



Item 7: Summer 2024 Operational and Market Review

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Vice President, System Operations

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Board of Directors Meeting

ERCOT Public

October 10, 2024

Overview

- **Purpose**

Provide an Operational and Market review of Summer 2024

- **Voting Items / Requests**

No action is requested of the ERCOT Board; for discussion

Note: Unless noted, data for September is through the 15th

- **Key Takeaways**

- Despite cooler temperatures than last year, load levels remained similar to 2023, indicating increased demand on the Texas grid
- A wind generation record and several solar generation records were set this summer
- Both Energy and Ancillary Service costs were lower in Summer 2024 than in the previous two summers
- Overall, operations and market outcomes supported reliability needs

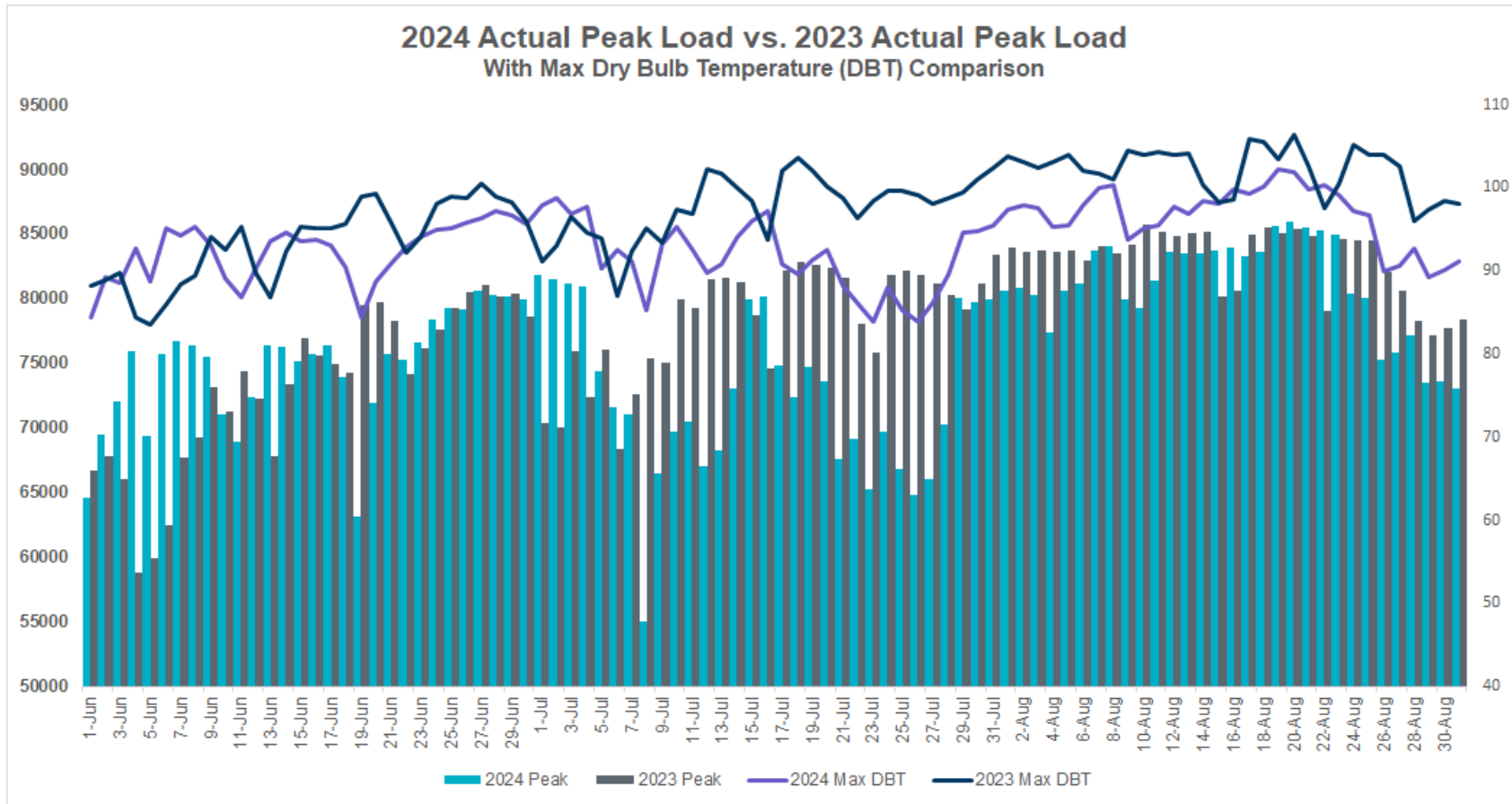
Summer 2024 Weather

- June-August 2024 was the **6th hottest** on record for Texas (since 1895, based on **average** temperatures); however, it was significantly cooler than the previous two years.
- June-August 2024 **minimum** temperatures ranked **4th warmest** of all-time (and close to the past two summers)
- 100-degree days (through 9/11/24):
 - Dallas: 23 days (2023: 55 days)
 - Houston: 9 days (2023: 22 days)
 - Austin: 30 days (2023: 80 days)
 - San Antonio: 25 days (2023: 58 days)
 - Abilene: 40 days (2023: 66 days)
 - McAllen: 54 days (2023: 97 days)
 - All locations listed (except McAllen in 2022) have recorded their fewest 100-degree days since 2021.

Key Takeaway: Summer 2024 was the 6th hottest on record for Texas, mostly due to high minimum temperatures.

Summer 2023 vs Summer 2024

- Overall, summer peak load was similar between 2024 and 2023, with a slight increase in June 2024 and a marginal decrease in July compared to the previous year.

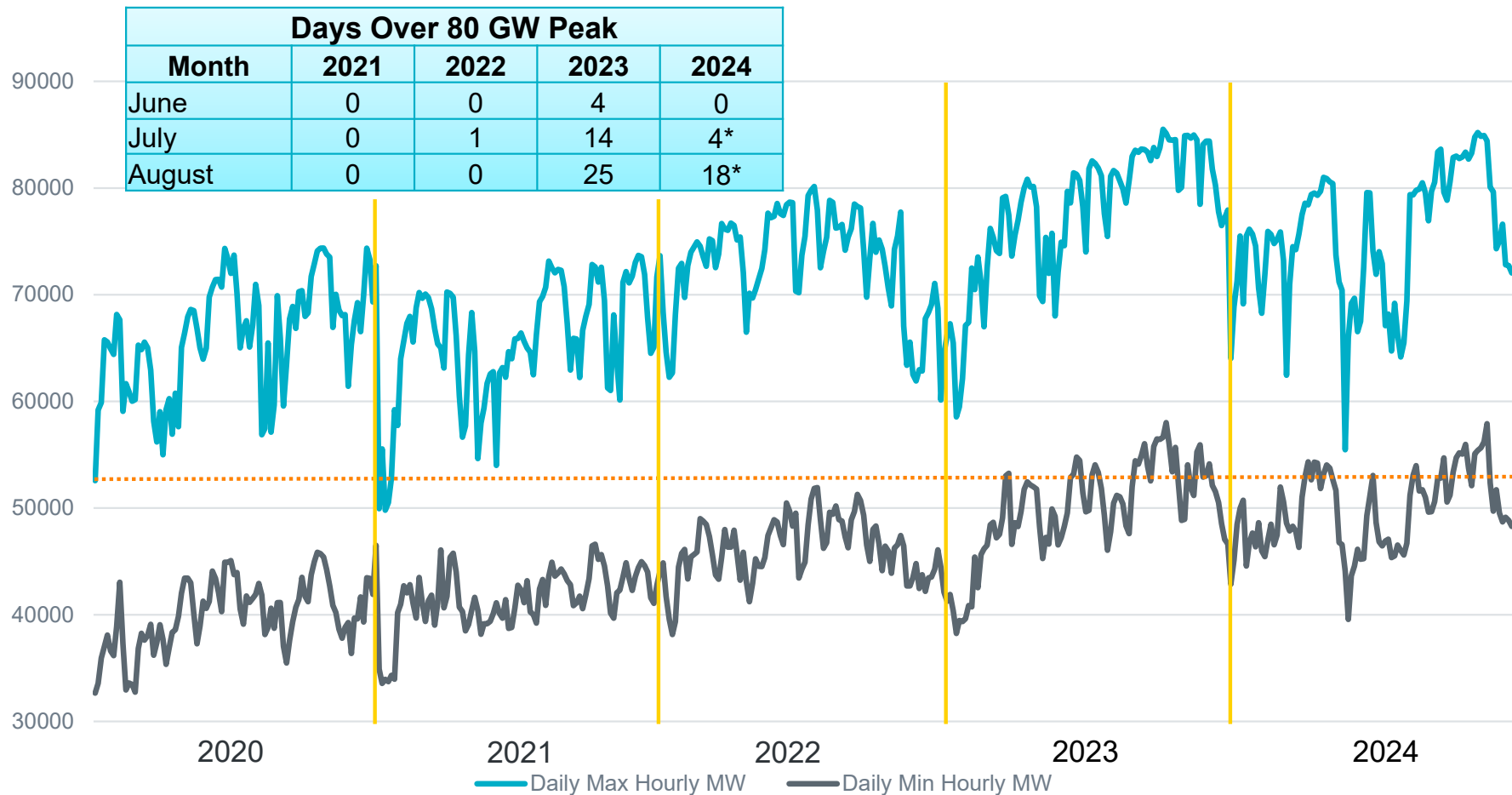


*July 8, 2024 was impacted by Hurricane Beryl



Key Takeaway: Despite lower summer temperatures in 2024, load remained similar to 2023, indicating increased demand on the Texas grid.

Daily Summer Minimum and Maximum Demand 2020-2024

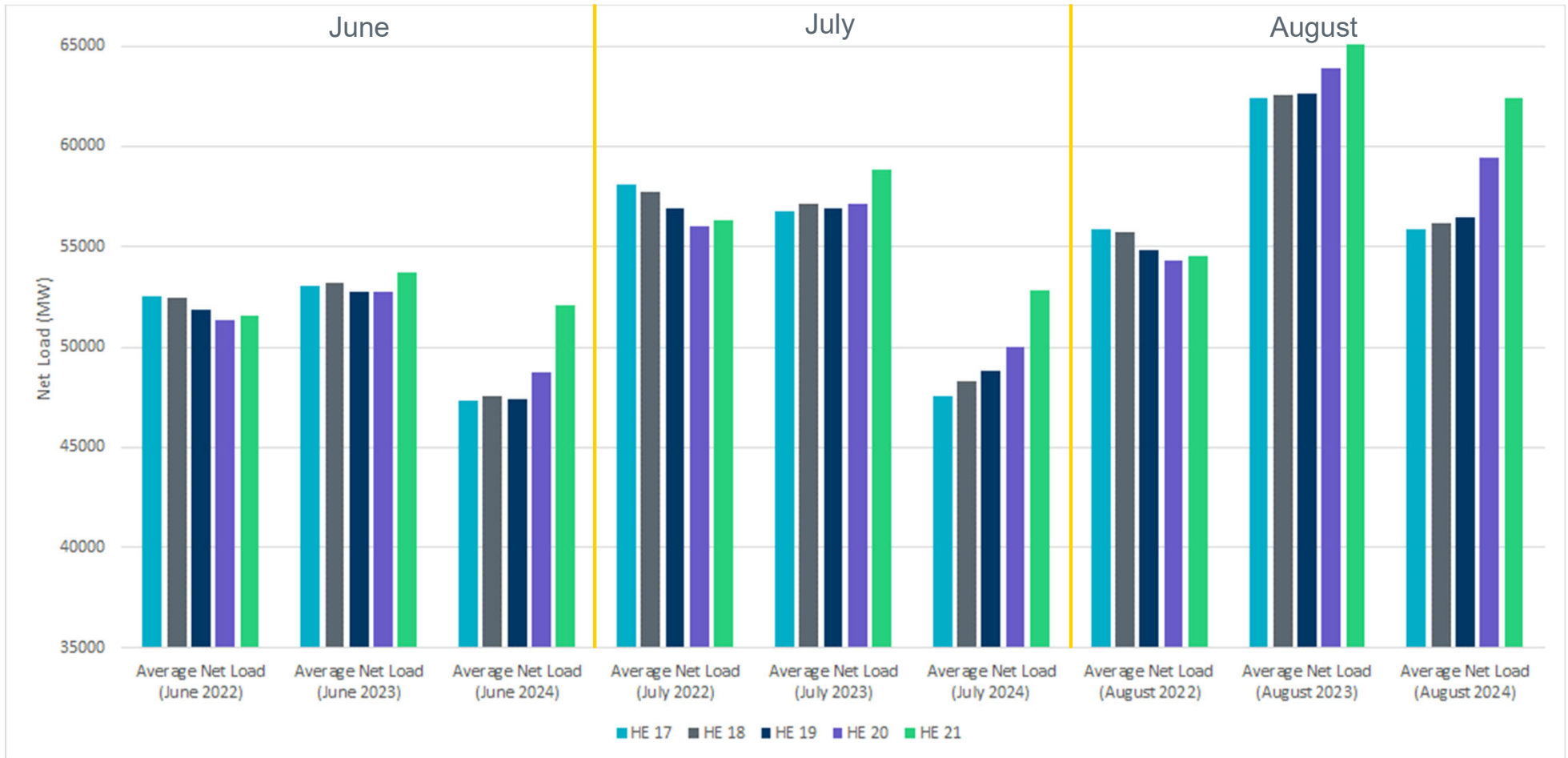


Key Takeaway: Many summer 2024 days had a minimum hourly load greater than the some of the maximum hourly loads in summer 2020 and 2021.

*Information for this month has not been updated based on final settlements.



Net Load HE 17-21 for Summers 2022-2024

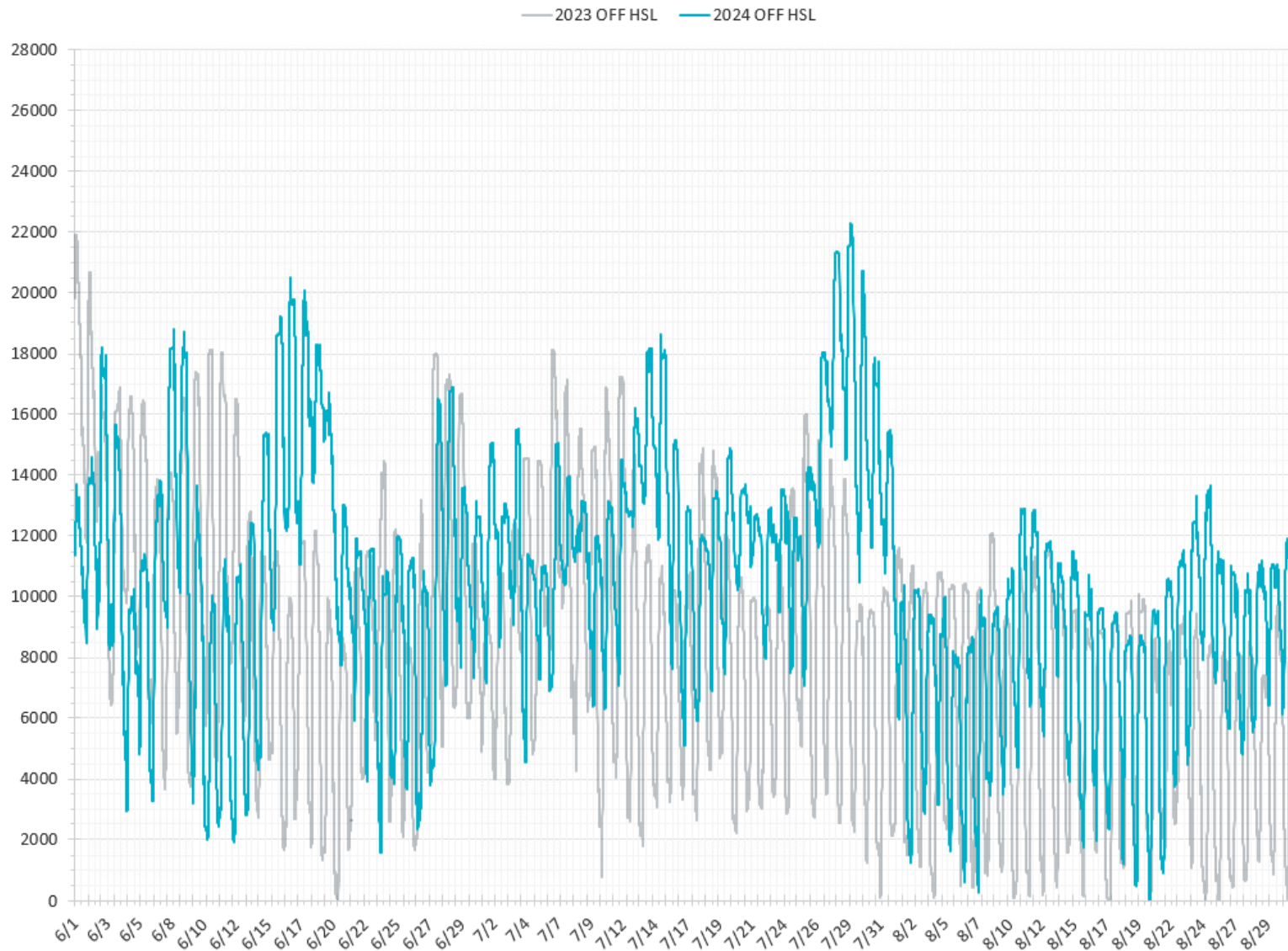


Net Load = Load-wind-solar; the peak net load is the highest loading on the non-renewable Resources

Key Takeaway: In the past few years, the peak net load hours during summer months have shifted from HE 17 to HE 21.



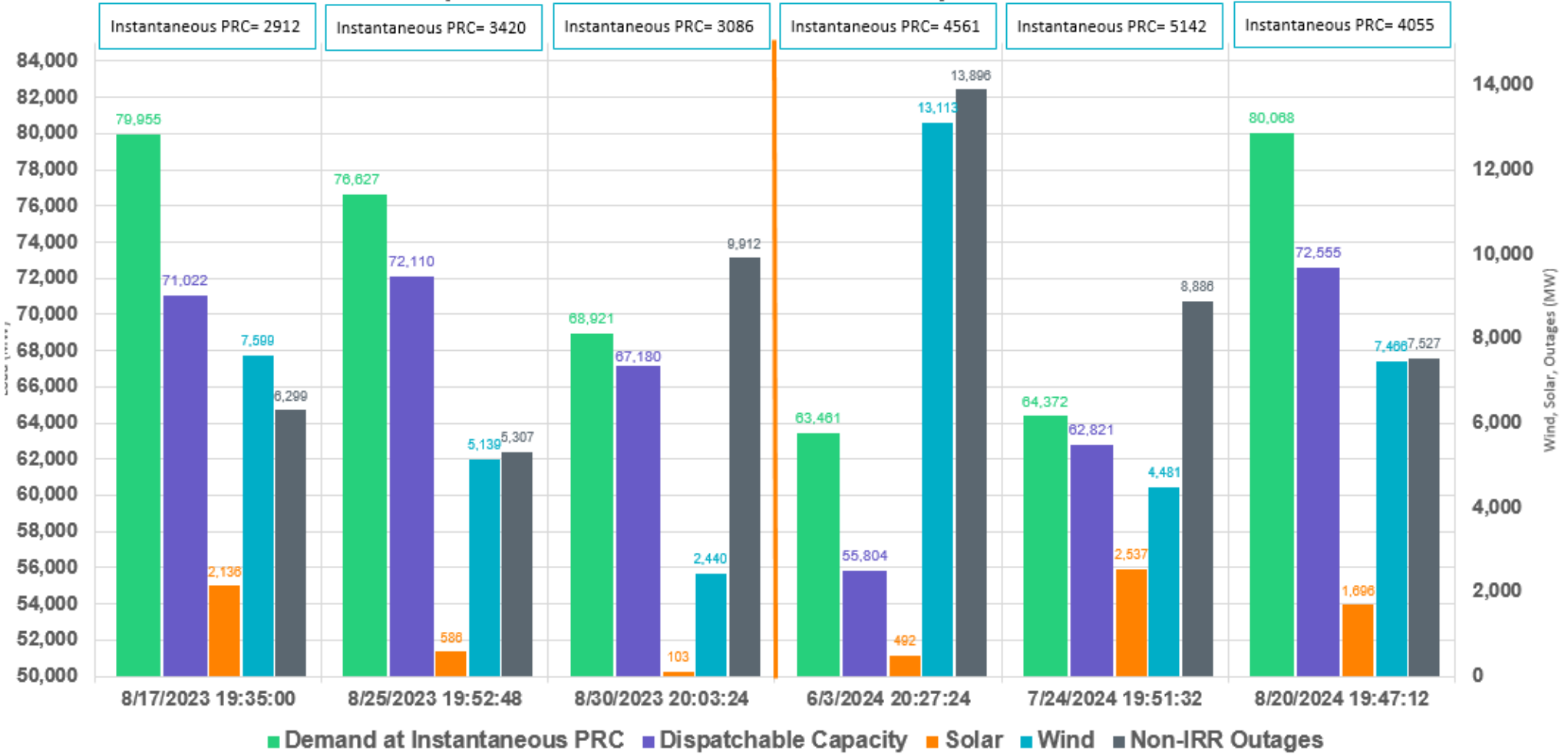
2023 vs. 2024 HSL of Offline Resources



Key Takeaway: In summer 2024, only one day (8/20) required all available generation to run, compared to several days in summer 2023.

Three Lowest PRC Days 2023 vs 2024

Comparison of the Three Lowest PRC Days: 2023 vs. 2024

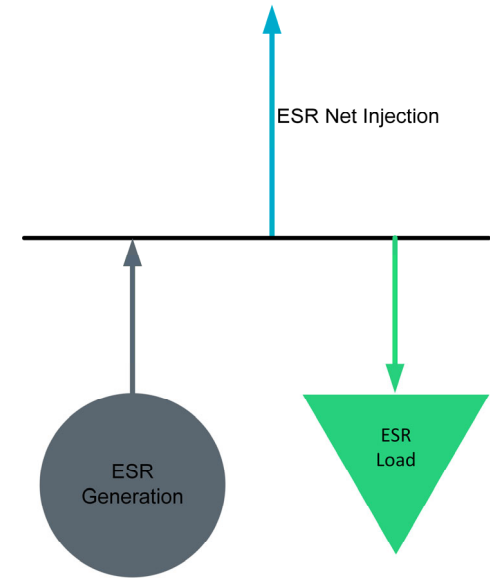
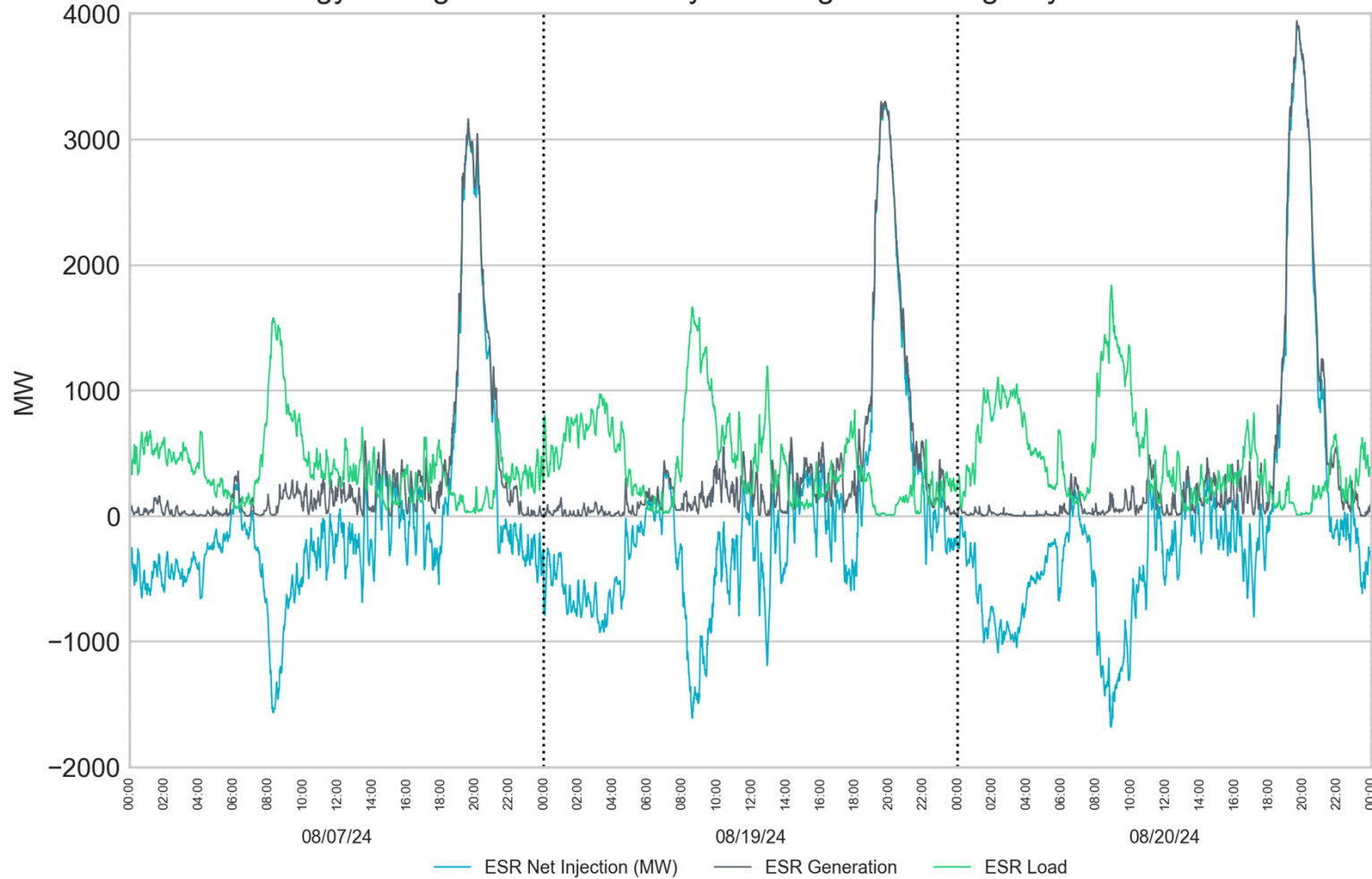


Key Takeaway: 8/20/2024 was only day in 2024 when all generation was online but PRC never got as low as on multiple days in 2023 due to more non-IRR capacity in 2024



ESR Behavior on days with Highest System Lambda

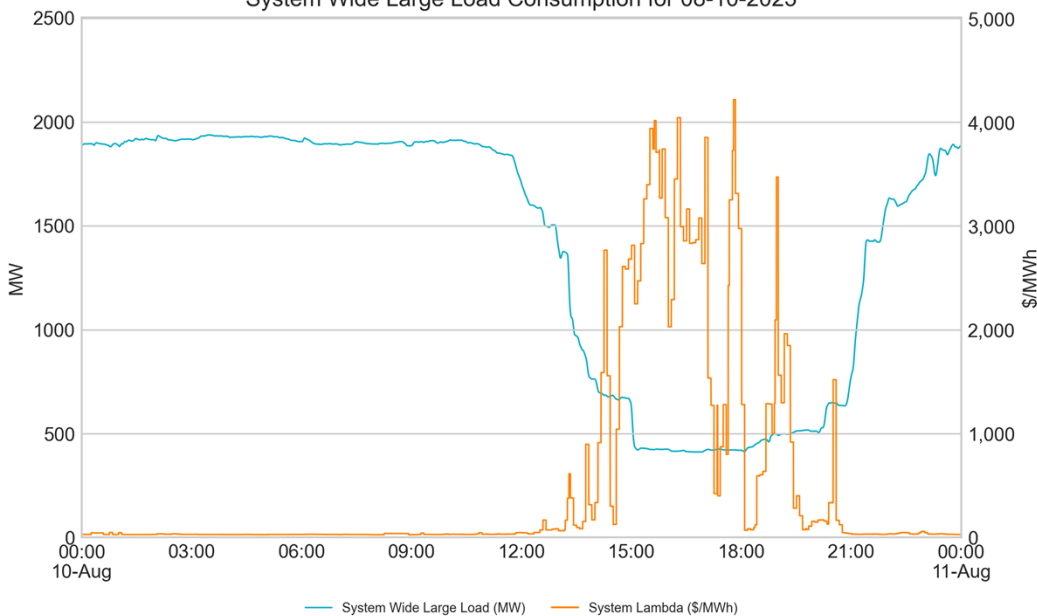
Energy Storage Behavior on days with highest average System Lambda



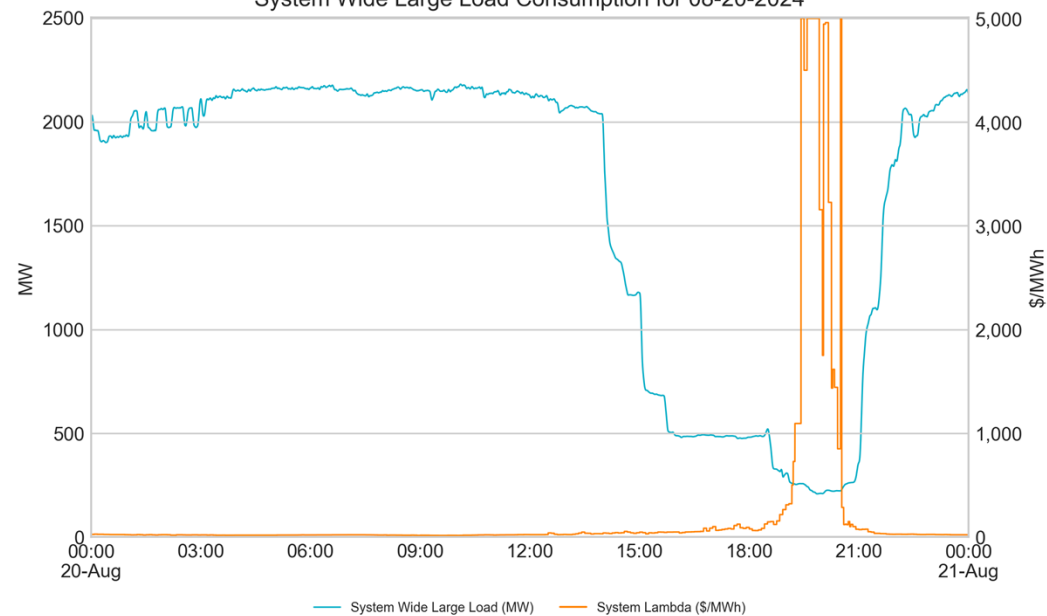
Key Takeaway: ESRs are mostly discharging around solar ramp down and before the solar ramp up, while charging during the night and during periods of high solar generation.

Large Flexible Load During Summer Peak Demand

System Wide Large Load Consumption for 08-10-2023



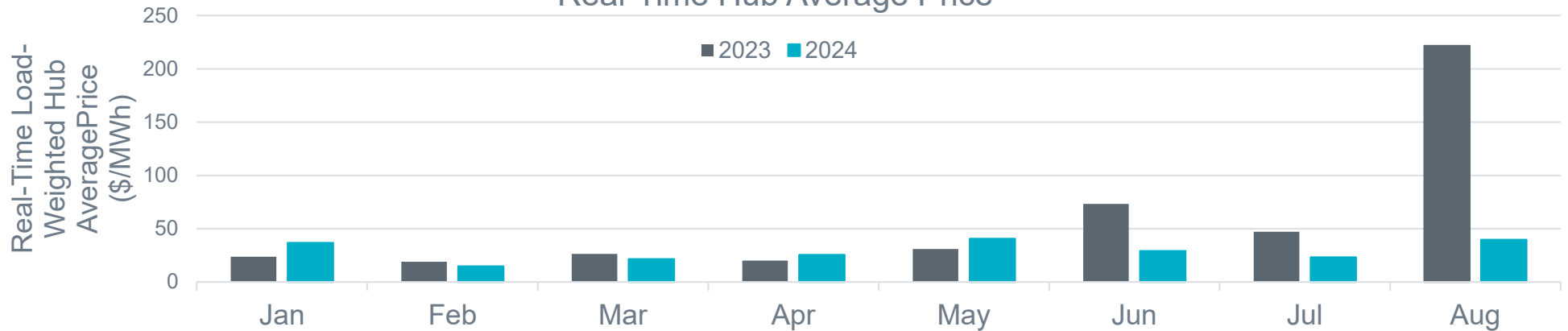
System Wide Large Load Consumption for 08-20-2024



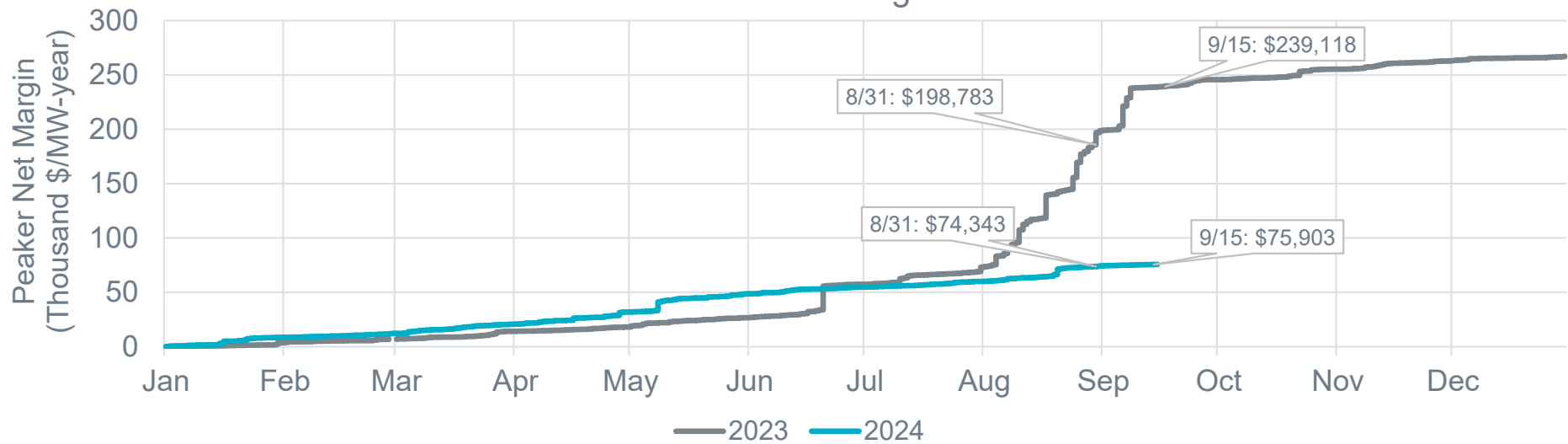
Key Takeaway: Large Flexible Loads (LFLs) have increased in the system compared to last year. LFLs reduced their load during high price periods and in response to grid conditions, which in consequence helped to balance the grid.

Real-Time Hub Price and Peaker Net Margin

Real-Time Hub Average Price



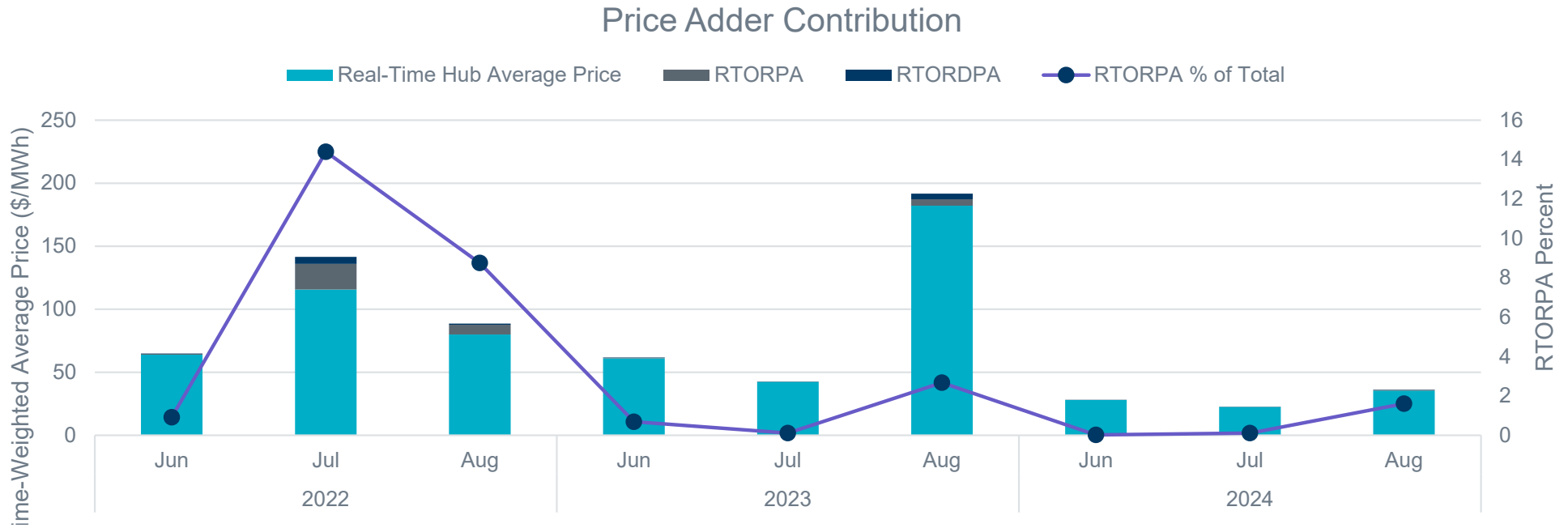
Peaker Net Margin



Key Takeaway: Real-Time Prices were lower in summer 2024 than 2023 due to higher supply and lower temperatures. Lower prices also mean that Peaker Net Margin is lower in 2024 relative to 2023.



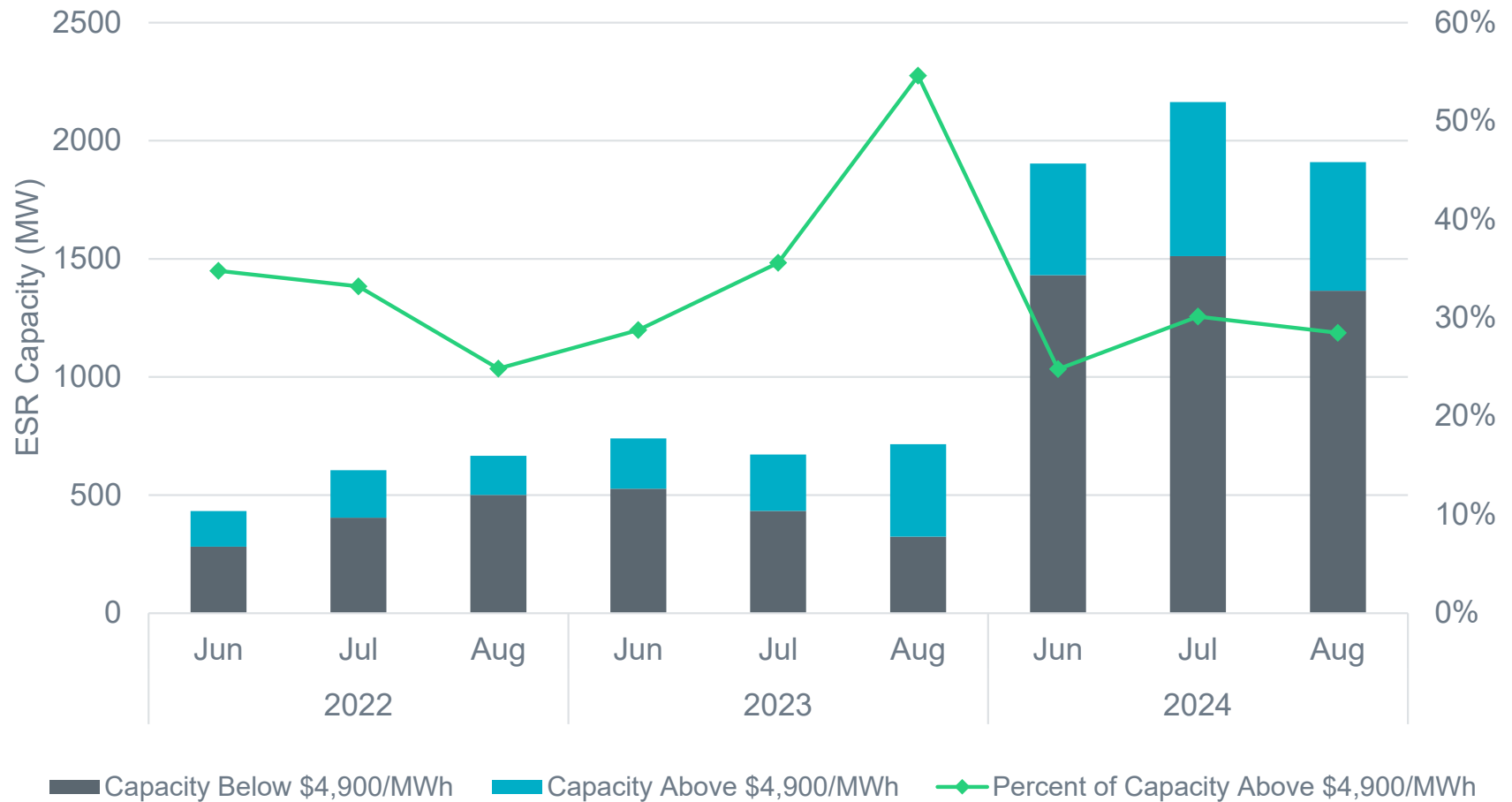
Operating Reserve Demand Curve (ORDC) Contribution to Real-Time Prices



RTORPA is the Real-Time Online Reserve Price Adder
 RTORDPA is the Real-Time Online Reliability Deployment Price Adder

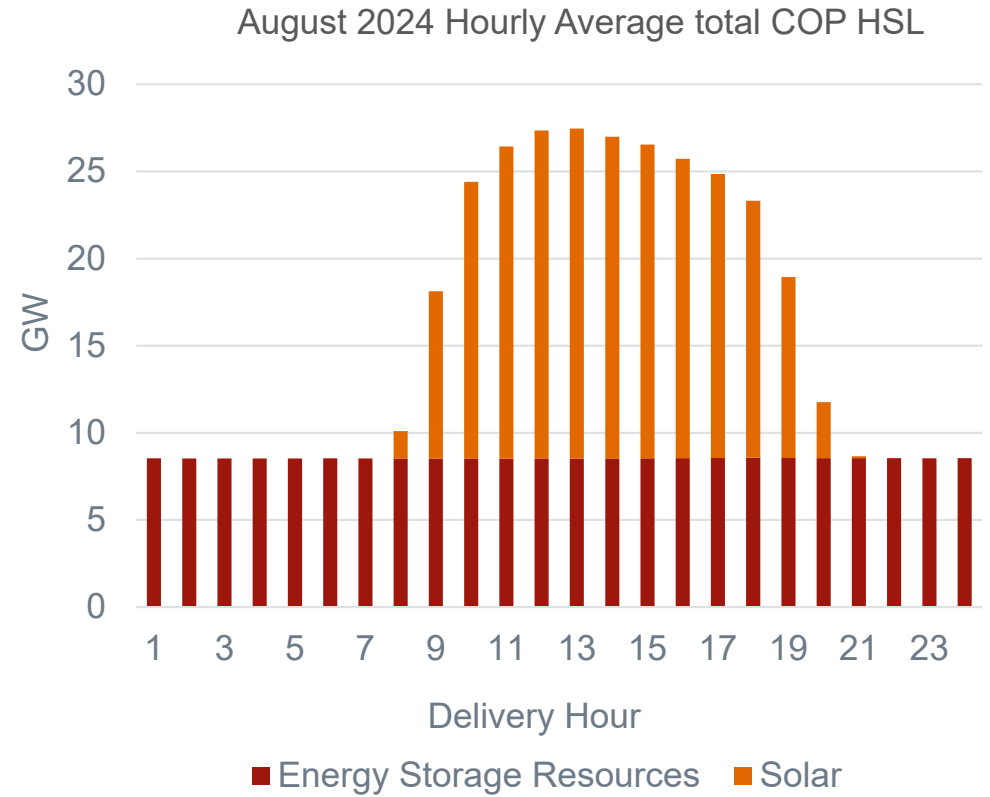
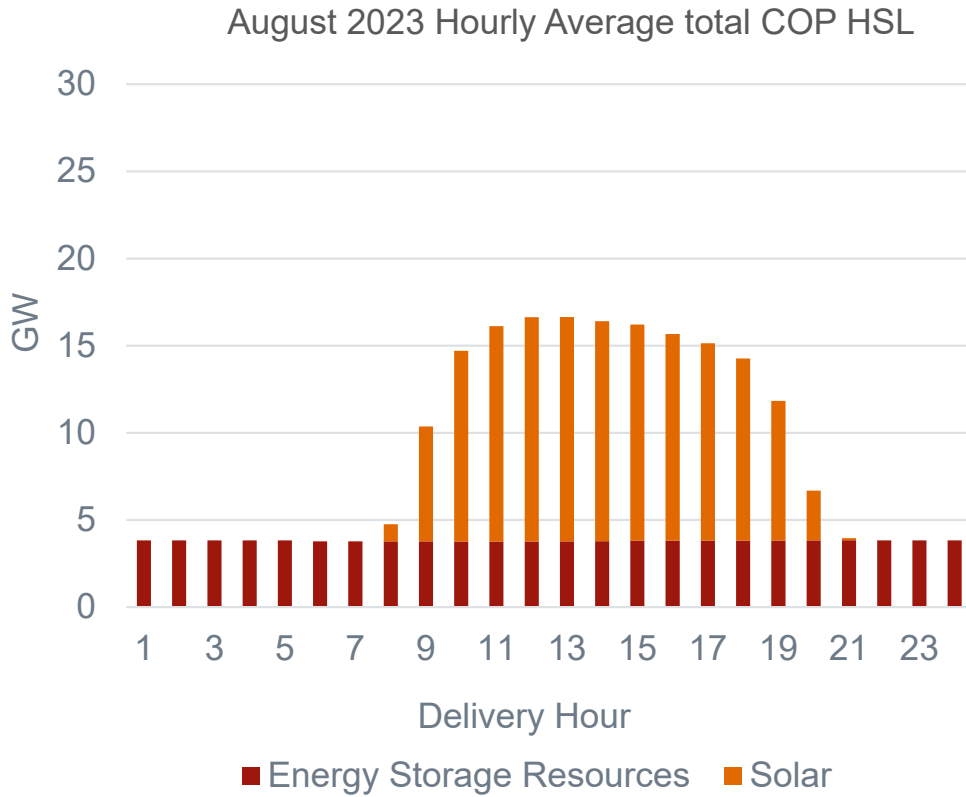
Key Takeaway: With more available capacity and lower RUC activity, price adders had a lower contribution to the market price in summer 2024 relative to previous two summers.

ESR Capacity Offered in Real-Time Market



Key Takeaway: ESR capacity offered into the market increased substantially and a lower proportion was offered near the maximum offer price cap.

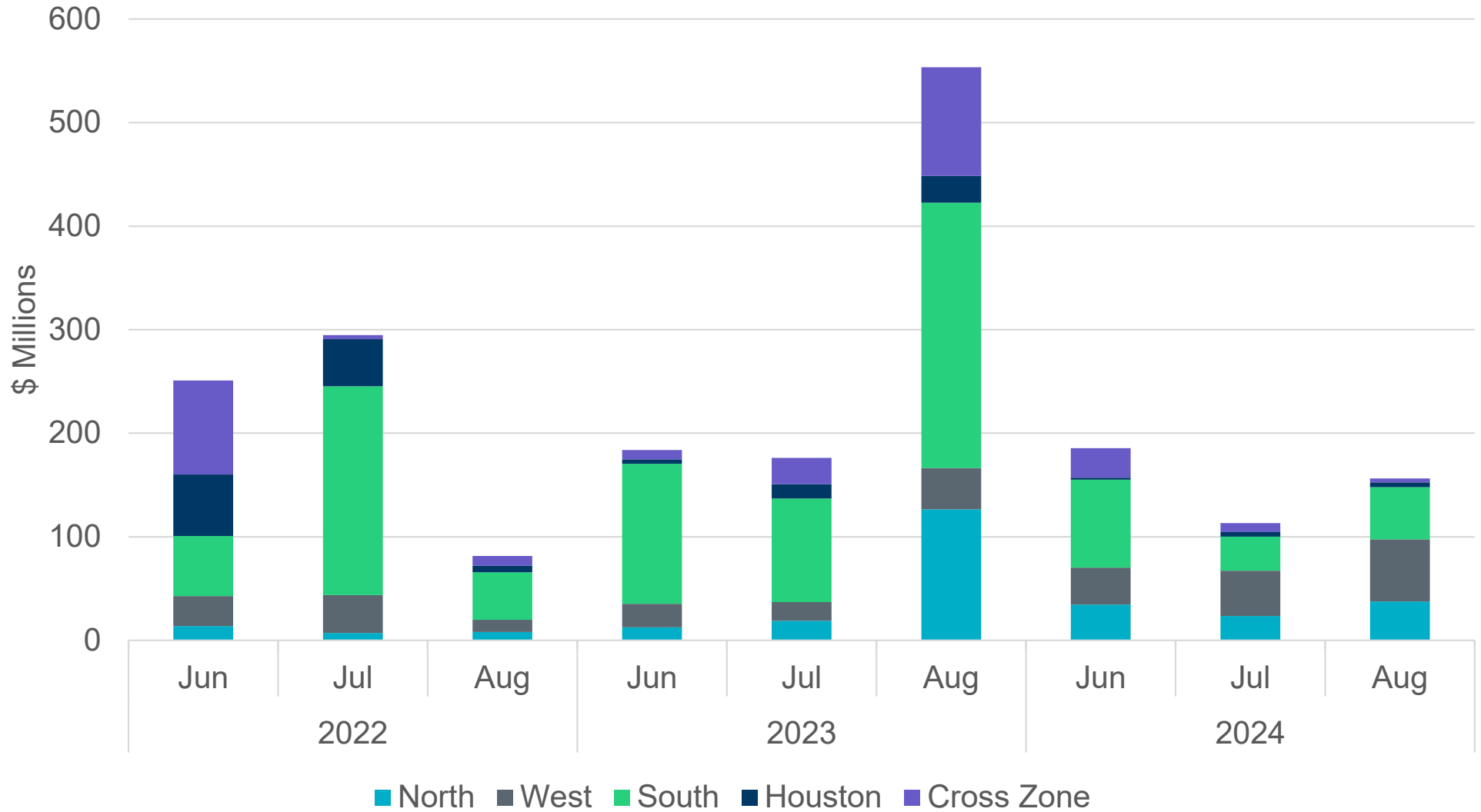
Solar and Energy Storage Resources Capacity



The graphs are based on the latest Current Operating Plan (COP) snapshot data prior to real-time.

Key Takeaway: More solar and ESR capacity was in the system in summer 2024 compared to 2023.

Real-Time Congestion Rent by Zone

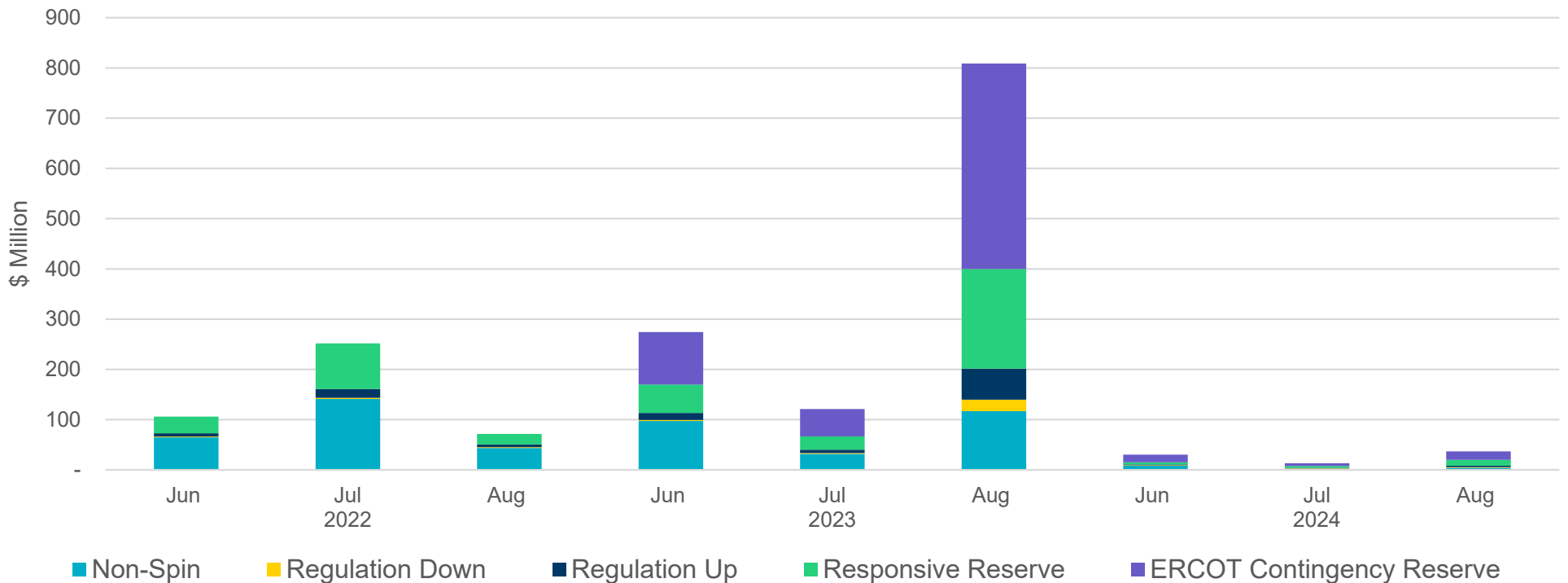


Key Takeaway: Real-Time Congestion Rent in summer 2024 was lower than previous two summers.



Cost of Ancillary Services

- Cost of Ancillary Services in summer 2024 were substantially lower than for the previous two summers.
 - Total cost of Ancillary Services in 2024 (\$36 Million) were 95% lower than the those in August 2023 (\$809 Million).
 - Lower total cost of Ancillary Services is in line with the lower total energy cost in 2024.

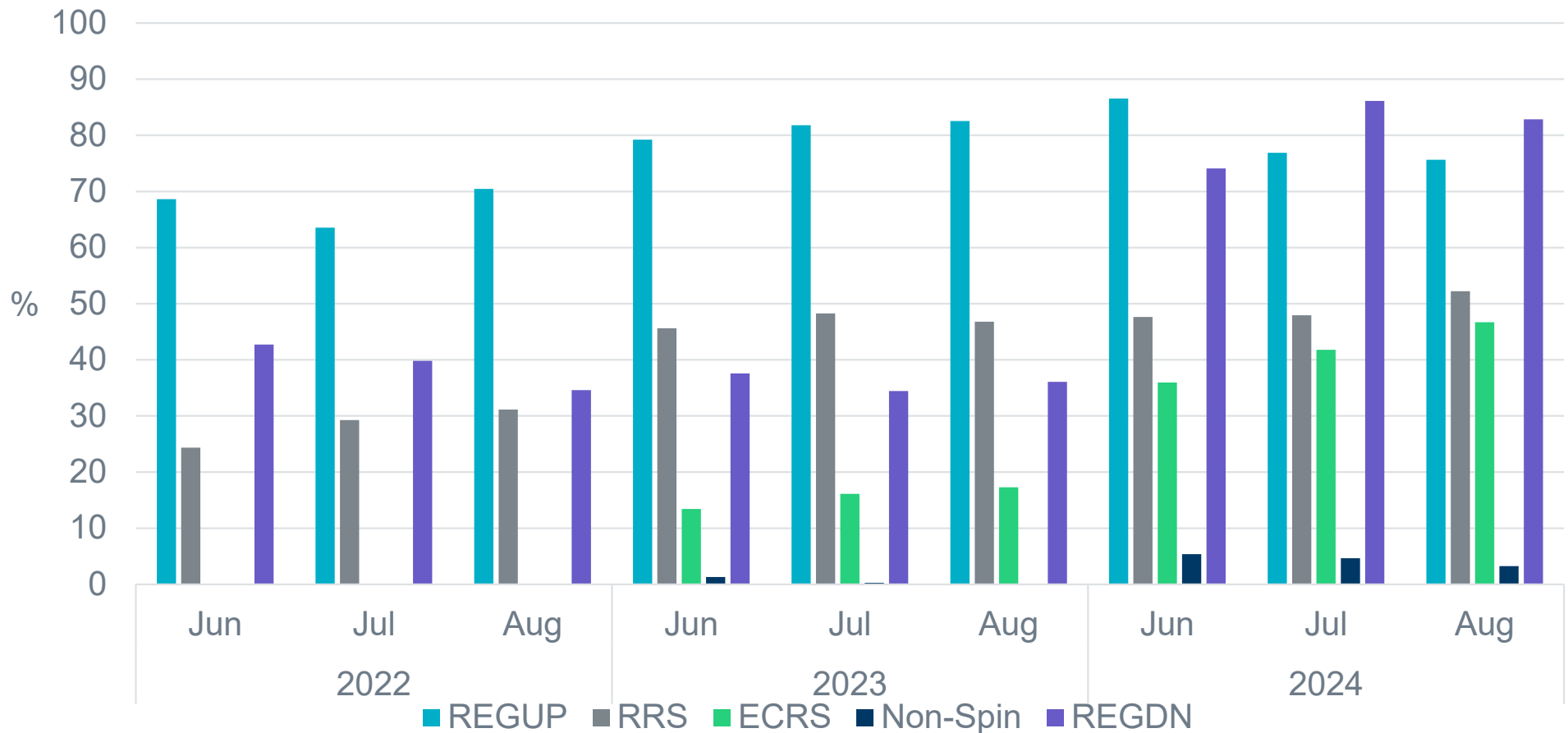


Values represent the payments to QSEs for AS procured in DAM and do not account for self-arrangement or bilateral trades.

Key Takeaway: Generally higher available capacity and resulting lower prices mean that the cost of Ancillary Services were lower in Summer 2024 than previous two summers.



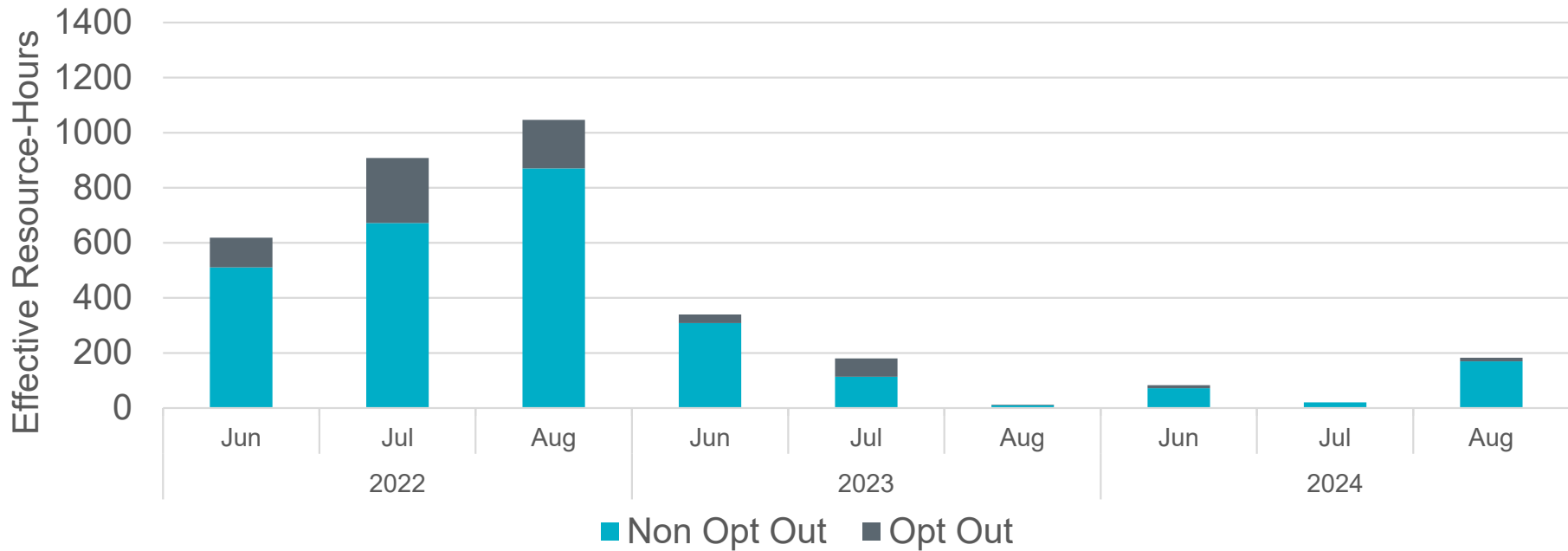
ESR Percent of Total System-Wide Ancillary Service Procurement in the DAM



Key Takeaway: The percentage of total system-wide Ancillary Services procured from ESRs in the Day-Ahead Market (DAM) was notable, particularly in ECRS and Regulation Down.

Resources Committed Through RUC

- There were 300 total Reliability Unit Commitment (RUC) effective Resource-hours in summer 2024. This was a reduction from the 533 effective Resource-hours in the summer of 2023 and a substantial reduction from the 2,573 effective Resource-hours in the summer of 2022.
- 56 unique Resources were committed from June to August 2024 which is more than the 36 unique Resources during summer 2023 and the 42 unique Resources during summer 2022.



“Effective Resource-hours” excludes any period during a RUC-instructed hour when the committed Resource was starting up, shutting down, off-line, or otherwise not available for dispatch by SCED.

Key Takeaway: RUC levels were lower in summer 2024 than previous two summers, but there was greater diversity in the fleet of Resources that were committed.

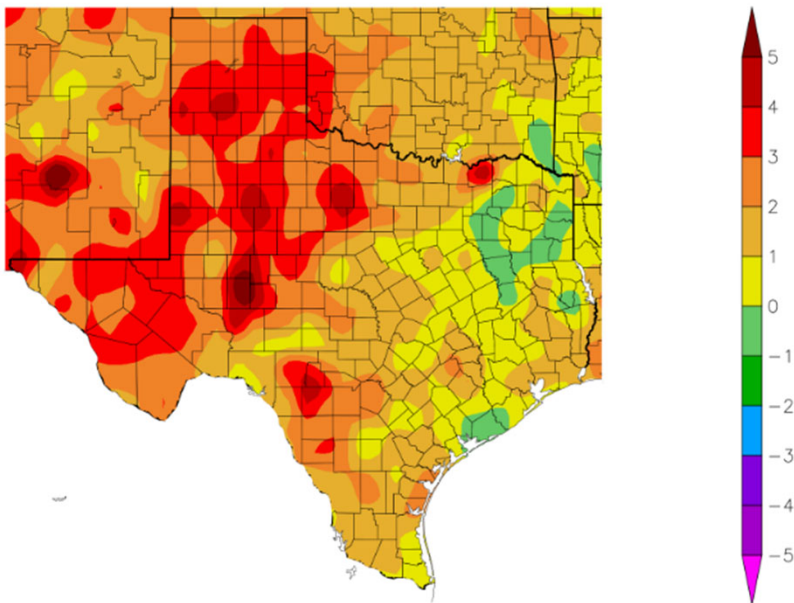


Appendix

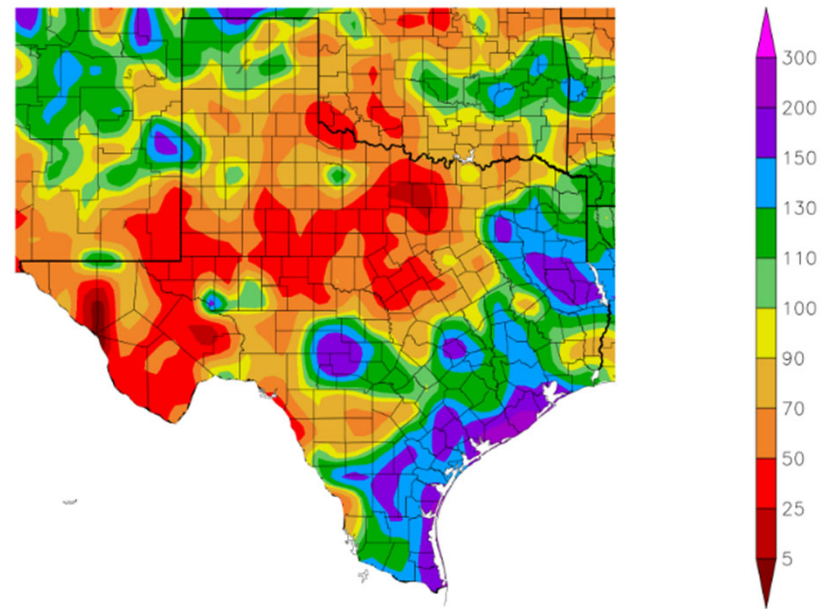
Summer 2024 Weather

- June-August 2024 was the **75th driest** on record for Texas, which was not nearly as dry as June-August 2023 which ranked 7th driest.

Departure from Normal Temperature (F)
6/1/2024 – 8/31/2024



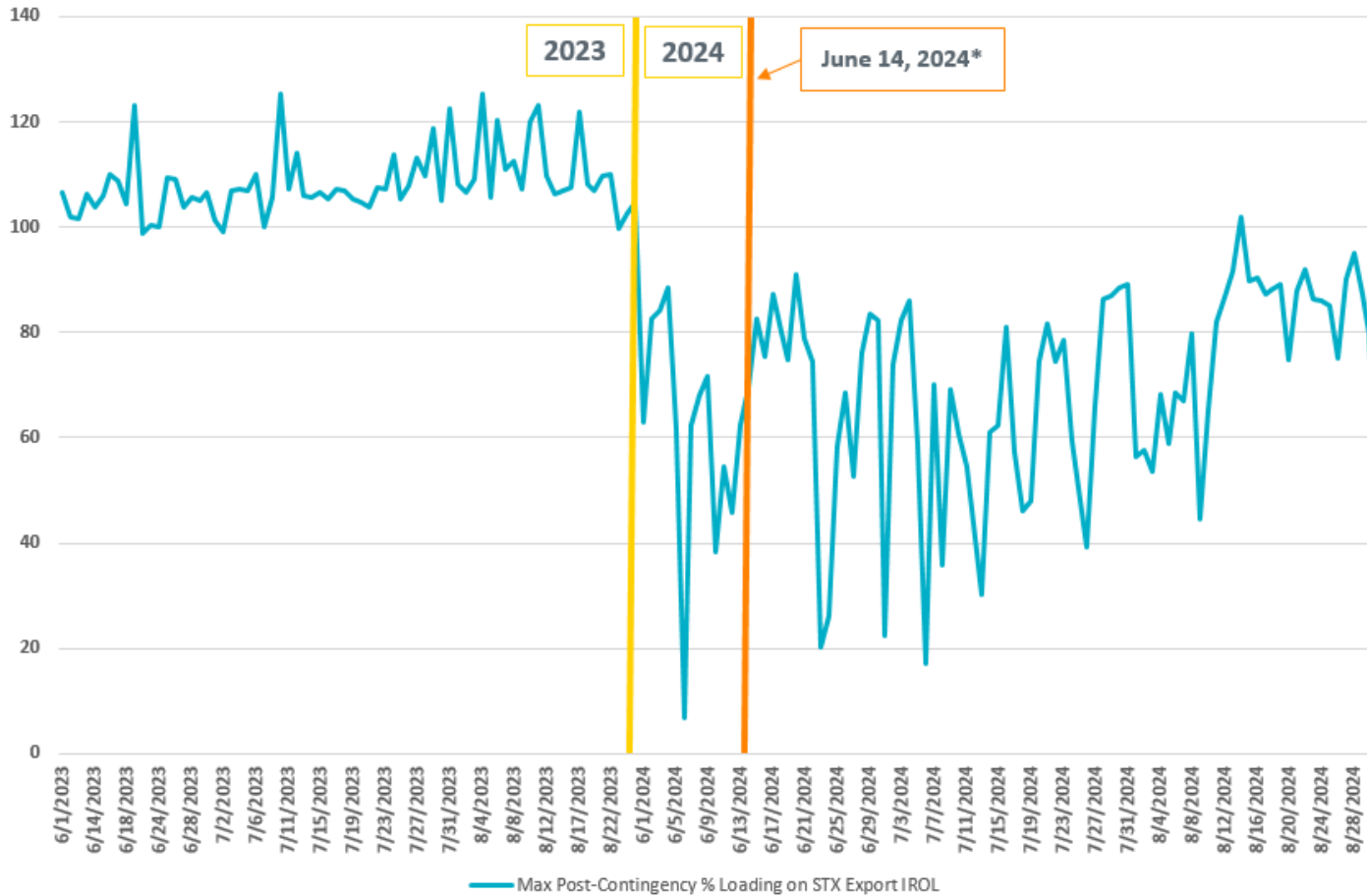
Percent of Normal Precipitation (%)
6/1/2024 – 8/31/2024



Key Takeaway: June-August 2024 was the hottest recorded for Texas in a summer with above normal precipitation.

South TX Export IROL 2023 vs 2024

STX Export IROL Comparison: Summer 2023 vs. Summer 2024 Performance Analysis



- The South Texas IROL has been in effect since March 2024.
- *Dynamic line ratings updated and implemented as of June 14, 2024
- The dynamic line rating updates have contributed to reducing post-contingency overloading of the constraint, though not fully mitigating the issue.

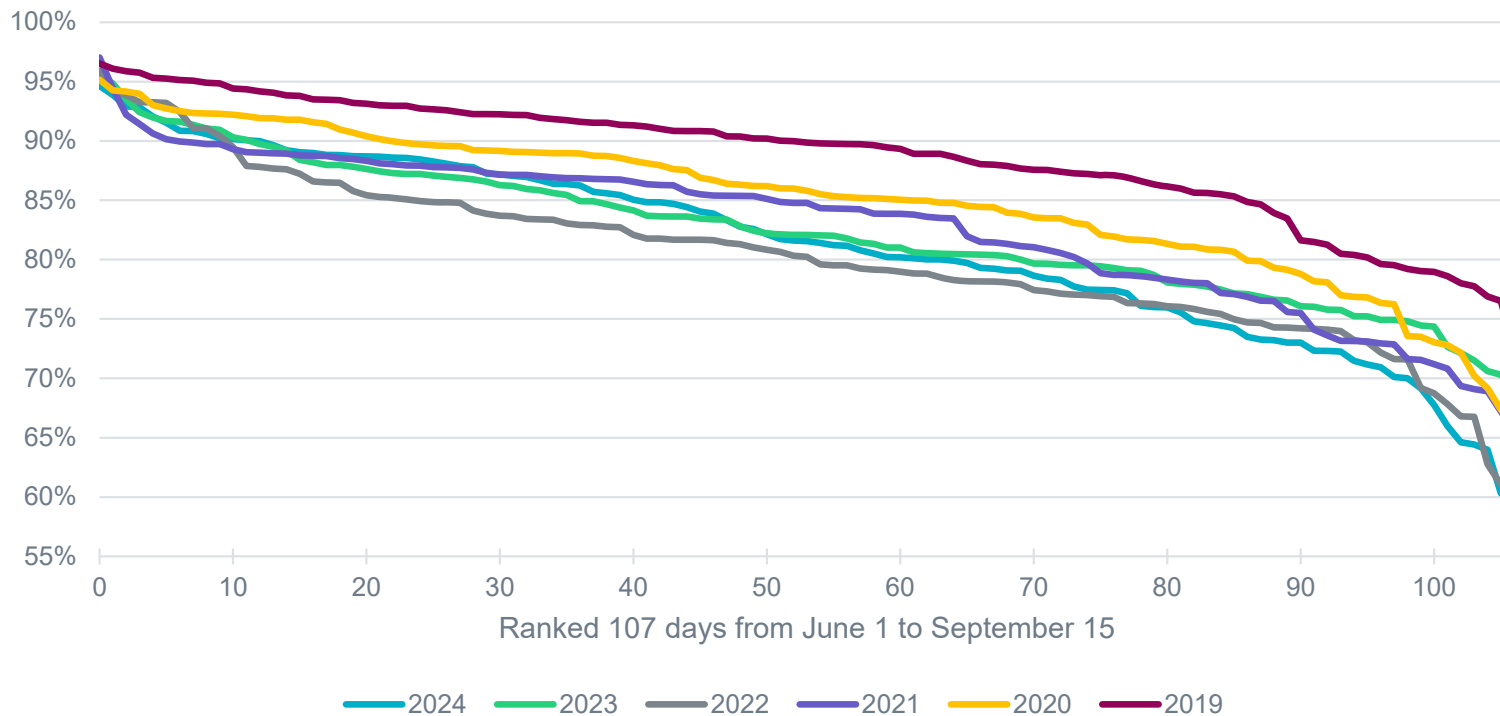
Key Takeaway: ERCOT is continuing to explore and implement alternative solutions for the South Texas IROL ahead of the planned transmission enhancements, including the switching configuration at San Miguel and Calaveras.



Dispatchable Generation at Peak Net Load

- The following chart compares the ratios of dispatchable generation to total generation at the time of Daily Peak Net Load since 2019.

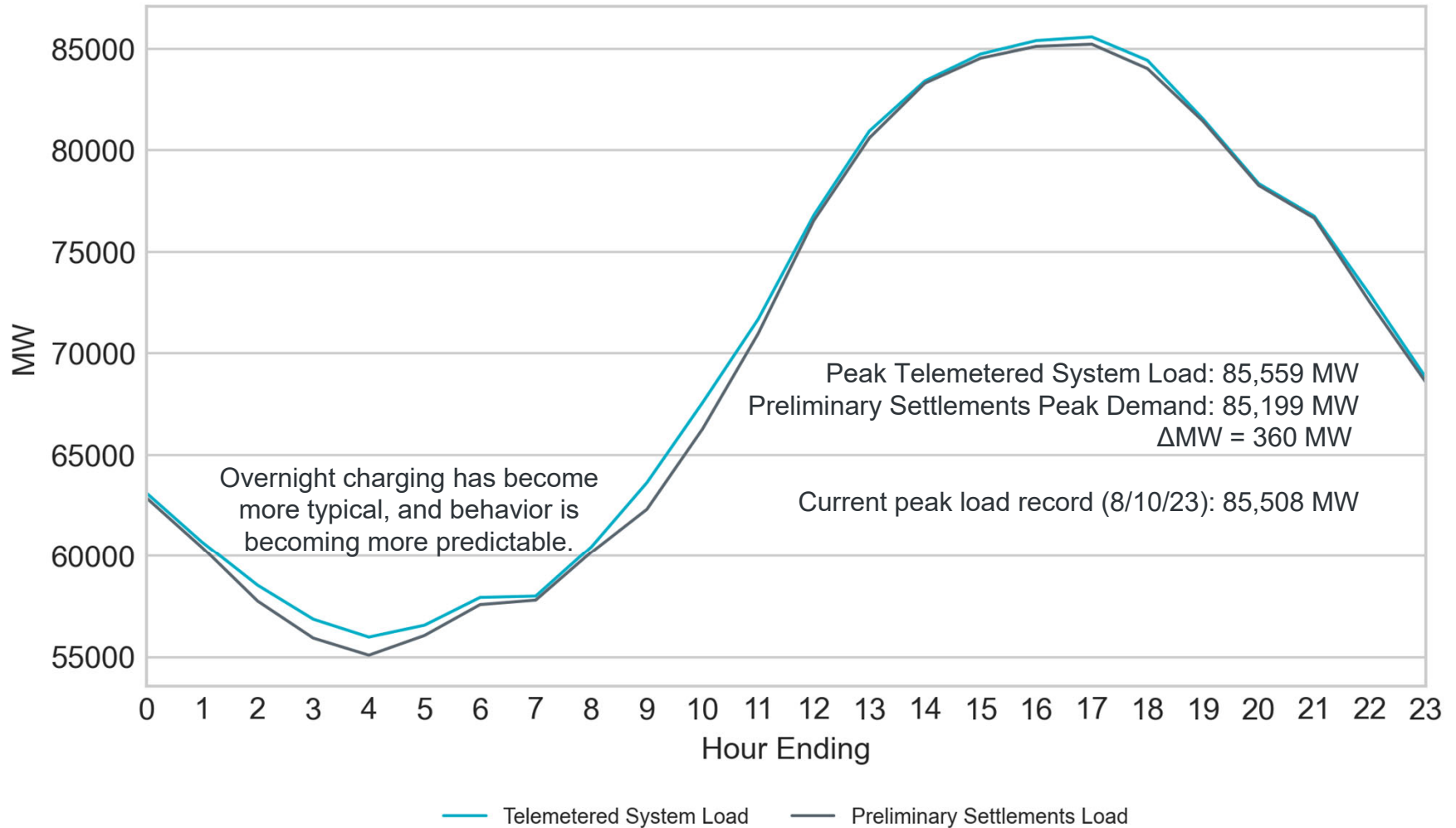
Percentage of Dispatchable Generation at Daily Peak Net Load
Ranked data for 2019 to 2024 (June 1 – September 15)



Key Takeaway: Dispatchable generation as a percentage of total generation has declined over years. Starting 2023, majority of Daily Peak Net Load hours shifted from HE15-17 to HE20-21 where little or no solar generation is available.

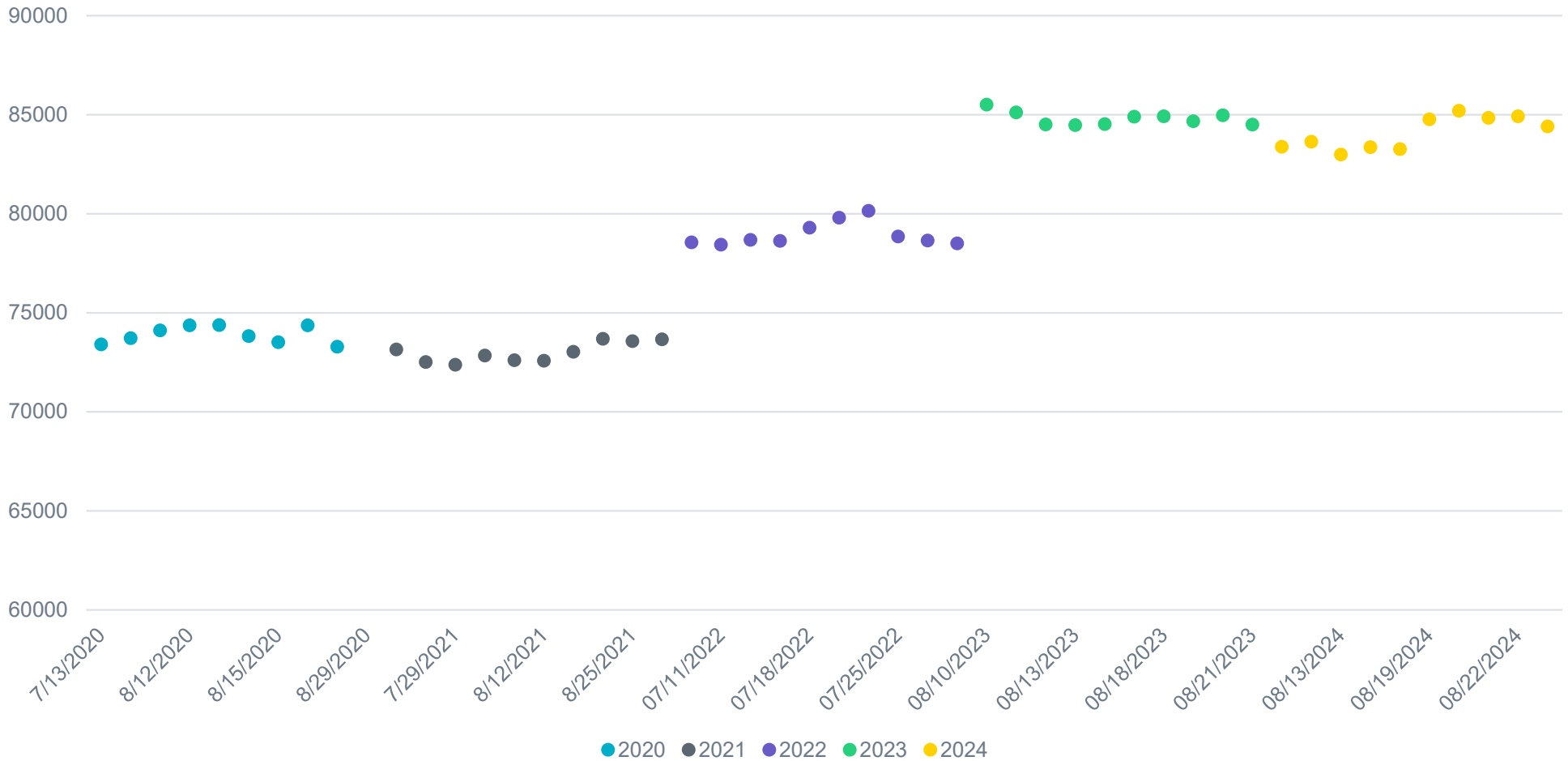
Summer 2024 Peak Demand

Telemetered Load & Settlements Load for Summer Peak (8/20/24)



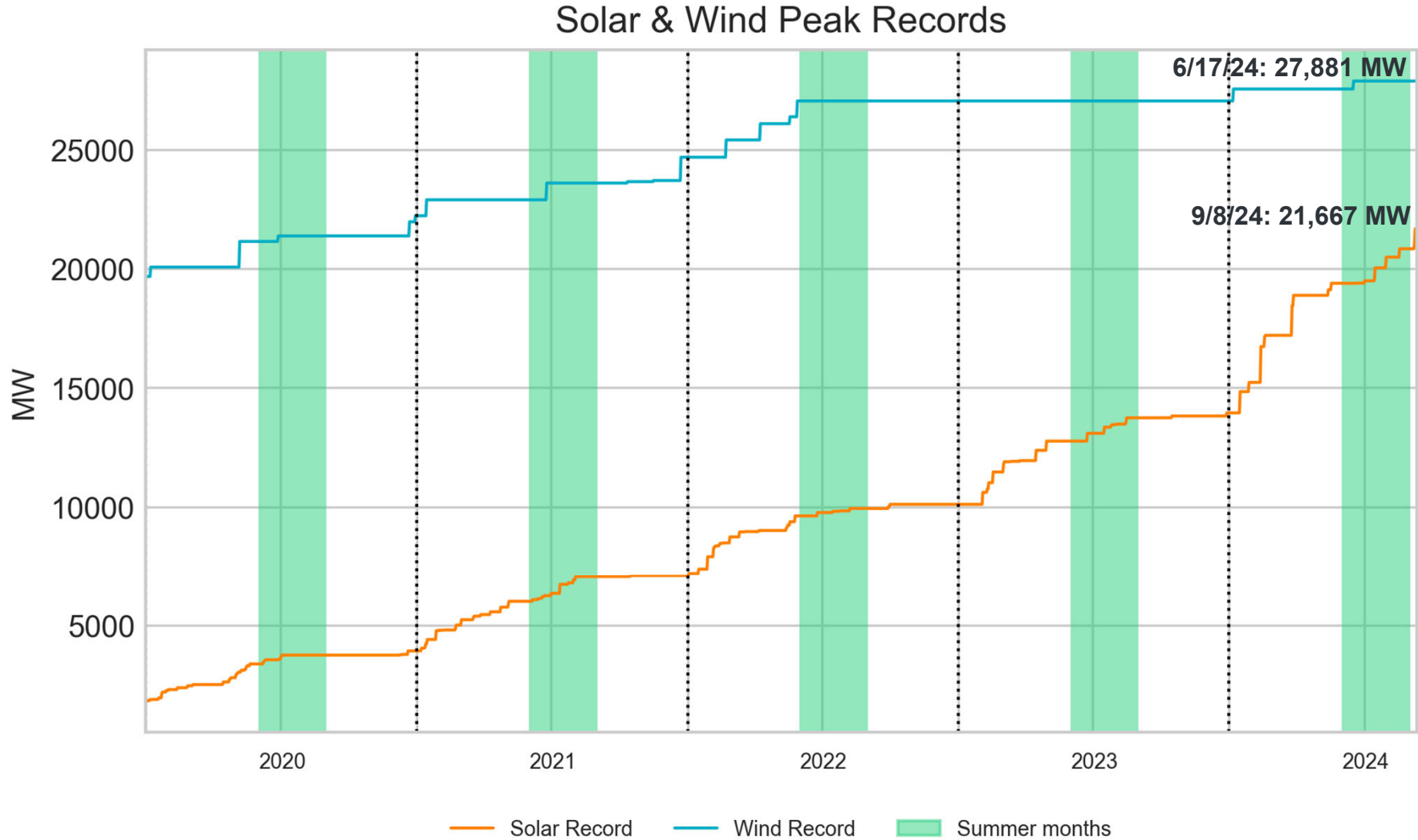
Key Takeaway: The peak 2024 summer demand occurred on 8/20/24. The Telemetered System Load was higher than the all-time peak demand record (8/10/23), however preliminary settlements load does not include Wholesale Storage Load (WSL).

10 Highest Demand Days from 2020-2024



Key Takeaway: The highest demand days in 2024 carried over 7 GW more load than the highest demand days in 2020.

Solar & Wind Records

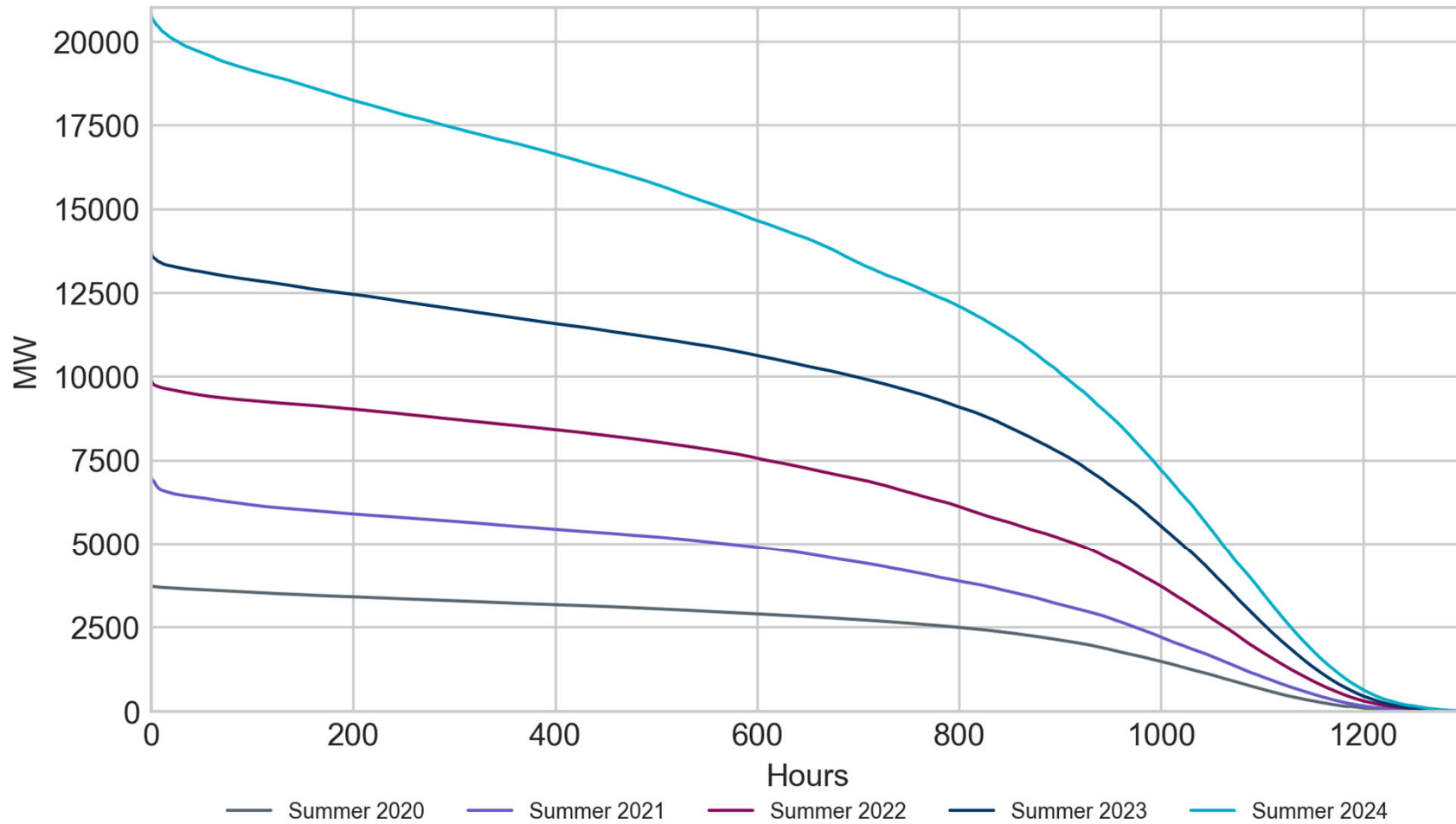


Key Takeaway: A wind generation record was set on 6/17/24 with 27,881 MW. ERCOT recently surpassed CAISO's solar generation record with 21,667 MW (9/8/24) vs. CAISO's 19,650 MW (8/23/24).



Solar Duration Curve

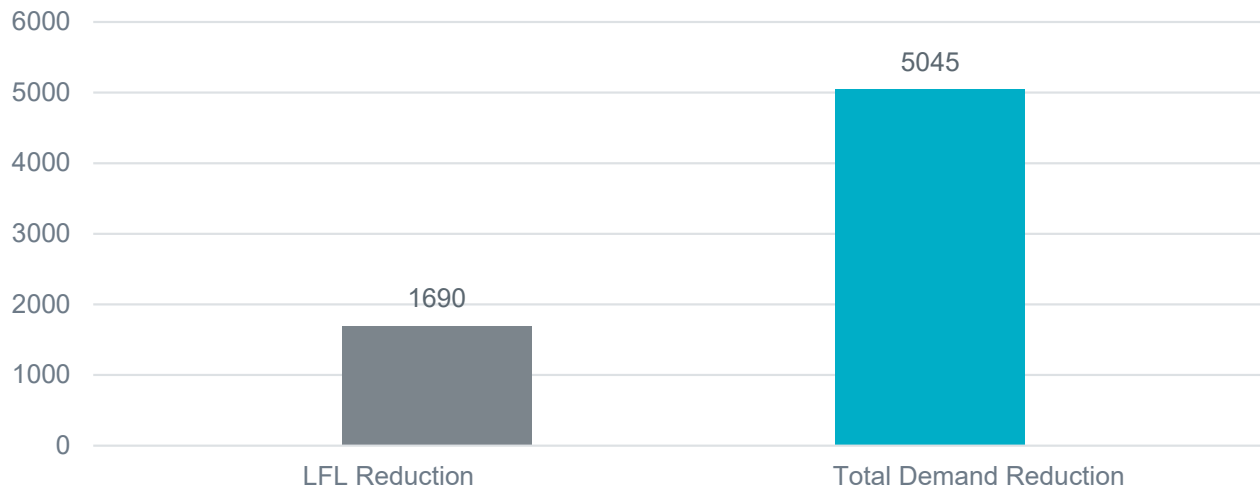
Summer Solar Duration Curve through the last Five Years



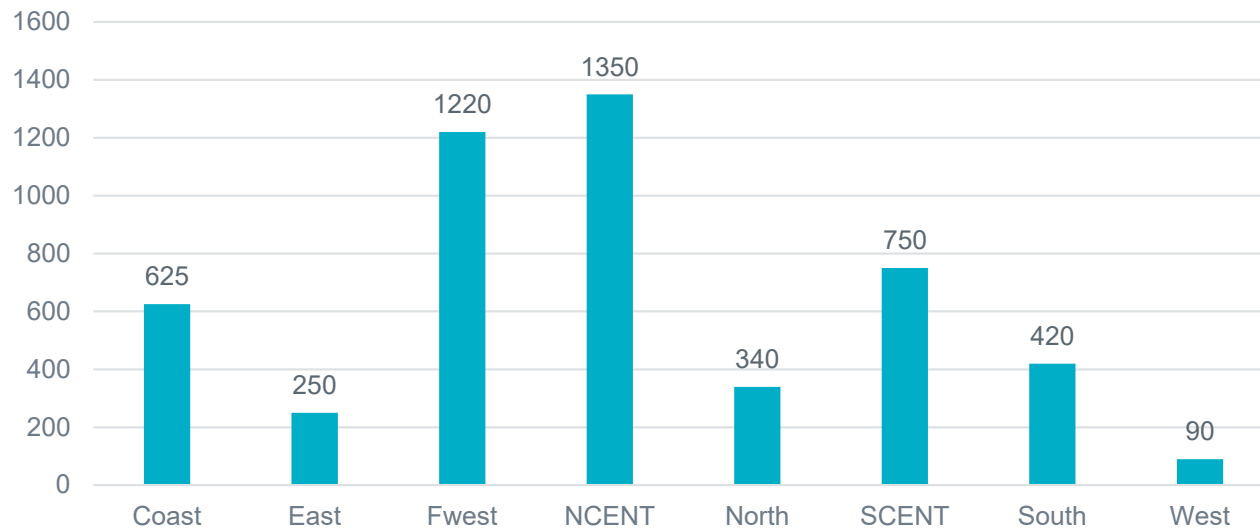
Key Takeaway: Solar capacity has increased through the last five years, serving more load during the summer days.

Demand Response at the Time of Peak

8/20/24 Demand Reduction ERCOT System



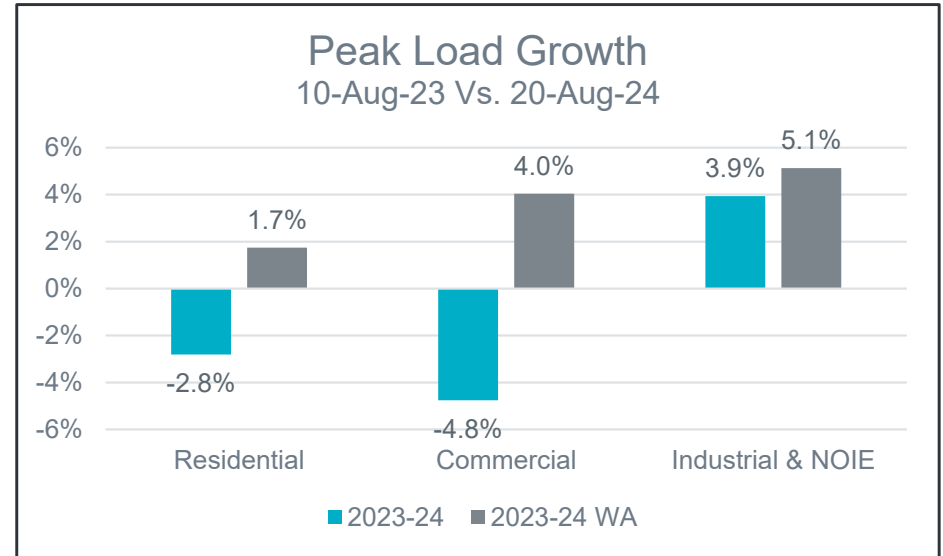
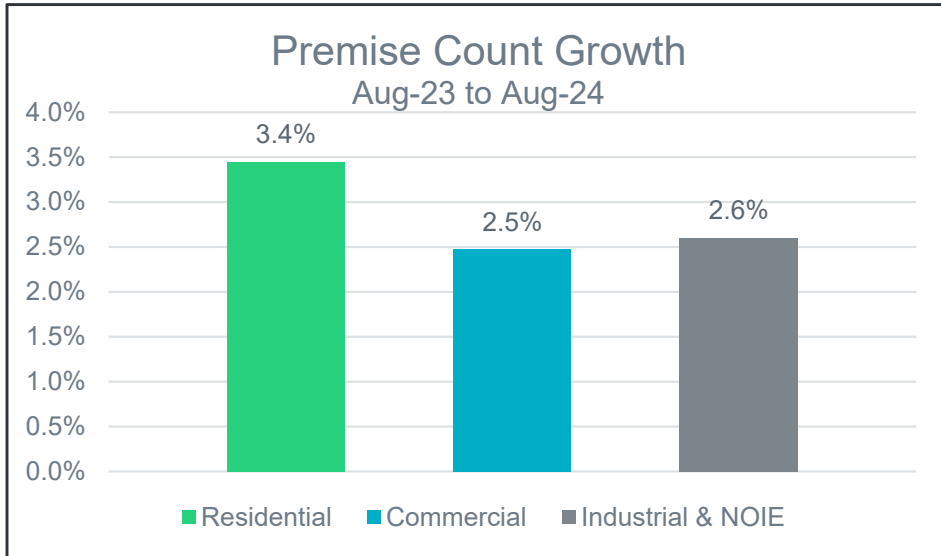
8/20/24 Estimated Peak Demand Reduction by Zone



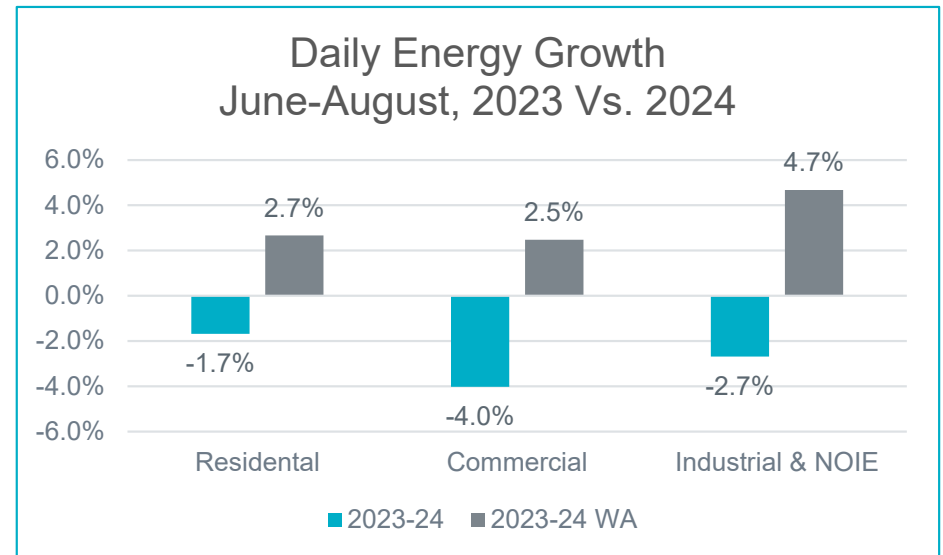
- The LFLs reduced less at the time of peak than last years normal. However, they did reduce to below 10% over the netload peak.
- The total demand reduction at the time of the peak is estimated at 5,045 MW.
- In contrast to last year, there was no reduction due to conservation or media appeal.

Key Takeaway: Lower prices reduce the amount of reduction observed over the peak hour.

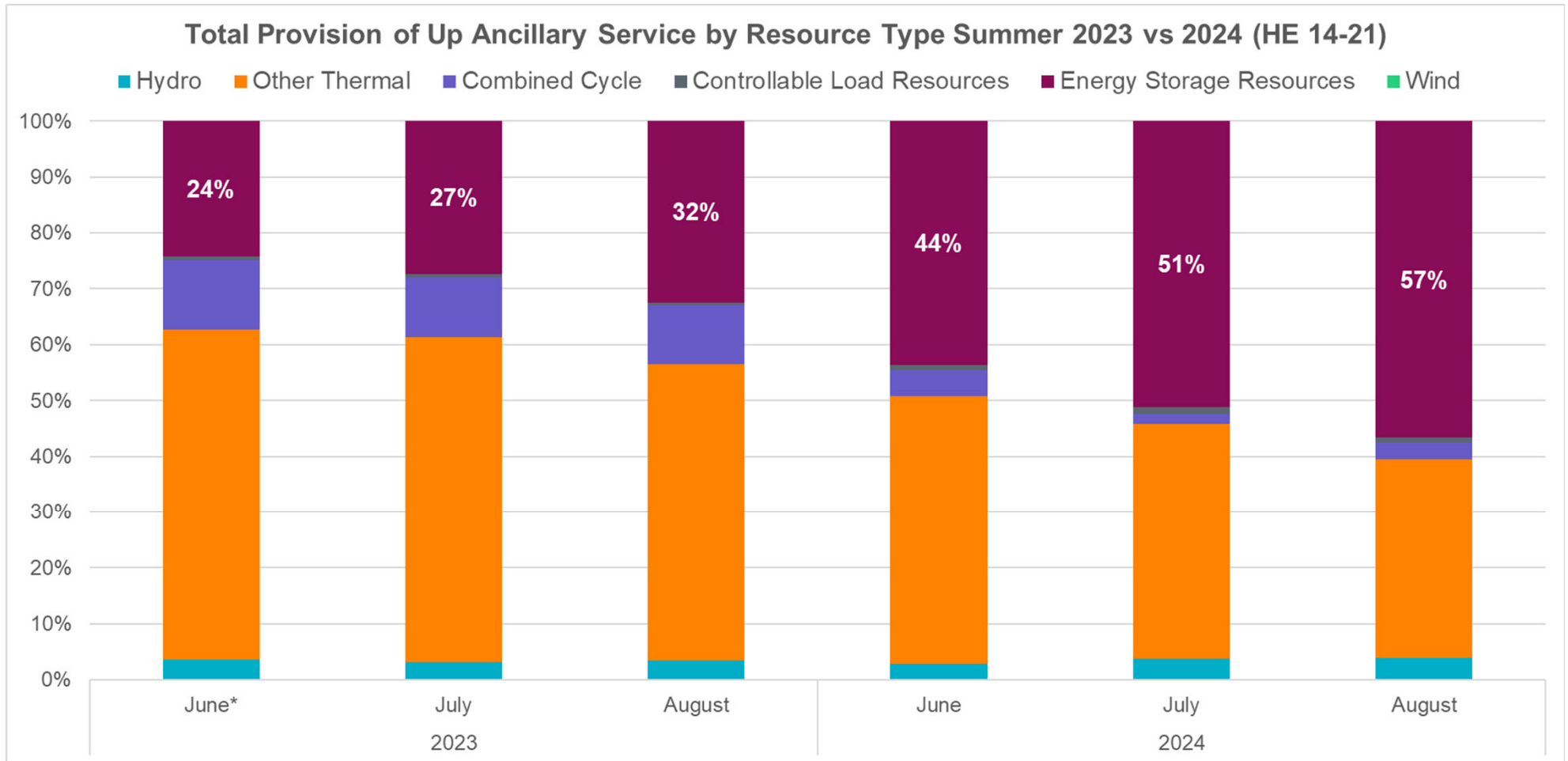
Load Growth By Class



Key Takeaway: Much of the growth was in the IDRRQ profile group that includes industrial consumers (with Non Opt-in Entities (NOIEs) included). This growth at peak is somewhat suppressed due to 4CP and LFL reductions. On a weather-adjusted (WA) basis, the peak and energy growth of residential and commercial is offset due to: growth in rooftop solar, continually improving energy efficiency of appliances and HVAC systems.



Ancillary Services Carried by Energy Storage Resources (ESRs)



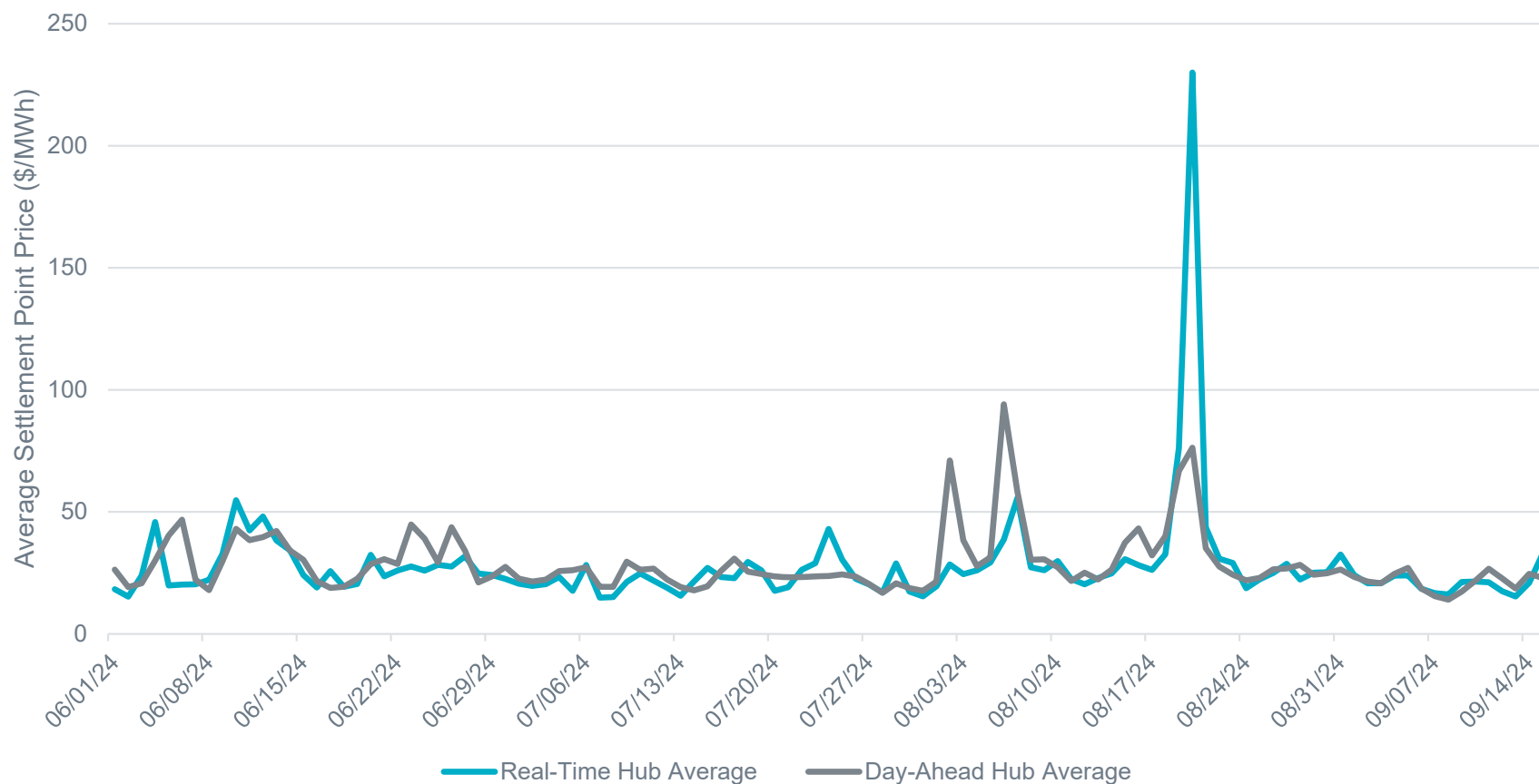
* ECRS was introduced on June 10th, 2023

Key Takeaway: ESRs provided a significant portion of the Ancillary Services this summer.



Comparison of Day-Ahead and Real-Time prices

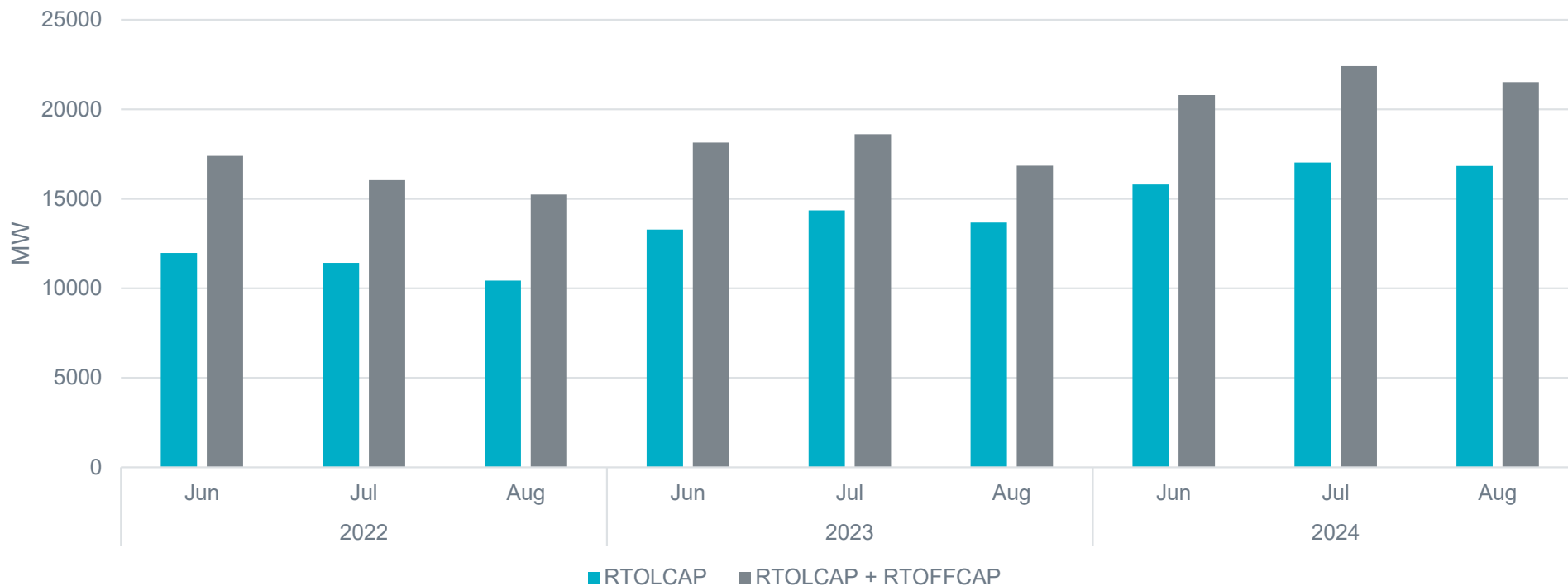
- Price convergence between the DAM and Real-Time Market (RTM) remained typical during summer 2024, though there were several days where the two markets diverged. On some occasions, DAM cleared higher, while on others, RTM prices were higher.



Key Takeaway: DAM and RTM prices were generally aligned during summer 2024.

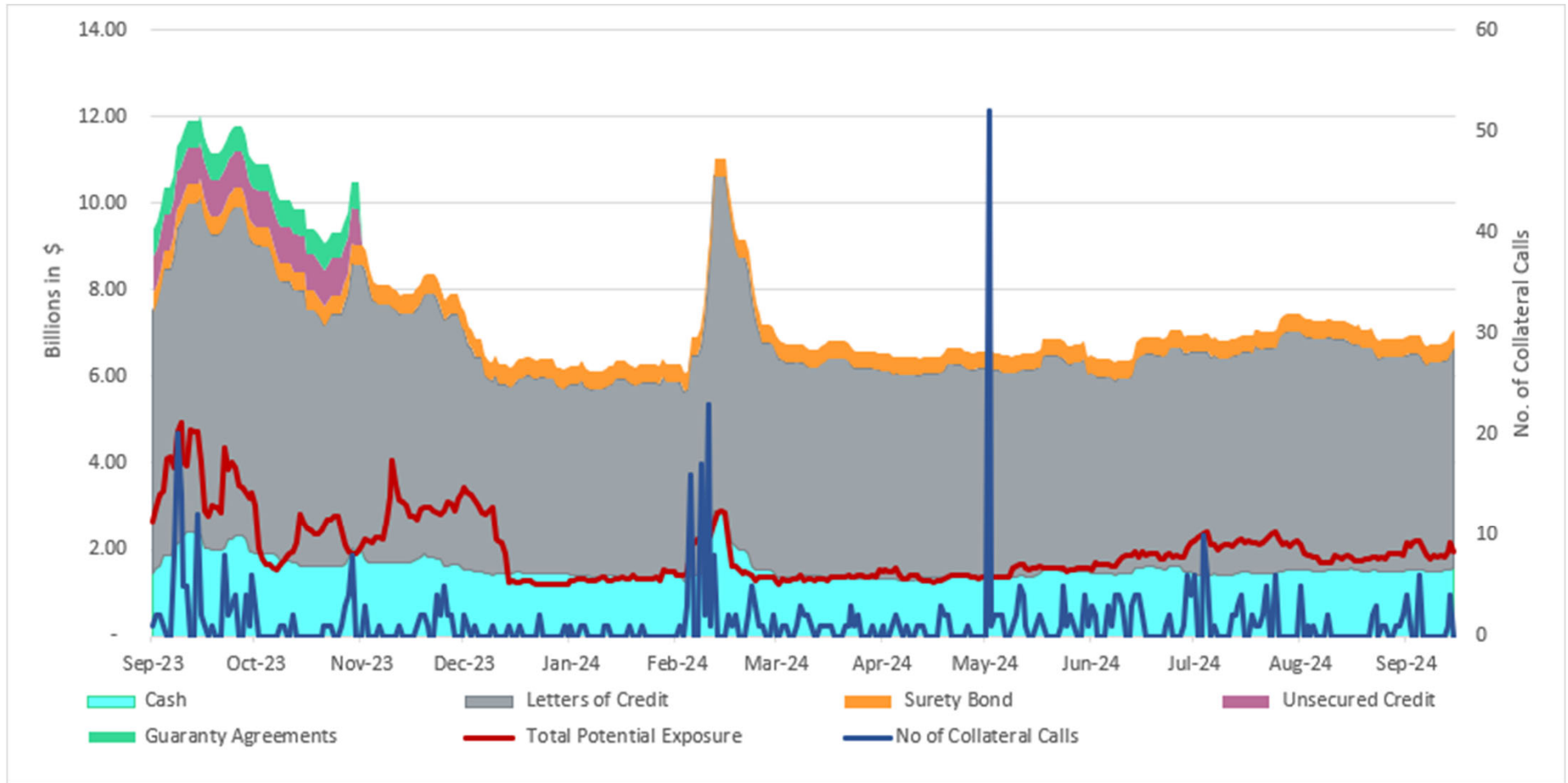
Operating Reserve Demand Curve (ORDC) Capacity Consists of Online and Offline Reserves

Average Reserves



Key Takeaway: Online and offline reserves were greater in summer 2024 than in 2023, due to factors related both to supply and demand.

Total Potential Exposure, Collateral, and Collateral Calls September 2023 – September 15, 2024



Key Takeaway: No significant increase on total potential exposure and collateral requirements due to low prices in summer 2024.