**ERCOT Monthly Operational Overview**
(August 2019)

ERCOT Public
September 15, 2019

Monthly Highlights

- ERCOT set a new maximum peak demand in August 2019 at 74,666 MW*, that is 4,747 MW more than the August 2018 demand of 69,919 MW.

- ERCOT implemented the Inactive project status for the GINR process (PGRR066); as a result 3,638 MW of project capacity was changed to Inactive during August.

- ERCOT issued 19 notifications:
  - 6 OCNs issued due to projected reserve capacity shortage and 1 issued due to extreme hot weather.
  - 9 Advisories issued due to Physical Responsive Capability (PRC) being below 3,000 MW.
  - 1 Watch issued due to PRC being below 2,500 MW.
  - 2 Emergencies declared for reserves below 2,300 MW (EEA 1).

- With the scarcity in August and EEA Level 1 events, ERCOT observed significant real-time prices including prolonged $9,000/MWh prices during two Operating Days. This corresponded to higher average real-time and day-ahead prices for the month.

- ERS was deployed on August 13 and August 15 during the EEA Level 1 events.

- Net allocation to Load of $190.1 million, primarily driven by Ancillary Services Settlements. Likewise, increased Settlement amounts for DAM and RTM energy.

* Preliminary value from September release of Demand and Energy 2019 report.

Monthly energy generation increased 7% year-over-year to 41,854 GWh in August 2019, compared to 39,205 GWh in August 2018
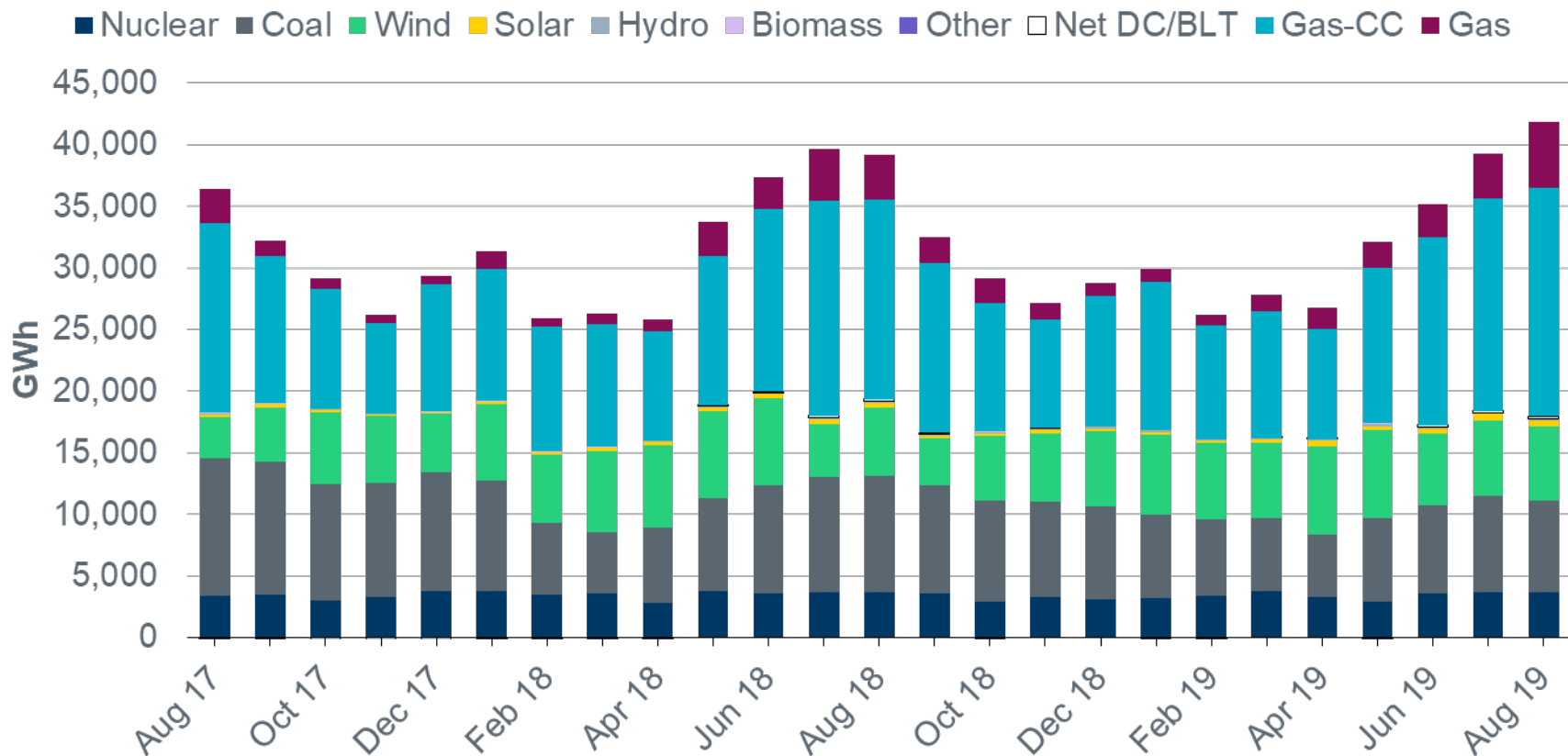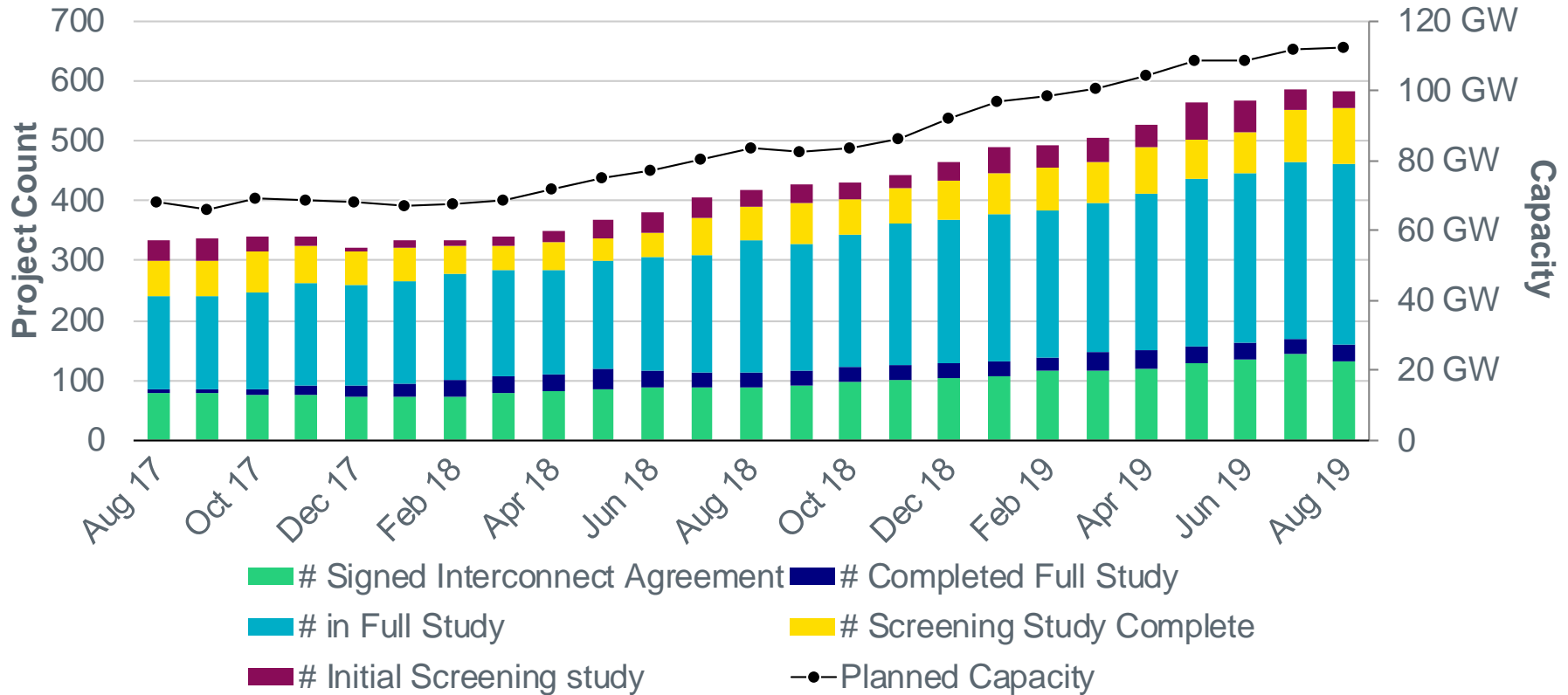

Data for latest two months are based on preliminary settlements.

Generation Interconnection activity by project phase
**(excludes 3,638 MW of project capacity changed to Inactive during August due to PGRR066)**

A break out by fuel type can be found in the monthly Generator Interconnection Status (GIS) reports available on the ERCOT Resource Adequacy Page: http://www.ercot.com/gridinfo/resource

Interconnection Queue Capacity by Fuel Type

Queue totals: Solar 65 GW (57%), Wind 35 GW (31%), Gas 8 GW (7%), Battery 4 GW (4%) (excludes 3,638 MW of project capacity (wind 38%, gas 34%, solar 28%) changed to Inactive during August due to PGRR066)
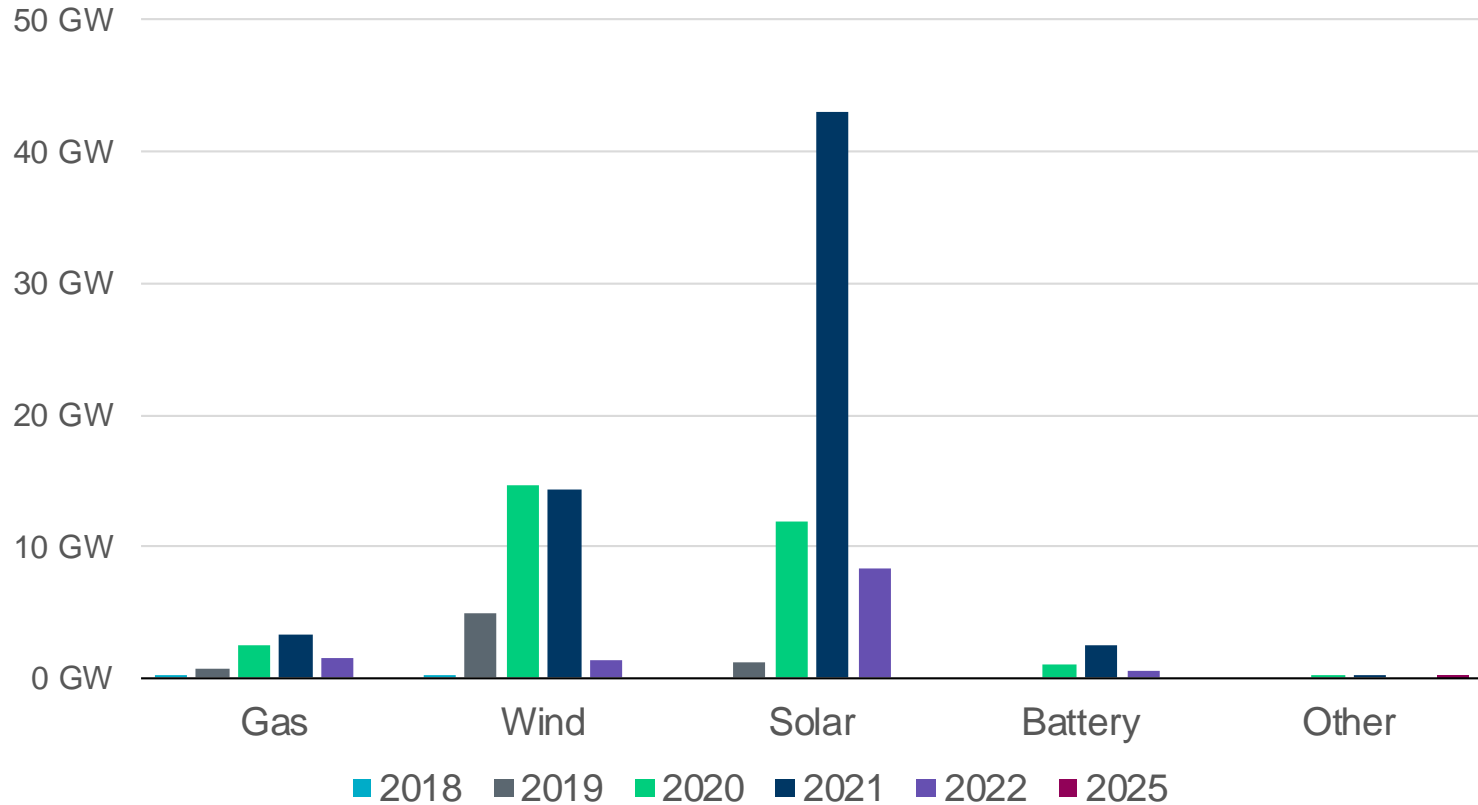

A break out by zone can be found in the monthly Generator Interconnection Status (GIS) reports available on the ERCOT Resource Adequacy Page: http://www.ercot.com/gridinfo/resource

Planning Summary

- ERCOT is currently tracking 583 active generation interconnection requests totaling 112,615 MW. This includes 64,579 MW of solar projects and 35,276 MW of wind projects as of August 31, 2019.

- ERCOT is currently reviewing proposed transmission improvements with a total estimated cost of $1,121.21 Million as of August 31, 2019.

- Transmission Projects endorsed in 2019 total $295.6 Million as of August 31, 2019.

- All projects (in engineering, routing, licensing and construction) total approximately $3.86 Billion as of June 1, 2019.

- Transmission Projects energized in 2019 total about $1.06 Billion as of June 1, 2019.

The new ERCOT maximum peak demand on August 12, 2019 was 74,666 MW*, 4,747 MW more than August 2018 demand of 69,919 MW
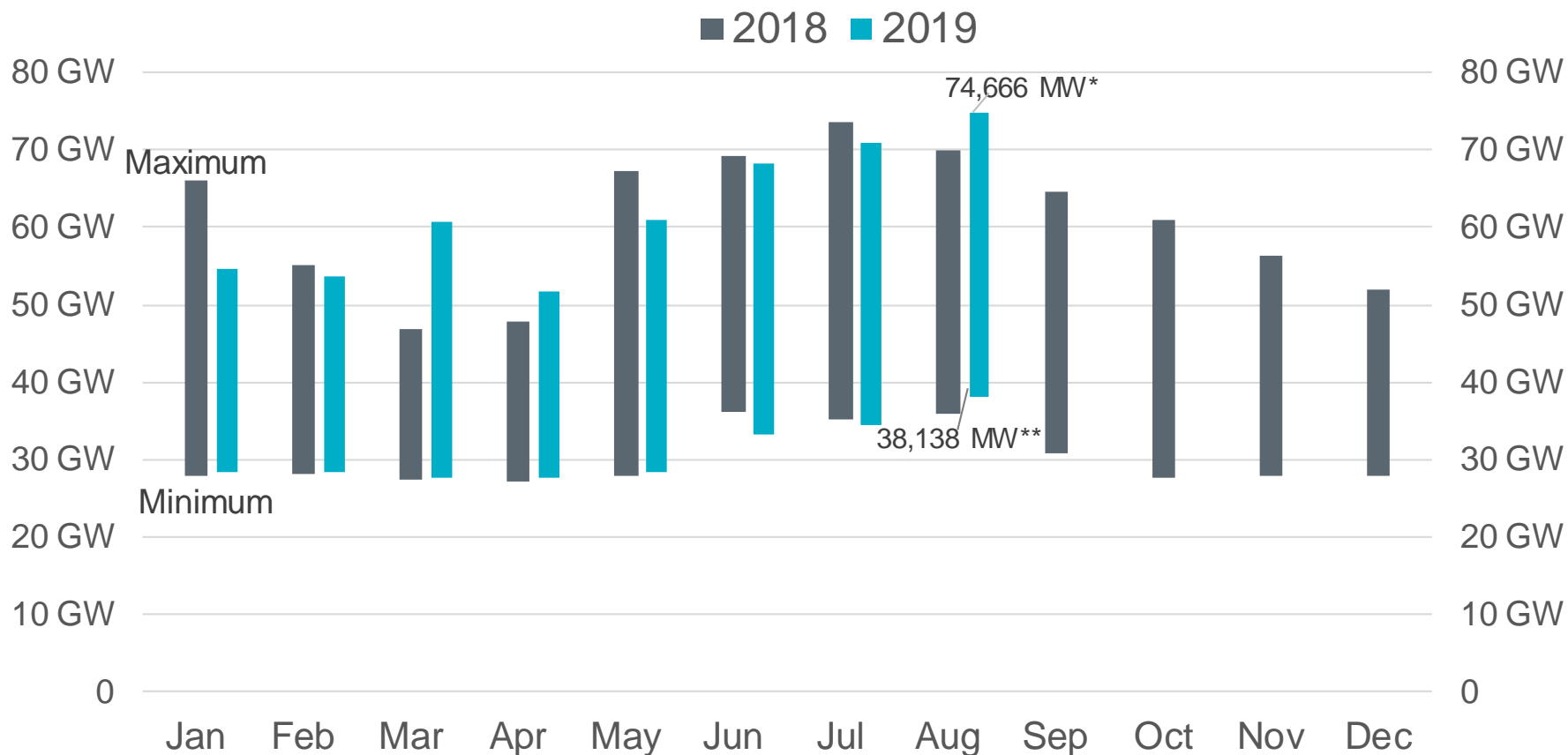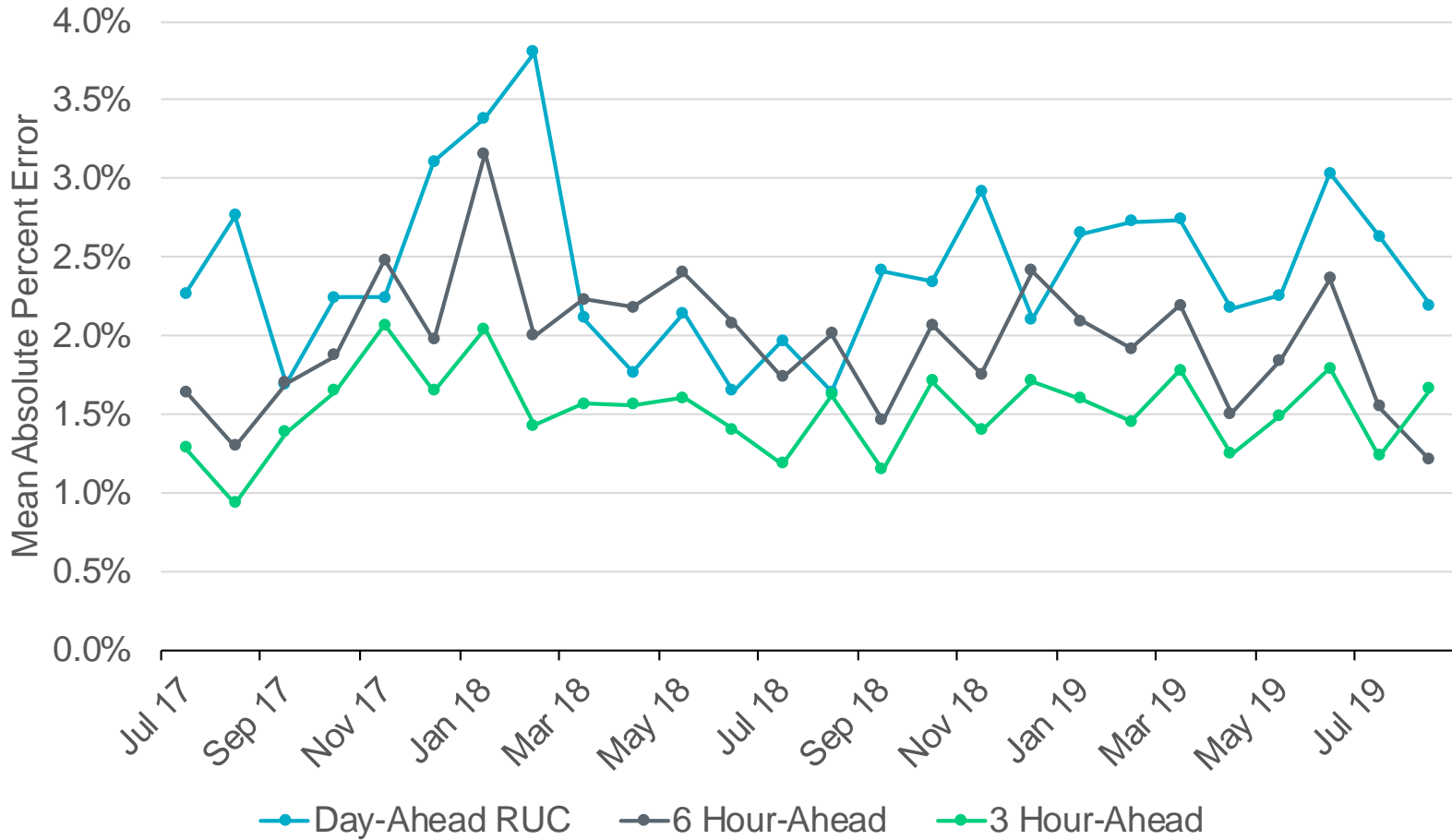

*Value based on net system hourly data from September release of Demand and Energy 2019 report.
**Value based on 15-minute metered data from September release of Demand and Energy 2019 report.
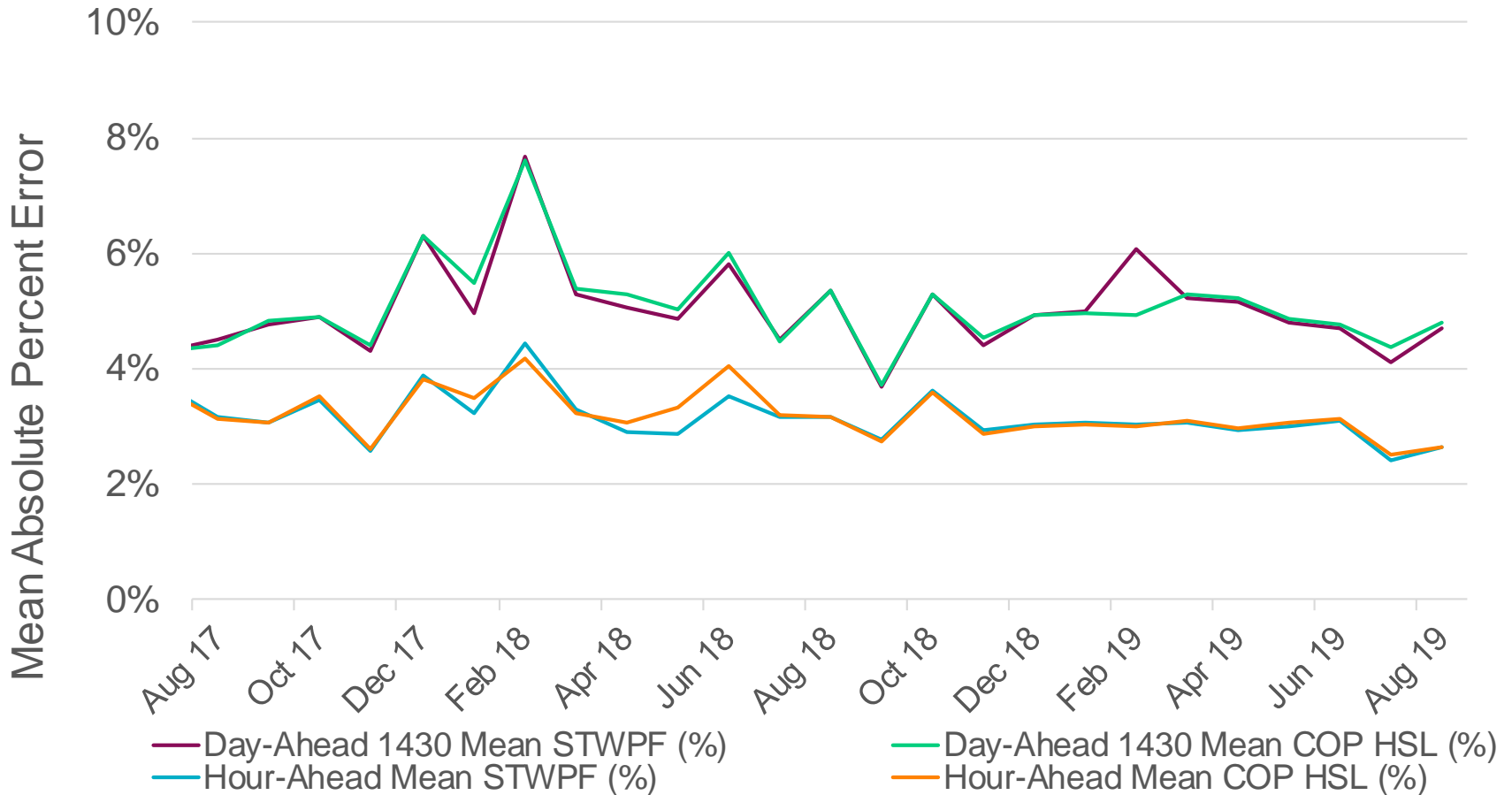Data for latest two months are based on preliminary settlements.

Mid-Term Load Forecast Performance

The Mid-Term Load Forecast is an hourly forecast that looks 7 days into the future
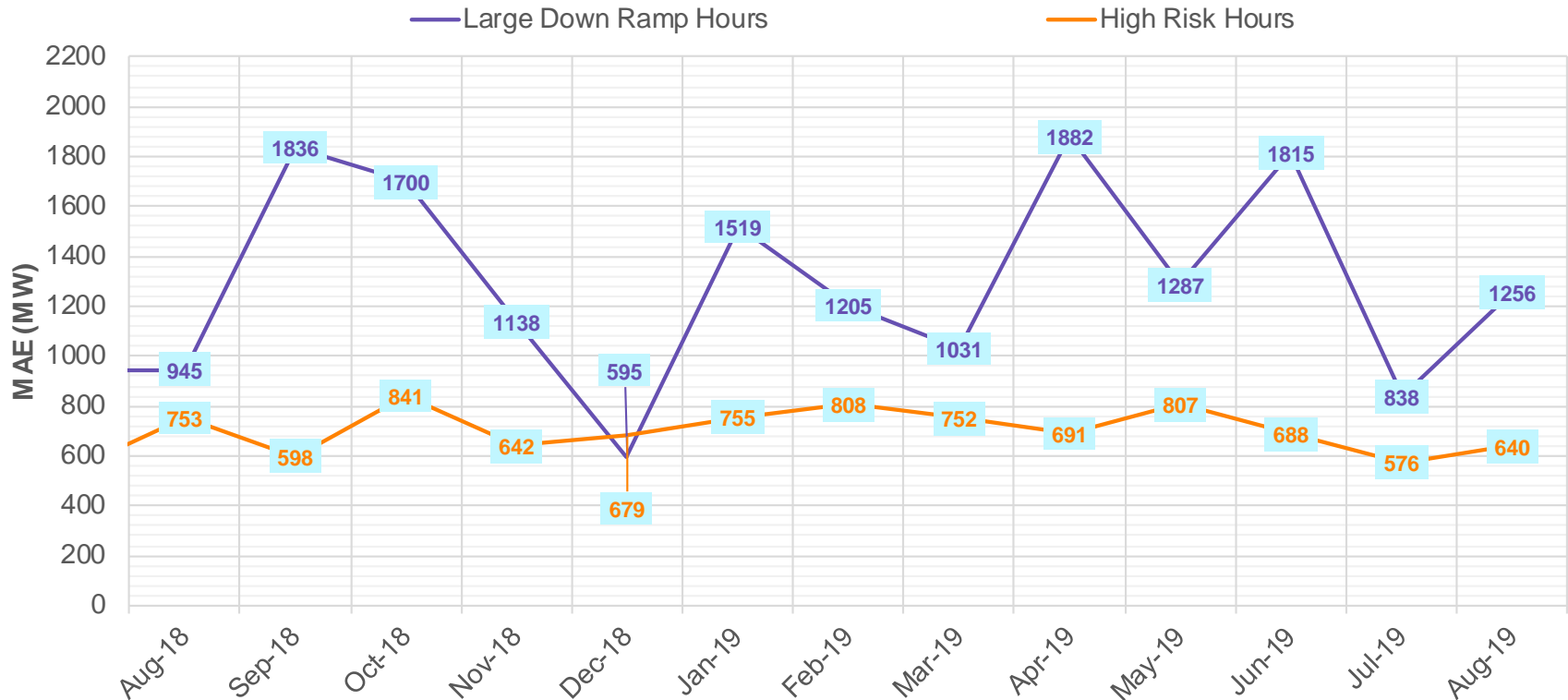
Wind Forecast Performance

The Short-Term Wind Power Forecast (STWPF) is an ERCOT produced hourly 50% probability of exceedance forecast of the generation in MWh per hour from each Wind Generation Resource.
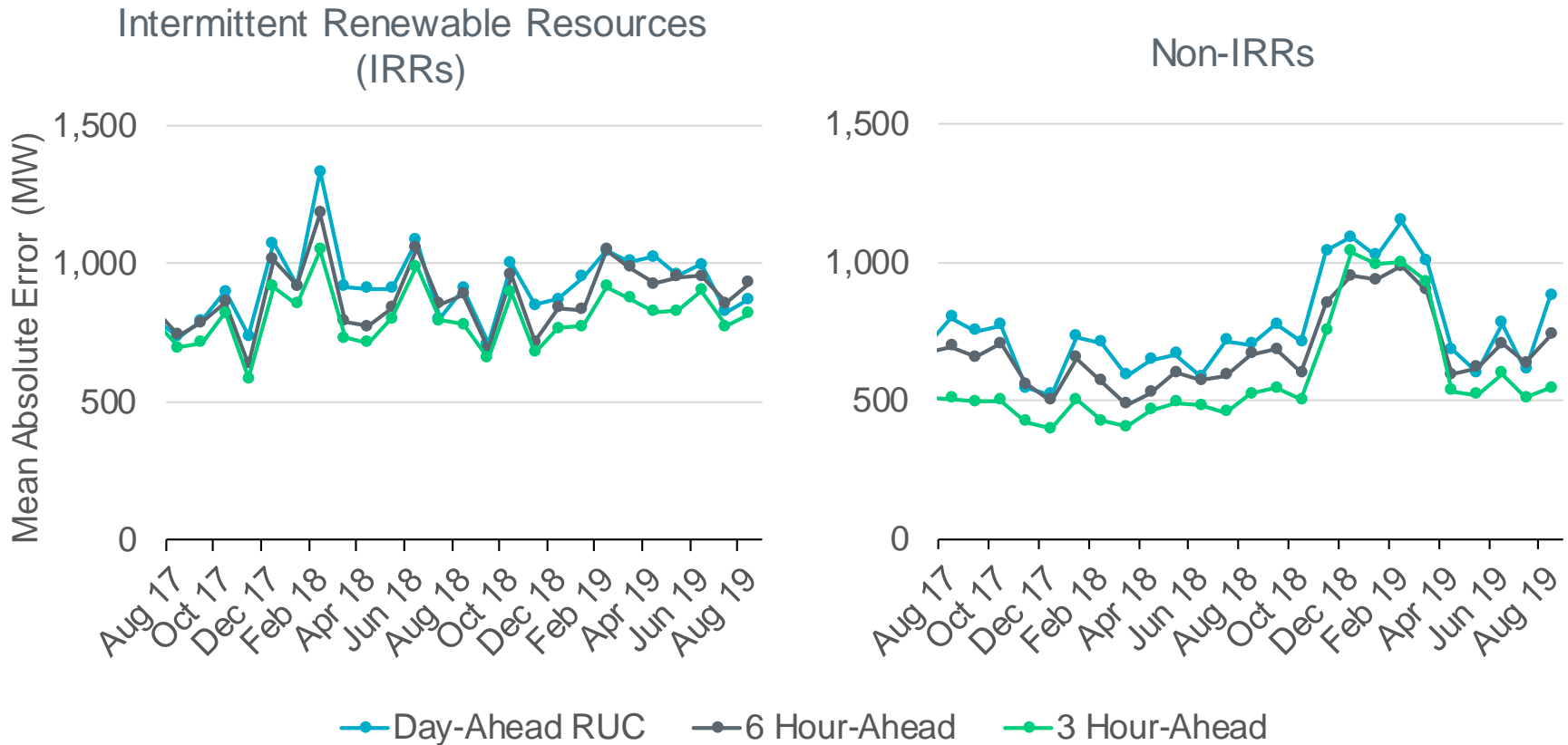
Hour-Ahead Wind Forecast Performance

Hour-Ahead Mean Absolute Error (MAE) During Large Down Ramp (> 2000 MW) and High Risk Hours*

Legend: —— Large Down Ramp Hours —— High Risk Hours

Month	Large Down Ramp Hours	High Risk Hours
Aug-18	945	753
Sep-18	1836	598
Oct-18	1700	841
Nov-18	1138	642
Dec-18	595	679
Jan-19	1519	755
Feb-19	1205	808
Mar-19	1031	752
Apr-19	1882	691
May-19	1287	807
Jun-19	1815	688
Jul-19	838	576
Aug-19	1256	640

*ERCOT's performance based payment structure for Wind Forecasts with both vendors incentivizes improvements in forecast performance during hours that are of more importance to operational reliability. This approach is a paradigm shift from the "traditional" methodology of measuring wind forecast performance as a singular monthly average metric.

Forecast performance during large down ramp (wind ramp > 2000 MW) hours and high risk hours (historic risk of load ramping up and wind ramping down is high) is focused upon. Note that for the purposes of forecast performance measurement every hour in a month is classified as either a large down ramp hour or a high risk hour or something else. Any hour that is a high risk hour wherein a large down ramp was experienced will be tracked as a large down ramp hour.

Current Operating Plan (COP) Performance

Intermittent Renewable Resources (IRRs)

Non-IRRs

Legend: Day-Ahead RUC, 6 Hour-Ahead, 3 Hour-Ahead

- COPs for IRRs are derived from wind and solar forecasts from ERCOT with any adjustments from Qualified Scheduling Entities.

- The installed capacity of approved IRRs is 24,761 MW (as of August 31, 2019).

August 13th & 15th ERS Deployment Events

| Date	Type	Deployment Start	Start of Sustained Response Period	Recall Time	Total Deployment Time	Fleet Obligation (MWs) – Time Period 3 (HE14-HE16)	Fleet Obligation (MWs) – Time Period 4 (HE17-HE19)
8/13/2019	ERS-30	15:25	15:55	16:18	00:23	833	715
8/13/2019	ERS-10	15:34	15:44	15:58	00:14	93	N/A
8/15/2019	ERS-30	15:13	15:43	16:56	01:12	833	715

August 13th Event
- Deployed ERS-30 and ERS-10
- Total deployment time ≈ 23 minutes
- ERCOT legal reviewing the deployment of ERS-10 while in EEA 1

August 15th Event
- Deployed ERS-30
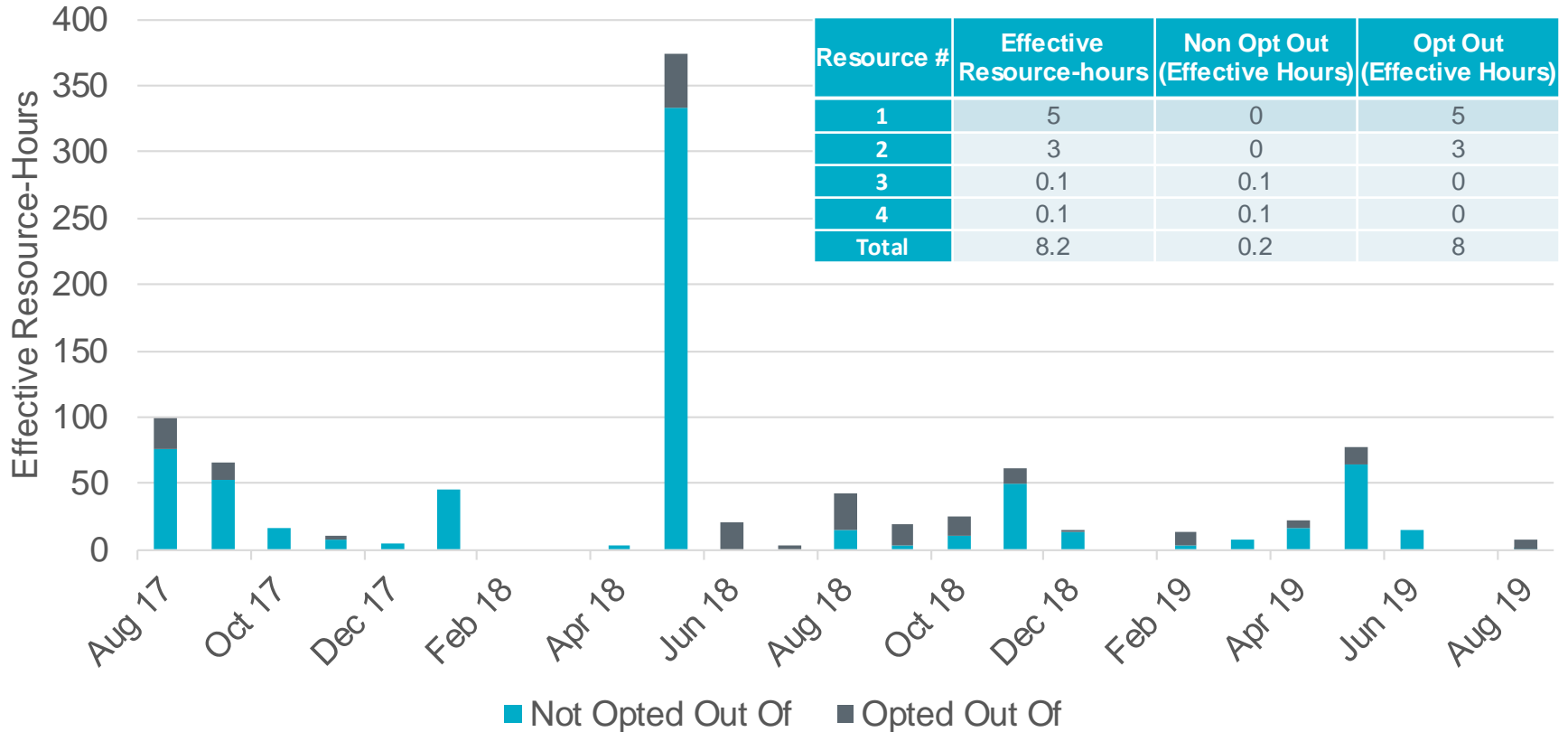- Total deployment time ≈ 72 minutes

Actual performance will not be reported in October for either event

![ercot logo]

Real-Time Congestion Rent by Zone
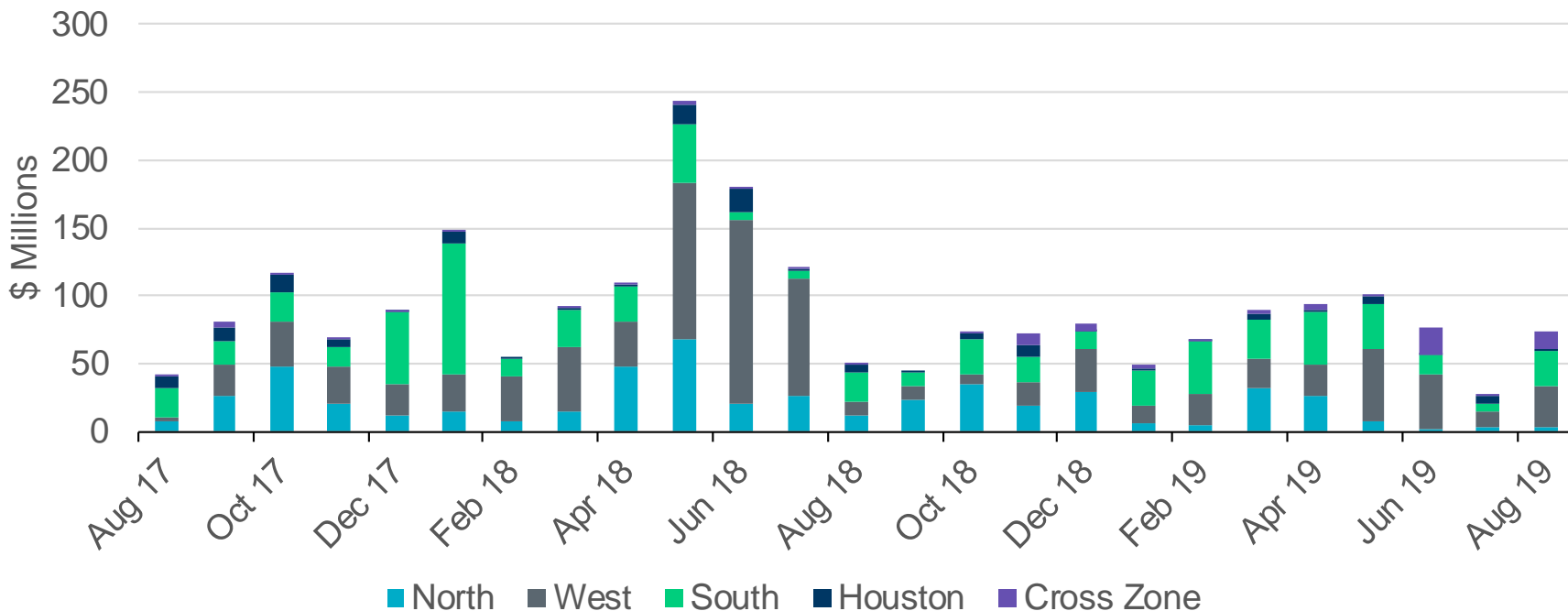
- Congestion rent in August 2019 was $73.77 M, compared $27.25 M in July 2019. Congestion rent is determined using the shadow prices and MW flows for individual constraints in SCED as well as the length in time of SCED intervals.

- The congestion rent in the South Zone category increased significantly in August compared to July in part due to the constraint SCOLPAW5: COLETO_ROSATA1_1.

- The congestion rent in the West Zone category increased significantly in August compared to July in part due to the constraint SECNMO28: 6518__A.

- The "Cross Zone" category consists of cases where the substations on either end of the constraint are in different zones. The Congestion rent in the Cross Zone category increased significantly compared to July in part due to constraints DWAPHLJ5: STPWAP39_1.

Nine Resources Committed in August for Capacity

Resource #	Effective Resource-hours	Non Opt Out (Effective Hours)	Opt Out (Effective Hours)
1	5	0	5
2	3	0	3
3	0.1	0.1	0
4	0.1	0.1	0
Total	8.2	0.2	8

Legend: ■ Not Opted Out Of   ■ Opted Out Of

- "Effective Resource-Hours" excludes any period during a Reliability Unit Commitment hour when the RUC-committed Resource was starting up, shutting down, off-line, or otherwise not available for dispatch by SCED.

- In August five Resources were committed through RUC but were never made available for dispatch by SCED.

High Ancillary Service costs contributed to the increase in Net Allocation to Load of $190.1M for August 2019
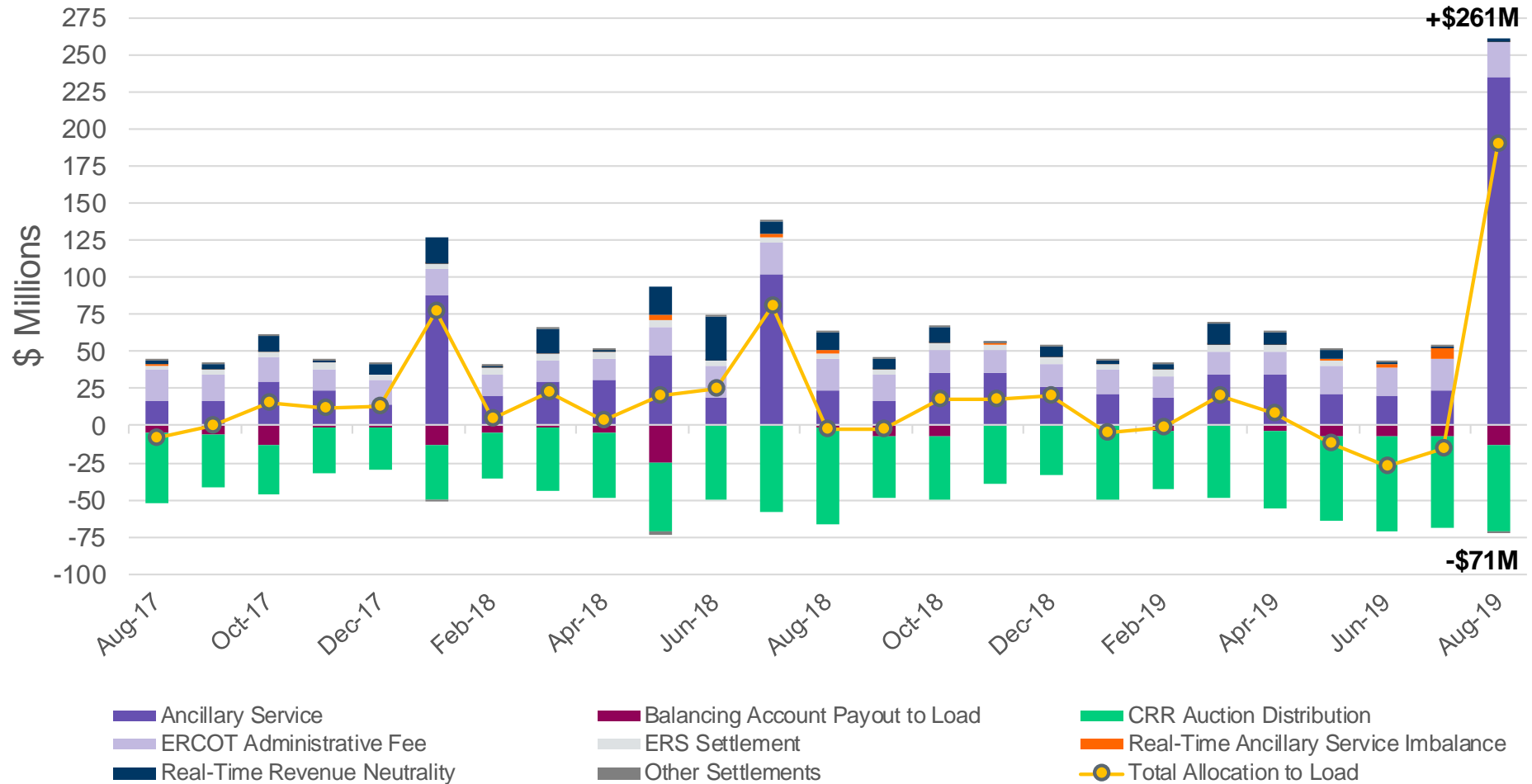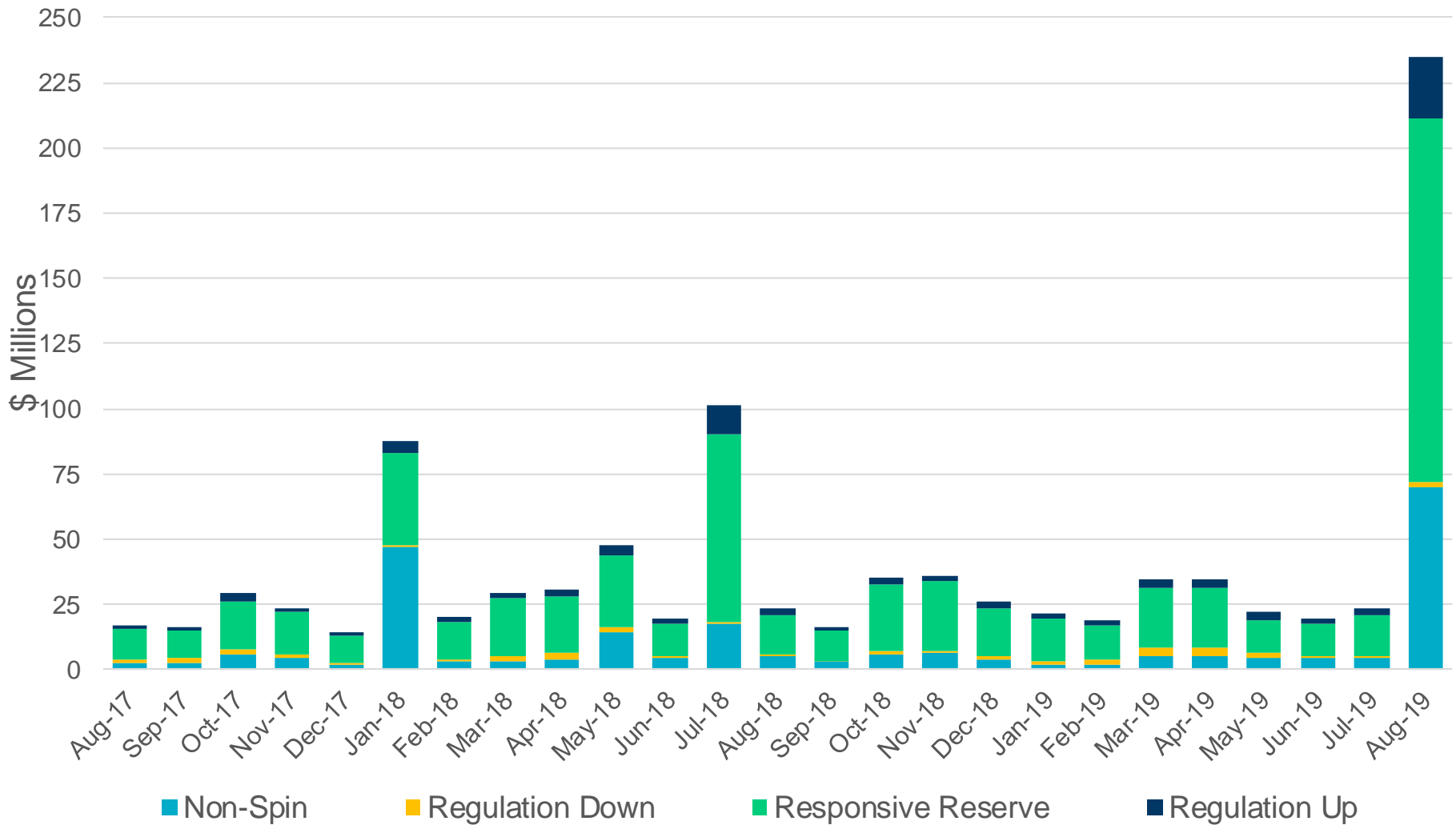

This information is available in tabular form in the Settlement Stability Report presented quarterly to the Market Settlement Working Group and Wholesale Market Subcommittee

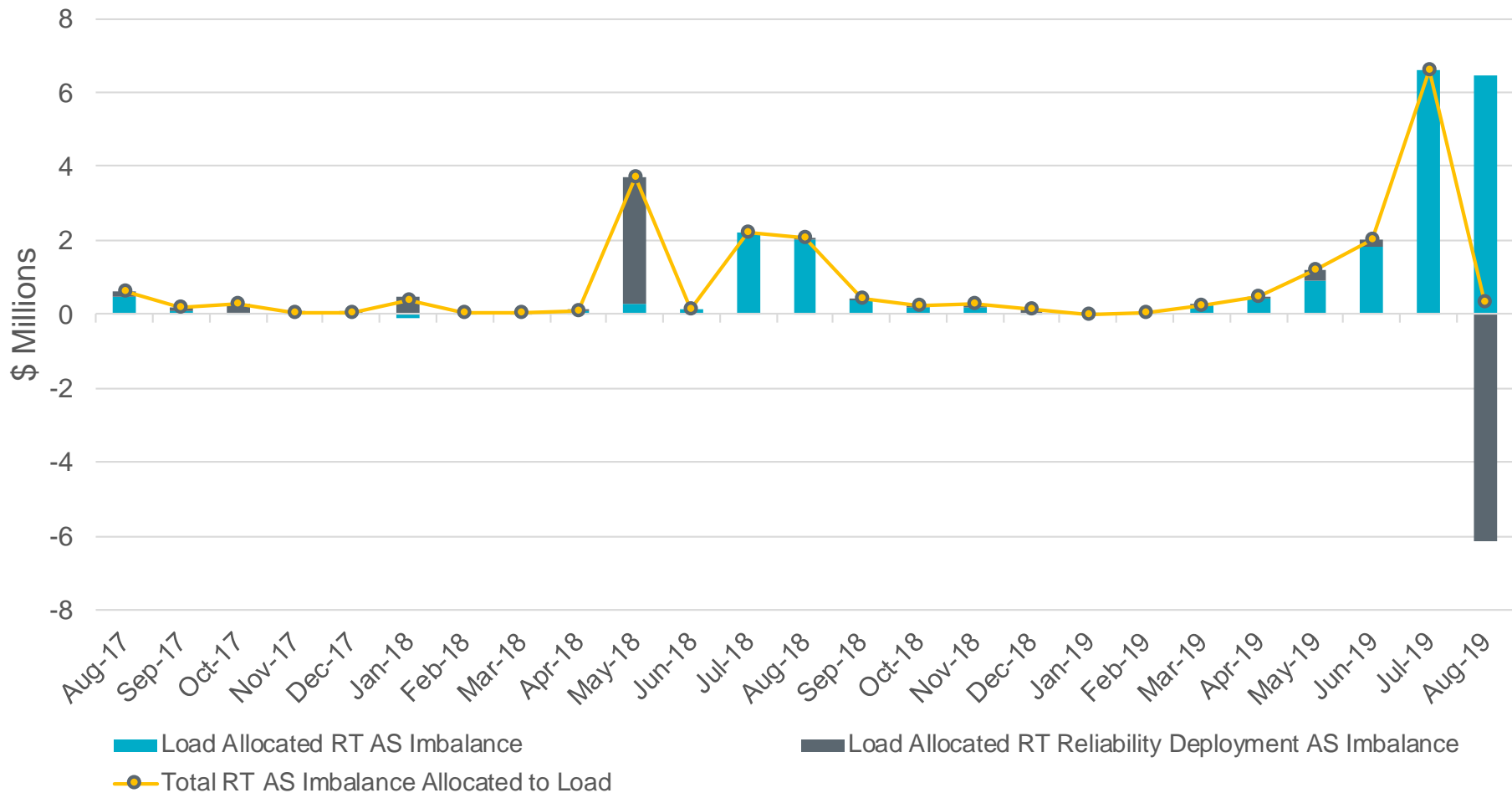# Ancillary Services for August 2019 totaled $234.7M
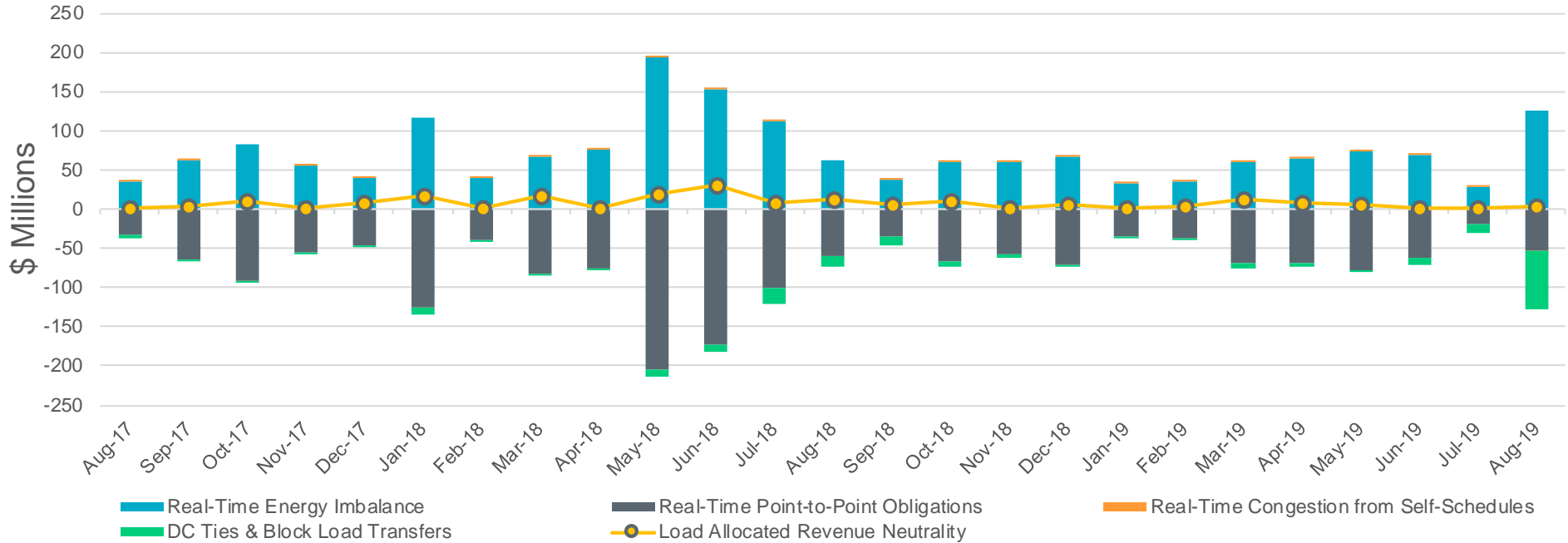## Second highest Ancillary Service cost in the Nodal Market

■ Non-Spin   ■ Regulation Down   ■ Responsive Reserve   ■ Regulation Up

Load Allocated Real-Time Ancillary Service Imbalance Payments and Charges much higher than historical due to high price adders


Legend:
- Load Allocated RT AS Imbalance
- Load Allocated RT Reliability Deployment AS Imbalance
- Total RT AS Imbalance Allocated to Load

Load-Allocated Real-Time Revenue Neutrality was $3.01M for August 2019

|	August 2019 ($M)
Real-Time Energy Imbalance	$125.69
Real-Time Point-to-Point Obligation	($52.37)
Real-Time Congestion from Self-Schedules	$0.01
DC Tie & Block Load Transfer	($76.32)
Load Allocated Revenue Neutrality	**$3.01**

Real-Time Energy Imbalance components much higher than historical averages due to high Real-Time prices
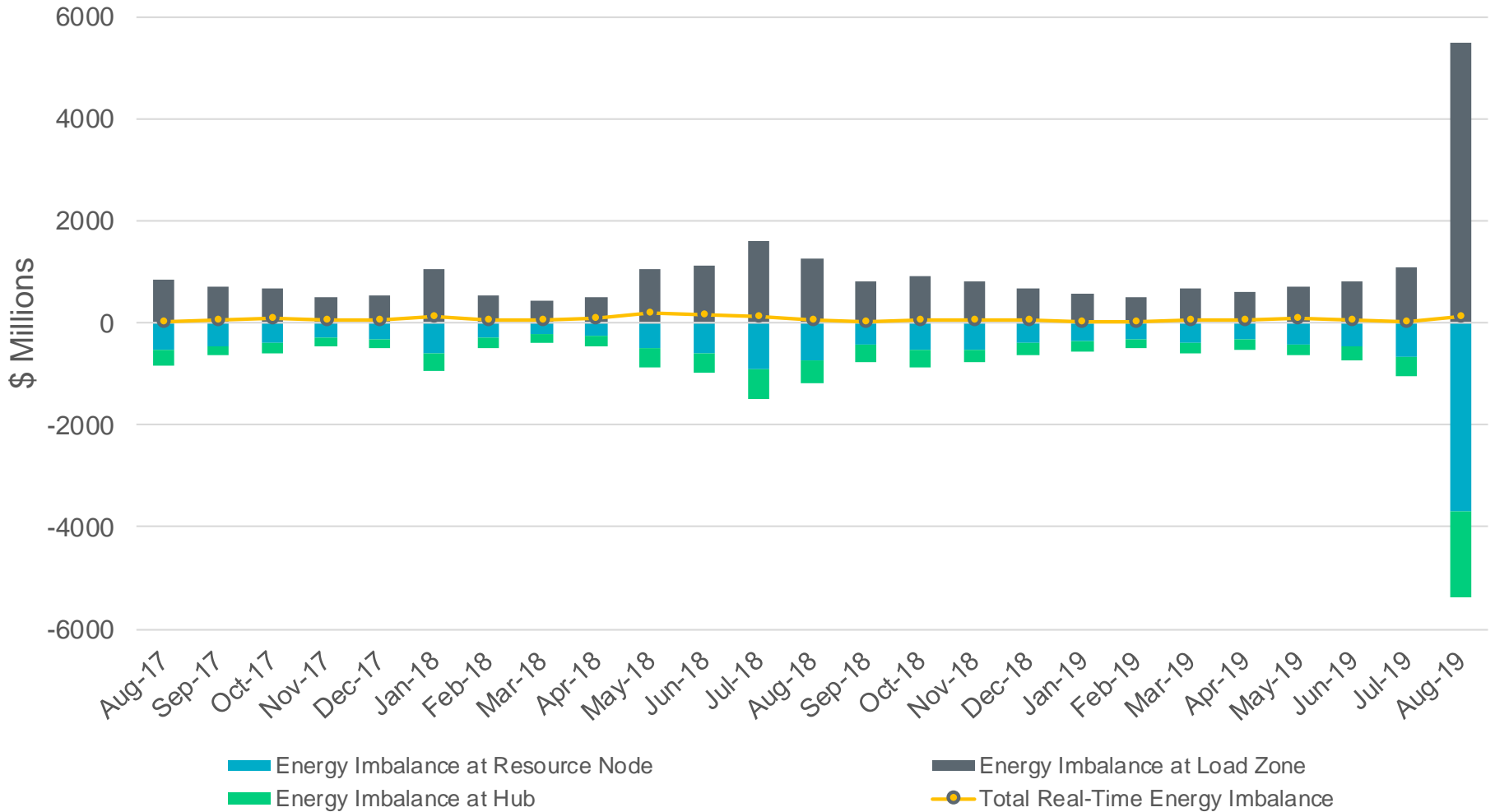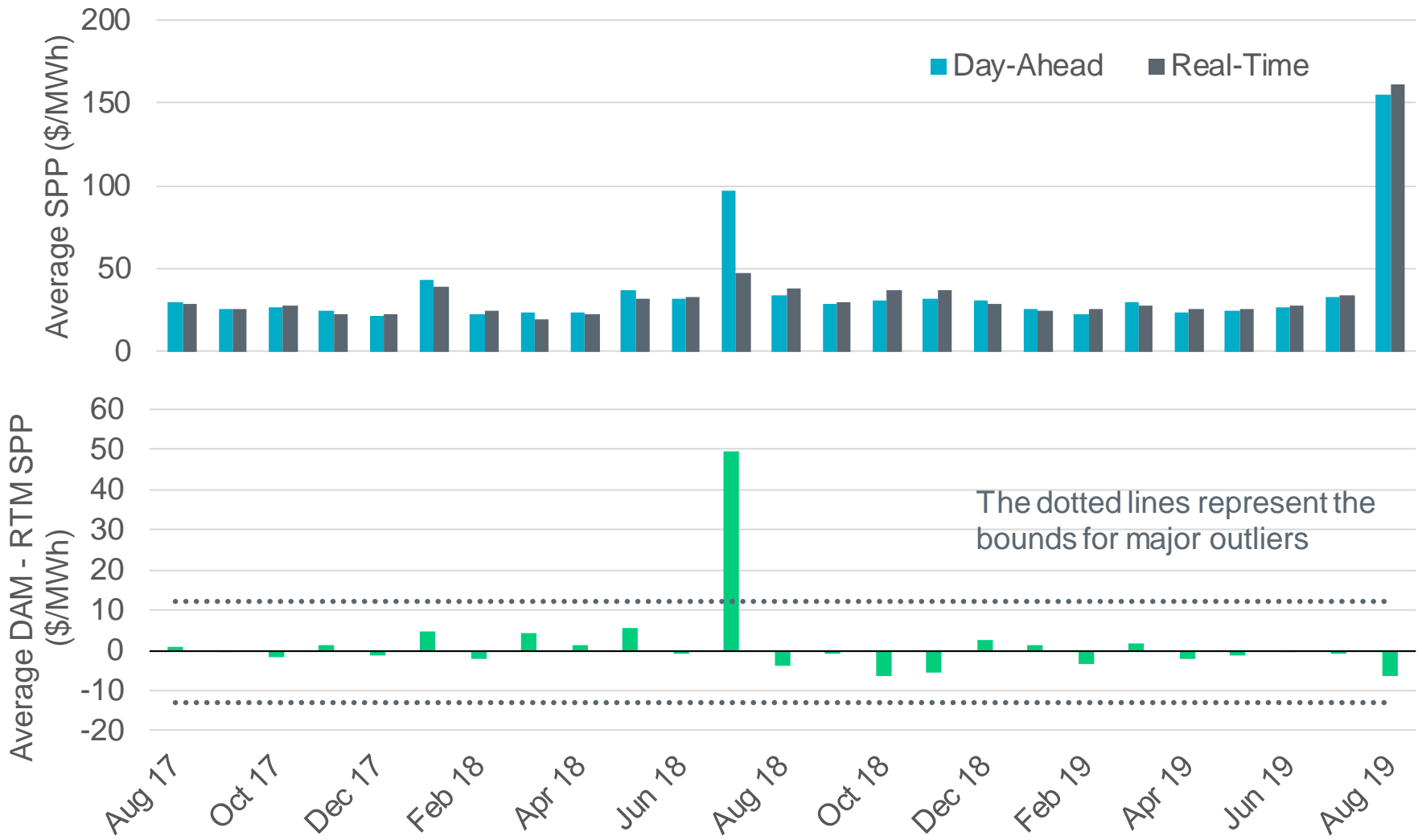
Day-Ahead Energy sales and purchases much higher than historical averages

August 13, 16, 21 and 26 accounted for 44% of the total DAM purchases and sales for the month.
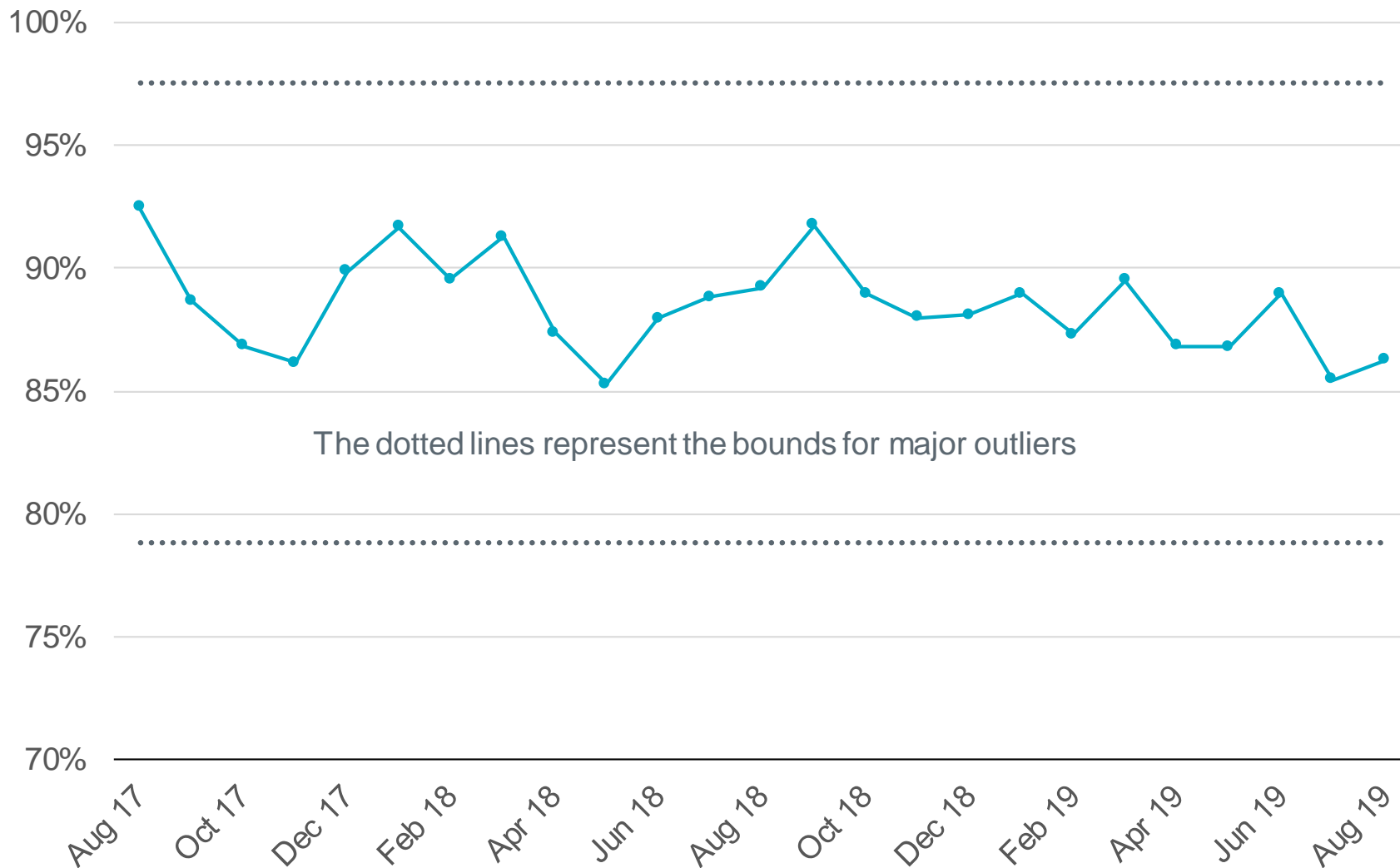

Legend:
- Day-Ahead Energy Purchases
- Day-Ahead Energy Sales
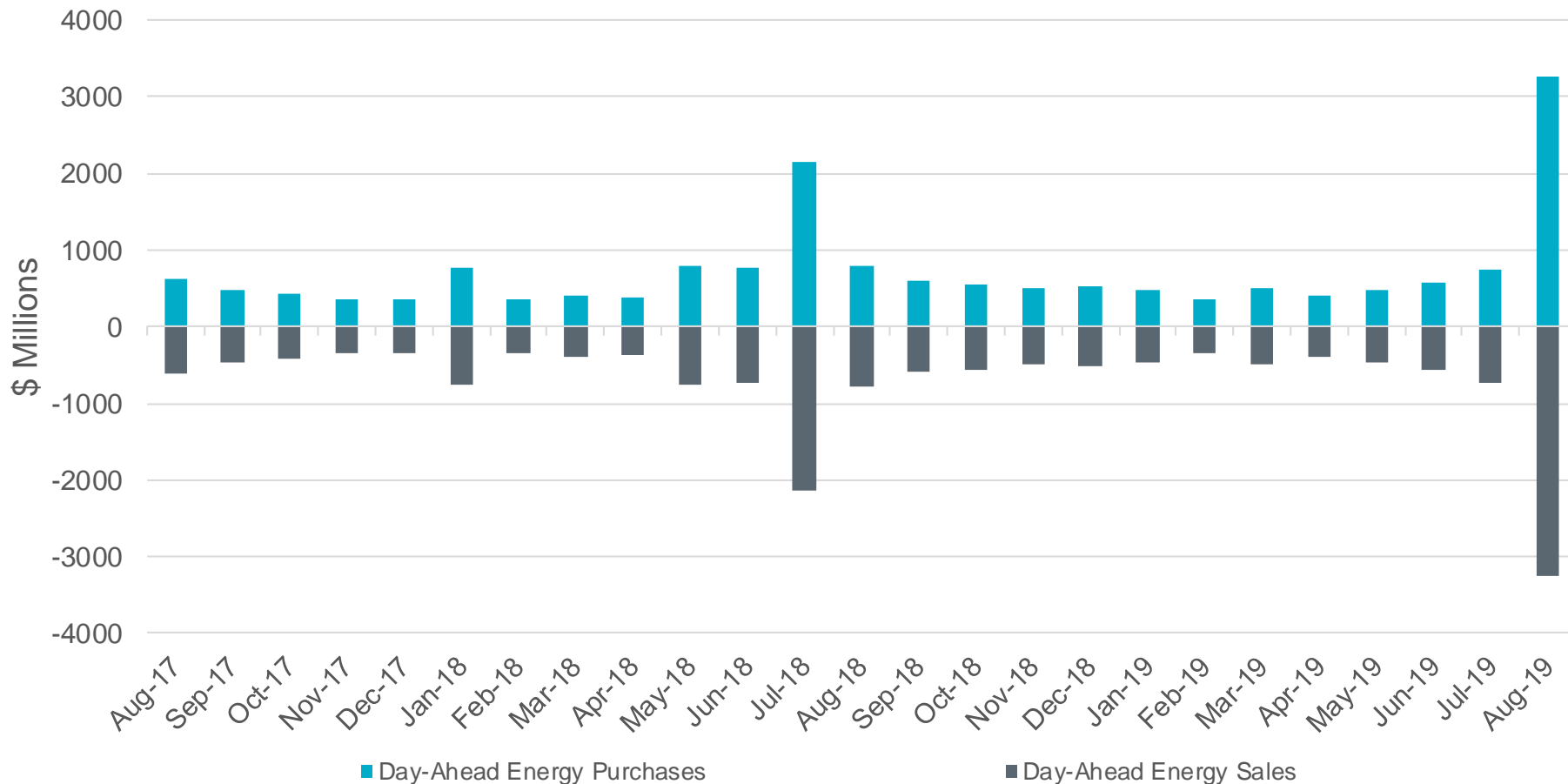
Day-Ahead and Real-Time Market Price Differences

The dotted lines represent the bounds for major outliers
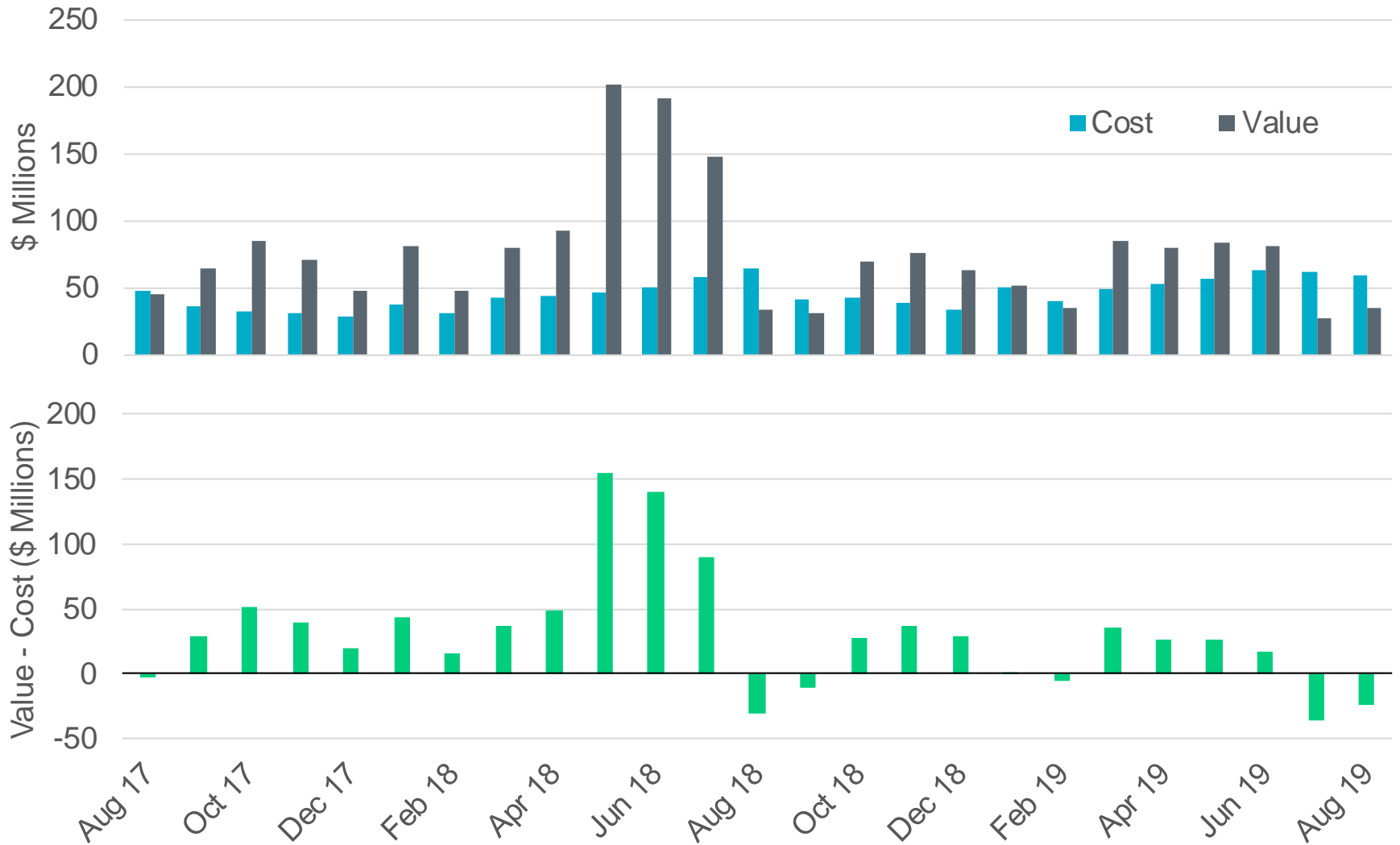
*Averages are weighted by Real-Time Market Load

Percentage of Real-Time Load Transacted in the Day-Ahead Market

The dotted lines represent the bounds for major outliers
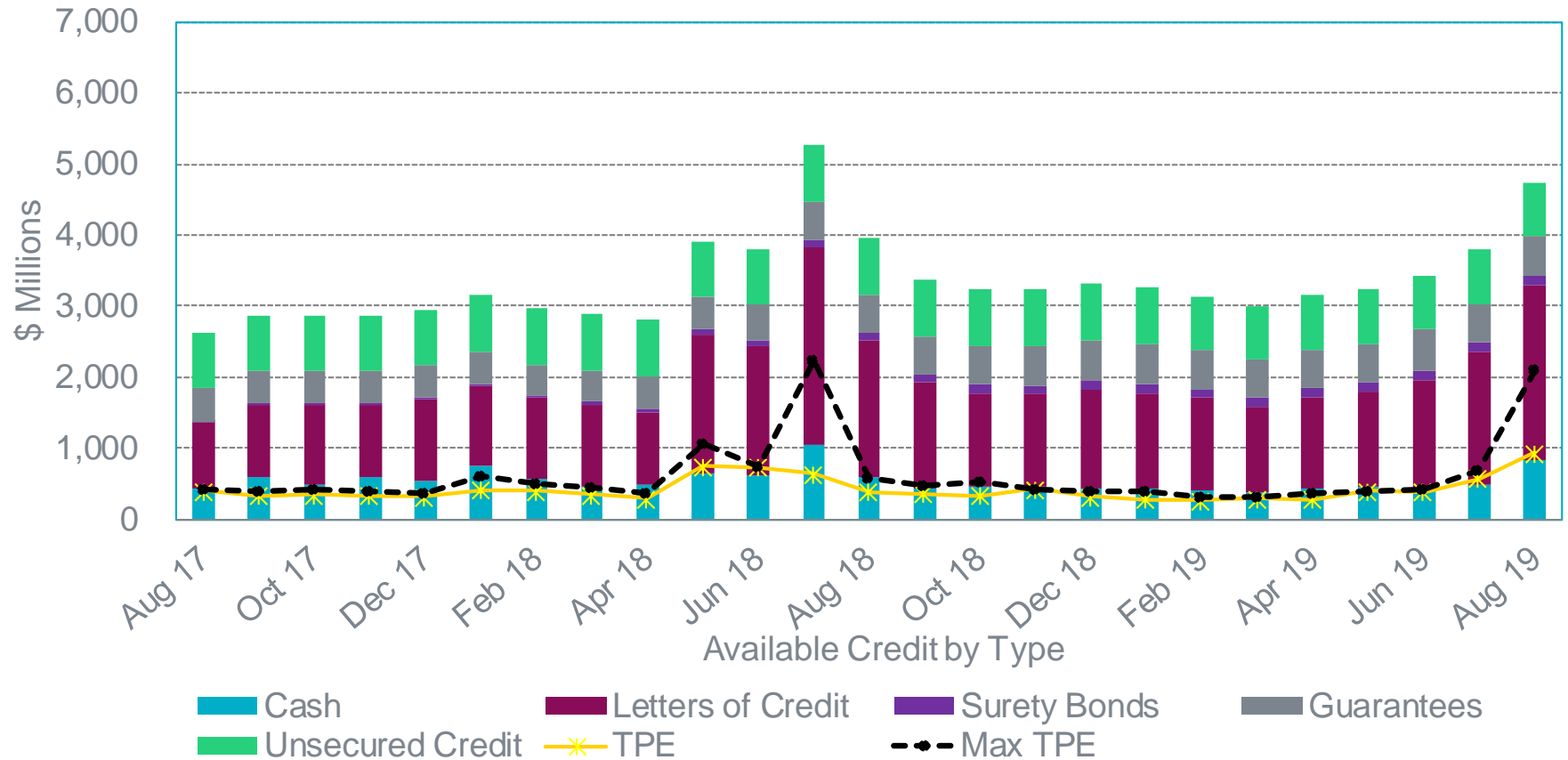
CRR Value and Cost Differences

The CRR Balancing Account was fully funded and excess amounts were allocated to Load
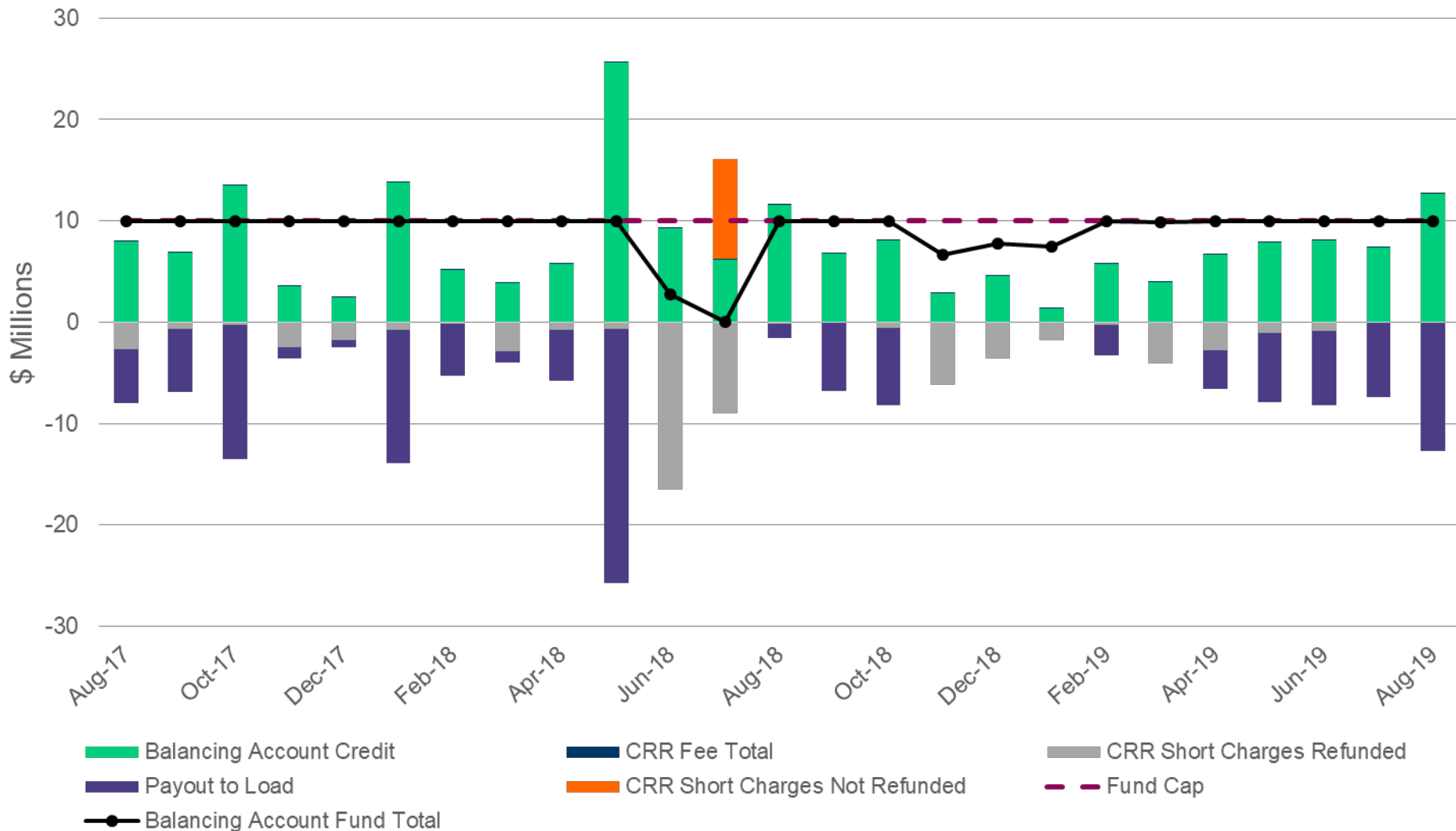
Available Credit by Type Compared to Total Potential Exposure (TPE)

The peak TPE in July 2018 is higher than peak TPE in August 2019 due to higher Forward Adjustment Factors in 2018.

*Numbers are as of month end except for Max TPE

Retail Transaction Volumes – Summary – August 2019

Transaction Type	Year-To-Date		Transactions Received	
	August 2019	August 2018	August 2019	August 2018
Switches	976,001	790,776	146,534	120,867
Acquisition	0	0	0	0
Move - Ins	2,005,936	1,954,972	278,737	287,935
Move - Outs	934,455	946,048	127,564	131,468
Continuous Service Agreements (CSA)	708,023	455,506	43,827	59,562
Mass Transitions	0	9,034	0	0
Total	**4,624,415**	**4,156,336**	**596,662**	**599,832**