between mid-day prices and the evening ramp, providing higher heat-rate natural gas plants the ability to clear in the day-ahead. ■■

Natural Gas Important Points

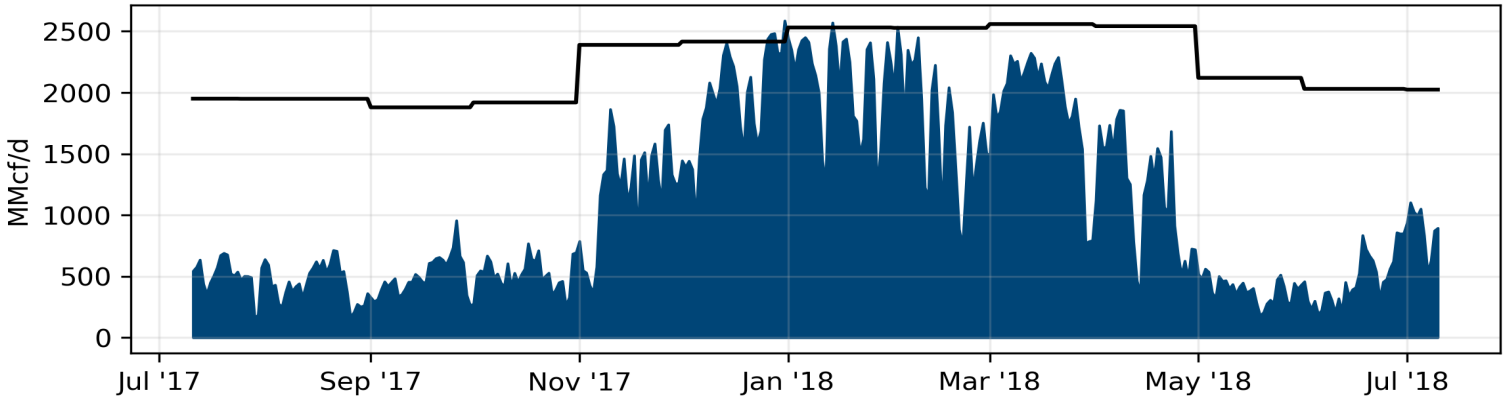
Algonquin: Stony point Compressor



Transcontinental: Leidy Line Station 505



Texas Eastern: Lambertville Compressor

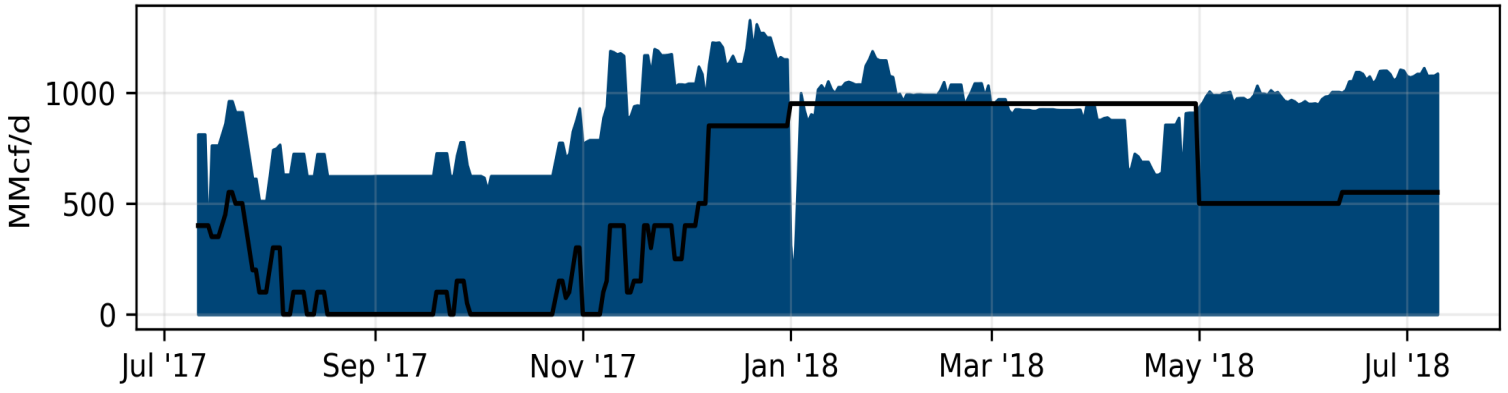


Millennium: Wagner West Compressor

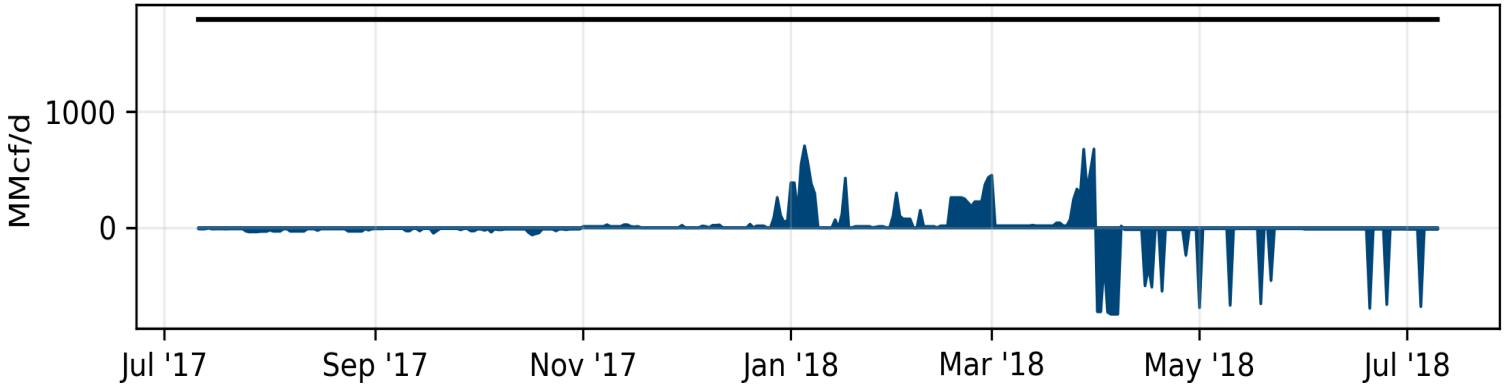


■ Volume — Capacity

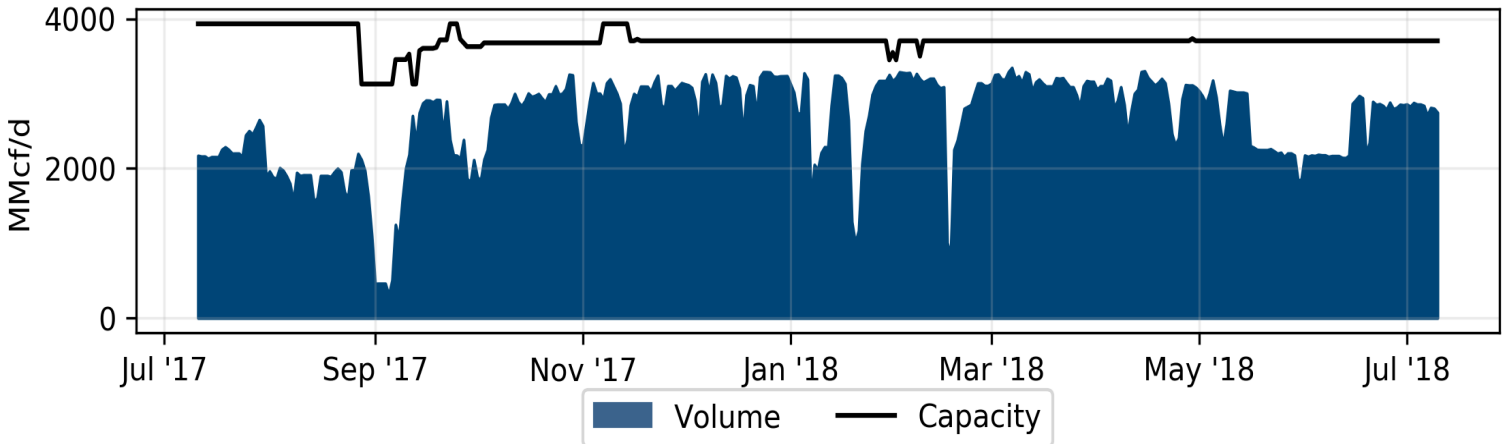
Columbia Gas Trans: Braxton-Stonewall



LNG: Cove Point



LNG: Sabine



■ Volume — Capacity

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