Item 5.1: Summer 2018 Operational and Market Review

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Board of Directors Meeting

ERCOT Public
October 9, 2018

Key observations for summer 2018

- One of the hottest summers on record across Texas, but extreme temperatures were limited to one period (July 18 – 23) that was not as significant or as sustained as in 2011.

- Resource performance was exceptional with overall low outage numbers.

- Sufficient operating reserves were maintained. ERCOT did not initiate an Energy Emergency Alert (EEA) and did not issue any appeals for conservation.

- The market responded during peak conditions, with the majority of generation resource capacity self-committed.

Key observations for summer 2018

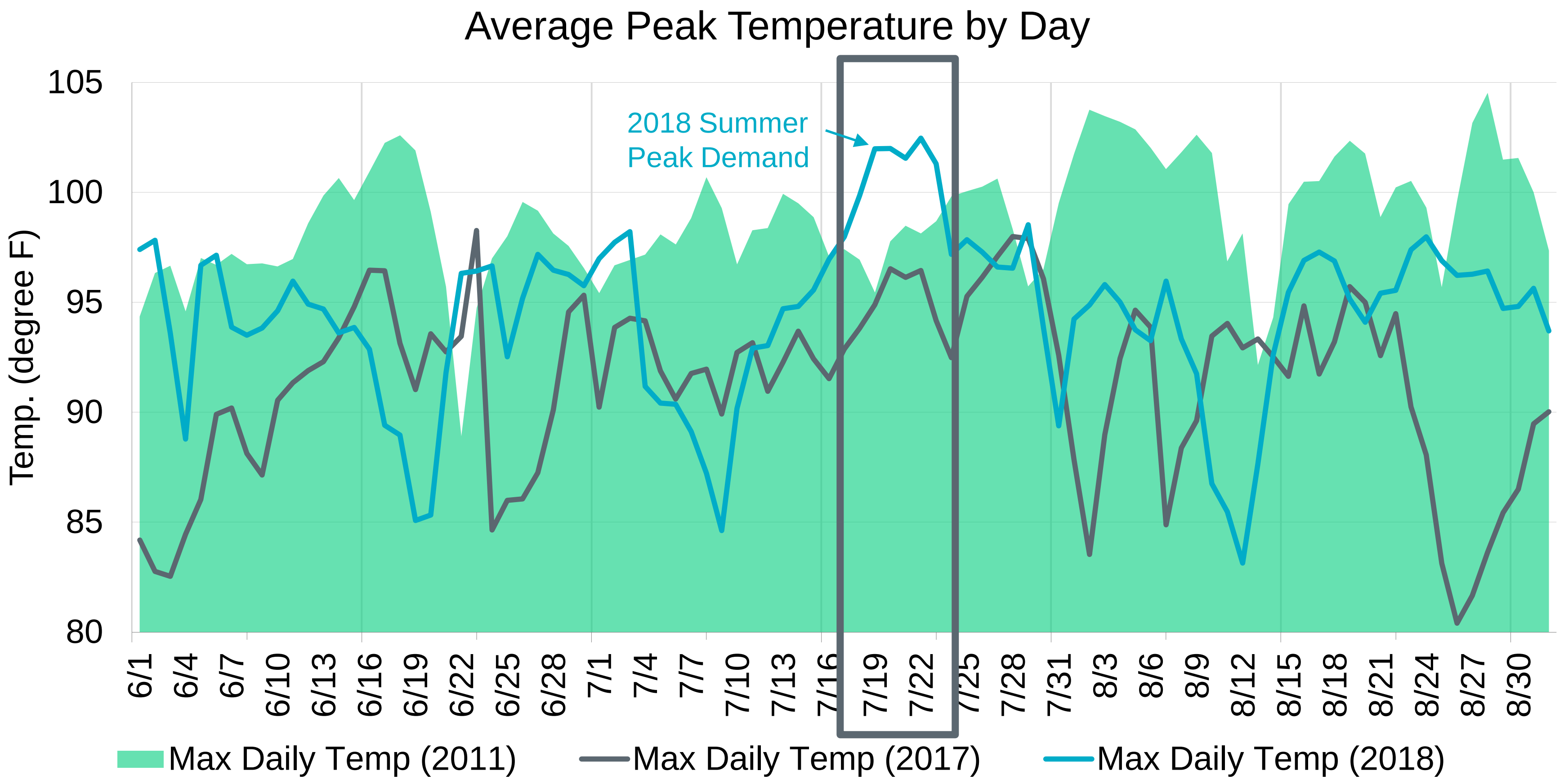
- There was limited remaining generation resource capacity to respond to any significant additional resource unavailability during peak conditions without the use of emergency reserves.
  - There was likely additional available response from demand-side and Distributed Energy Resources.
  - Increased visibility would allow ERCOT to better understand this potential response.

- System-wide prices were higher than in recent years, but Peaker Net Margin did not approach 2011 values.

- High electricity prices in the forward markets led to an increase in collateral requirements for market participants.

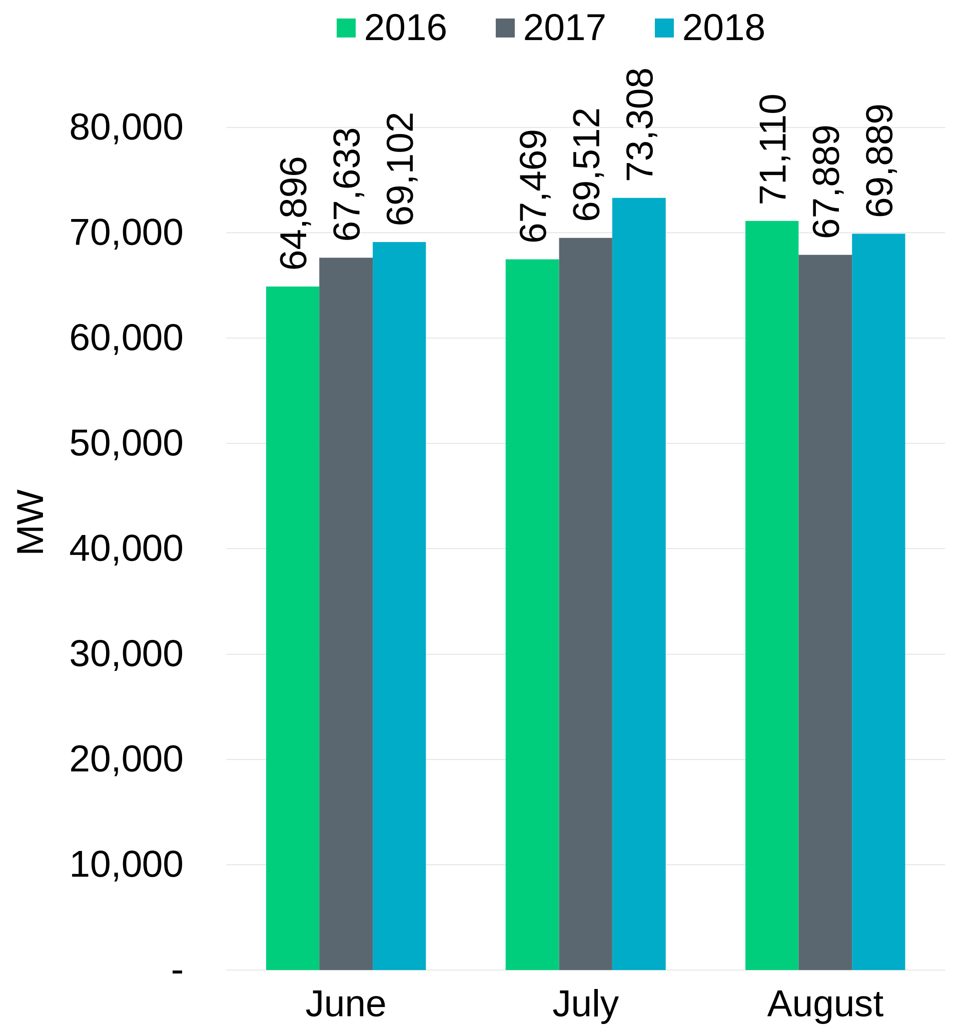
Most sustained period of higher temperatures in 2018 occurred from July 18 – 23

- 2018 temperatures were not as sustained through June, July and August as they were in 2011.



The hotter temperatures generally led to increased system-wide demand

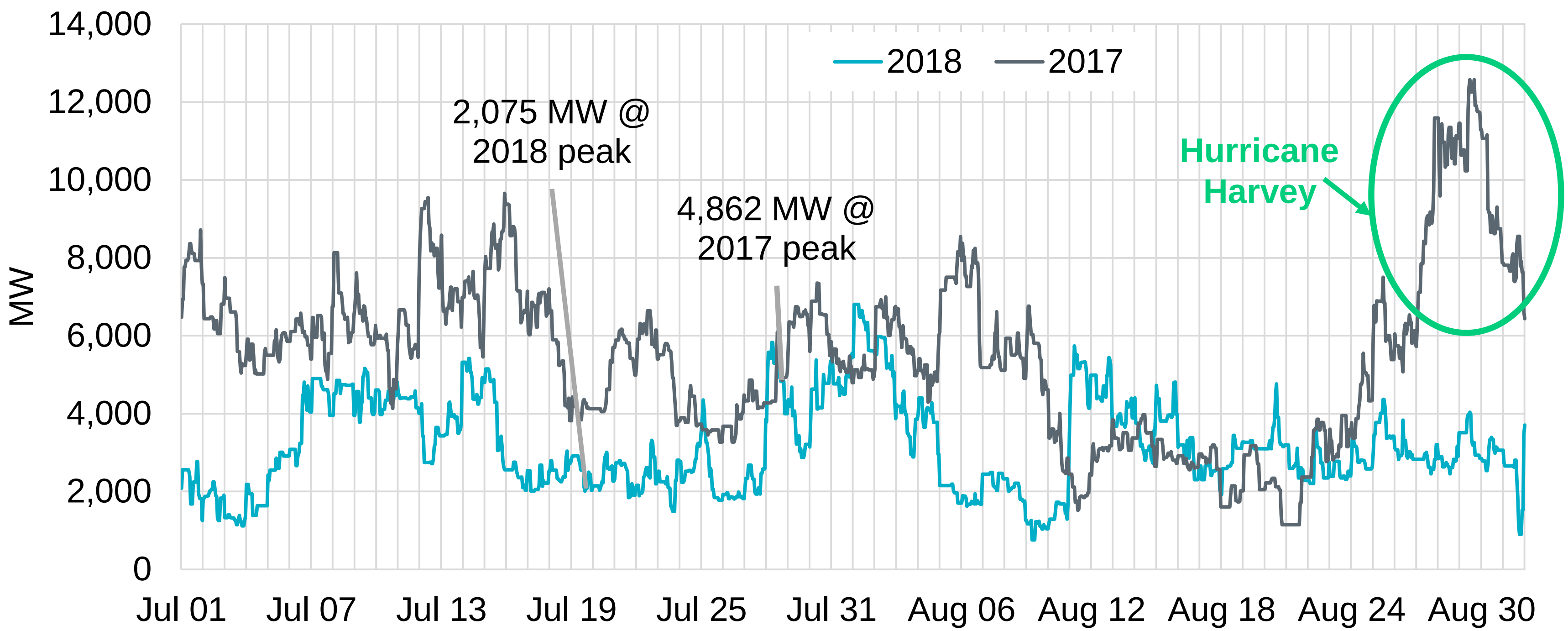
- A new all time system-wide peak demand record was set at 73,308 MW on July 19, 2018.
- A new all time system-wide peak weekend demand record was set at 71,445 MW on July 22, 2018.
- Monthly peak demand in June and July 2018 were larger than the two previous years.
- The monthly peak demand from August 2016 was not surpassed.



* Data: Hourly integrated peak demand as published in the ERCOT D&E report.

MWs of resource outages during peak demand in 2018 were especially low

- During peak demand periods, the resource outage capacity was observed to be significantly lower than in summer 2017.



* Only uses the Outage Scheduler Data as of September 4, 2018
Excludes outages for New Equipment, Retirement, and Mothballs
Excludes outages for PUNs and IRRs.
Includes de-rates, planned, and forced outages for non-IRR, non-PUN Resources

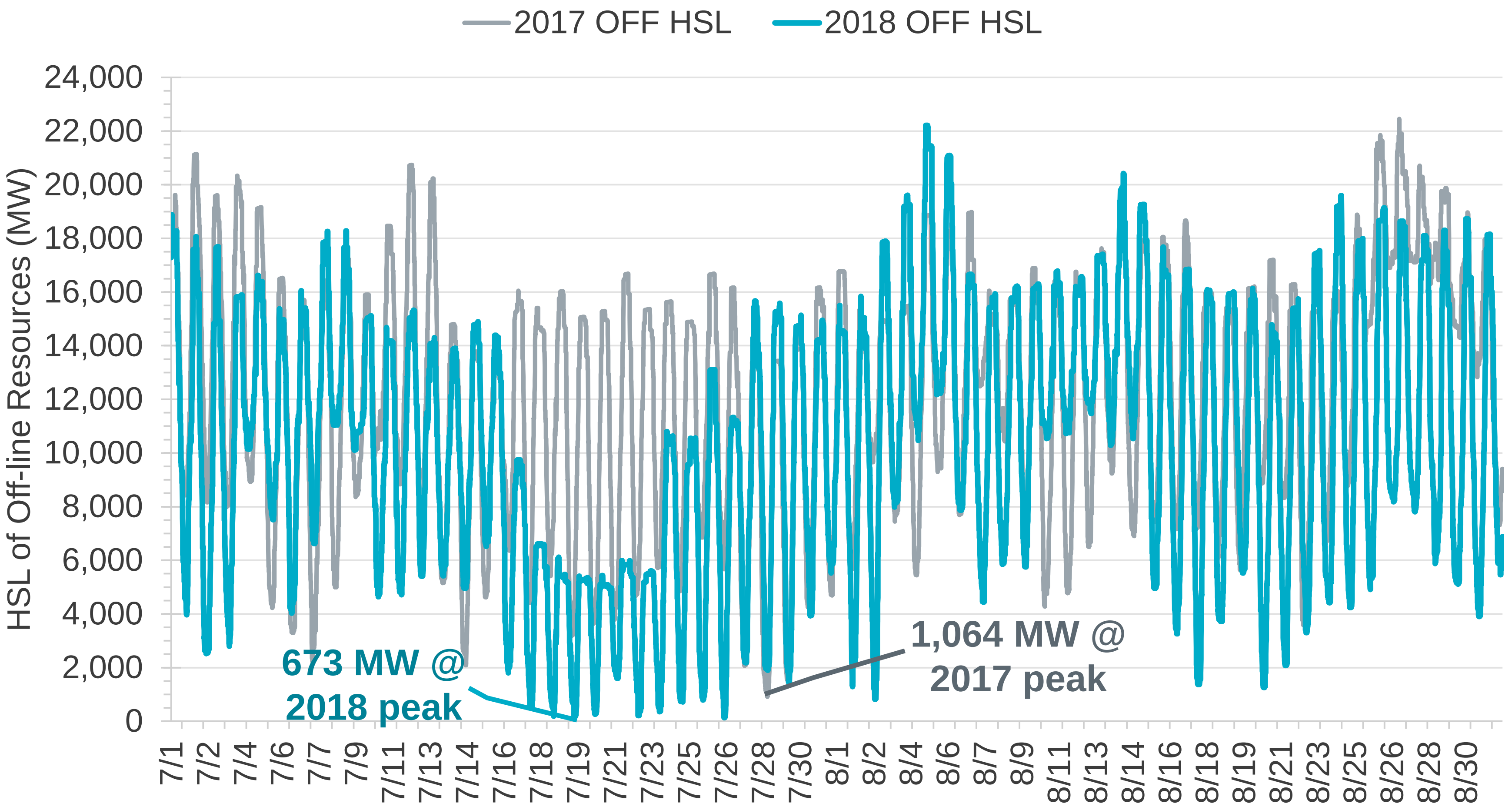
The Summer 2018 Seasonal Assessment of Resource Adequacy (SARA) values vs. actuals at peak demand

	2018 Actual Peak Demand (7/19/18)	Final 2018 Summer SARA*
Total Resources, MW	77,558	78,184
Thermal and Hydro	65,200	66,457
Private Use Networks, Net to Grid	3,019	3,298
Switchable Generation Resources	3,057	2,727
Wind Capacity Contribution	4,229	4,193
Solar Capacity Contribution	1,136	1,120
Non-Synchronous Ties	917	389
Peak Demand, MW	73,308	72,756
Reserve Capacity, MW	4,250	5,428
Total Outages, MW	**2,075***	4,349
Extreme Outage Scenario		6,915
Capacity Available for Operating Reserves, MW	2,175	1,079

No outages greater than 500 MW

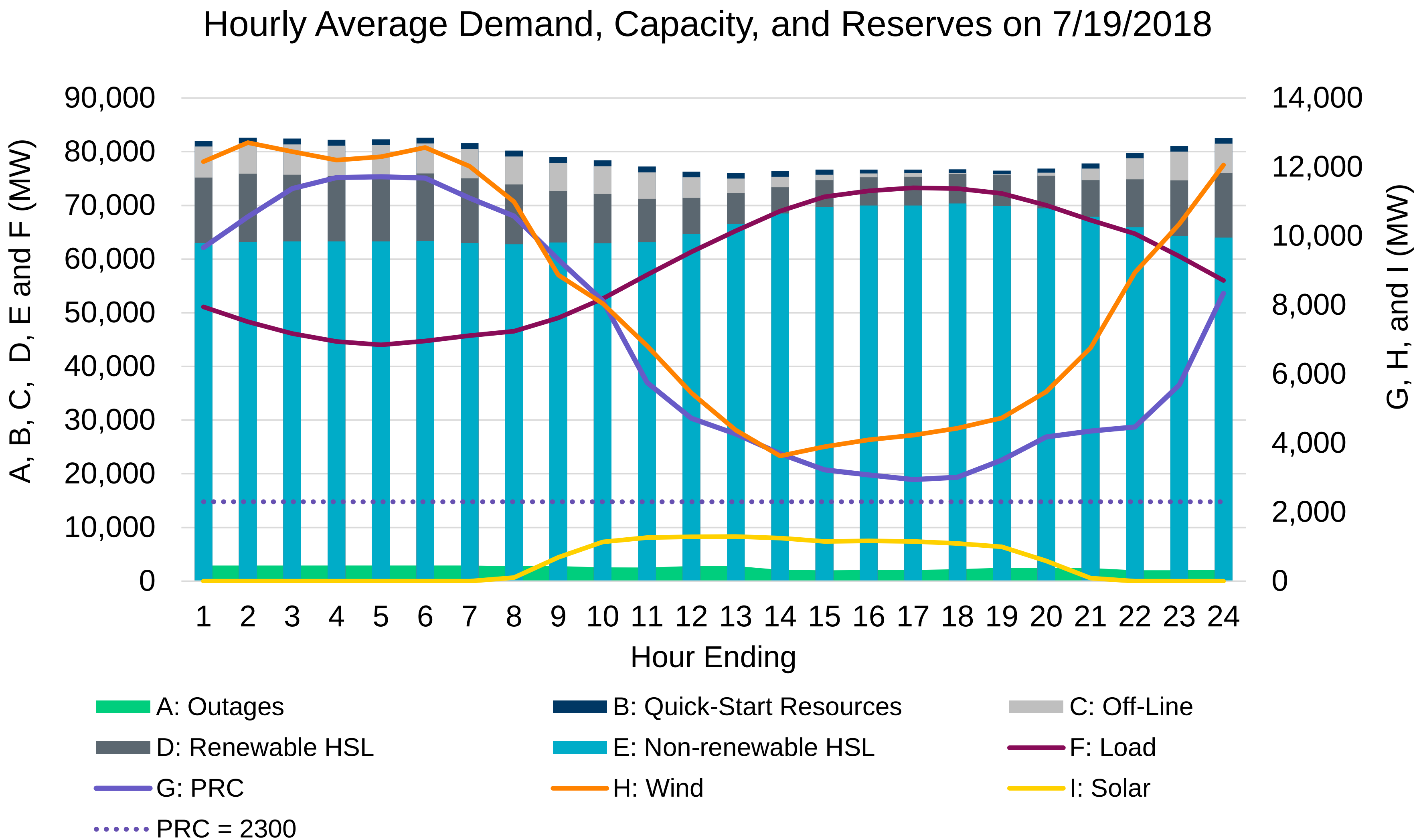
Source: Final 2018 Summer SARA
* The totals for the Final 2018 Summer SARA column combine multiple rows into a single row in some cases (E.g., already in-service Thermal and Hydro Resources with planned Thermal and Hydro Resources).
** The outage information in this table was extracted on September 4, 2018.

Observed a particularly small amount of resource capacity that was off-line and available during the peak demand period in 2018



*"OFF HSL" is a summation of capacity from resources that were simply off-line and those providing non-spinning reserves as an off-line resource.

A closer look at the peak demand day of July 19

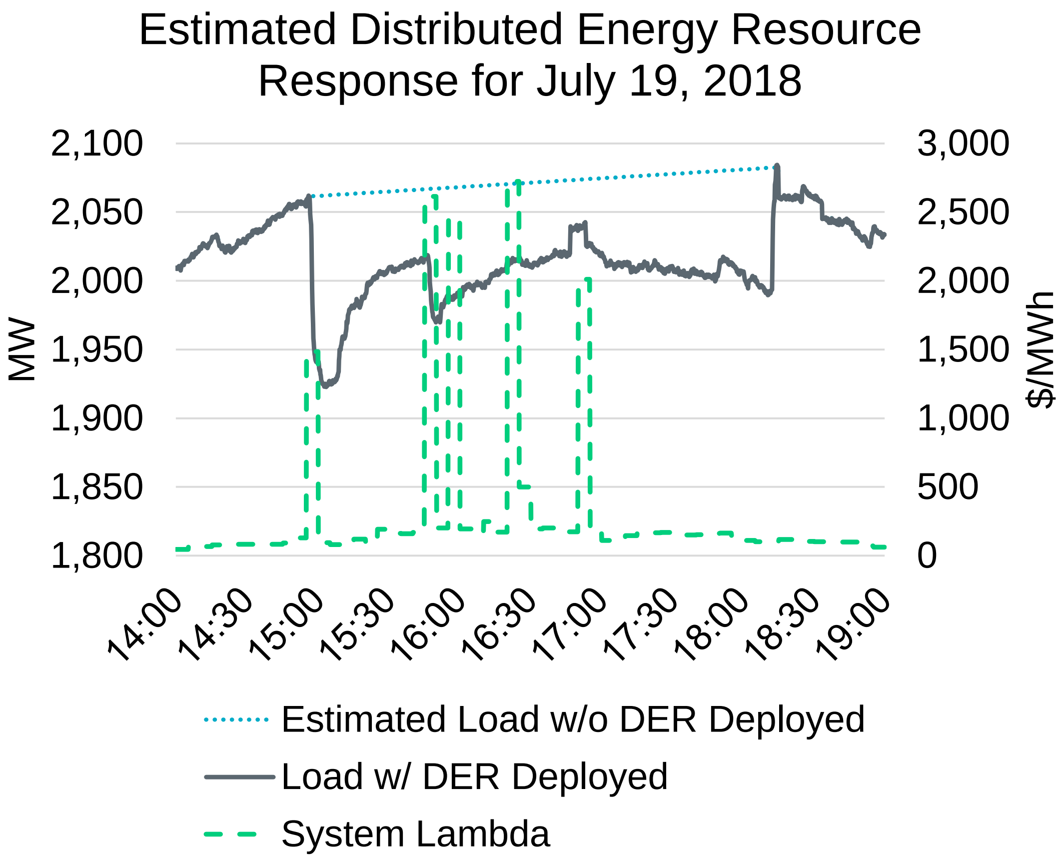


*Off-line capacity is a summation of capacity from resources that were simply off-line and those providing non-spinning reserves as an off-line resource.

Based on the limited information currently available, ERCOT estimated that some Distributed Energy Resources (DERs) are responding to price

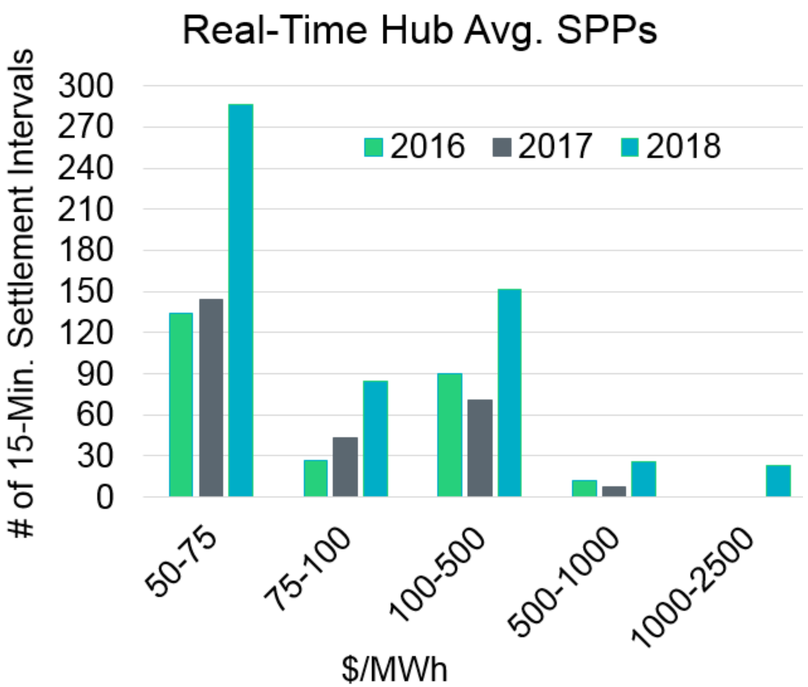
- ERCOT is currently tracking ~100 mapped, registered DERs located at 93 unique transmission-level loads.
  - ERCOT does not receive telemetry from these DERs.
  - DER response estimated based on changes in transmission-level load consumption.

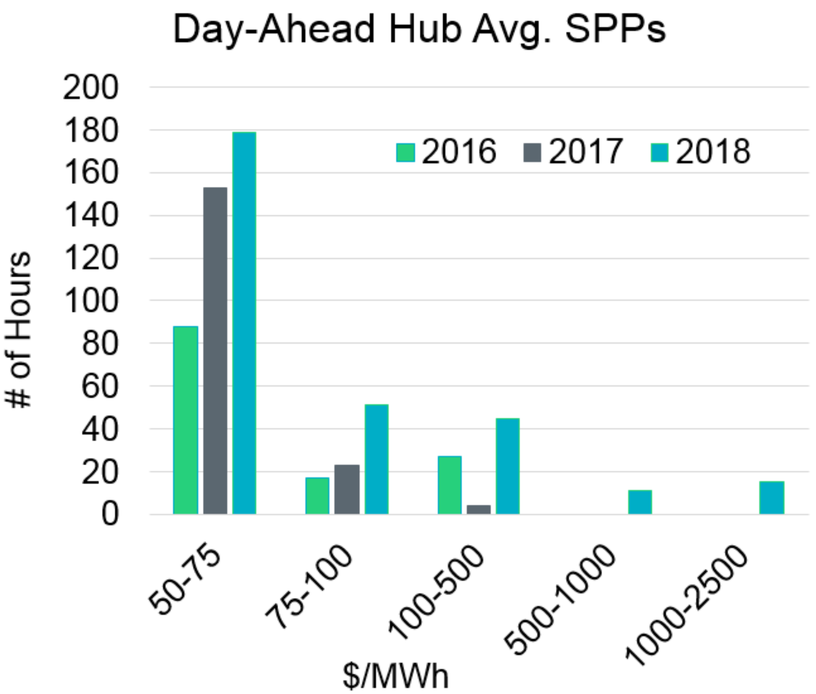
- This may include 4-Coincident Peak (4-CP) response during this Operating Day.



Aggregation of ~100 DERs located behind 93 unique transmission-level loads

Occurrences of high system-wide Settlement Point Prices (SPPs) in the Day-Ahead Market (DAM) and Real-Time increased in June – August 2018, relative to 2016 and 2017



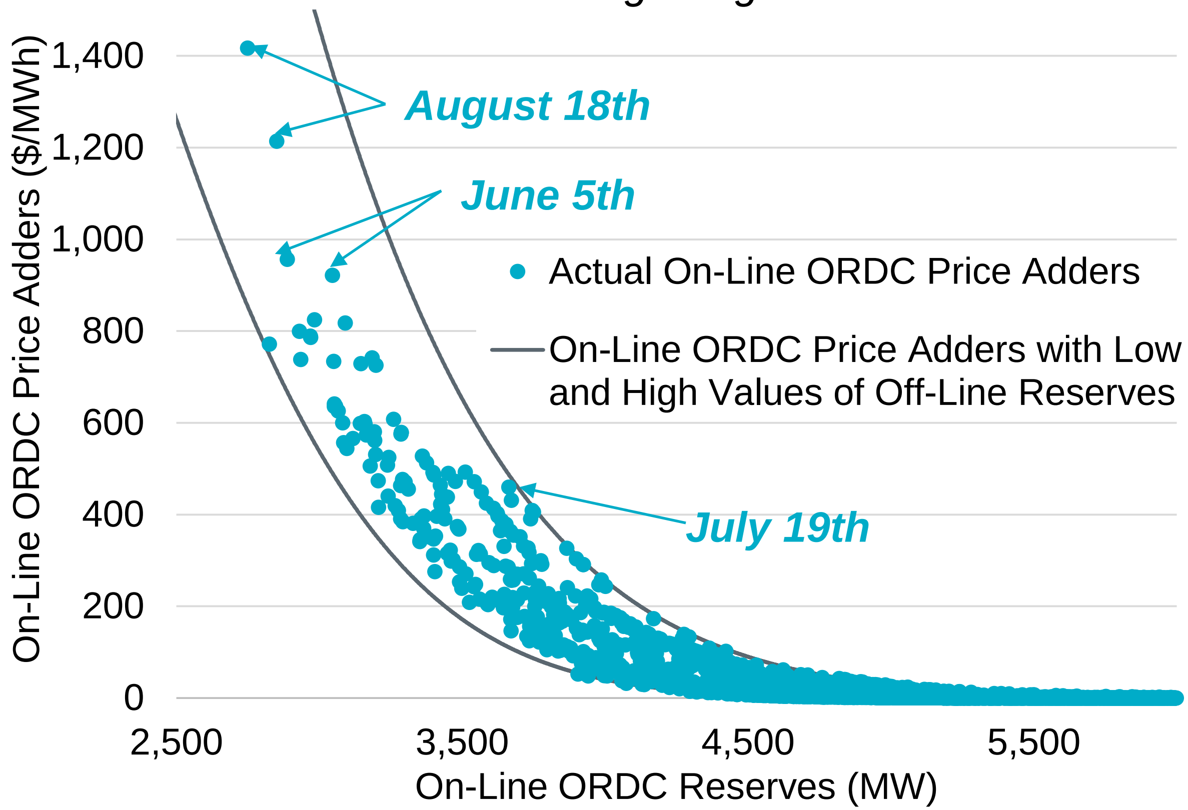


Month	2018 Avg. Hub Avg. SPP in Real-Time	2017 Avg. Hub Avg. SPP in Real-Time
June	$32.56/MWh	$28.71/MWh
July	$47.20/MWh	$30.83/MWh
August	$38.17/MWh	$28.50/MWh

Overall reserves did not reach emergency levels, but there were periods of lower ORDC reserves and higher ORDC price adders during June – August 2018

- The day with the largest ORDC price adder was August 18.
- While there were other periods of lower off-line ORDC reserves, higher levels of on-line ORDC reserves were being observed.
  - E.g., on-line ORDC reserves remained above 3,600 MW on July 19.

Real-Time On-Line ORDC Reserves and Price Adders for Hours Ending 15 through 18
June through August



Accumulated Peaker Net Margin during June – August 2018 was higher than in recent years, but did not approach the value from 2011