# Item 5.1: Summer 2019 Operational and Market Review – Revised October 8, 2019

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Board of Directors Meeting

ERCOT Public
October 8, 2019

# Key Observations for Summer 2019

- Early summer was mild, and August was very hot (September was also above normal).
- There were many days with tight conditions, and an Energy Emergency Alert (EEA) Level 1 was declared twice.
  - Emergency Response Service (ERS) deployments prevented the need for EEA2.
- Peak demand day saw higher Intermittent Renewable Resource (IRR) production.
  - As a result, it was not one of the highest-priced days, and there was no EEA.
- Tightest conditions frequently occurred earlier than time of peak demand.
- Resource performance continues to outpace historical patterns.
- Overall, the market outcomes supported reliability needs.
- Even with significant pricing events, there were no mass transitions.

# Outline

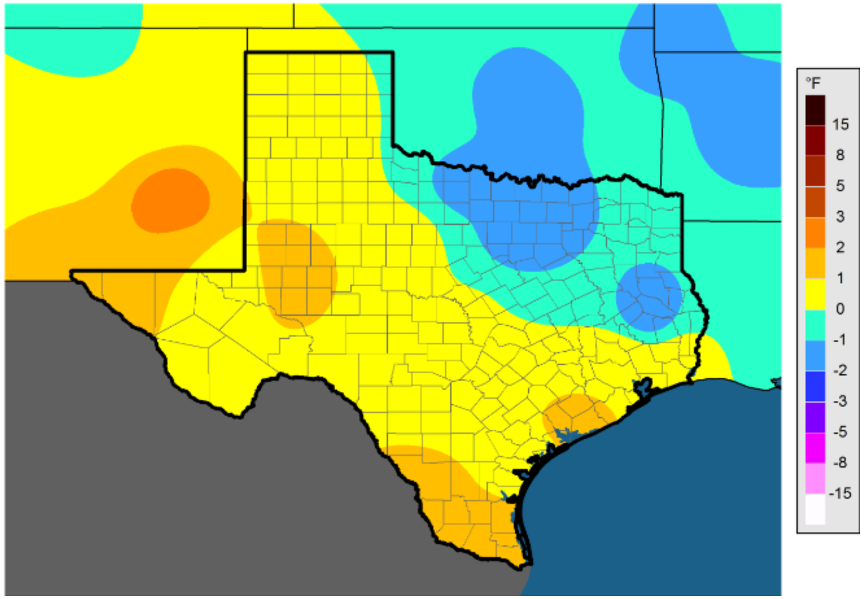
- Summer overall
- Peak week/day
- EEA days
- Commercial information

# Weather

- June – July 2019 was the coolest since 2007*
- August 2019 was the 2nd hottest on record*
- Overall, June – August 2019 was 21st hottest on record
- Extended period of above normal heat in Texas – but not much extreme heat (105 or greater)

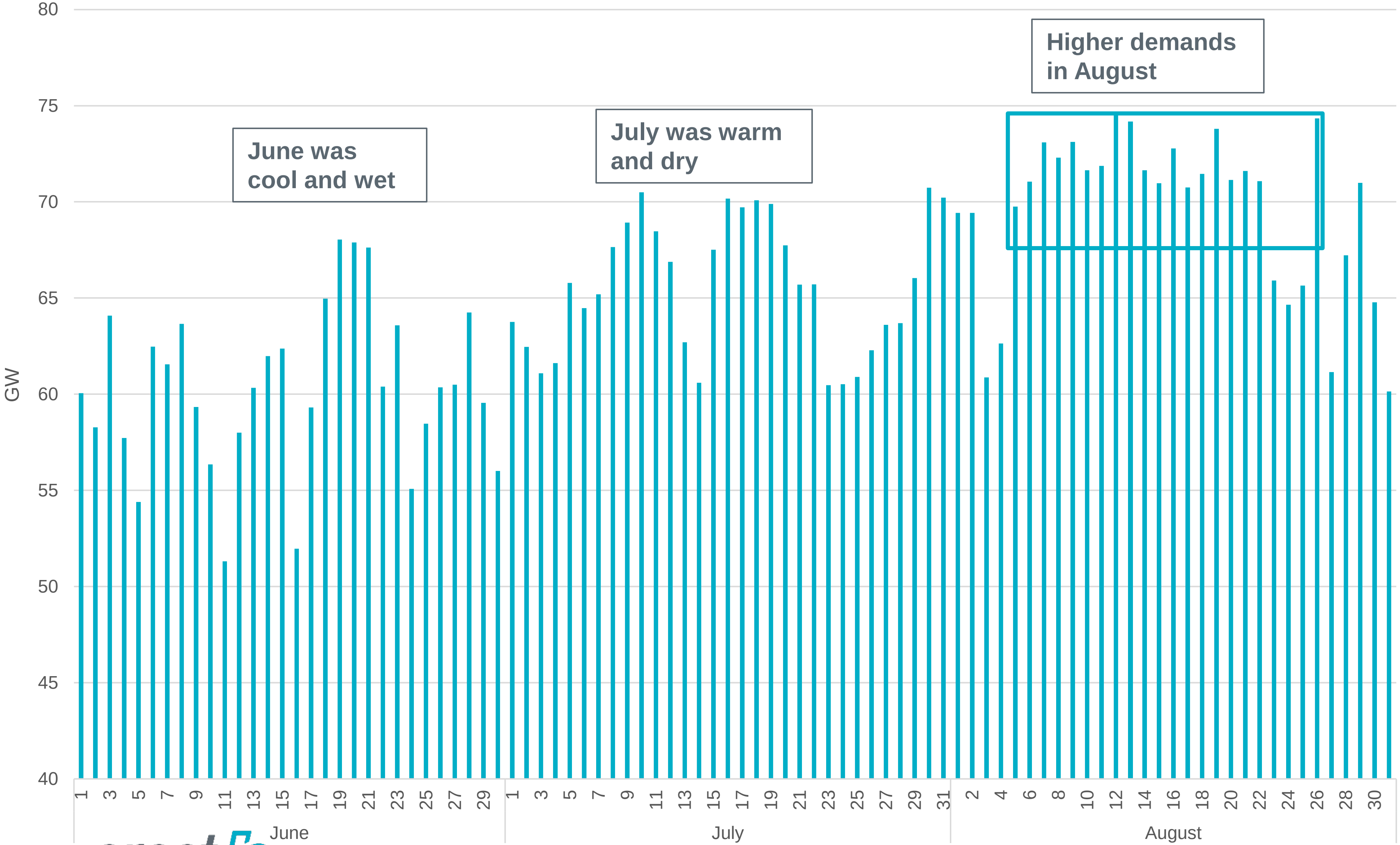
- Comparison to 2018 differed across the state
  - Dallas cooler
  - Austin/San Antonio similar
  - Houston, South Texas hotter
    - More heat along coast

Average Temperature (°F) Departure from 20190601 to 20190831 - Fifteen Year Average




*Based on mean temperature

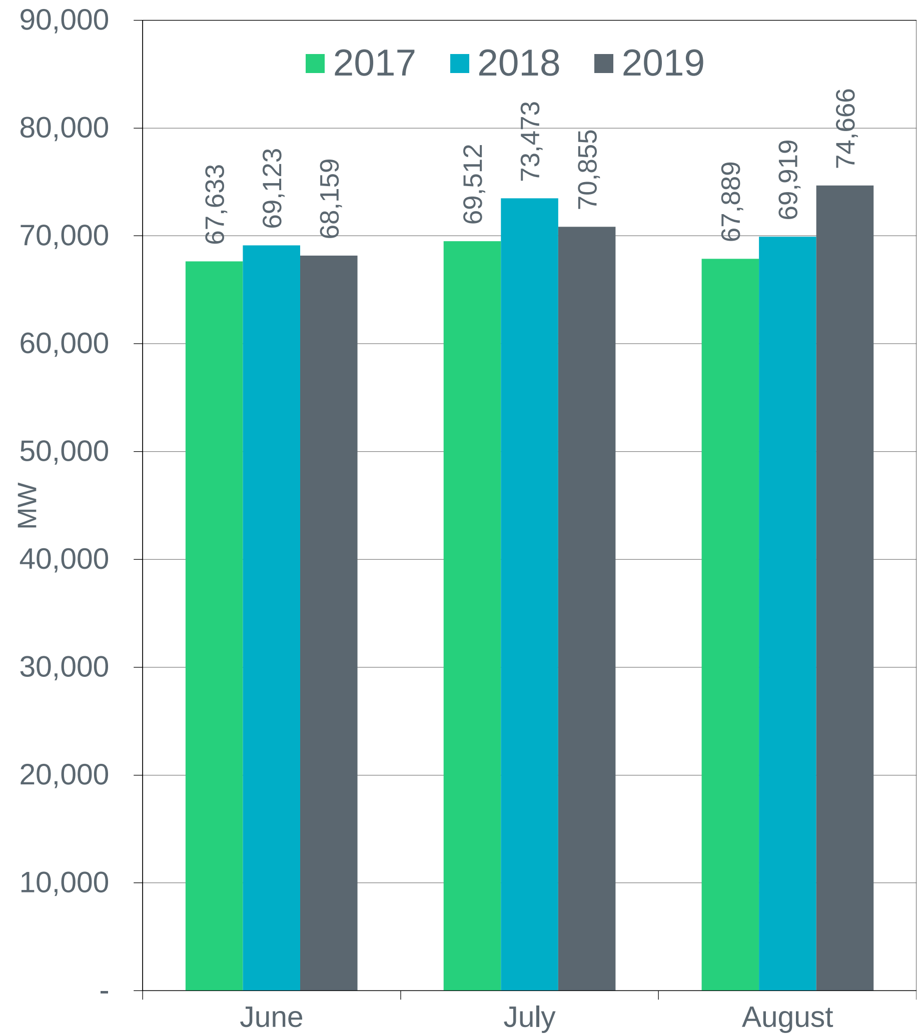
# Daily Peak Hour Demands



# Comparison of Summer Monthly Peak Demand

*Revised 10.08.19

- A new all-time record for system demand peak was set at 74,666 MW on Aug. 12, 2019.
- A new all-time record for weekend system demand peak was set at 71,915 MW on Aug. 11, 2019.*
- Monthly peak demands in June and July 2019 were lower than 2018.

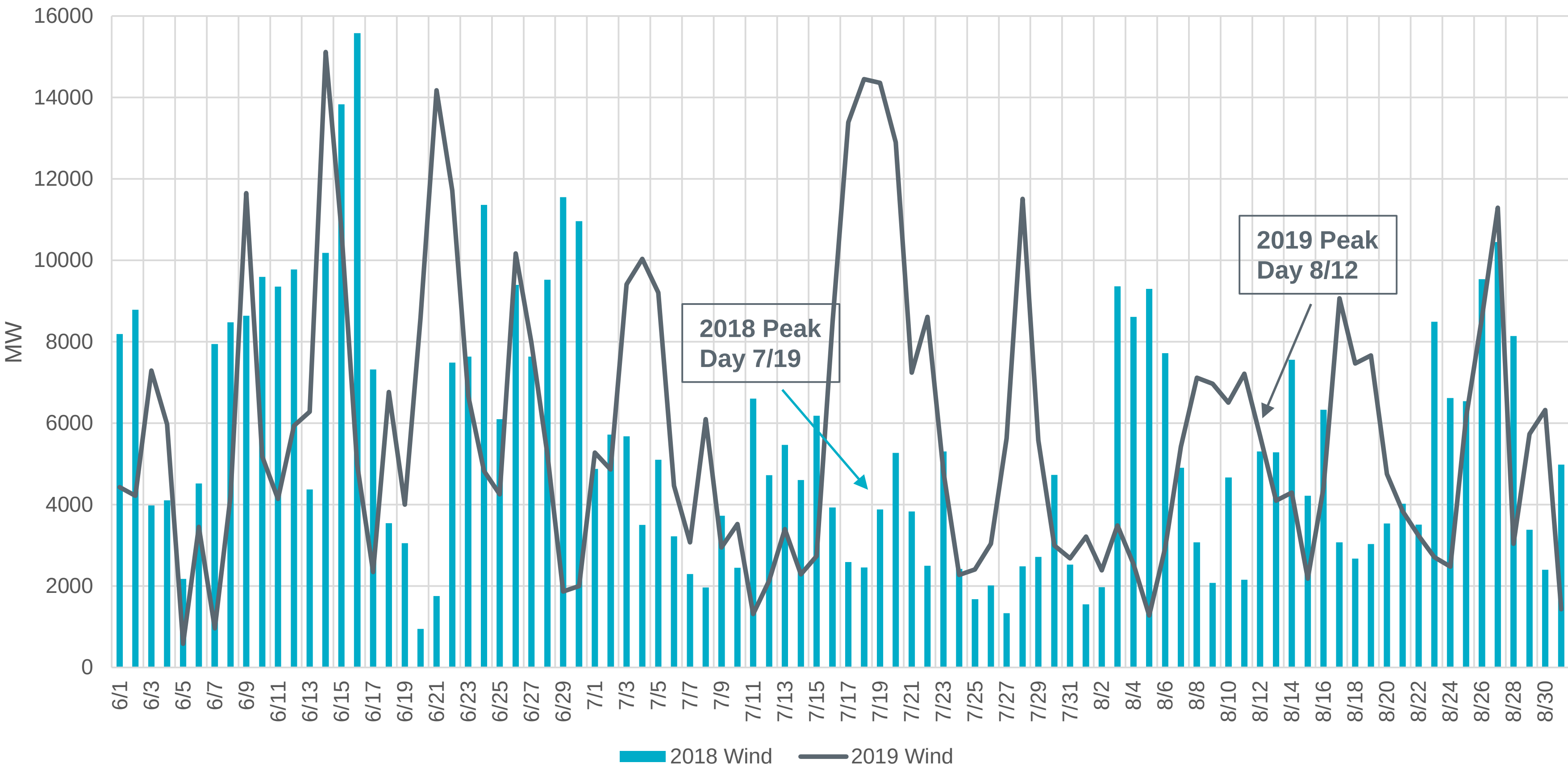



* Data: Hourly integrated peak demand as published in the ERCOT D&E report.

# Wind Output

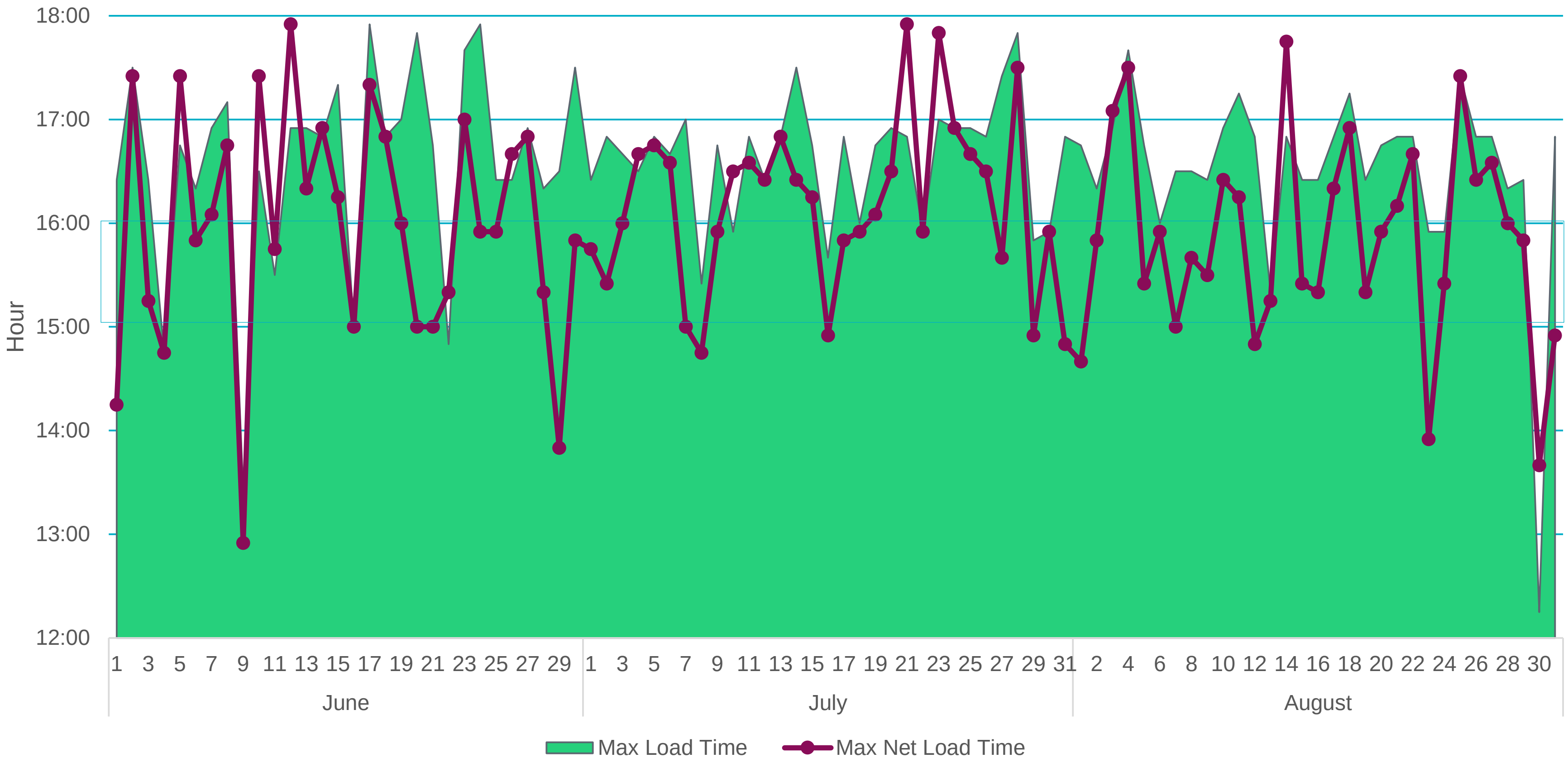
- ERCOT had approximately 2,400 MWs of additional installed wind capacity going into summer 2019 compared to 2018.

For hour ending 15:00



# Timing of Peak Load and Peak Net Load (Load-IRR)

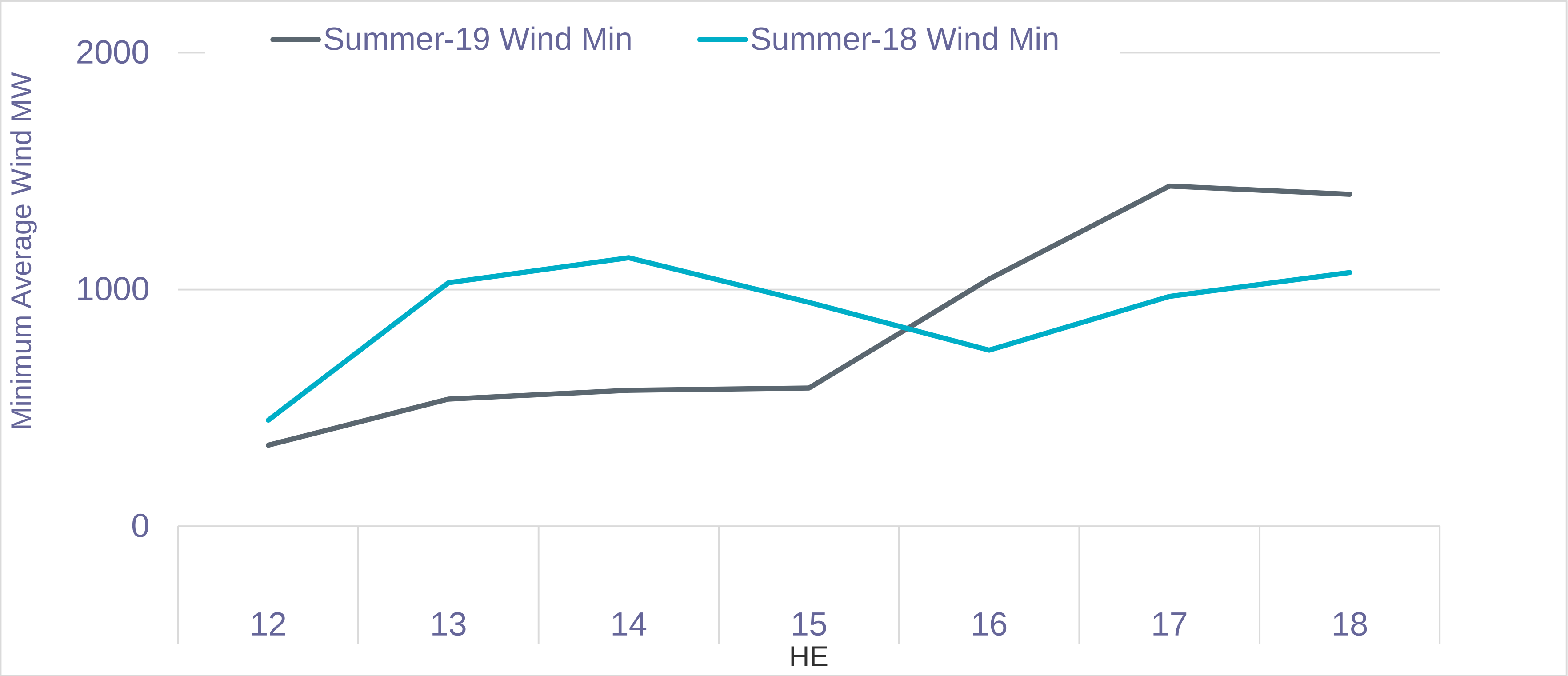
- During summer 2019, the peak net load frequently occurred prior to peak load.
- Net peak load occurred prior to 4 p.m. nearly 2/3 of the days in August.




Time is rounded to nearest 5 minute interval

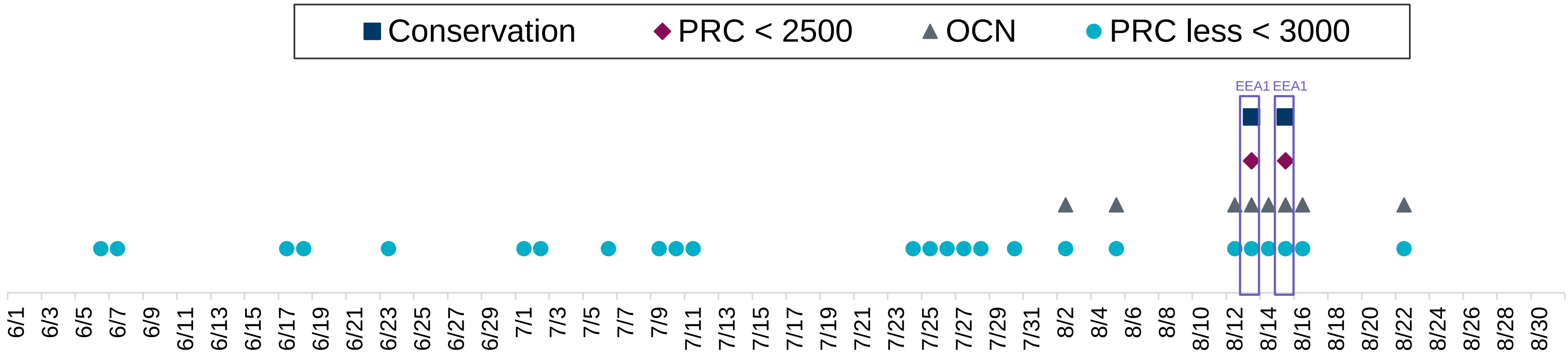
# Minimum Wind Generation for June – August

- Looking at the minimum wind each day for each hour and taking the average, the wind output was lower earlier in the afternoon and higher later in the afternoon when compared to 2018.



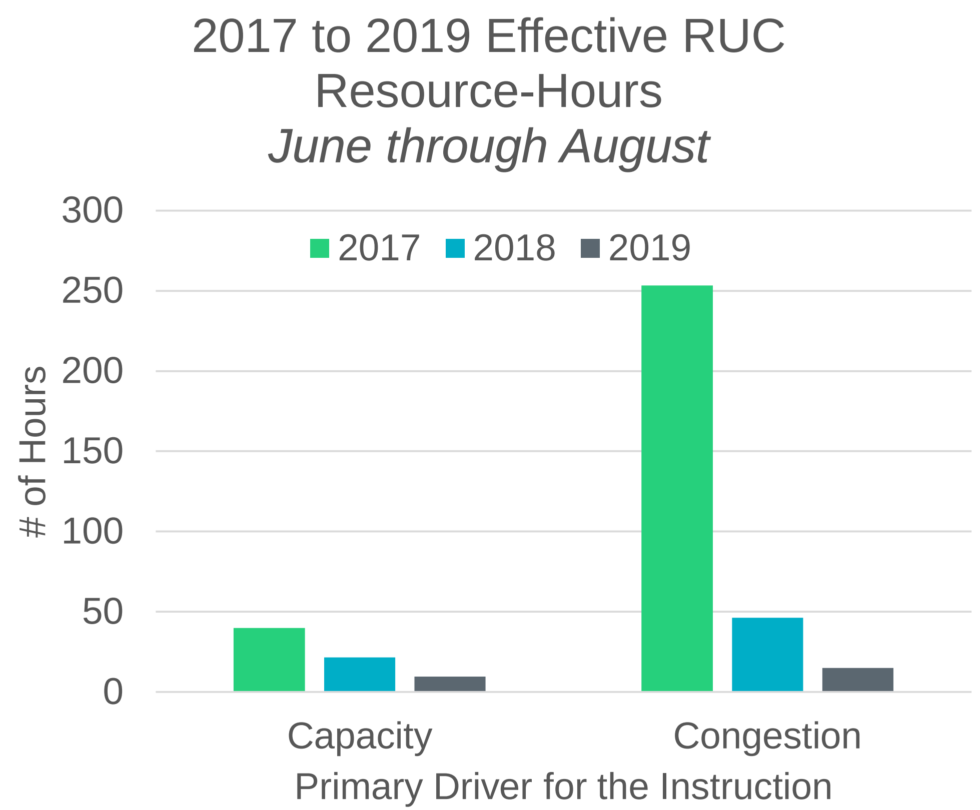
# Operating Notices Issued in Summer 2019

- 8 Operating Condition Notices (OCNs) for reserve capacity shortage in August
  - Several others in September
- 25 Advisories due to PRC less than 3,000 MW
- 2 Watches due to Physical Responsive Capability (PRC) less than 2,500 MW
- 2 EEA Level 1 events
- 2 conservation requests during August EEAs
  - One additional voluntary conservation request for Operating Days 9/5 and 9/6



# The Number of RUC Instructions Continued to Decrease

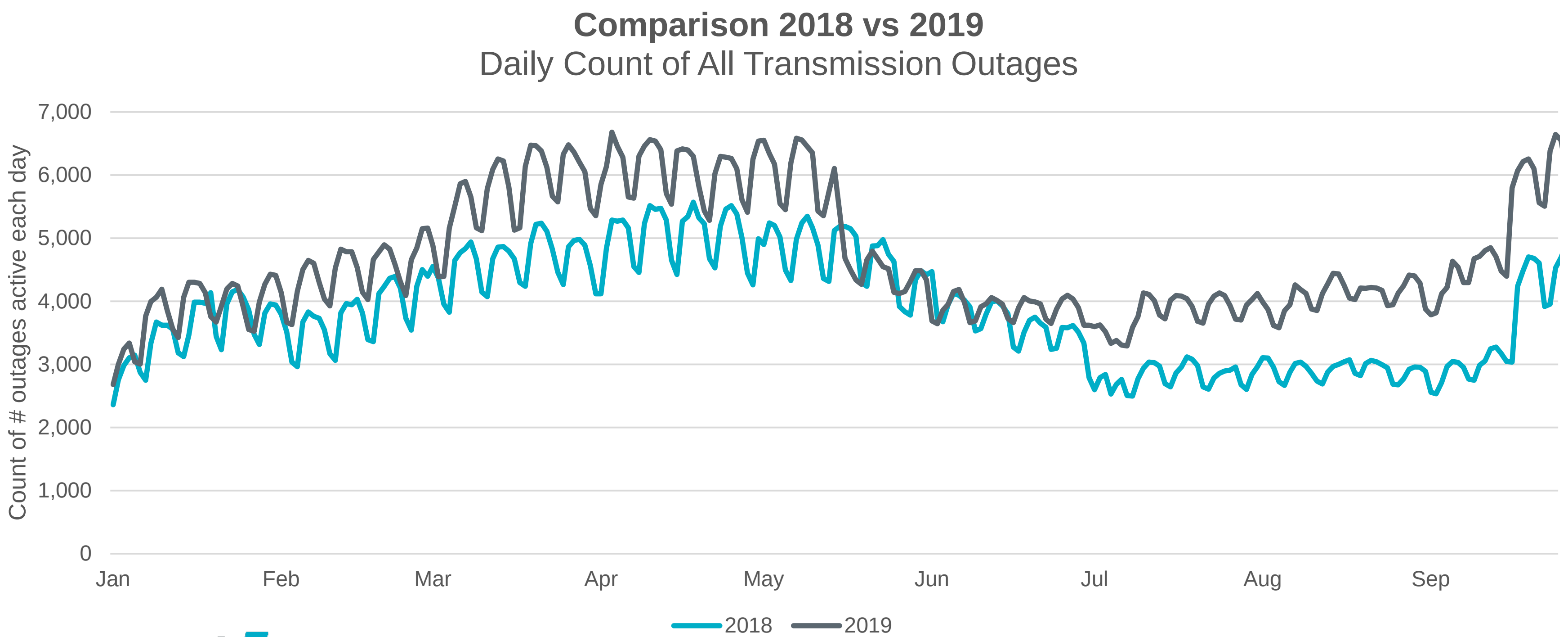
- Noticeable trend toward self-commitment during peak periods.
- June instructions were all extensions of self-committed hours when the unit was needed for congestion.
- August instructions (occurred on two different days) were driven by capacity shortage and longer lead times.




Note this does not include VDIs

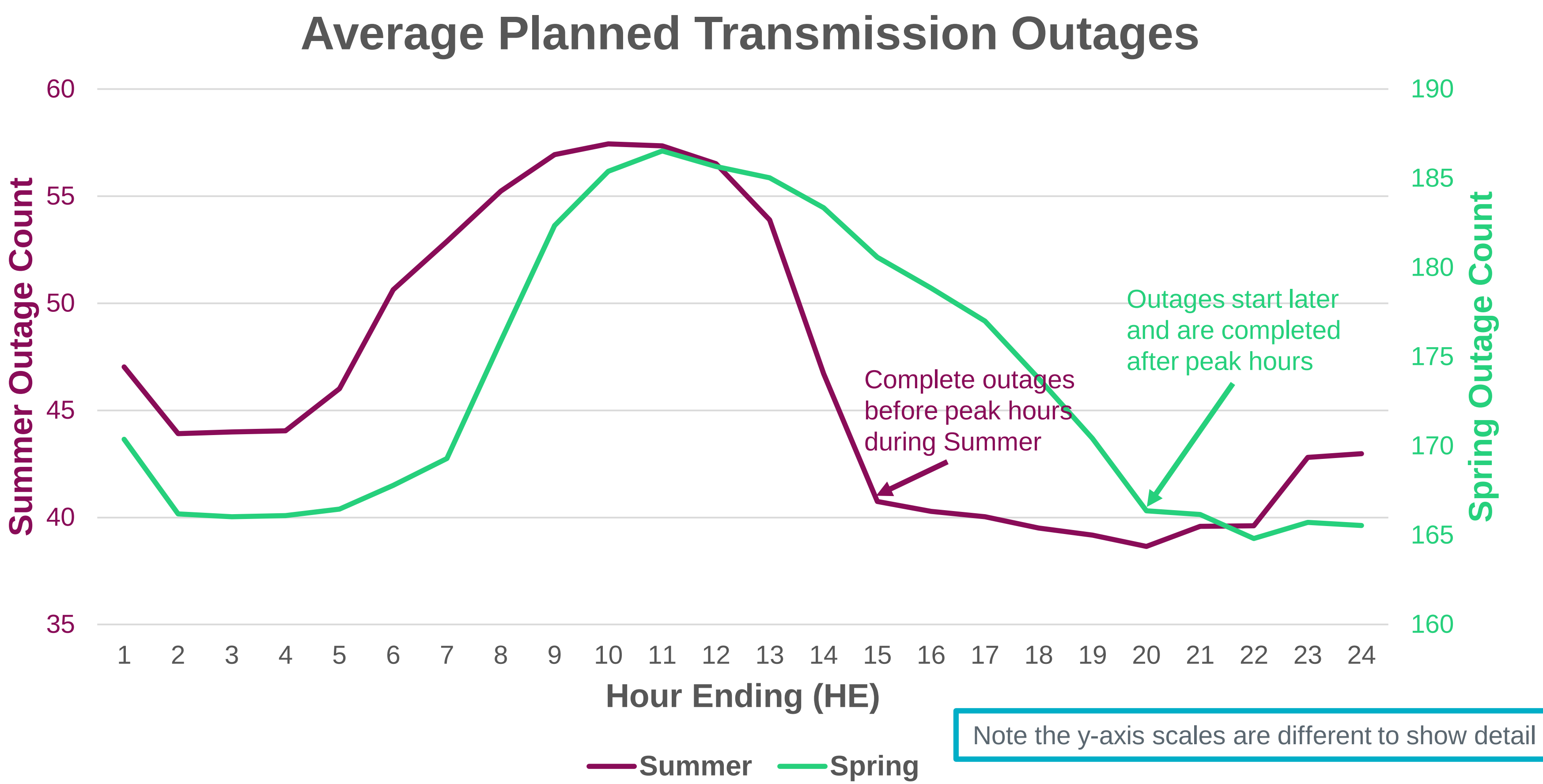
# Planned Transmission Outages

- Restrictions on summer transmission outages were again implemented to avoid planned transmission outages that could require generation curtailment during high load periods.
- With longer lead time to adjust outage plans to meet the restrictions compared to 2018, more maintenance and upgrade outages were approved, even during summer.



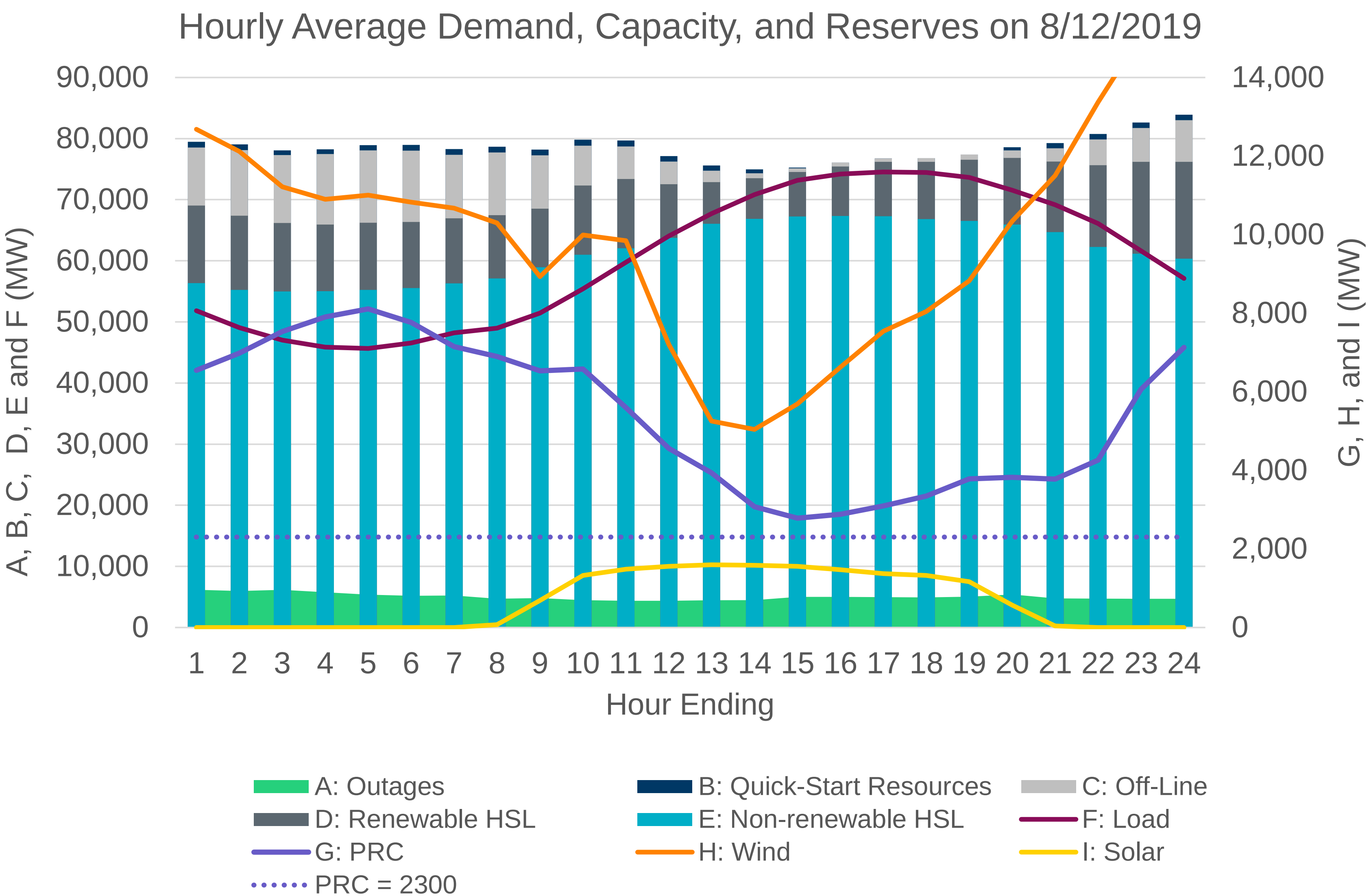
# Transmission Outages in Summer 2019

- There are impacts of meeting these restrictions, such as starting outages very early in the day.

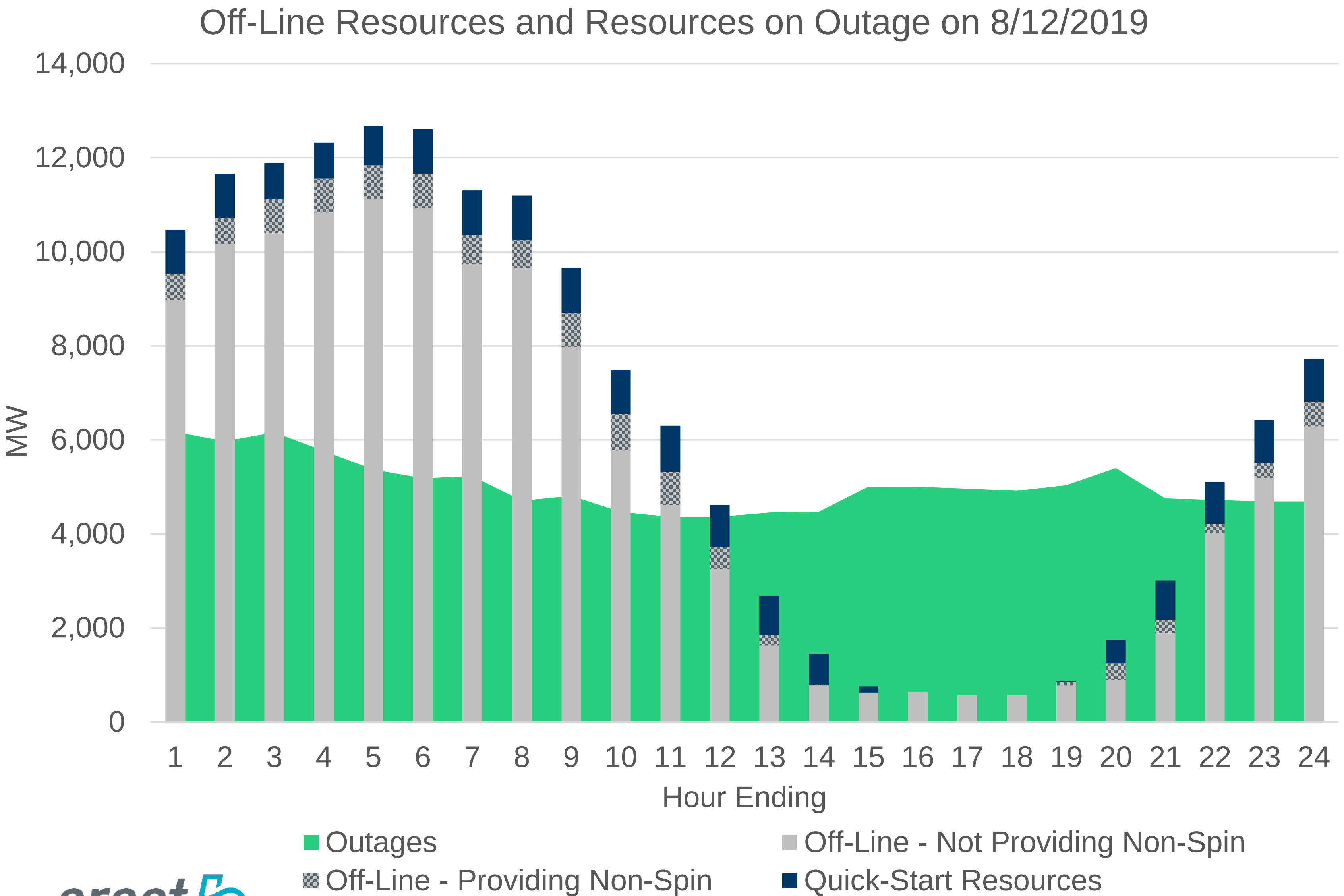



Data only includes Line and Transformer Outages

# Closer Look at Aug. 12 – Peak Day



# A Closer Look at August 12th



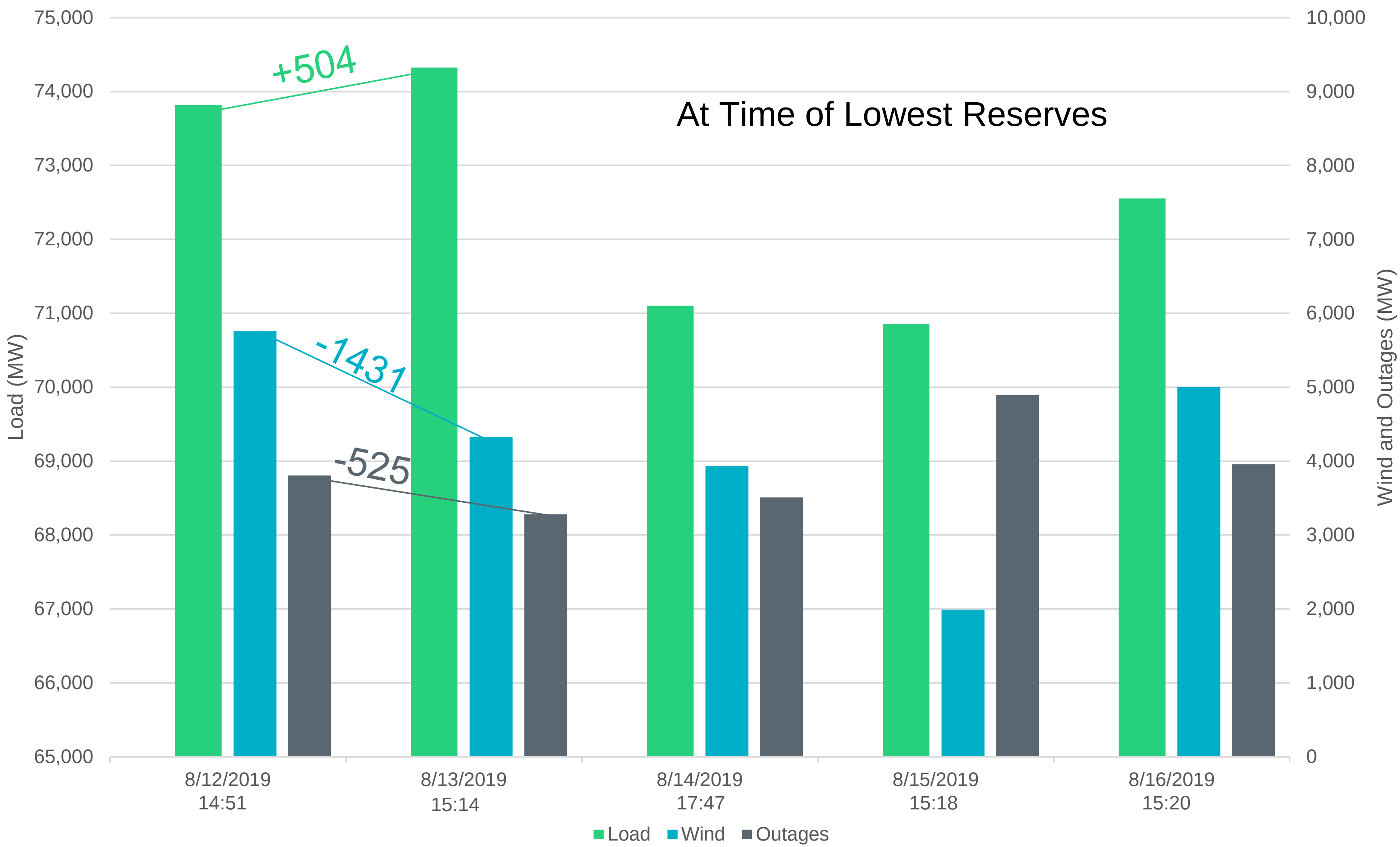
# The Summer 2019 Seasonal Assessment of Resource Adequacy (SARA) Values vs. Actuals at Peak Demand

| | 2019 Actual Peak Demand (8/12/19) | Final 2019 Summer SARA* | Difference |
|---|---|---|---|
| Total Resources, MW | 80,098 | 78,930 | 1,168 |
| Thermal and Hydro | 64,401 | 65,526 | (1,125) |
| Private Use Networks, Net to Grid | 3,203 | 3,437 | (234) |
| Switchable Generation Resources | 2,837 | 2,726 | 111 |
| Wind Capacity Contribution | 7,447 | 4,898 | 2,549 |
| Solar Capacity Contribution | 1,394 | 1,405 | (11) |
| Non-Synchronous Ties | 816 | 938 | (122) |
| Peak Demand, MW | 74,666 | 74,853 | (187) |
| Reserve Capacity, MW | 5,432 | 4,077 | 1,355 |
| Total Outages, MW | 3,972 ** | 4,226 | (254) |
| Extreme Outage Scenario | | 6,891 | |
| Capacity Available for Operating Reserves, MW | 1,460 | (149) | 1,609 |

Largest absolute difference

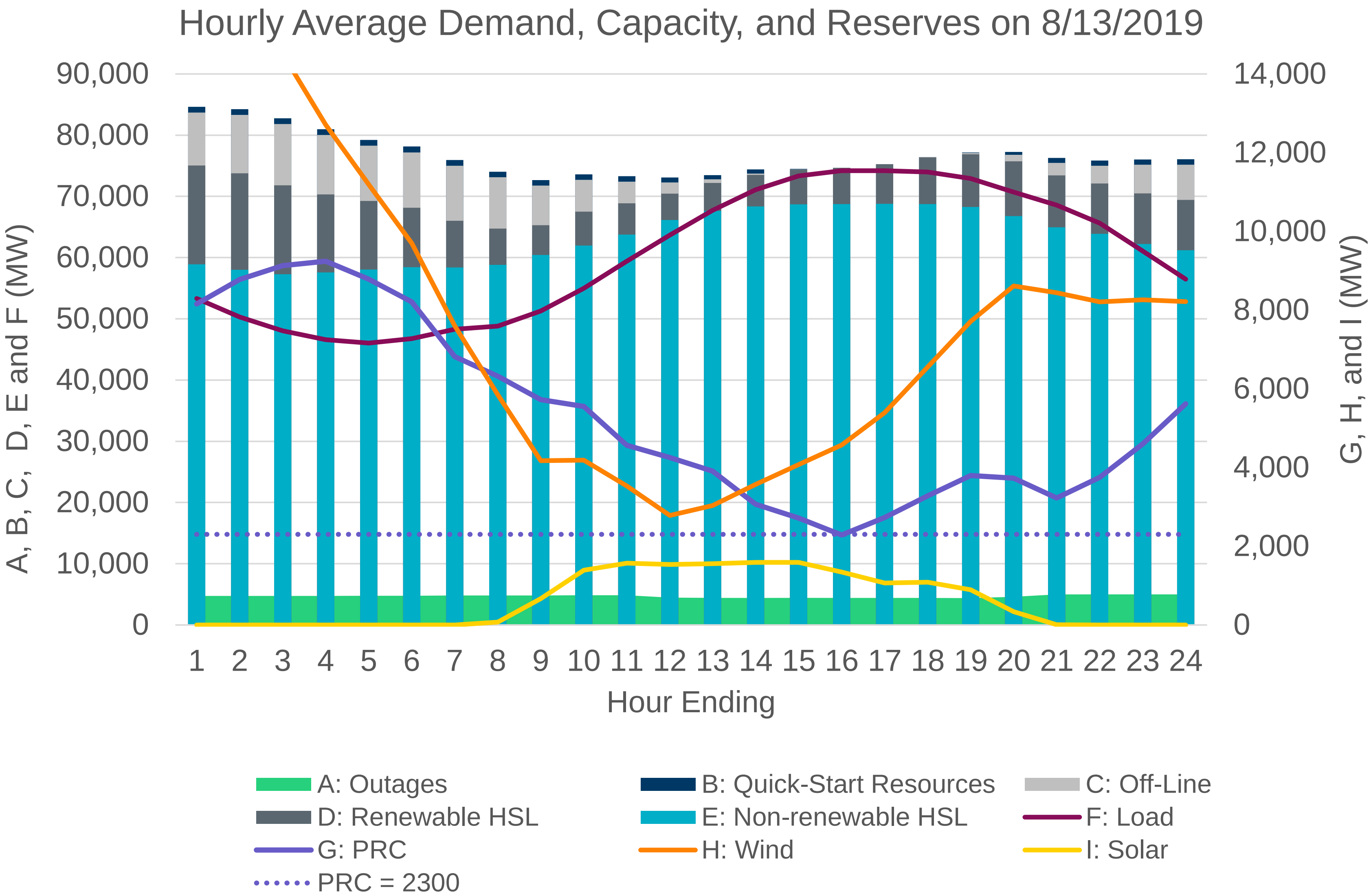
Source: Final 2019 Summer SARA
*The totals for the Final 2019 Summer SARA column combine multiple rows into a single row in some cases. (E.g., already in-service Thermal and Hydro Resources with planned Thermal and Hydro Resources).
**The outage information in this table was extracted on September 16, 2019.

# Load, Wind, and Outage Differences – 8/12-8/13

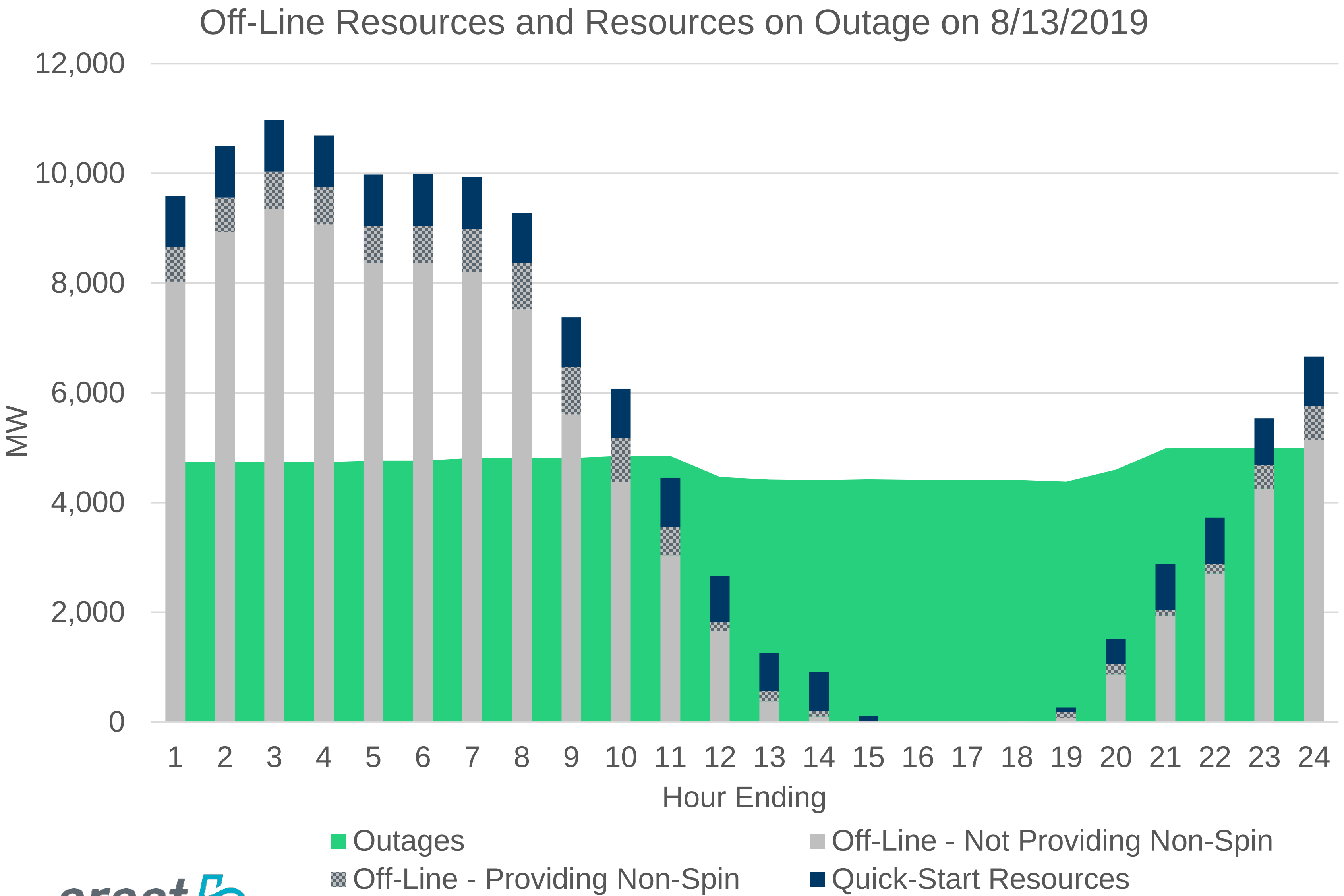



Outages Shown are non-IRR Outages

# Closer Look at Aug. 13 – EEA1 Day

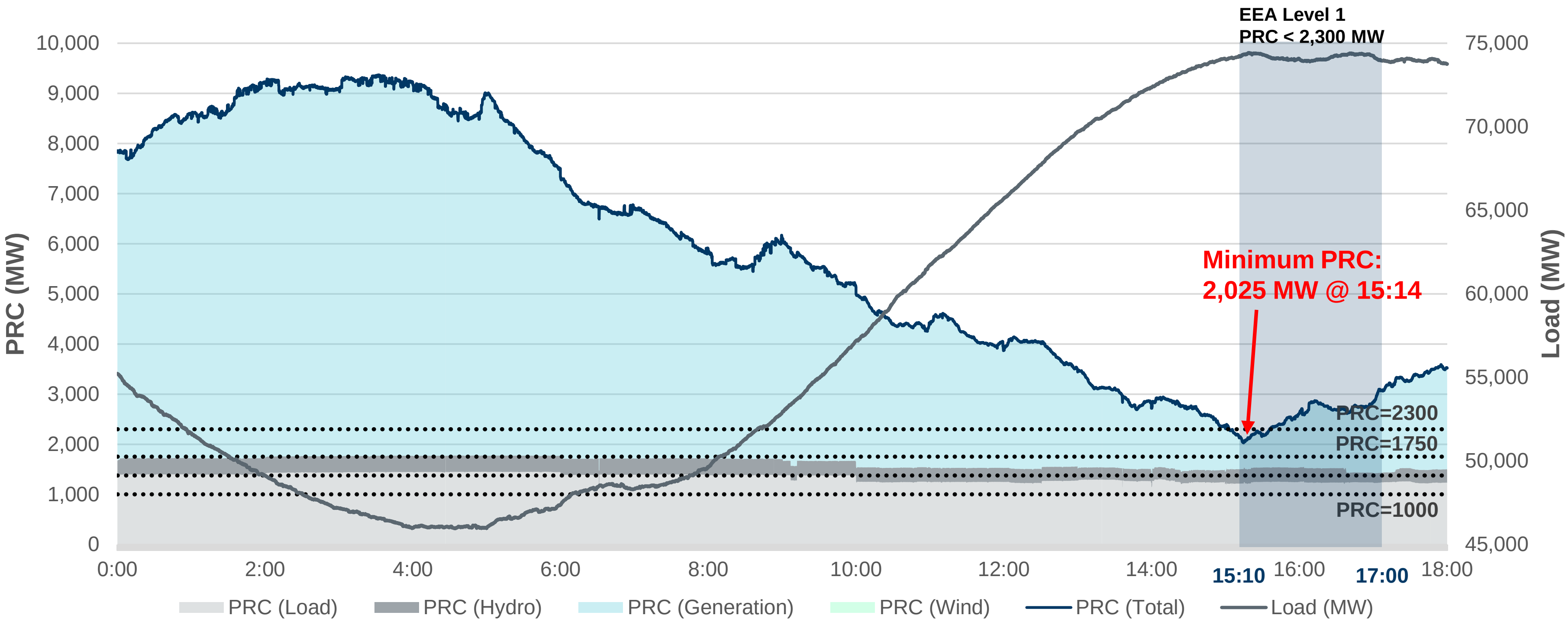


# Closer Look at Aug. 13 – EEA1 Day

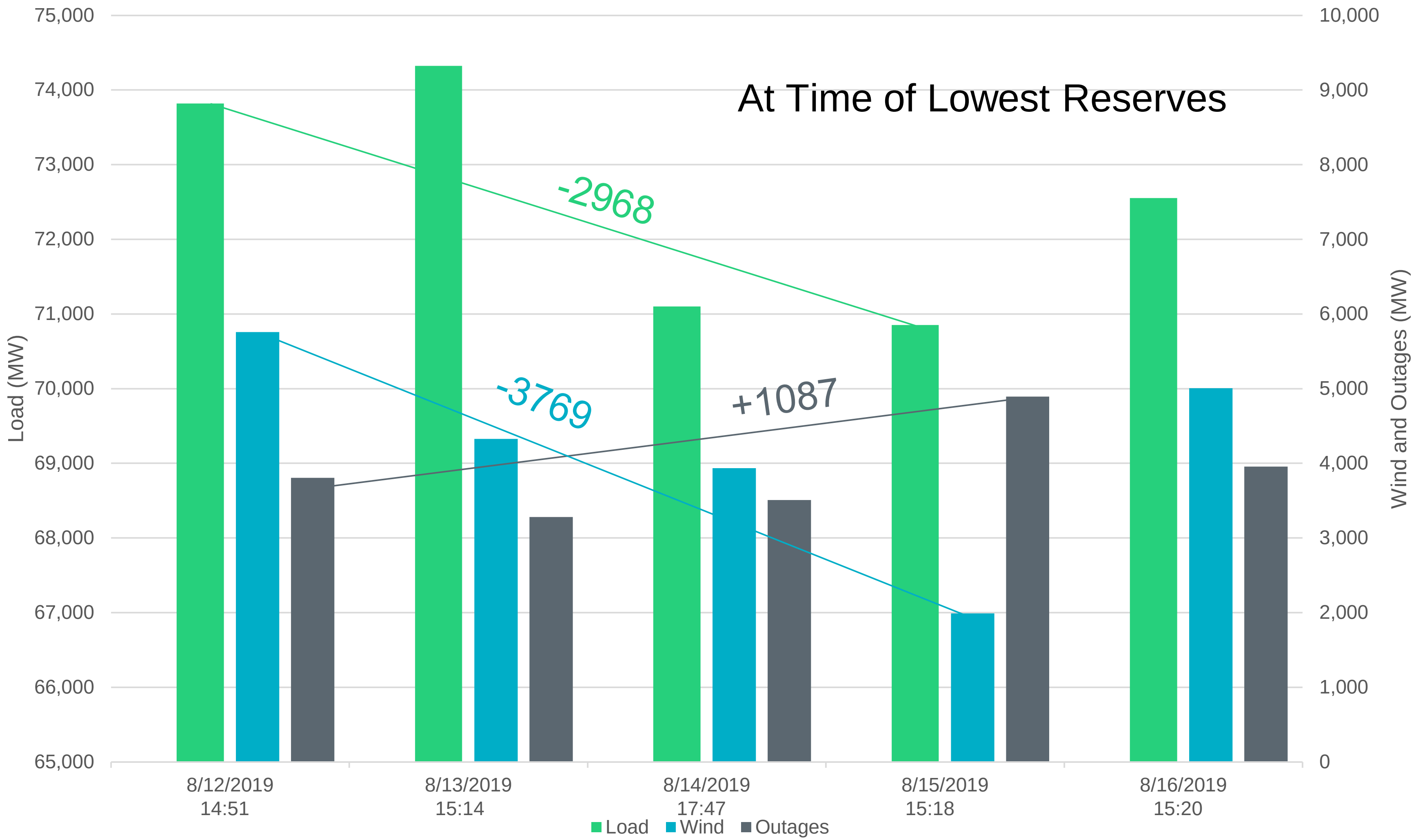


# PRC on Aug. 13 – EEA1 Day

- ERCOT declared EEA Level 1 at 15:10 when the PRC was 2,156 MW.
- PRC was under 2,300 MW for 35 minutes.
- EEA Level 1 continued for 1 hour and 50 minutes until deployed resources were recovered and reserves sustained an upward trend.

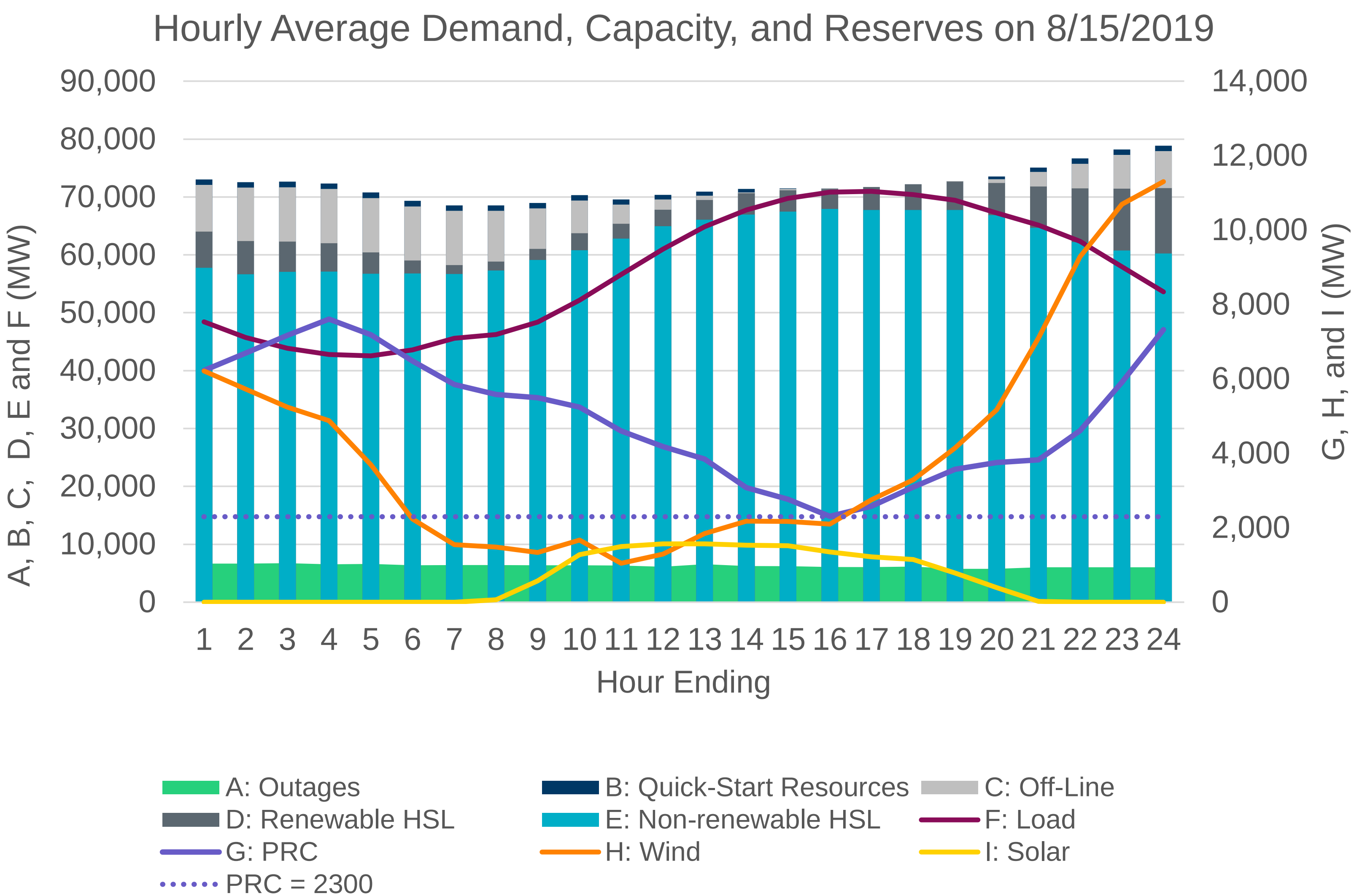


# Load, Wind, and Outage Differences – 8/12-8/15

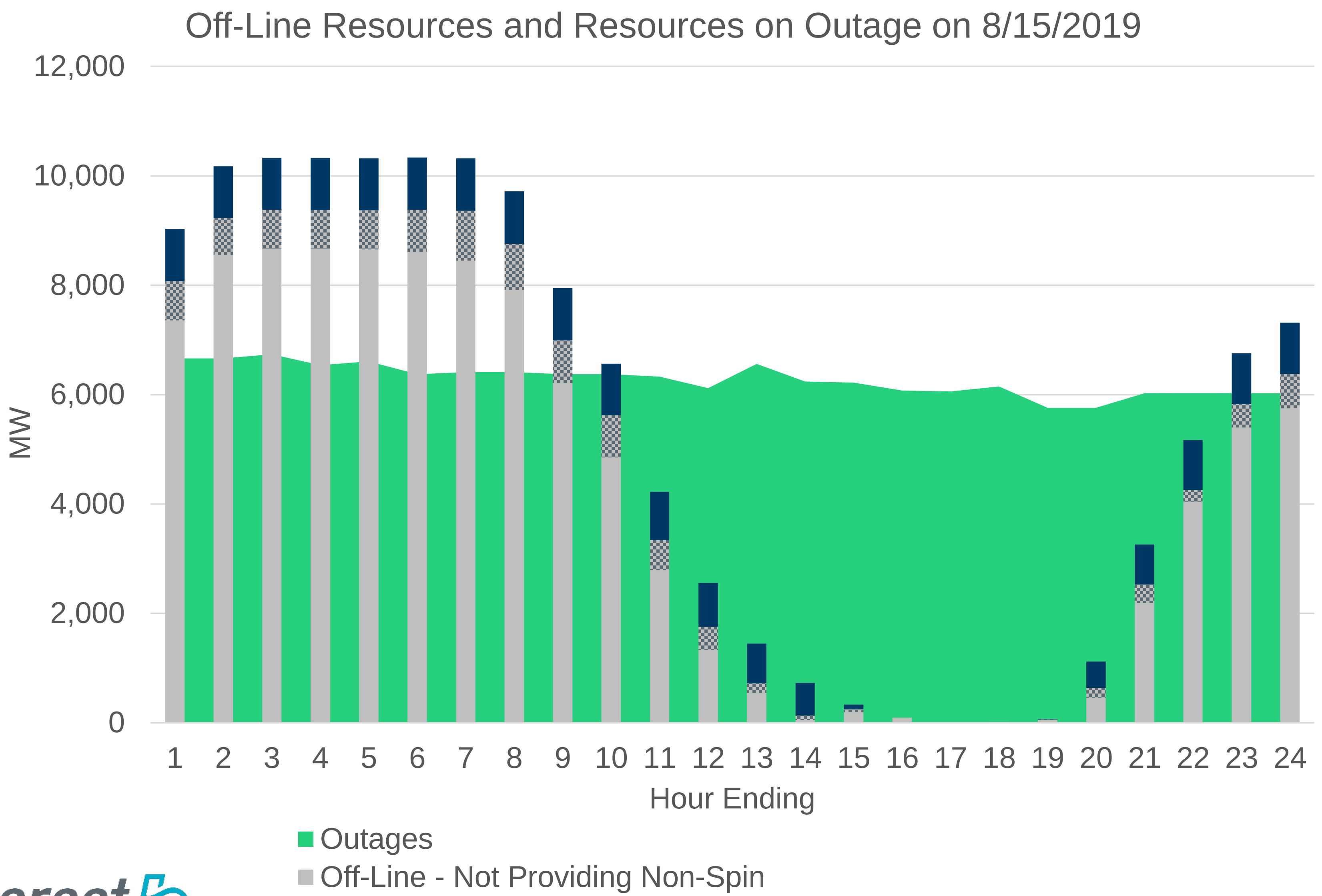



Outages Shown are non-IRR Outages

# Closer Look at Aug. 15 – EEA1 Day

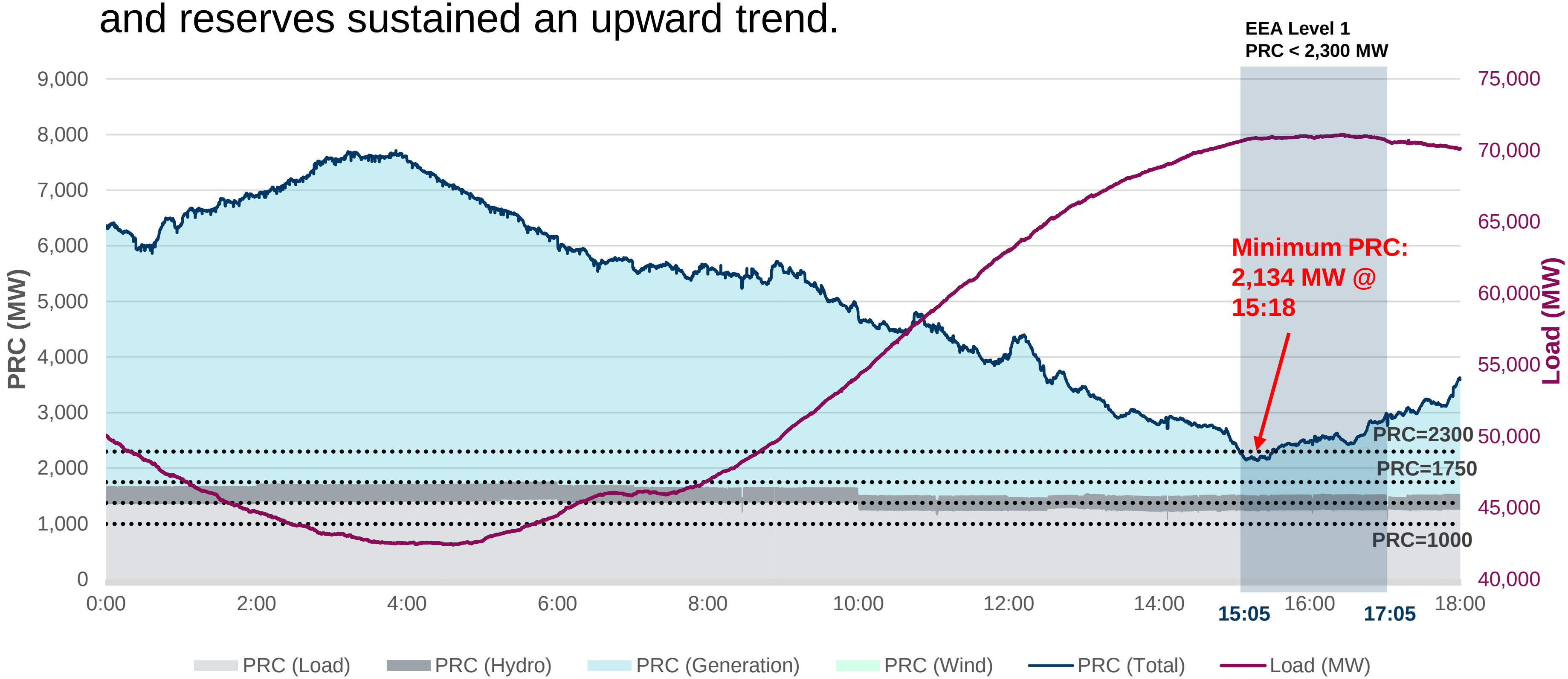


# Closer Look at Aug. 15

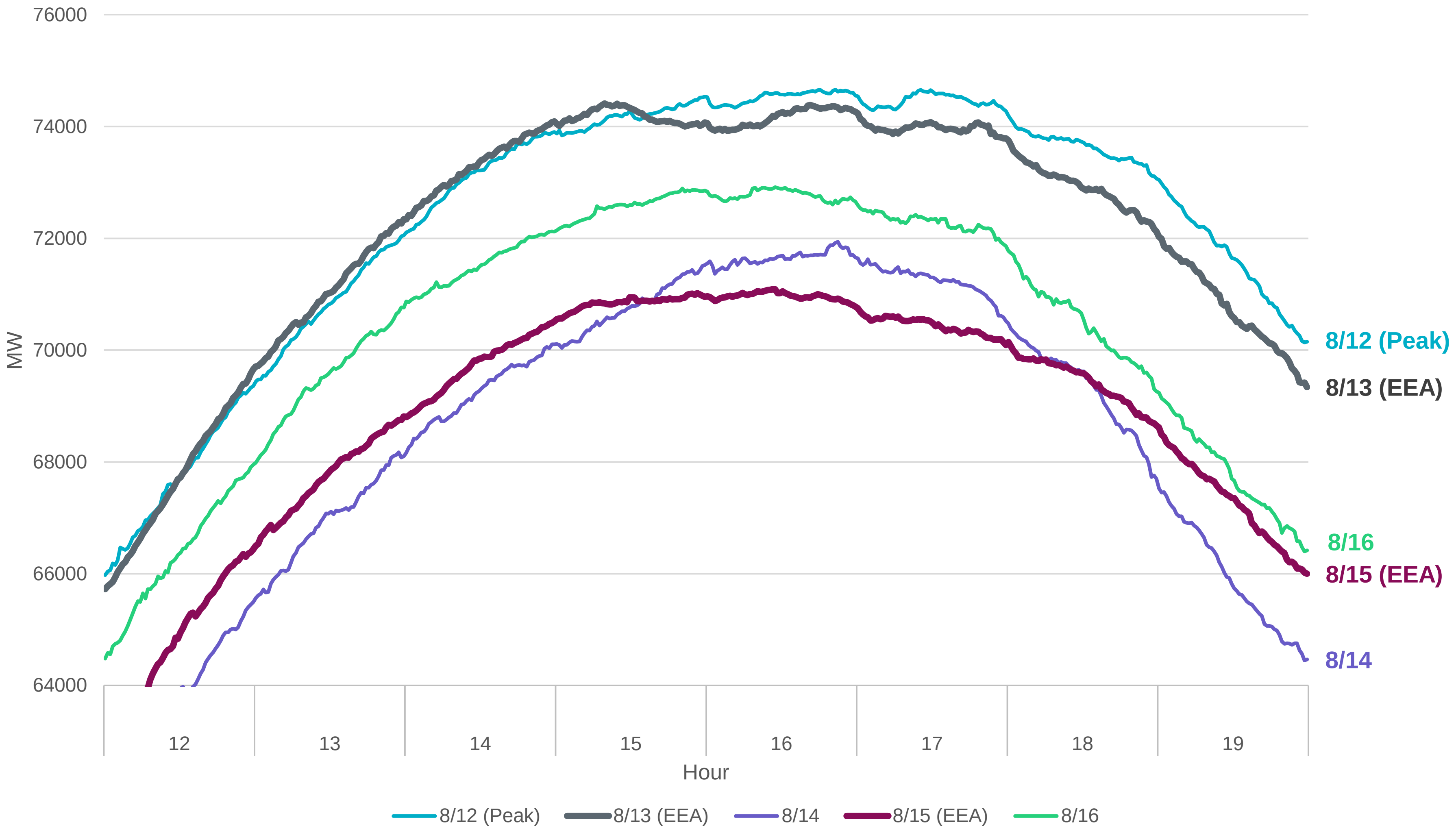


# PRC on Aug. 15 – EEA1 Day

- ERCOT declared EEA Level 1 at 15:05 when the PRC was 2,245 MW.
- PRC was under 2,300 MW for 26 minutes.
- EEA Level 1 continued for 2 hours until deployed resources were recovered and reserves sustained an upward trend.



# Load Patterns – 13:00-20:00 on 8/12-8/16

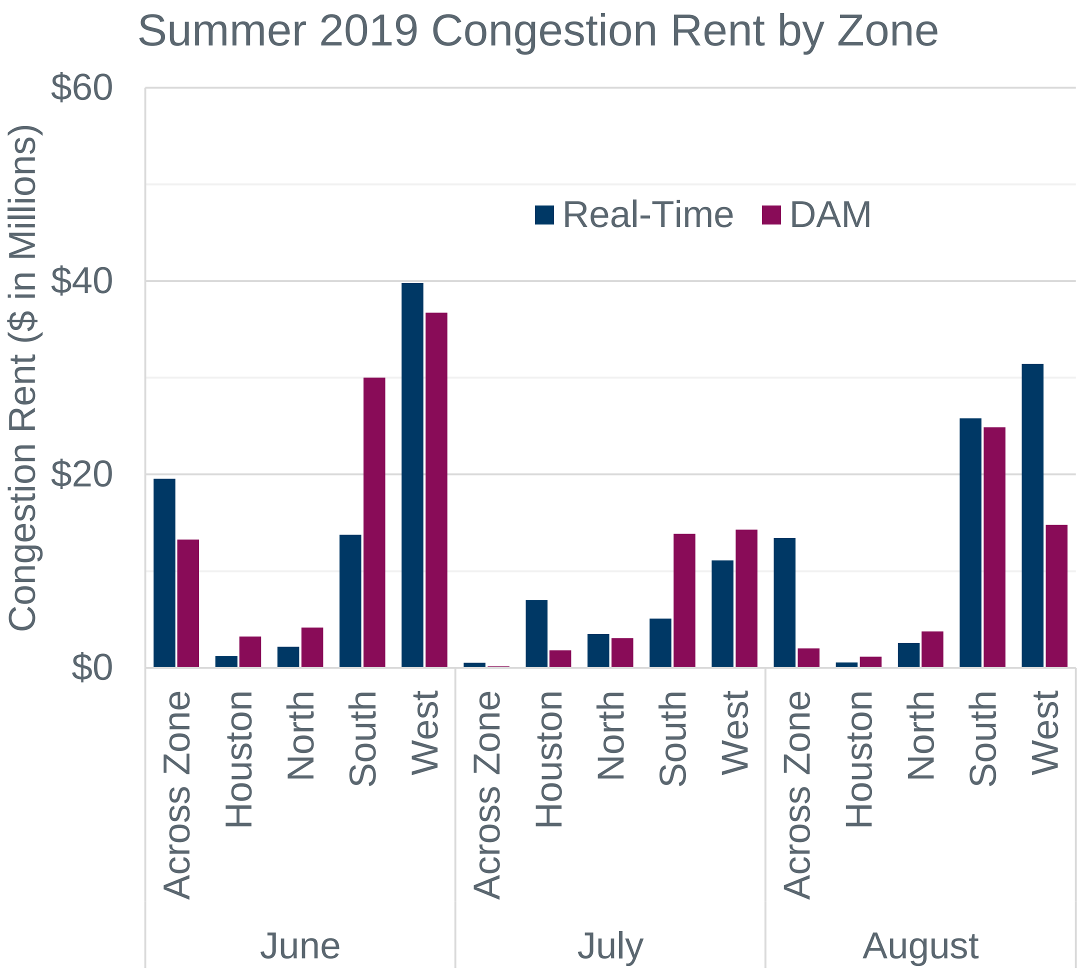


# Preliminary Load Reduction Observations for Peak Week

- The information needed to accurately evaluate demand response during 2019 is not yet available.
  - Customer-level data is needed to evaluate the occurrence and load reductions in response to various factors. Data and results for summer are expected to be available by December 2019.
- Reductions shown below are estimates of the total of all load reduction (including ERS, 4CP and for high prices), calculated using regression baseline estimates of ERCOT total load.
  - Load reductions are small relative to the total load, so the accuracy of the load reduction estimates <u>is relatively low</u>.

| Date | Characteristics | Max RT Load Zone SPP | Estimated HE 17 Load Reduction |
|---|---|---|---|
| Aug. 12 | Actual 4CP Day | $6,537 | 2,500 MW |
| Aug. 13 | EEA1/Near 4CP | $9,159 | 3,100 MW |
| Aug. 14 | - | $1,807 | 200 MW |
| Aug. 15 | EEA1 | $9,053 | 1,800 MW |
| Aug. 16 | Near 4CP | $1,583 | 1,600 MW |

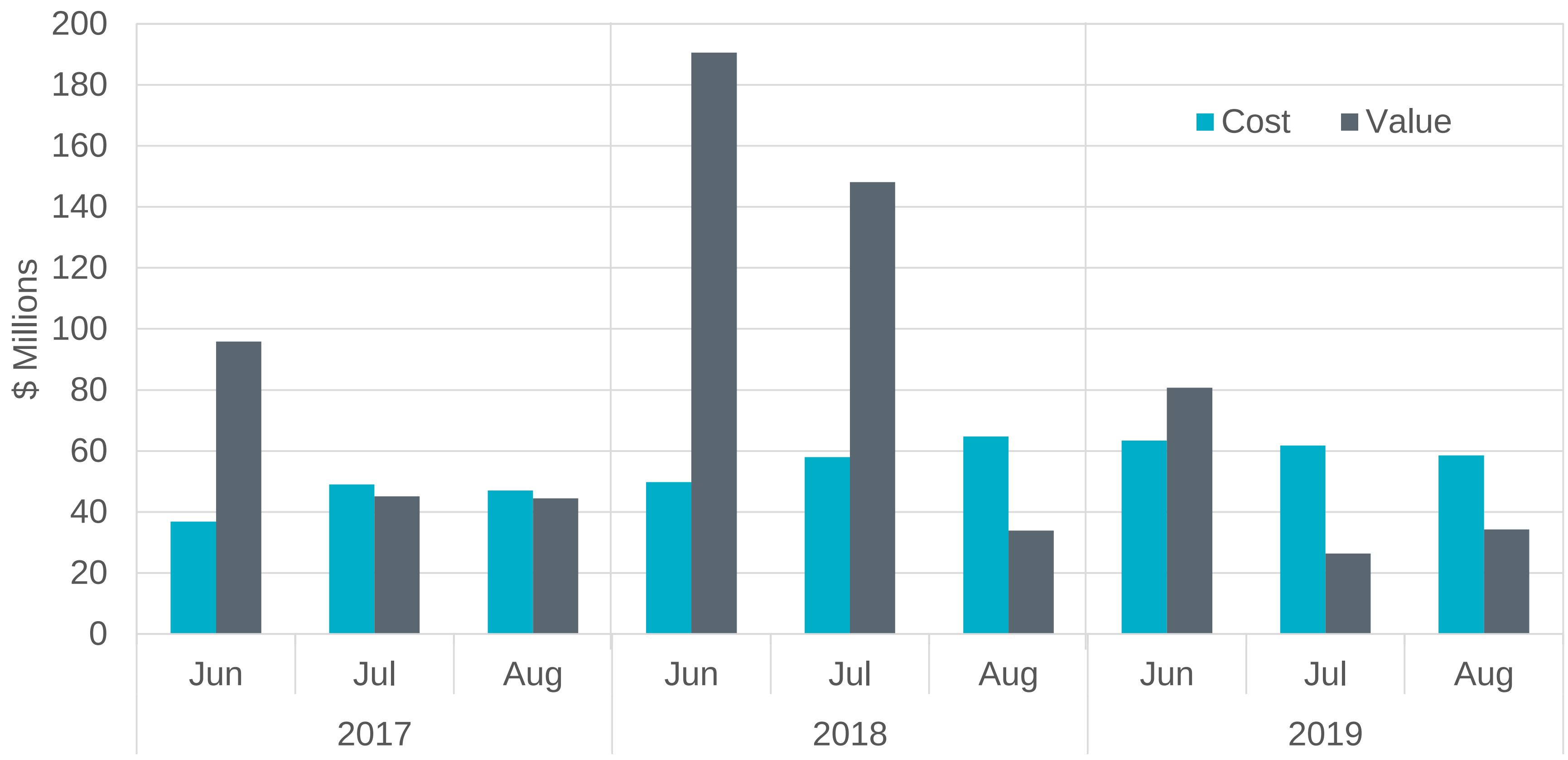
# Day-Ahead and Real-Time (RT) Market Congestion Rent



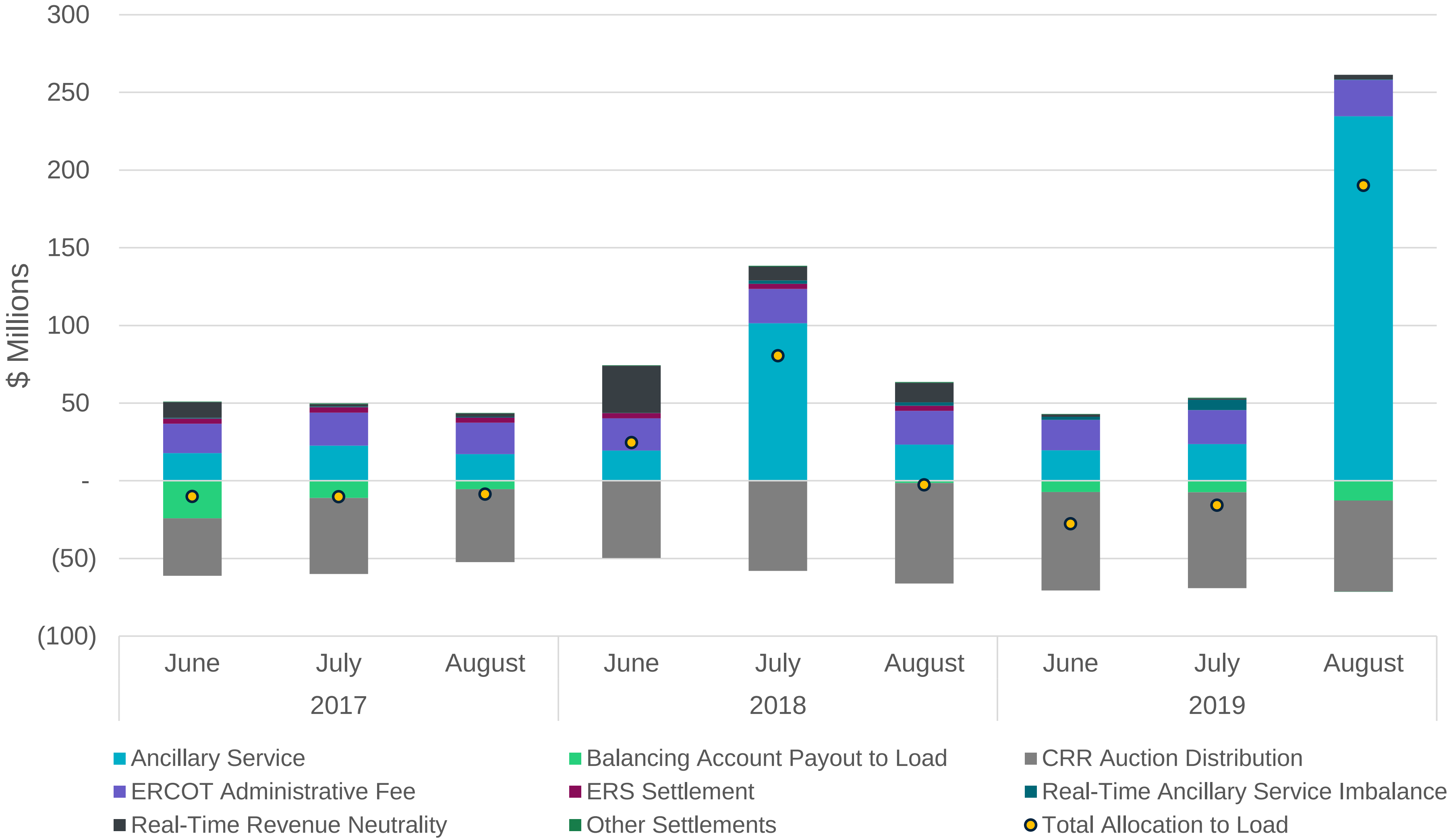

- In summer 2018 there was significant congestion, as well as CRR underfunding in July and higher RT Revenue Neutrality Allocation (RENA) overall.

- Summer 2019:
  - No CRR underfunding
  - RENA down to ~$5M from ~$50M last summer
  - 2019 RT congestion rent totaled approx. $180M; for 2018, it was $350M

# Congestion Revenue Rights (CRRs) Cost vs. Value



# Net Allocation to Load Increased in August Due to Higher Ancillary Service Costs



# Other Summer Observations

- Despite record prices, there were no mass transitions.
  - There was only one default of an entity with no load or generation (occurred in September).
  - There was one "near-miss" where an initial short-payment was later resolved.
    - The Credit Work Group is evaluating this event and re-examining surety bonds as financial security.

- Switchable generation coordination agreements enabled effective communications during EEAs.

# Summer 2019 Overall

- Early summer was mild while late summer was hot.
- There were many days with tight conditions, and an Energy Emergency Alert (EEA) Level 1 was declared twice.
- Peak demand day saw higher Intermittent Renewable Resource (IRR) production.
- Overall, the market outcomes supported the reliability needs.