**ERCOT Monthly Operational Overview**
(September 2021)

ERCOT Public
October 21, 2021

Notifications and Records

- ERCOT set a maximum all-time peak demand of 72,339 MW* for the month of September on 09/01/2021 at hour ending 17:00, which is 7,504 MW more than the September 2020 demand of 64,835 MW.

- ERCOT issued 7 notifications:
  - 1 DC Tie Curtailment Notice for DC_R (Railroad) DC Tie due to a planned or unplanned outage.
  - 1 Watch for potential Hurricane Nicholas due to a probability of making landfall in the ERCOT Region.
  - 2 Advisories for delay in clearing DAM and posting of DAM Solution.
  - 1 Advisory for potential hurricane Nicholas due to a probability of making landfall in the ERCOT Region.
  - 1 OCN for modifying the Panhandle Generic Transmission Constraint due to the current transmission outage topology.
  - 1 OCN for tropical storm Nicholas due to a probability of making landfall in the ERCOT Region.

* Preliminary value from October release of Demand and Energy 2021 report.

Monthly energy generation increased by 11.5% year-over-year to 36,545 GWh in September 2021, compared to 32,785 GWh in September 2020

Legend: ■ Nuclear ■ Coal ■ Wind ■ Solar ■ Hydro ■ Biomass ■ Other □ Net DC/BLT ■ Gas-CC ■ Gas
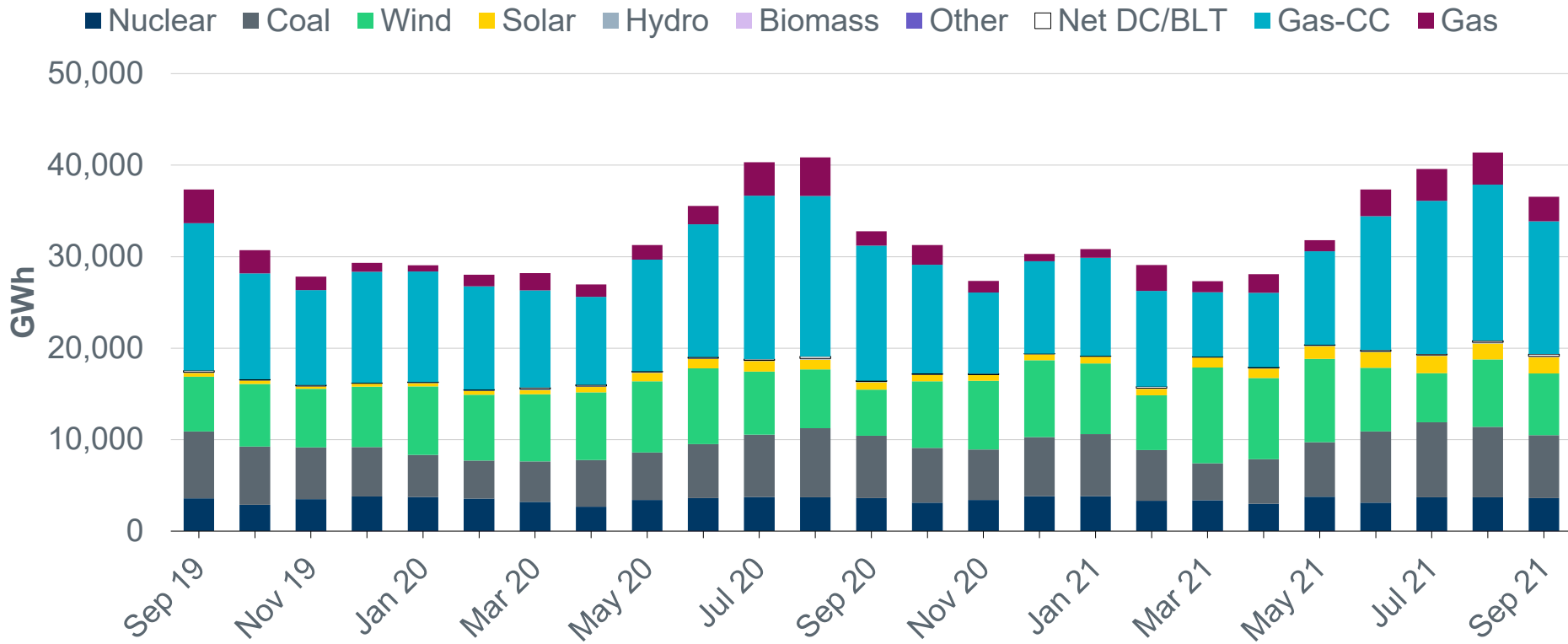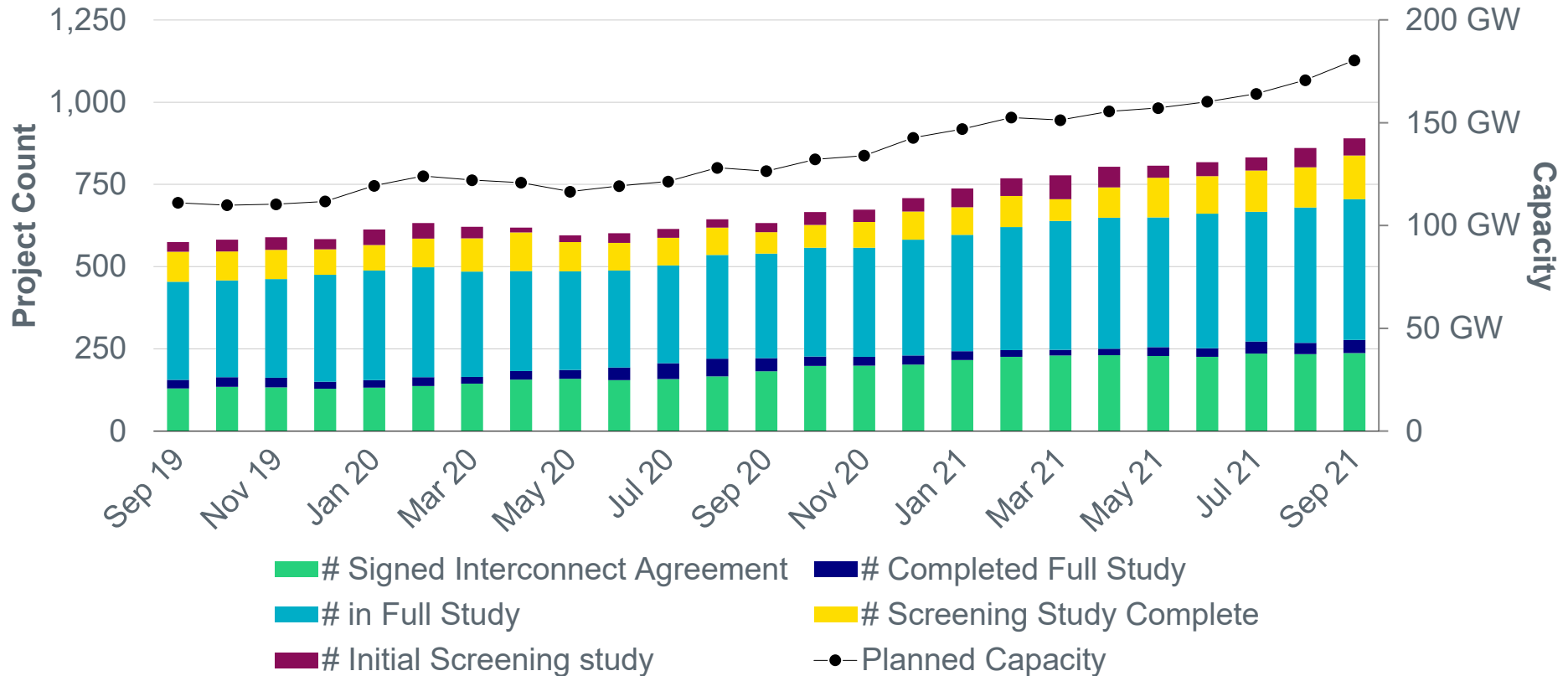

Data for latest two months are based on preliminary settlements.

Generation Interconnection activity by project phase

(Excludes capacity associated with Projects designated as Inactive per Planning Guide Section 5.7.6)

Legend:
- # Signed Interconnect Agreement
- # in Full Study
- # Initial Screening study
- # Completed Full Study
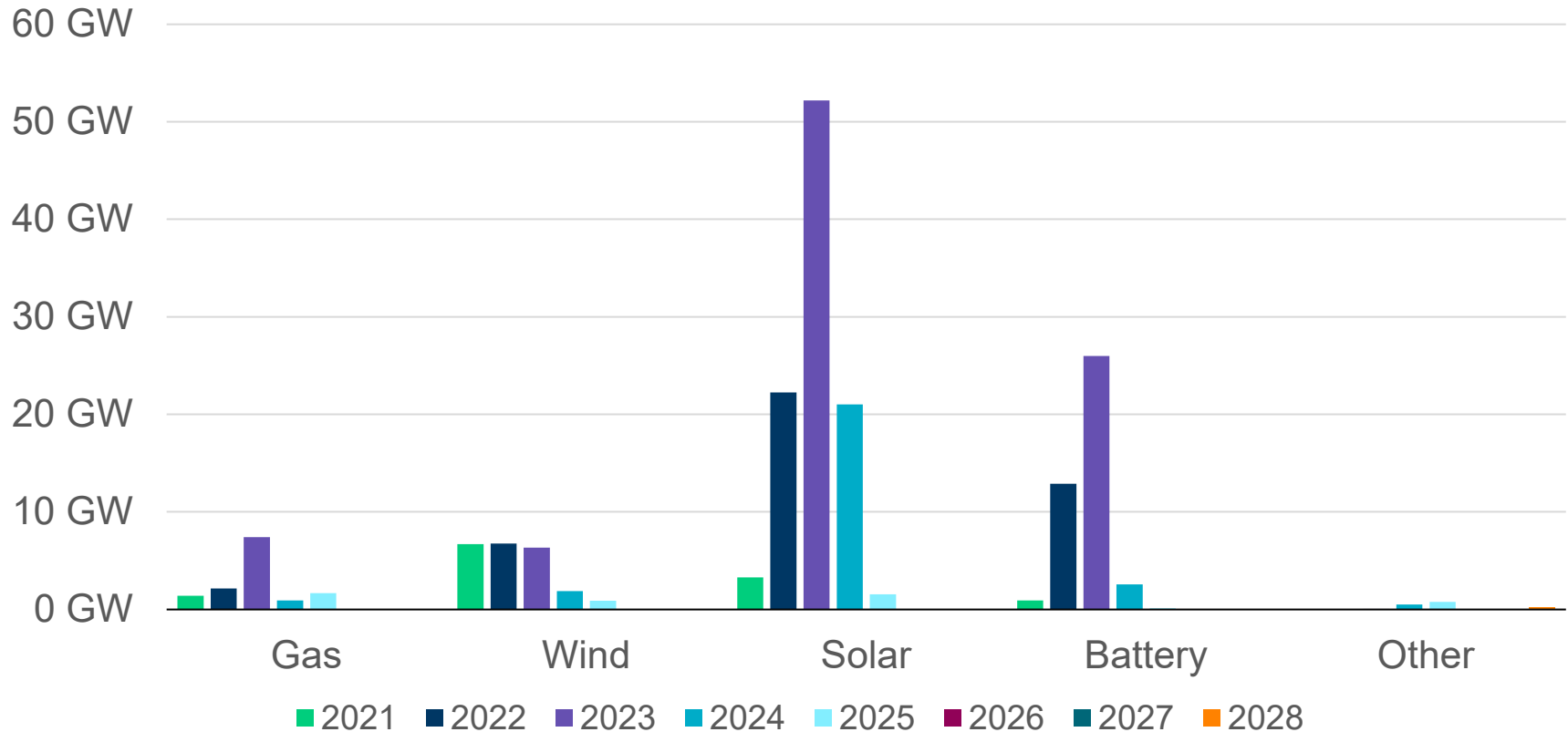- # Screening Study Complete
- Planned Capacity

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 100 GW (55.6%), Wind 23 GW (12.5%), Gas 14 GW (7.5%), Battery 42 GW (23.5%)
(Excludes capacity associated with Projects designated as Inactive per Planning Guide Section 5.7.6)


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 was tracking 890 active generation interconnection requests totaling 180,385 MW as of September 30. This includes 100,293 MW of solar, 22,537 MW of wind, 42,465 MW of battery, and 13,547 MW of gas projects; 60 projects were categorized as inactive, down from 66 inactive projects in August.

- ERCOT is currently reviewing proposed transmission improvements with a total estimated cost of $1,499.76 Million as of September 30, 2021.

- Transmission Projects endorsed in 2021 total $912.90 Million as of September 30, 2021.

- All projects (in engineering, routing, licensing and construction) total approximately $7.44 Billion as of June 1, 2021.

- Transmission Projects energized in 2021 total about $999.2 Million as of June 1, 2021.

ERCOT set a maximum all-time peak demand of 72,339 MW* for the month of September on 09/01/2021 at hour ending 17:00, which is 7,504 MW more than the September 2020 demand of 64,835 MW.
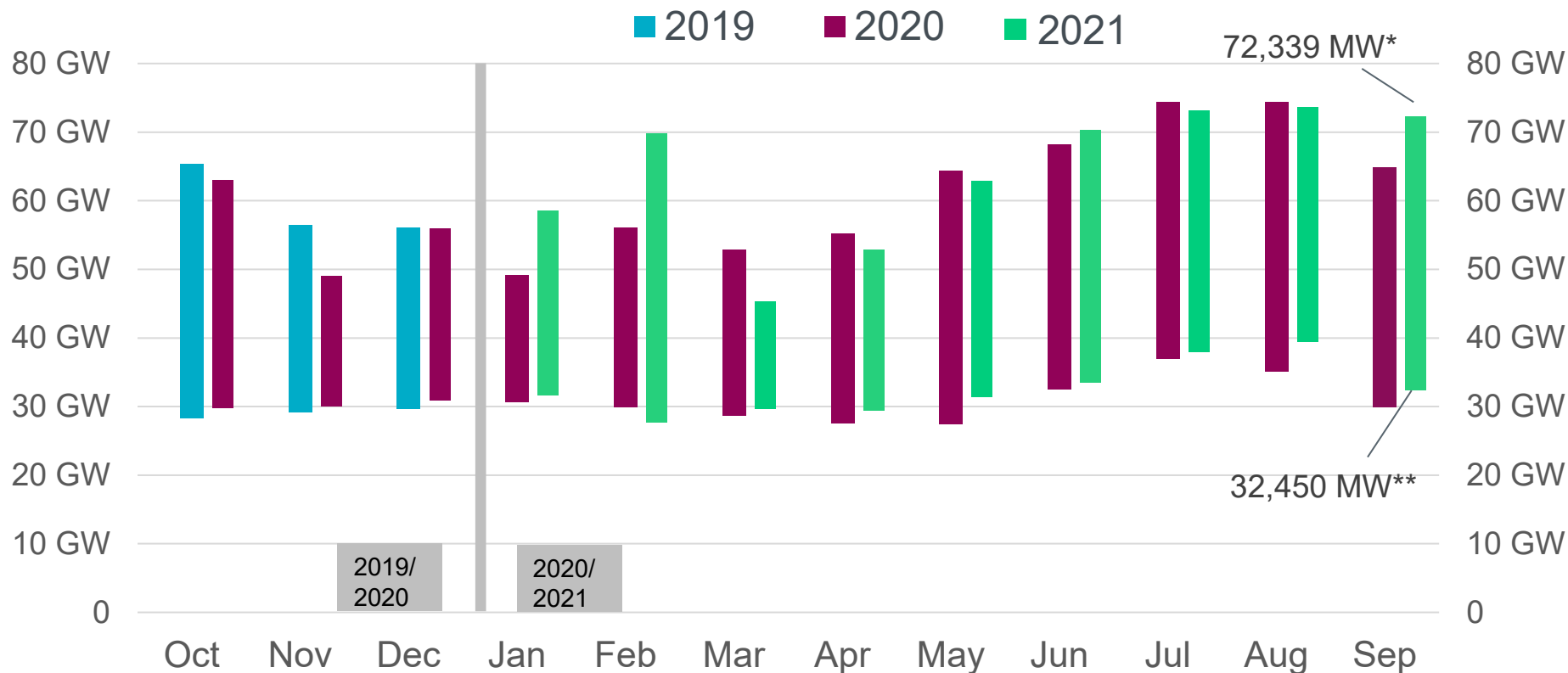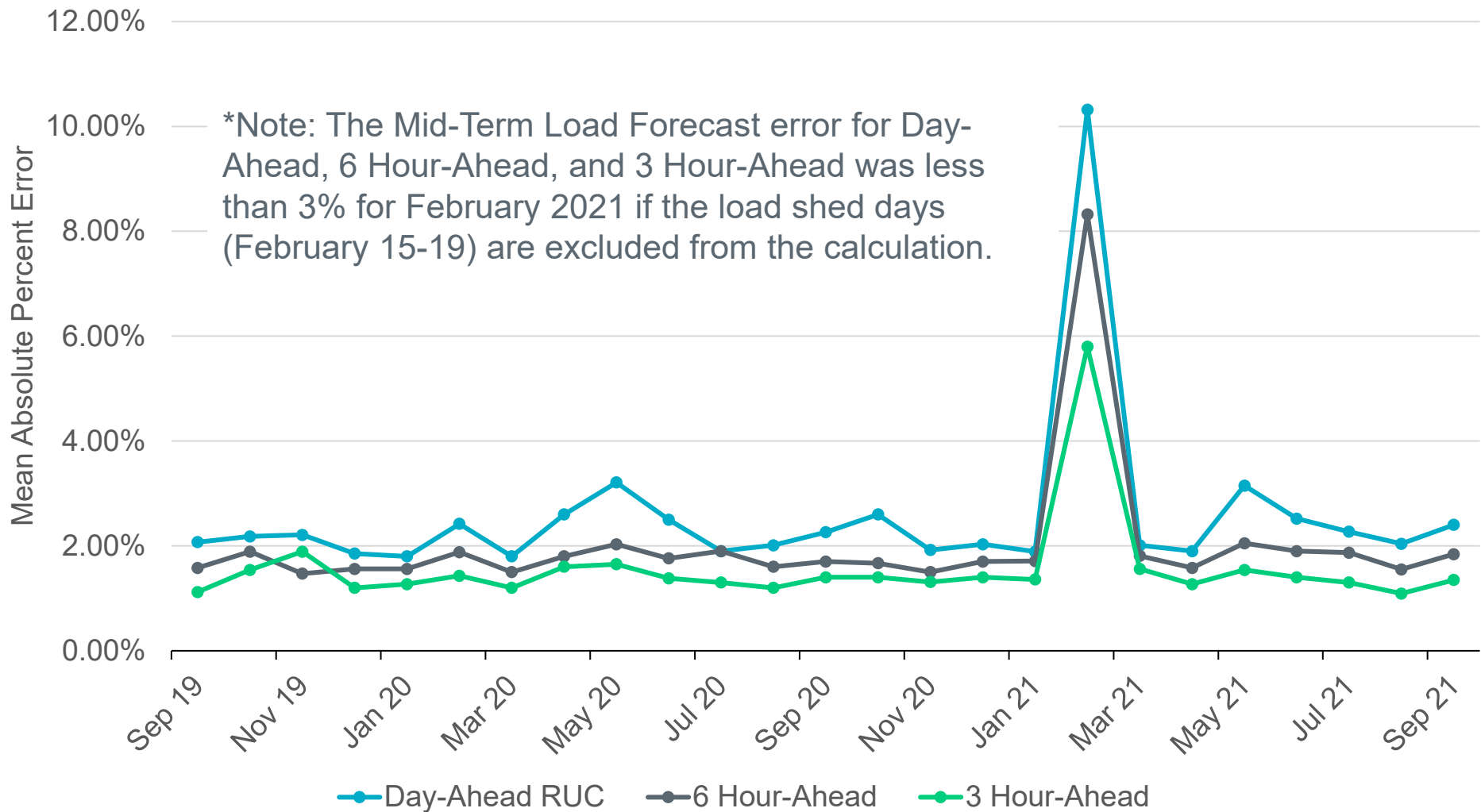

*Based on the maximum net system hourly value from October release of Demand and Energy 2021 report.
**Based on the minimum net system 15-minute interval value from October release of Demand and Energy 2021 report.
Data for latest two months are based on preliminary settlements.

Mid-Term Load Forecast Performance

*Note: The Mid-Term Load Forecast error for Day-Ahead, 6 Hour-Ahead, and 3 Hour-Ahead was less than 3% for February 2021 if the load shed days (February 15-19) are excluded from the calculation.

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

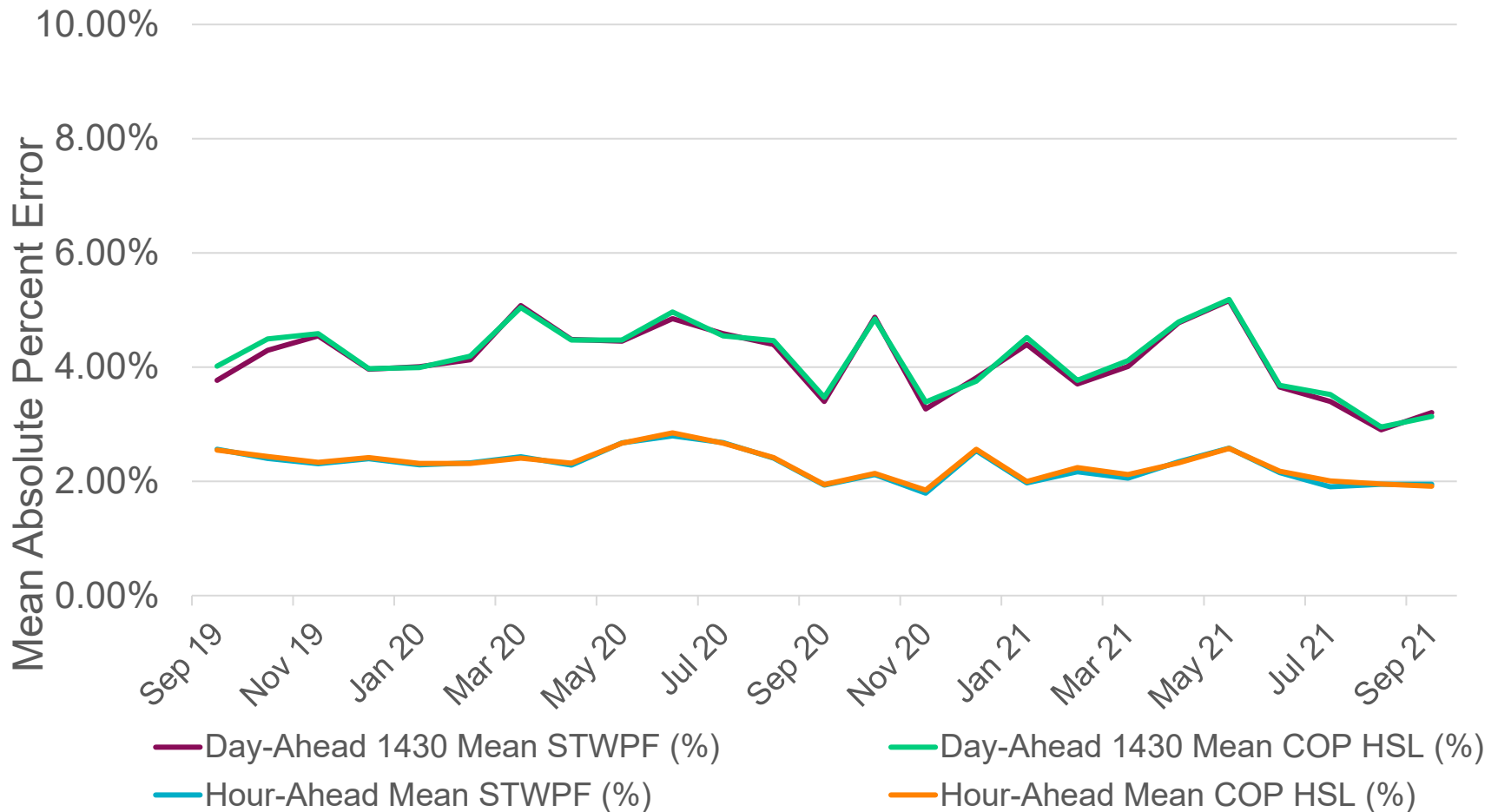The Mid-Term Load Forecast is an hourly forecast that looks 7 days into the future

Solar Forecast Performance
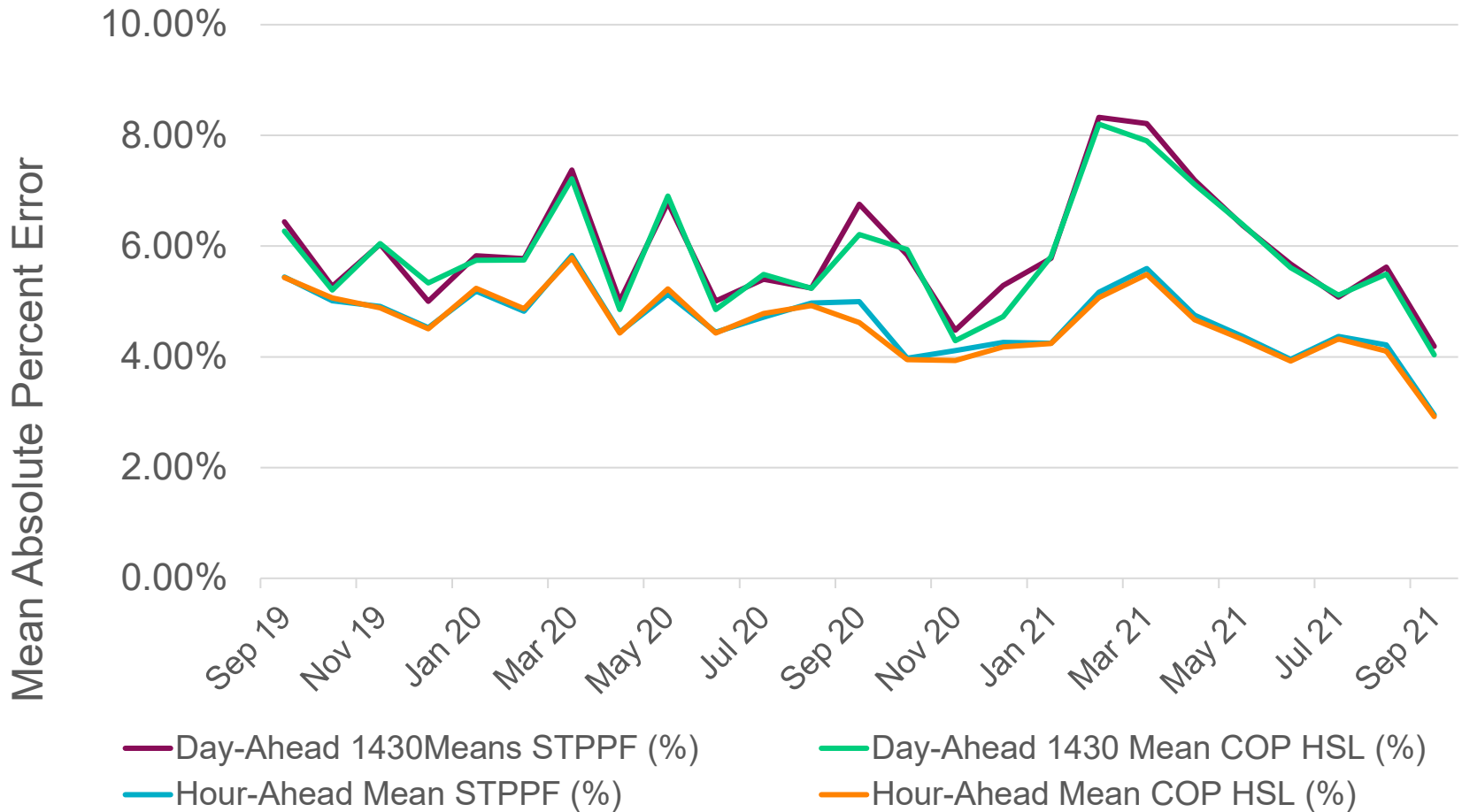
The Short-Term Photovoltaic Power Forecast (STPPF) is an ERCOT-produced hourly 50% probability of exceedance forecast of the generation in MWh per hour from each PVGR.
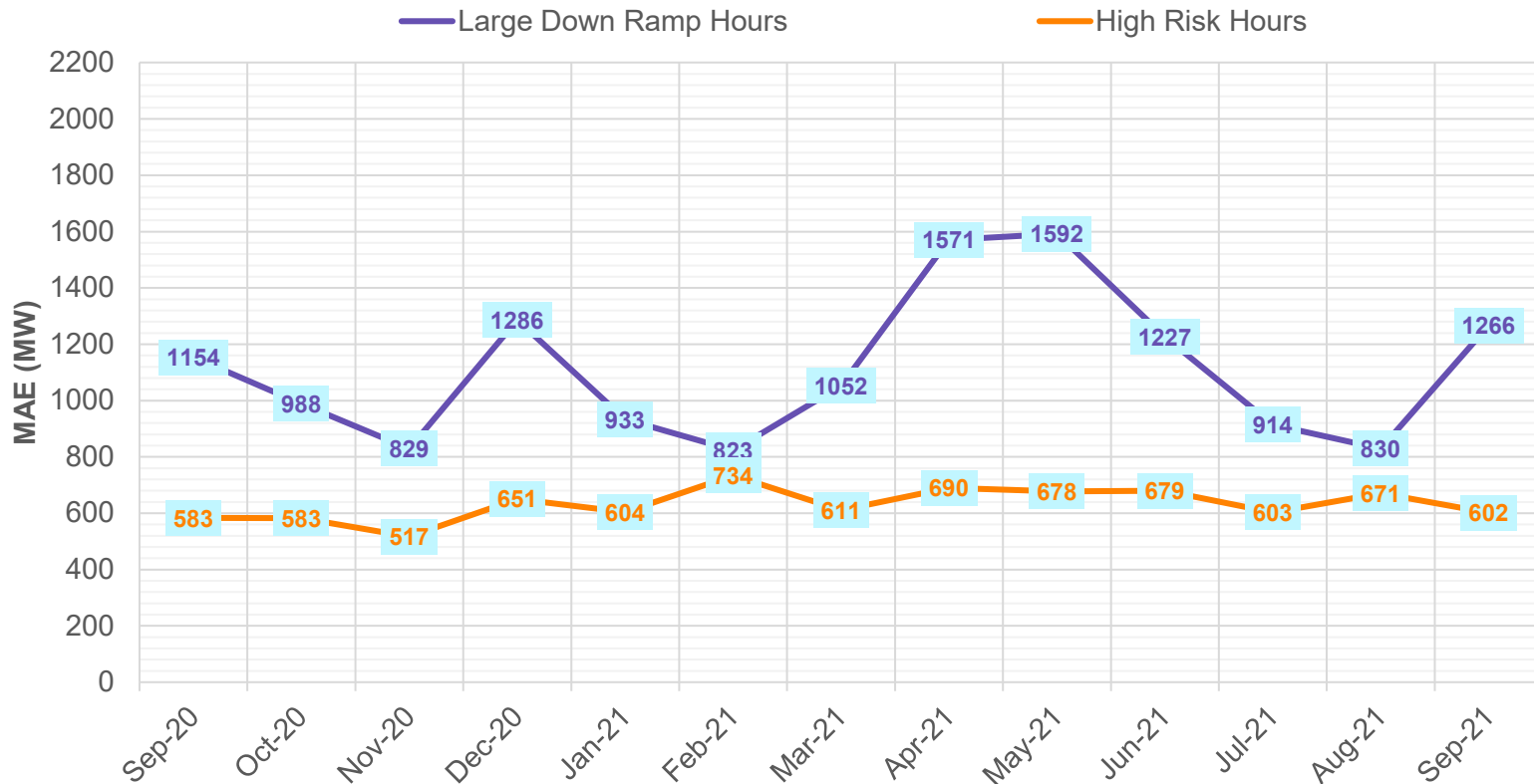
Wind Forecast Performance

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 (purple), High Risk Hours (orange)

Large Down Ramp Hours (MAE MW): Sep-20: 1154, Oct-20: 988, Nov-20: 829, Dec-20: 1286, Jan-21: 933, Feb-21: 823, Mar-21: 1052, Apr-21: 1571, May-21: 1592, Jun-21: 1227, Jul-21: 914, Aug-21: 830, Sep-21: 1266

High Risk Hours (MAE MW): Sep-20: 583, Oct-20: 583, Nov-20: 517, Dec-20: 651, Jan-21: 604, Feb-21: 734, Mar-21: 611, Apr-21: 690, May-21: 678, Jun-21: 679, Jul-21: 603, Aug-21: 671, Sep-21: 602

*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.
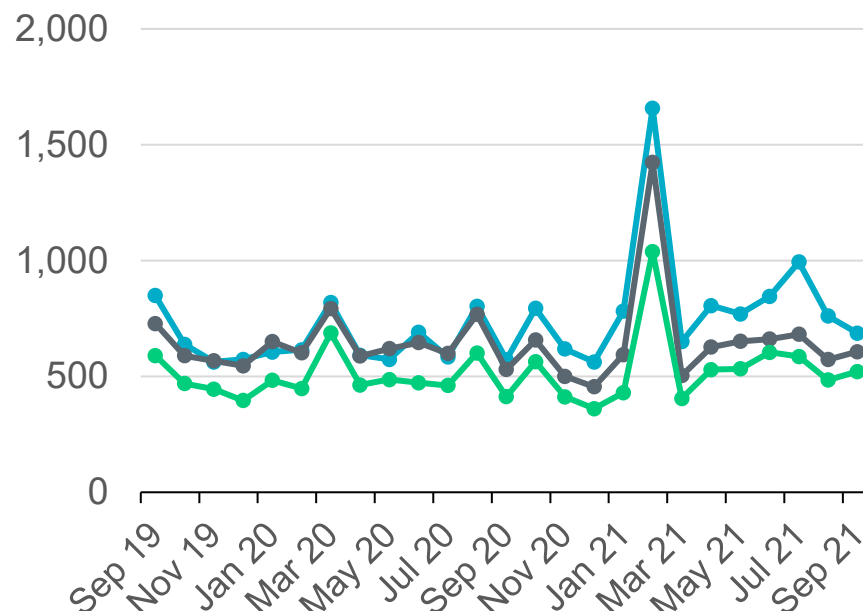
Current Operating Plan (COP) Performance

## Intermittent Renewable Resources (IRRs)
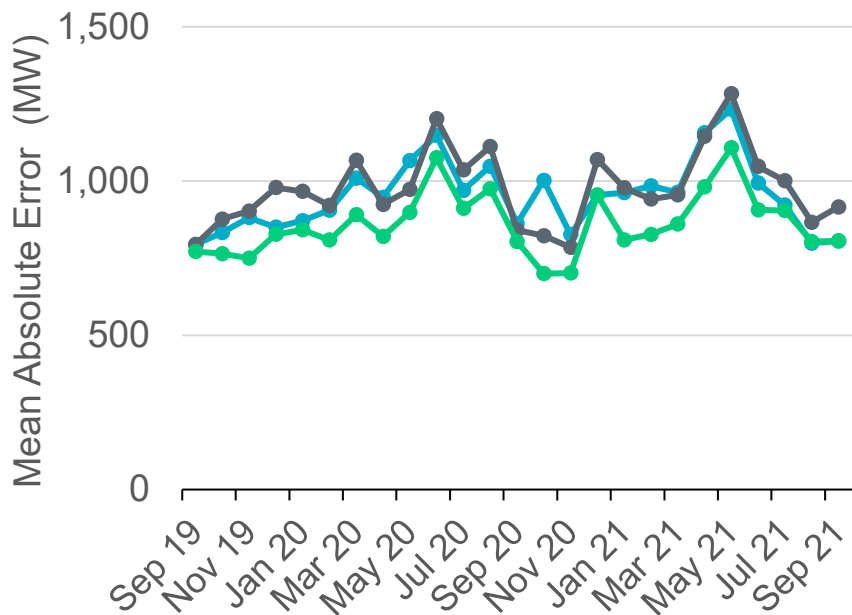
Non-IRRs

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 Wind Units is 33,519 MW (as of September 30, 2021).

- The installed capacity of approved Solar Units is 8,524 MW (as of September 30, 2021).

Real-Time Congestion Rent by Zone
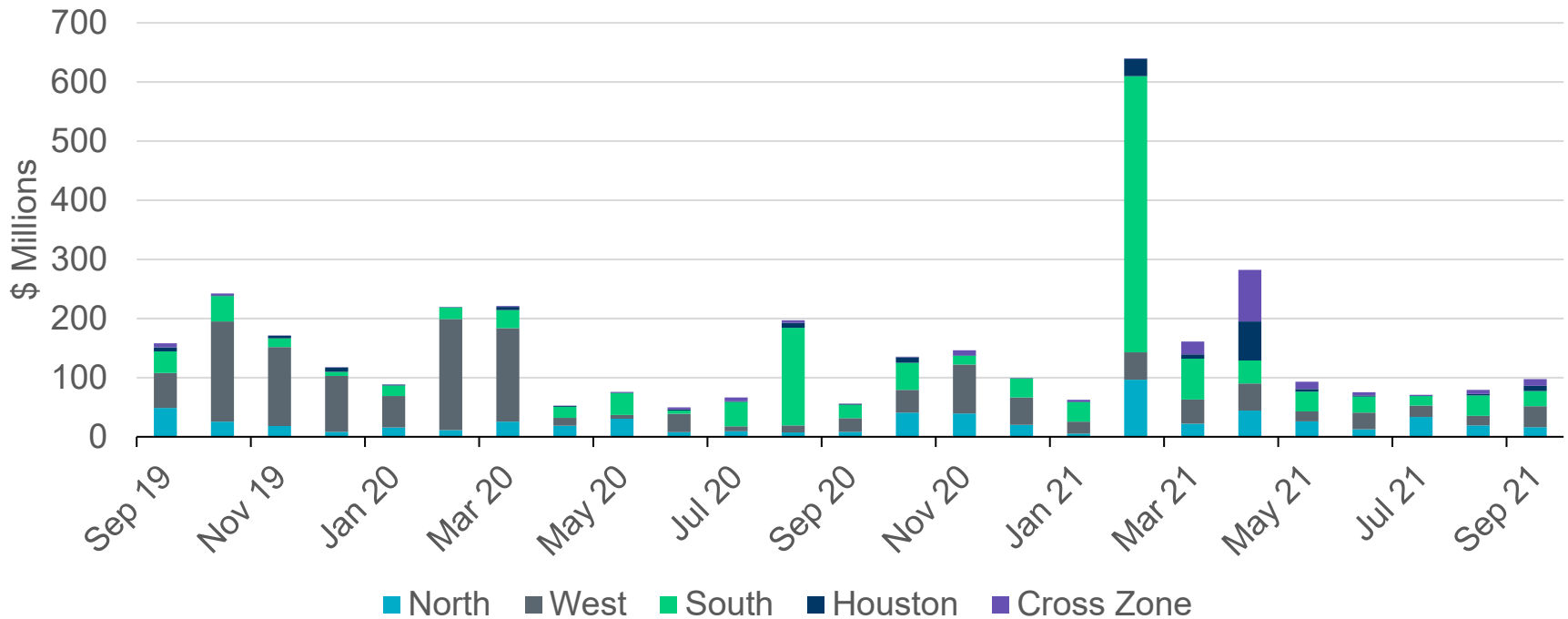
- The congestion rent for September increased in the West Zone, Houston Zone, and Cross Zone when compared to August. The most significant constraints for September are MHARNED5: HAINE__LA_PAL1_1 in the South Zone and XMDL58: TALLCITY_TELPR_1 in the West Zone.

- 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 "Cross Zone" category consists of cases in which the substations on either end of the constraint are in different zones.

Thirty-Five Resources were Committed through RUC/VDI in September for Capacity and Congestion
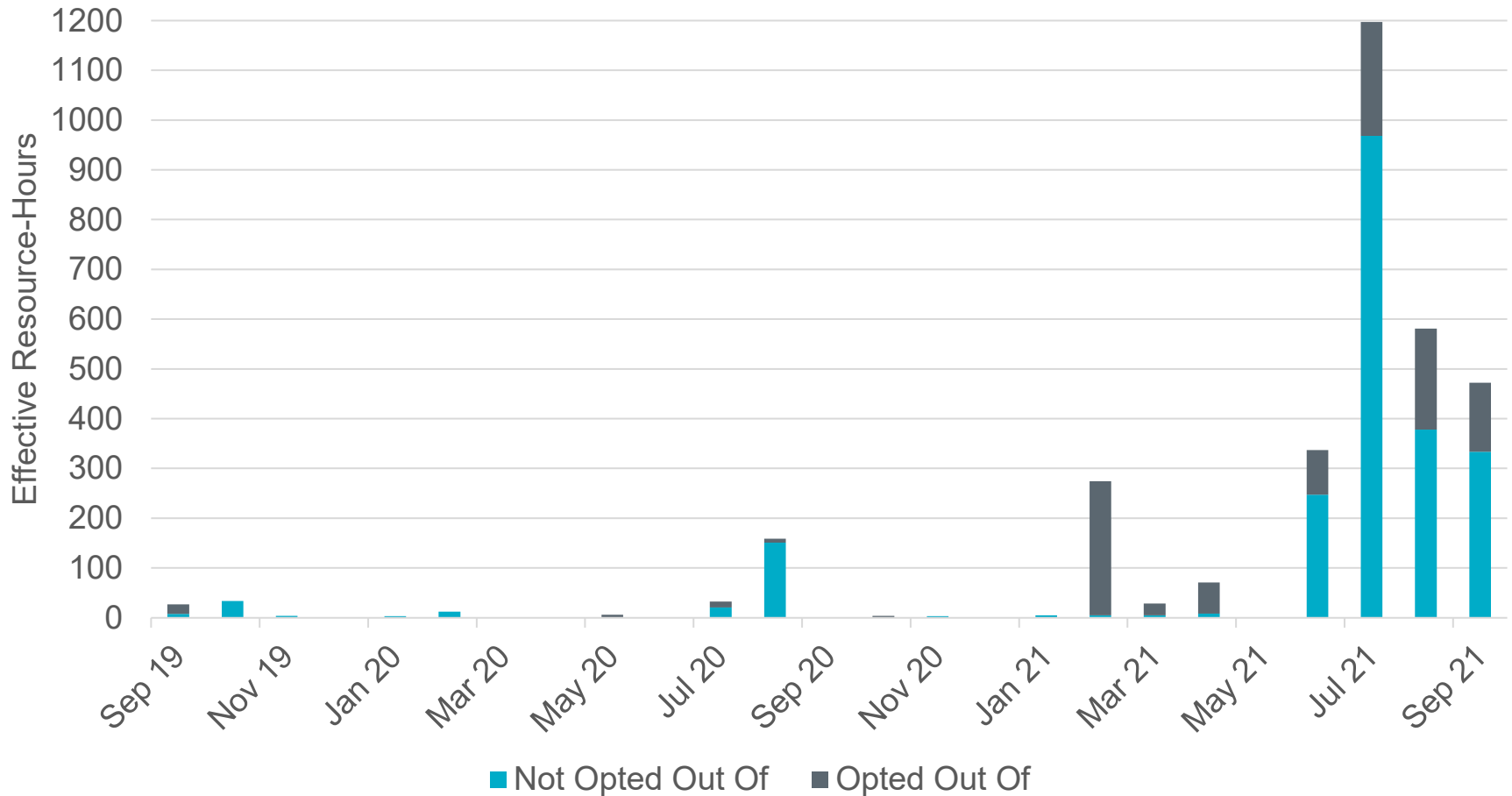
"Effective Resource-hours" excludes any period during a Reliability Unit Commitment hour when the RUC-committed Resource was starting up, shutting down, off-line, or otherwise not available for dispatch by SCED.

Thirty-Five Resources were Committed through RUC/VDI in September for Capacity and Congestion

Resource #	Effective Resource-hours	Non Opt Out (Effective Hours)	Opt Out (Effective Hours)
1	6.0	0.0	6.0
2	6.0	6.0	0.0
3	36.7	24.7	12.0
4	14.7	14.7	0.0
5	6.0	6.0	0.0
6	8.0	8.0	0.0
7	6.0	6.0	0.0
8	9.0	9.0	0.0
9	23.0	9.0	14.0
10	5.0	5.0	0.0
11	4.0	4.0	0.0
12	22.7	6.9	15.8
13	4.9	4.9	0.0
14	16.0	0.0	16.0
15	15.8	7.9	7.9
16	6.0	0.0	6.0
17	59.0	59.0	0.0
18	34.0	34.0	0.0
19	11.8	11.8	0.0
20	13.8	13.8	0.0
21	35.9	25.9	10.0
22	6.4	1.4	5.0
23	38.5	26.6	11.9
24	18.1	18.1	0.0
25	9.8	9.8	0.0
26	4.0	4.0	0.0
27	3.0	0.0	3.0
28	0.0	0.0	0.0
29	3.7	3.7	0.0
30	7.0	7.0	0.0
31	6.0	6.0	0.0
32	8.0	0.0	8.0
33	6.0	0.0	6.0
34	11.0	0.0	11.0
35	6.4	0.0	6.4

"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.

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Net Allocation to Load in September 2021 was $25.6 Million
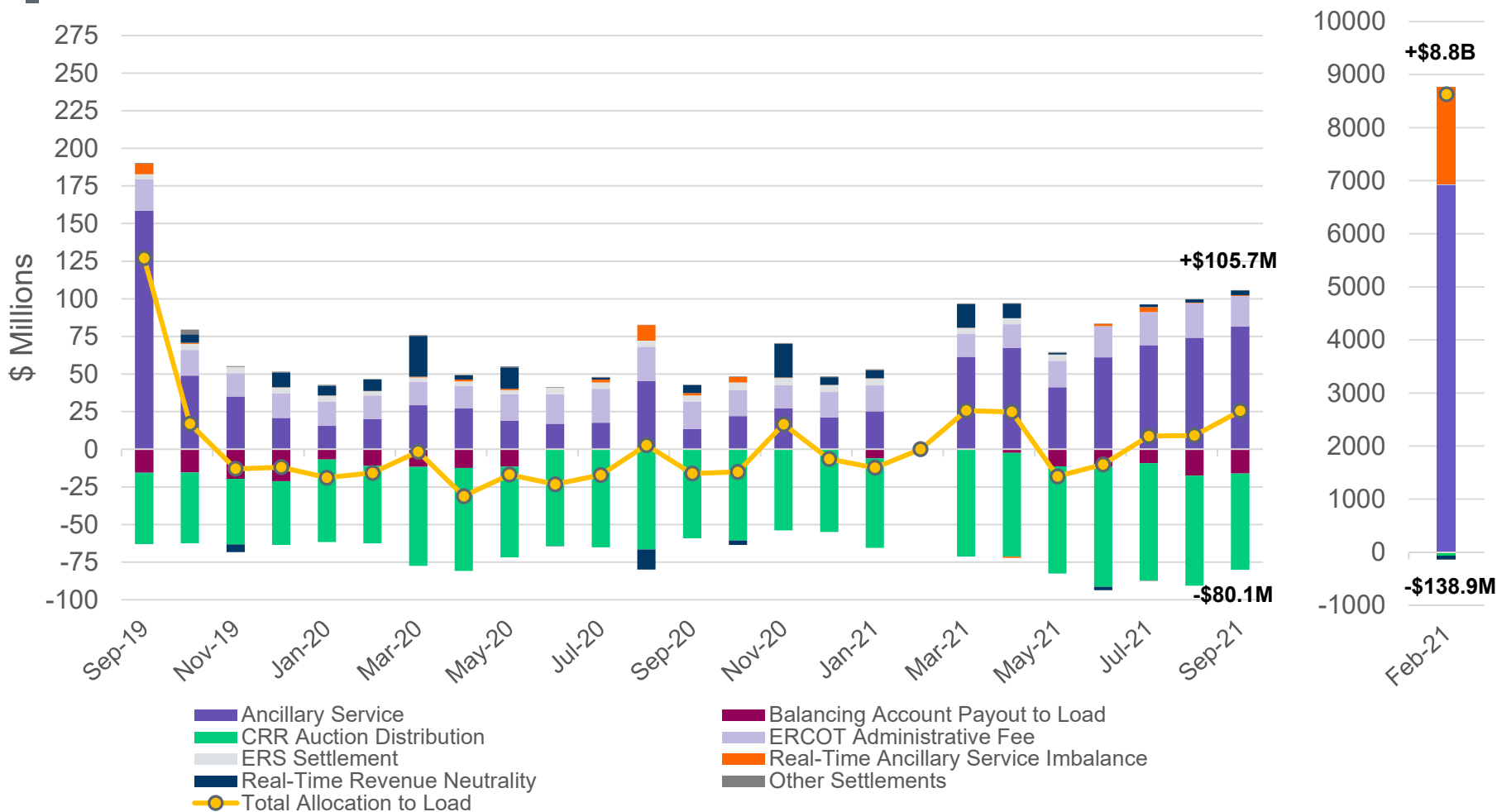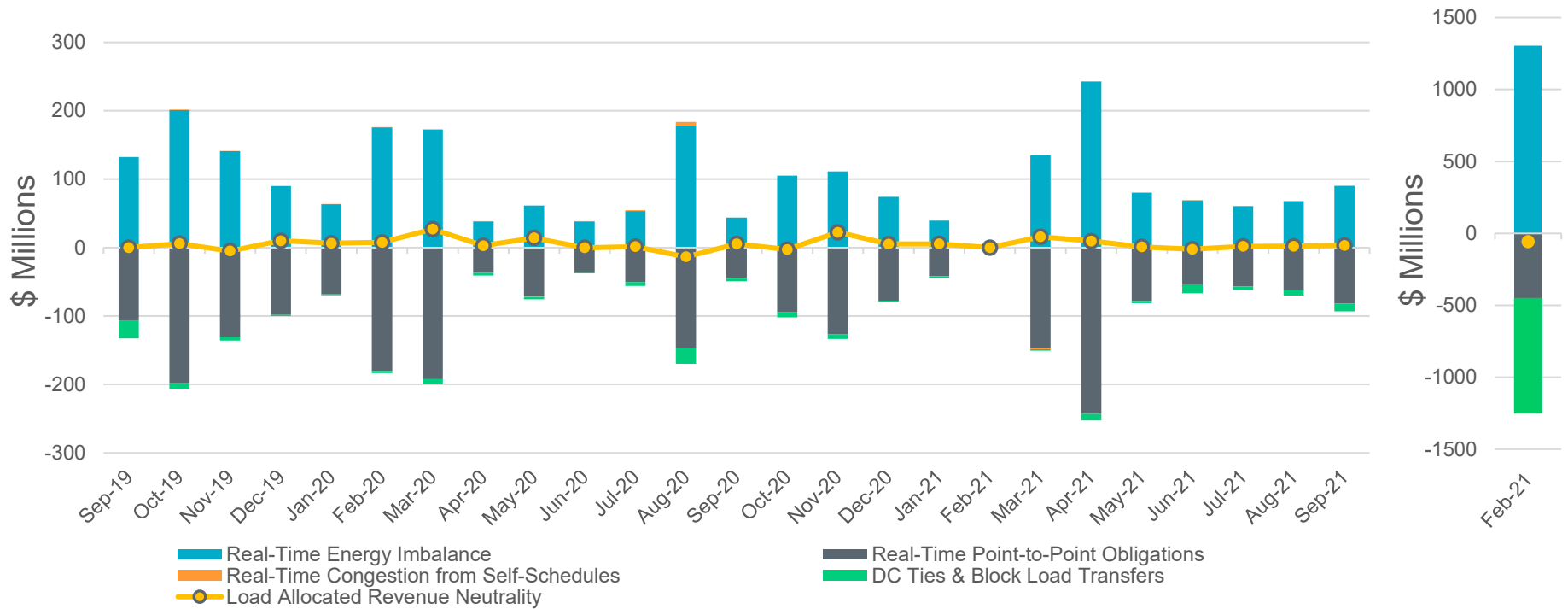

This information is available in tabular form in the Settlement Stability Report presented quarterly to the Wholesale Market Subcommittee

Note: For visual purposes, February 2021 has been separated into its own graph with different scaling. The legend applies for both graphs.

# Real-Time Revenue Neutrality Allocated to Load was $3.06M for September 2021

	September 2021 ($M)
Real-Time Energy Imbalance	$89.95
Real-Time Point-to-Point Obligation	($81.44)
Real-Time Congestion from Self-Schedules	$0.06
DC Tie & Block Load Transfer	($11.64)
Load Allocated Revenue Neutrality	**$3.06**

Note: For visual purposes, February 2021 has been separated into its own graph with different scaling. The legend applies for both graphs.

Ancillary Services for September 2021 totaled $81.58M
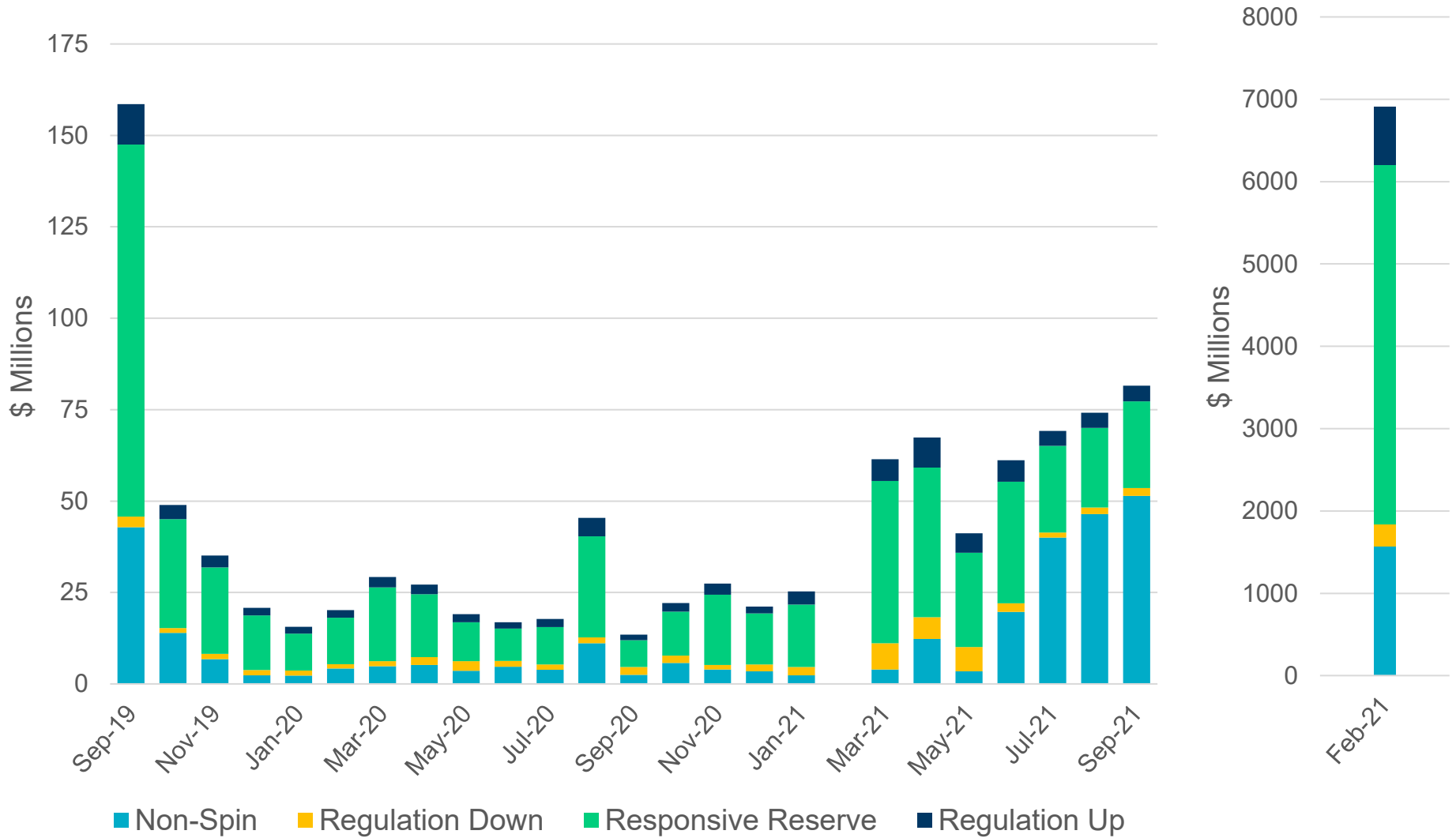
Legend: Non-Spin, Regulation Down, Responsive Reserve, Regulation Up

Note: For visual purposes, February 2021 has been separated into its own graph with different scaling. The legend applies for both graphs.
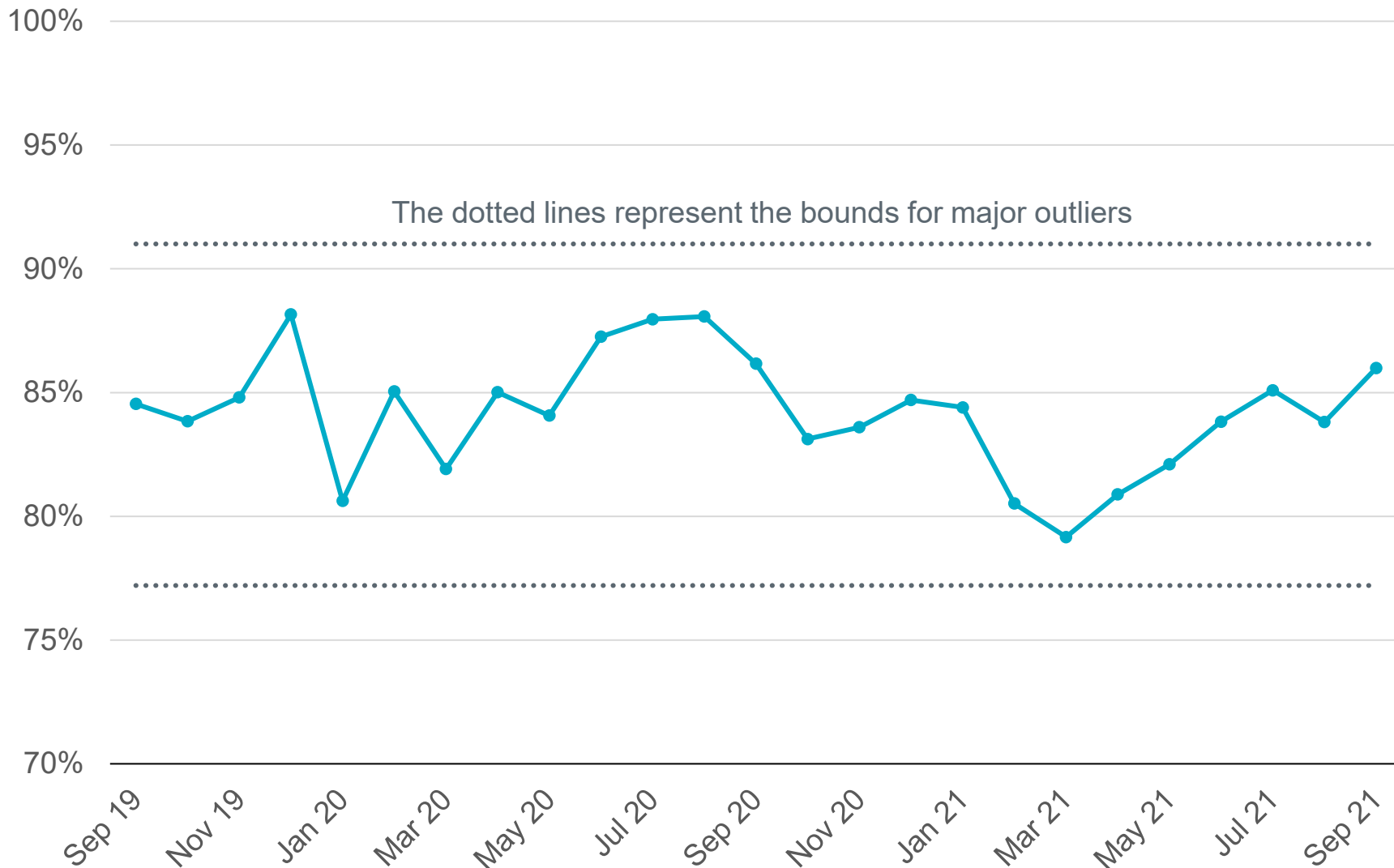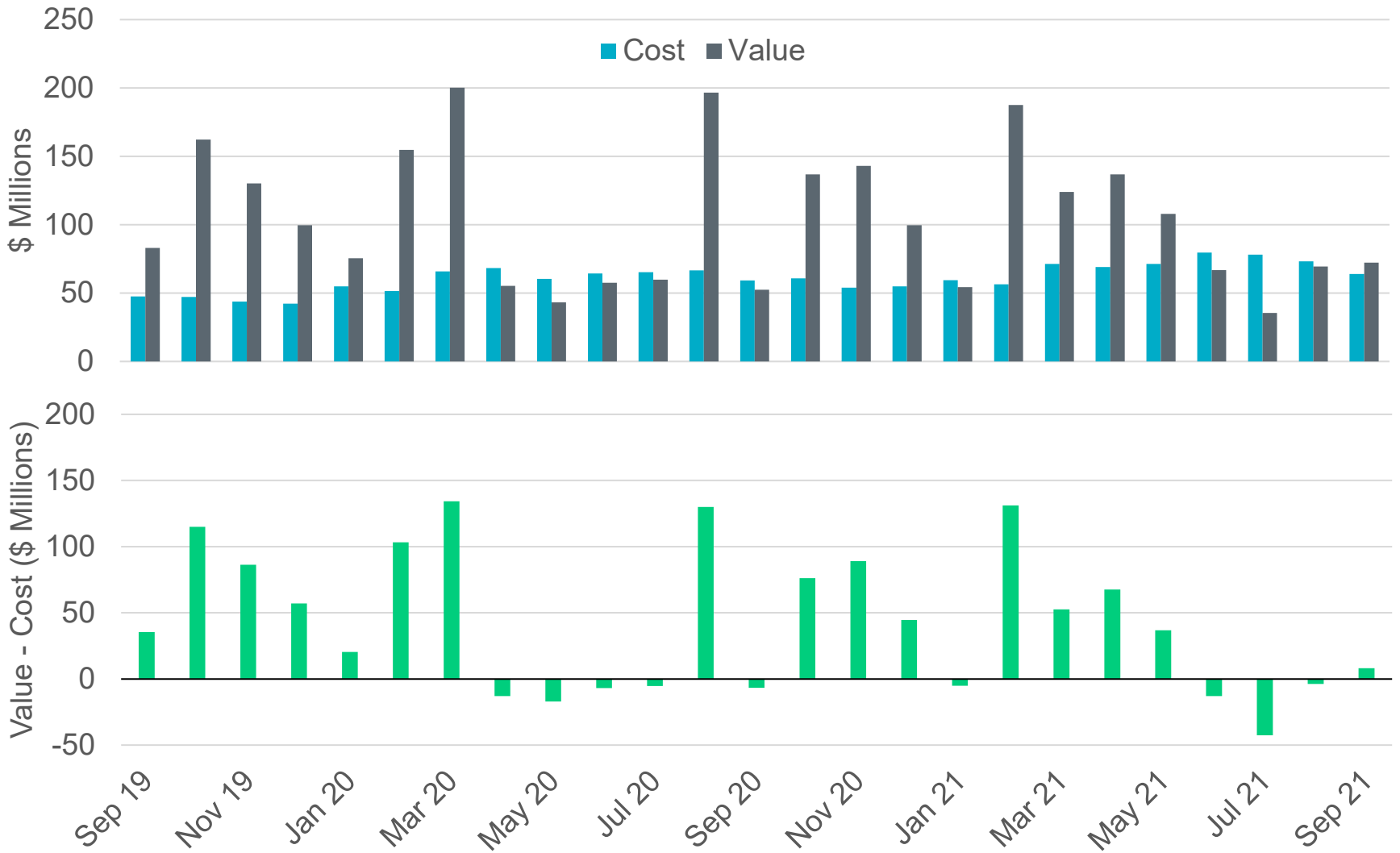
Day-Ahead and Real-Time Market Price Differences

Detail of $0/MWh to $200/MWh

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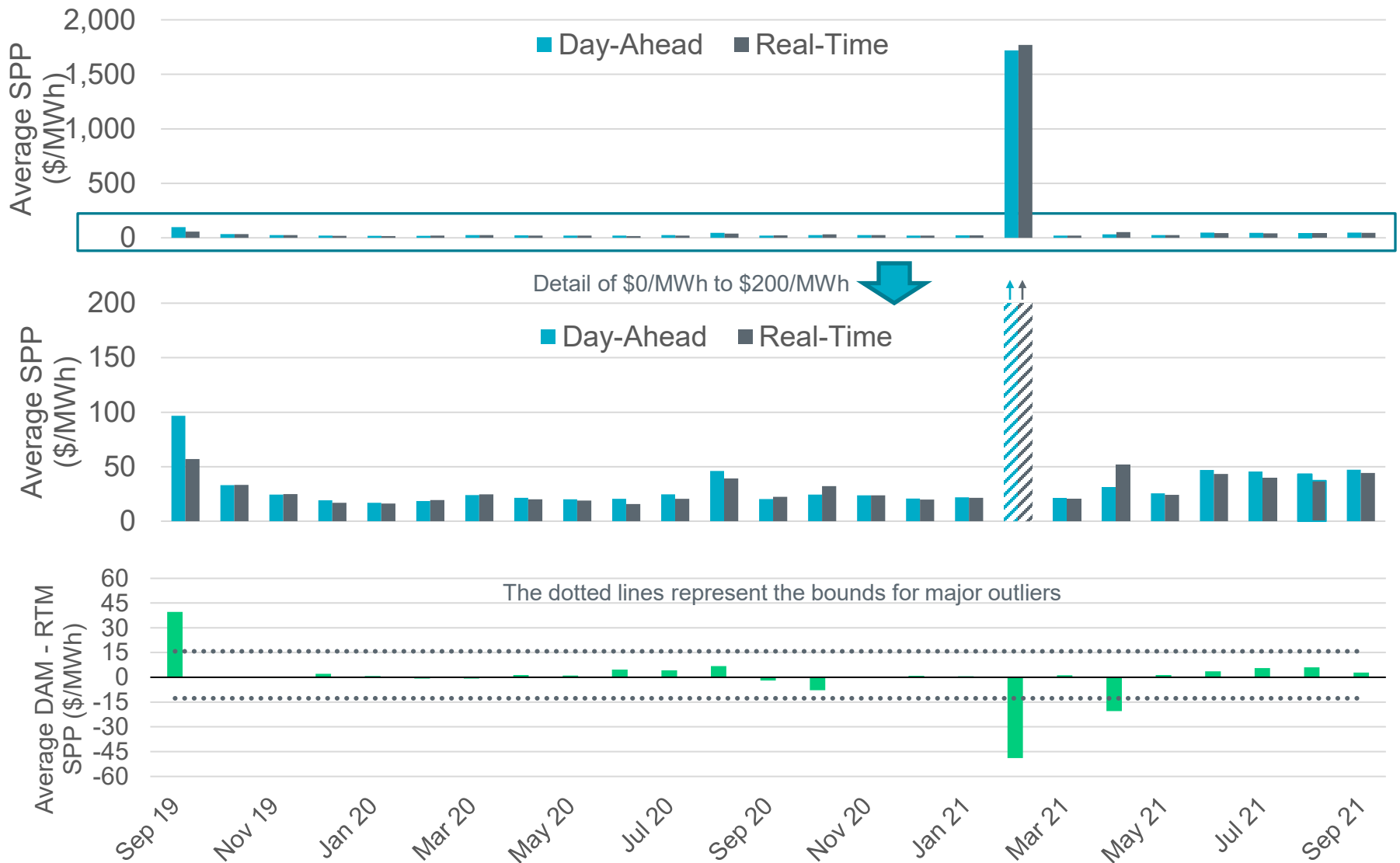
*Averages are weighted by Real-Time Market Load

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

Price Issues and the Impact of Nodal Protocol Revision Request (NPRR) 1024 on Price Corrections

This graph looks at the recent history of price issues in the RTM or DAM and breaks the impacted Operating Days into three categories:

- Days that met the criteria for "significance" under NPRR1024 and were corrected;

- Days that would not have met the criteria for "significance" under NPRR1024, but were corrected because NPRR1024 was not yet in place; and

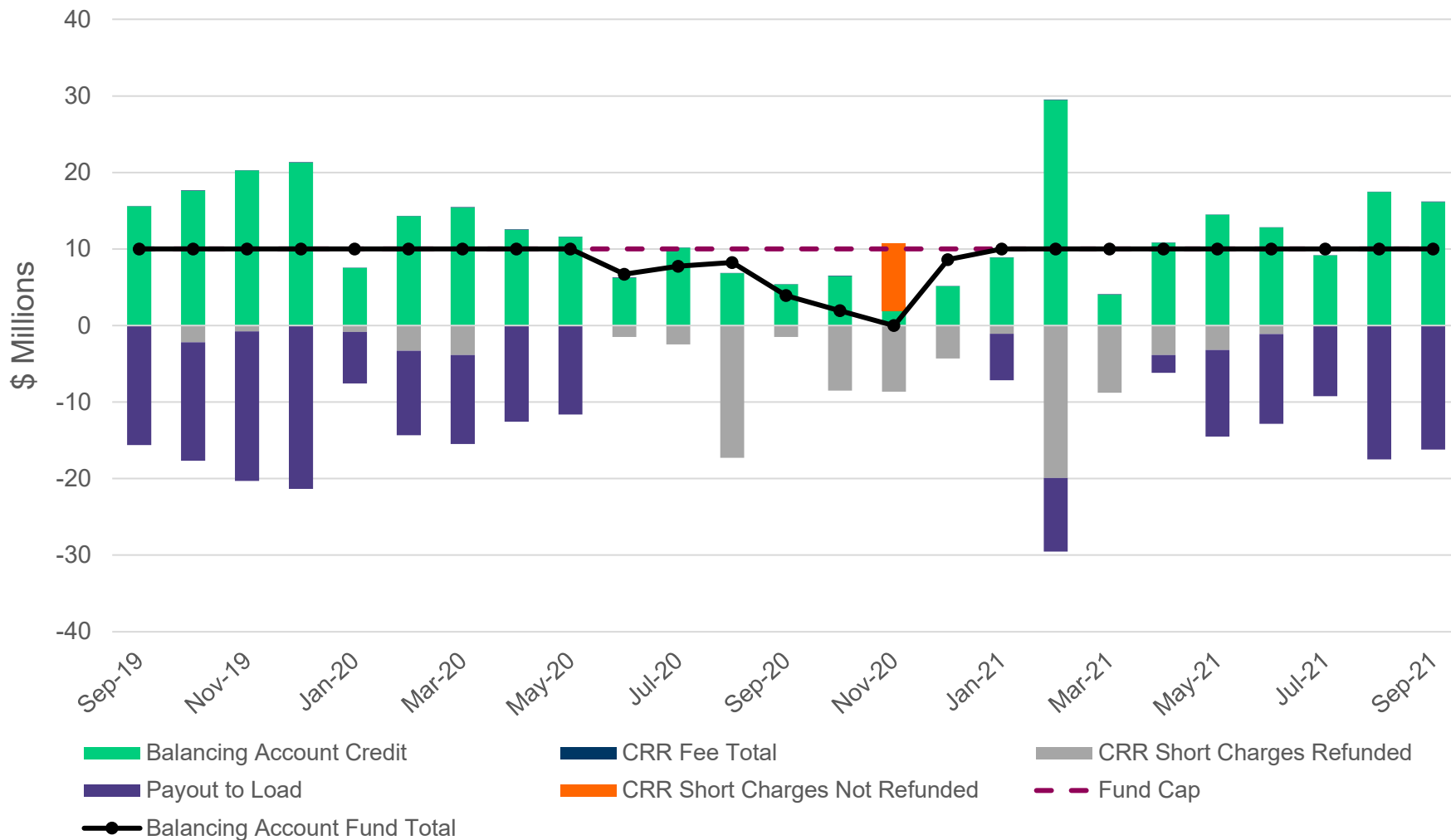- Days that were not corrected because they did not meet the criteria for "significance" under NPRR1024.

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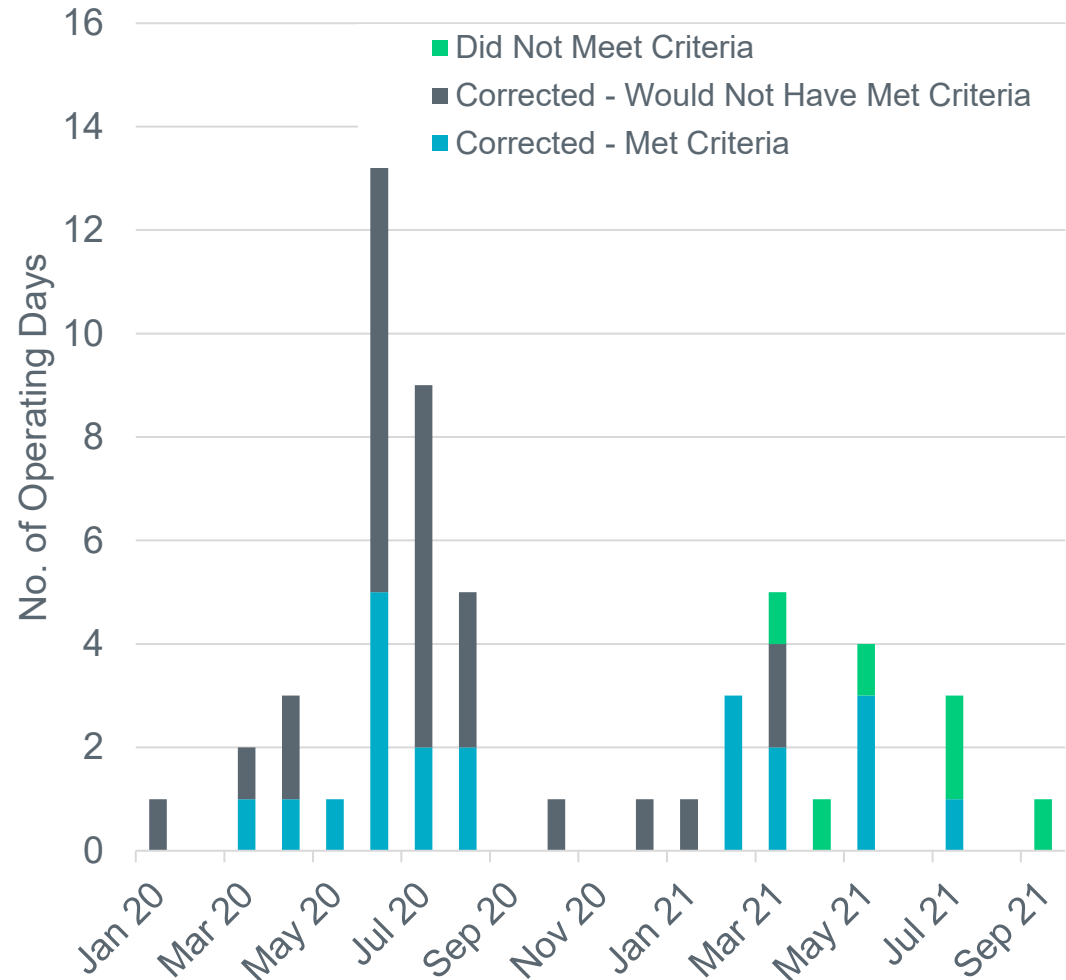
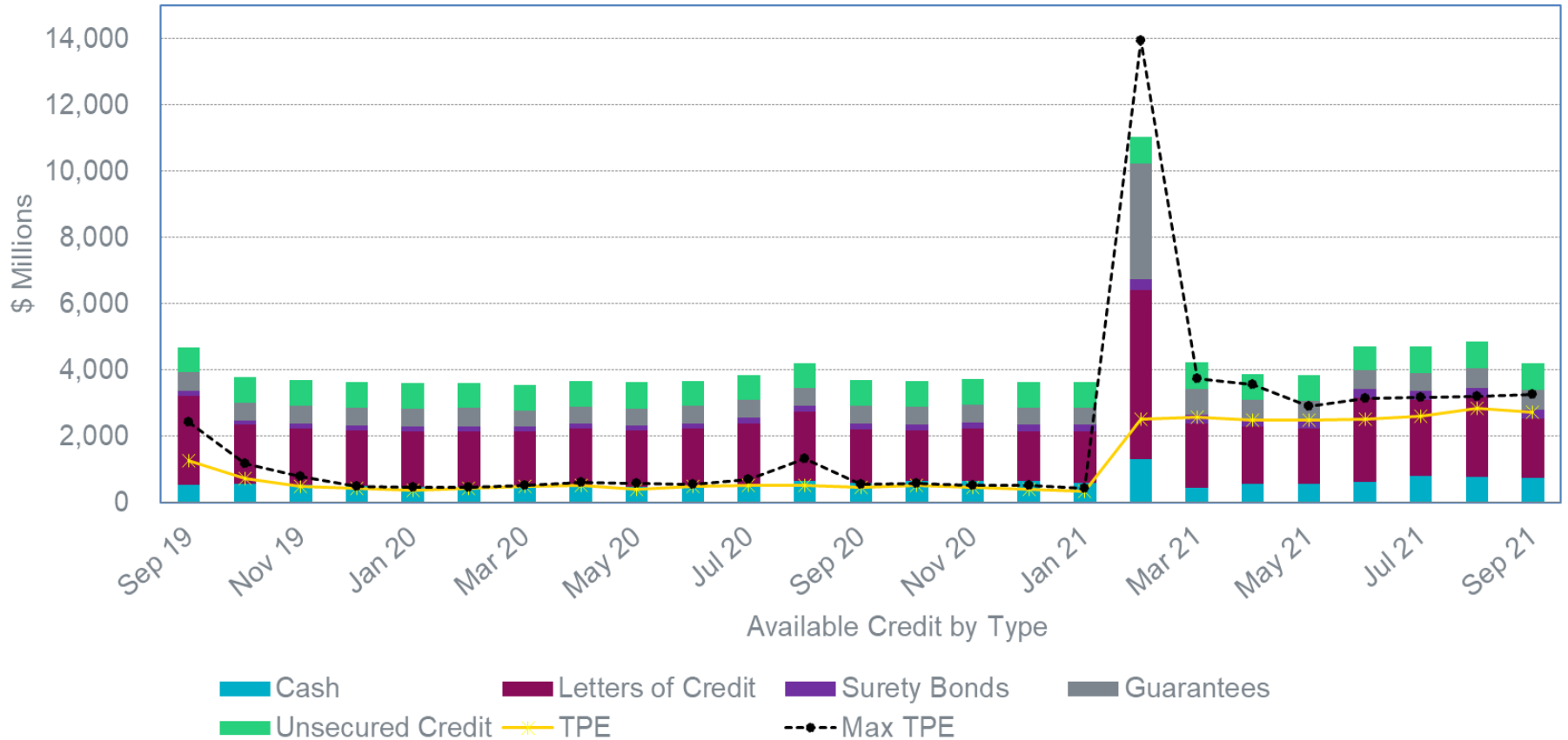# Details on Price Issues not Meeting the Criteria for Significance

Operating Day Sept. 13, 2021

- The price issue was driven by SCED executions that were missed during a routine planned site failover.

- Impacts were minor and specific to Real-Time Prices for Energy Metered for Resources (RTRMPRs).
  - The total dollar impact was estimated as less than $20

The CRR Balancing Account was fully funded and excess amounts were allocated to Load

Available Credit by Type Compared to Total Potential Exposure (TPE)

Available Credit by Type

Legend:
- Cash
- Letters of Credit
- Surety Bonds
- Guarantees
- Unsecured Credit
- TPE
- Max TPE

*Numbers are as of month end except for Max TPE

Retail Transaction Volumes – Summary – September 2021

Transaction Type	Year-To-Date		Transactions Received	
	September 2021	September 2020	September 2021	September 2020
Switches	1,057,571	885,742	68,915	81,951
Acquisitions	48,862	0	0	0
Move - Ins	2,120,833	2,062,104	243,881	239,448
Move - Outs	982,040	1,003,372	108,251	115,383
Continuous Service Agreements (CSA)	510,696	369,531	62,205	27,974
Mass Transitions	26,584	0	0	0
Total	**4,746,586**	**4,320,749**	**483,252**	**464,756**