April 13, 2021

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: California Independent System Operator Corporation
Docket No. ER15-861-___
Energy Imbalance Market – Third Quarter 2020
Available Balancing Capacity Report

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its quarterly informational report for the third quarter of 2020 (July 1 to September 30, 2020) on the Available Balancing Capacity (ABC) enhancement for the western Energy Imbalance Market (EIM). The quarterly informational report is to provide the Commission with information on the performance of the ABC enhancement and to provide the same information the CAISO provides in its monthly informational reports submitted during an EIM entity's first six-month transition period.

Consistent with the Commission's directive in the December 17, 2015 order, the CAISO will continue to file such quarterly reports for at least the first year after implementation of the ABC enhancement, or until the Commission finds the quarterly informational reports are no longer needed.

Please contact the undersigned with any questions.

Respectfully submitted

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Energy Imbalance Market

July 1 – September 30, 2020

Available Balancing Capacity Report

November 23, 2020

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I. Background

On December 17, 2015, the Federal Energy Regulatory Commission (Commission) approved the California Independent System Operator Corporation's (CAISO) proposed tariff revisions to comply with the Commission's July 20, 2015 order in FERC Docket No. ER15-861-006.[1] The CAISO's proposed tariff provisions enhanced the western Energy Imbalance Market (EIM) functionality so that the market systems automatically recognize and account for capacity an EIM entity has available to maintain reliable operations in its own balancing authority area (BAA), but has not been bid into the EIM.[2] This enhancement is referred to as the Available Balancing Capacity (ABC) enhancement. The CAISO implemented the ABC enhancement on March 23, 2016.

Consistent with the CAISO's commitments made in this proceeding, the Commission directed the CAISO to prepare and file with the Commission quarterly informational reports for at least the first year after implementation of the ABC enhancement, and until the Commission finds the quarterly informational reports are no longer needed.[3] The quarterly informational reports are to provide information on the performance of the ABC enhancement and to include the same information the CAISO provides in its monthly informational reports submitted during an EIM entity's first six-month transition period.[4]

[1] *Cal. Indep. Sys. Operator Corp.,* 152 FERC ¶ 61,060 (2015) (July 20 Order); and *Cal. Indep. Sys. Operator Corp*., 153 FERC ¶ 61, 305 (2015) (December 17 Order).

[2] December 17 Order at P 1.

[3] December 17 Order at P 99

[4] December 17 Order at P 39.

II. Highlights

- This report covers the following EIM entities: Pacificorp West (PAC West), Pacificorp East (PAC East), NV Energy, Arizona Public Service (APS), Idaho Power Corporation (IPCO), Puget Sound Energy (PSE), Powerex (PWRX), Portland General Electric (PGE), Balancing Authority of Northern California, Sacramento Municipal Utility District (BANCSMUD), Seattle City Light (SCL) and Salt River Project (SRP).

- The CAISO implemented the ABC enhancement on March 23, 2016. During the third quarter of 2020, SCL and SRP were undergoing the transitional period for price discovery as new EIM entities.

- The Powerex, NV Energy, APS, and BANCSMUD BAAs submitted ABC in nearly all intervals of the third quarter of 2020; this contrasts with the lower frequency of ABC submitted by other EIM entities.

- The EIM dispatched ABC, in either upward or downward direction as high as 100 percent for the PACW BAA, but as low as zero percent in other EIM BAAs.

- The APS BAA used as many as 20 different resources to support their ABC submissions.

- Overall, the impact of ABC was low, based on the relative low frequency of scheduling and availability when power constraint infeasibilities were observed.

III. Available Balancing Capacity

A. Available Balancing Capacity Submitted to the Market

Each EIM entity can identify and set the amount of ABC they will make available to the CAISO and the resources supporting this capacity through its EIM entities resource plan. The EIM entity submits this capacity to the CAISO on an hourly basis, and it is available for both the Fifteen-Minute Market (FMM) and the five-minute Real-Time Dispatch (RTD). The figures in this section show the ABC made available in each of the EIM BAAs. IPCO did not submit ABC bids in this quarter, thus they are not displayed graphically below.

For each BAA, there are two plots to show the amount of ABC dispatched in the FMM and RTD, separately. The blue bars indicate positive values and illustrate the upward ABC made available by the EIM entity; the green bars indicate negative values and illustrate the downward ABC made available. Red markers indicate the instances where the ABC was dispatched in either the upward or downward direction.

Figure 1: Submitted and Dispatched ABC in the PAC West BAA – FMM

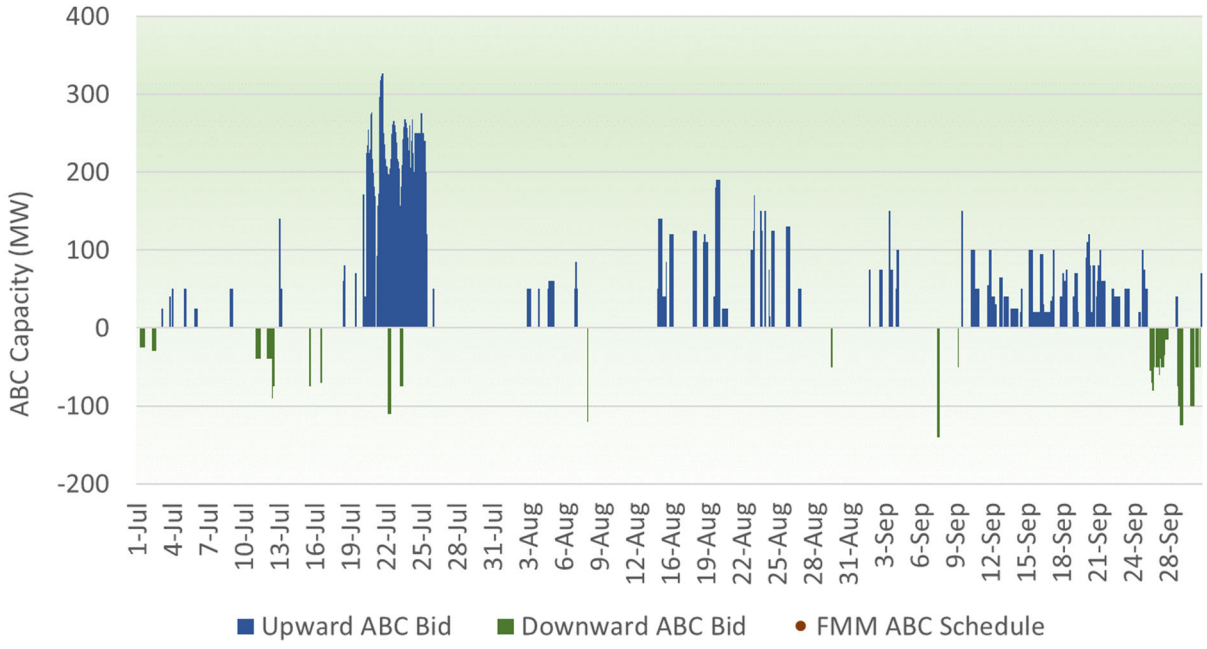


Figure 2: Submitted and Dispatched ABC in the PAC West BAA – RTD

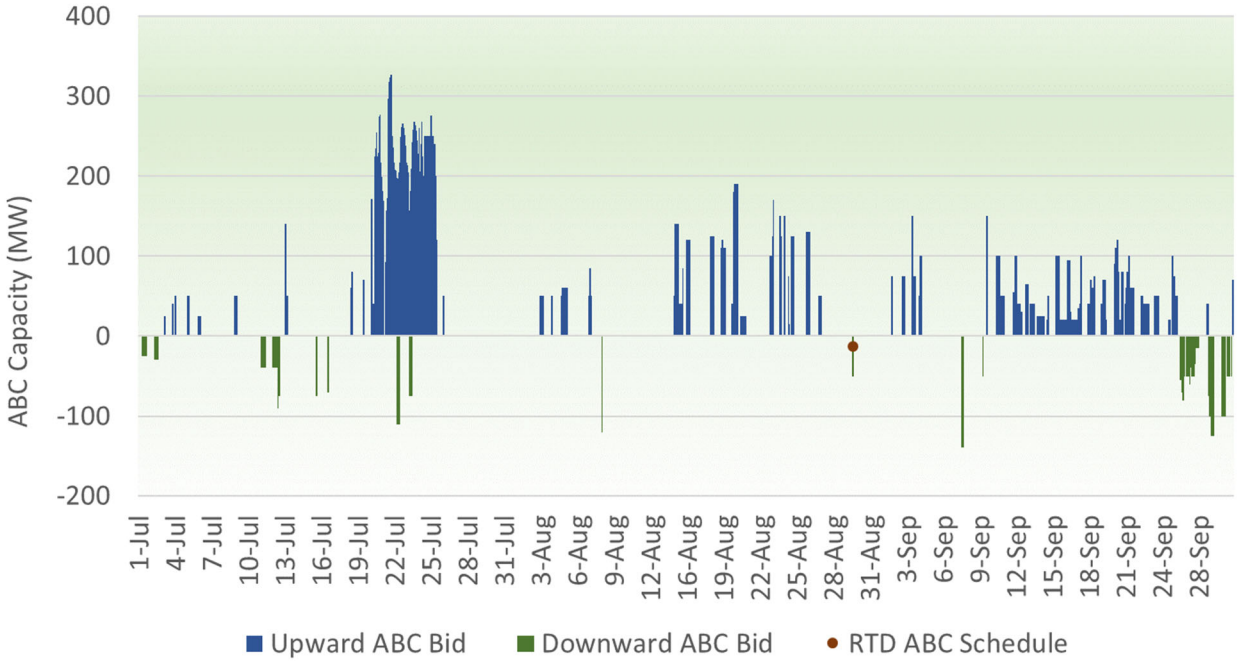


Figure 3: Submitted and Dispatched ABC in the PAC East BAA – FMM

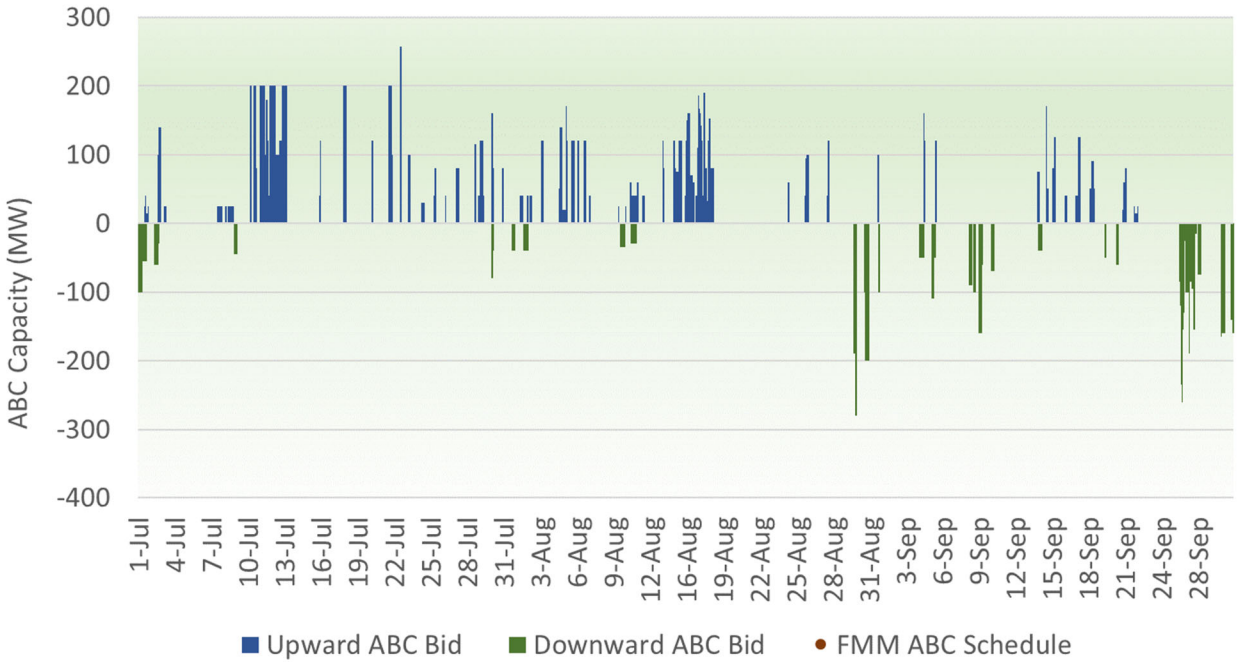


Figure 4: Submitted and Dispatched ABC in the PAC East BAA – RTD

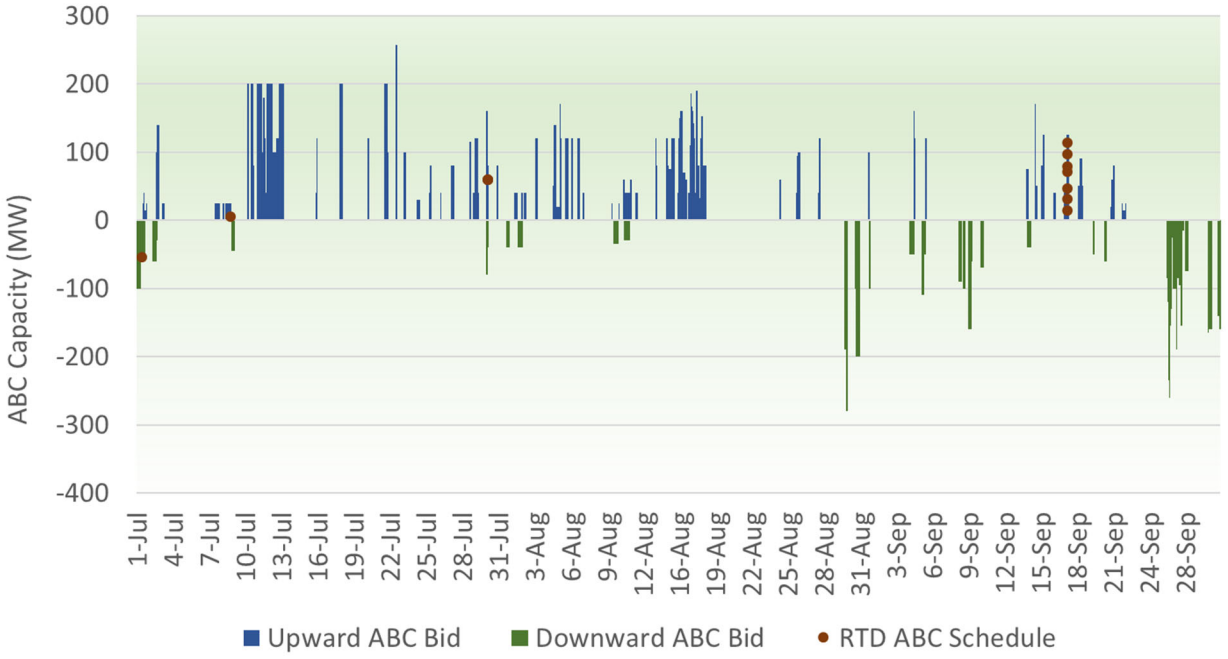


Figure 5: Submitted and Dispatched ABC in the NV Energy BAA – FMM

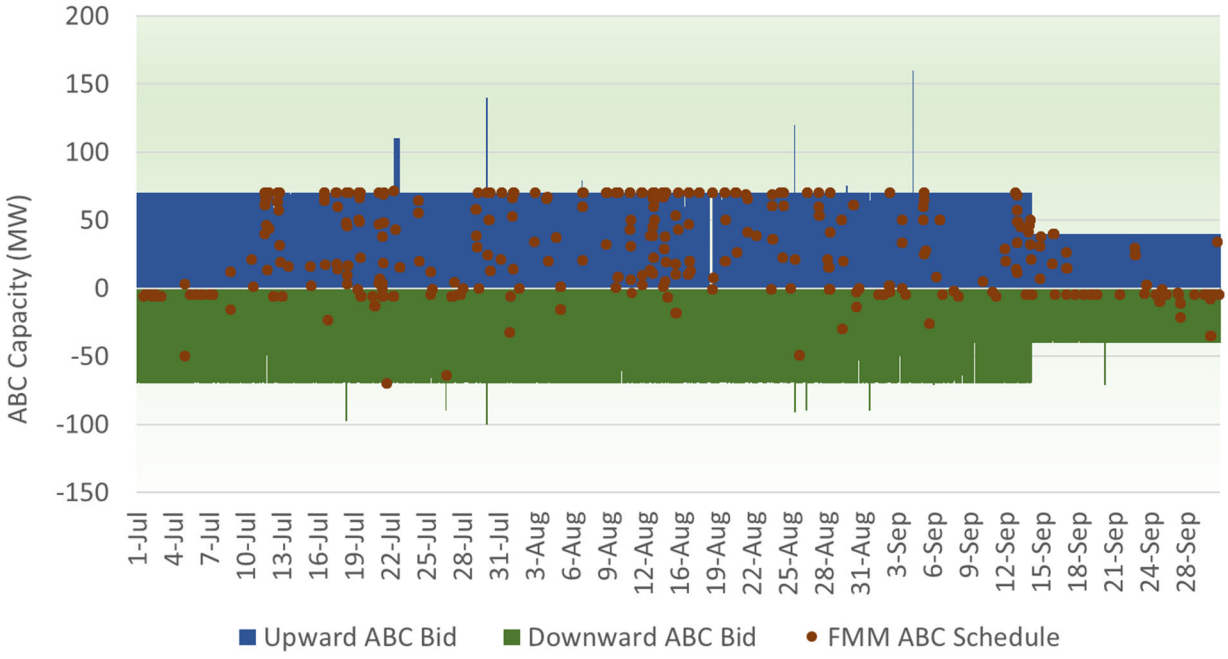


Figure 6: Submitted and Dispatched ABC in the NV Energy BAA – RTD

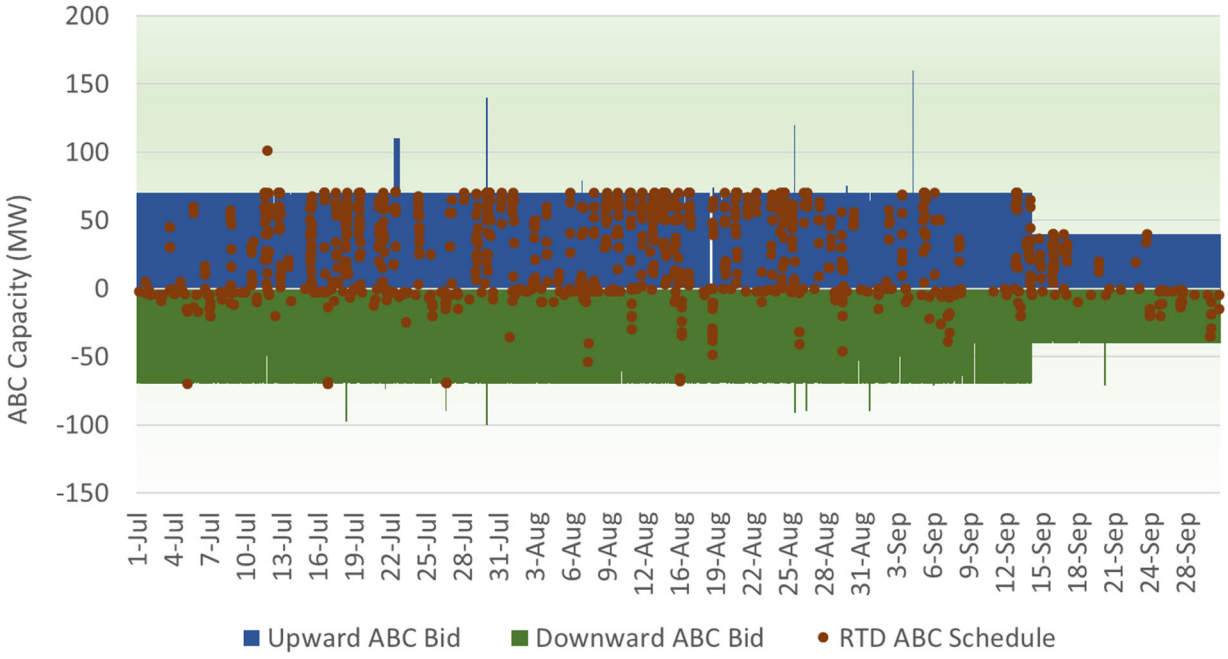


Figure 7: Submitted and Dispatched ABC in the APS BAA – FMM

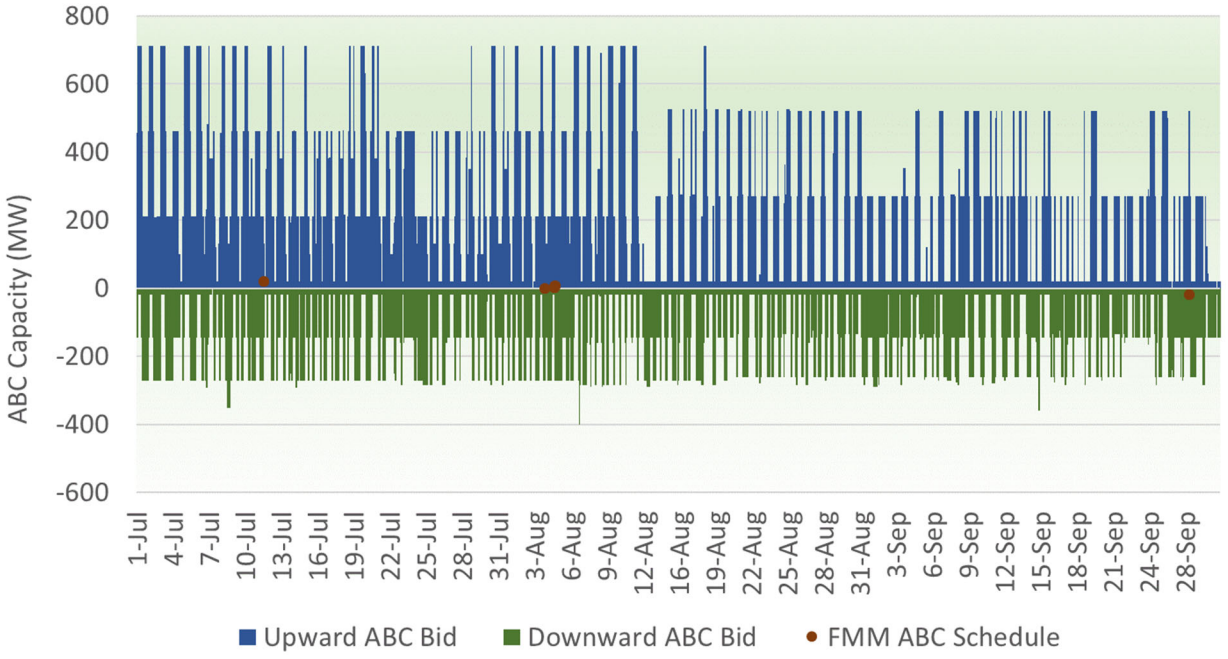


Figure 8: Submitted and Dispatched ABC in the APS BAA – RTD

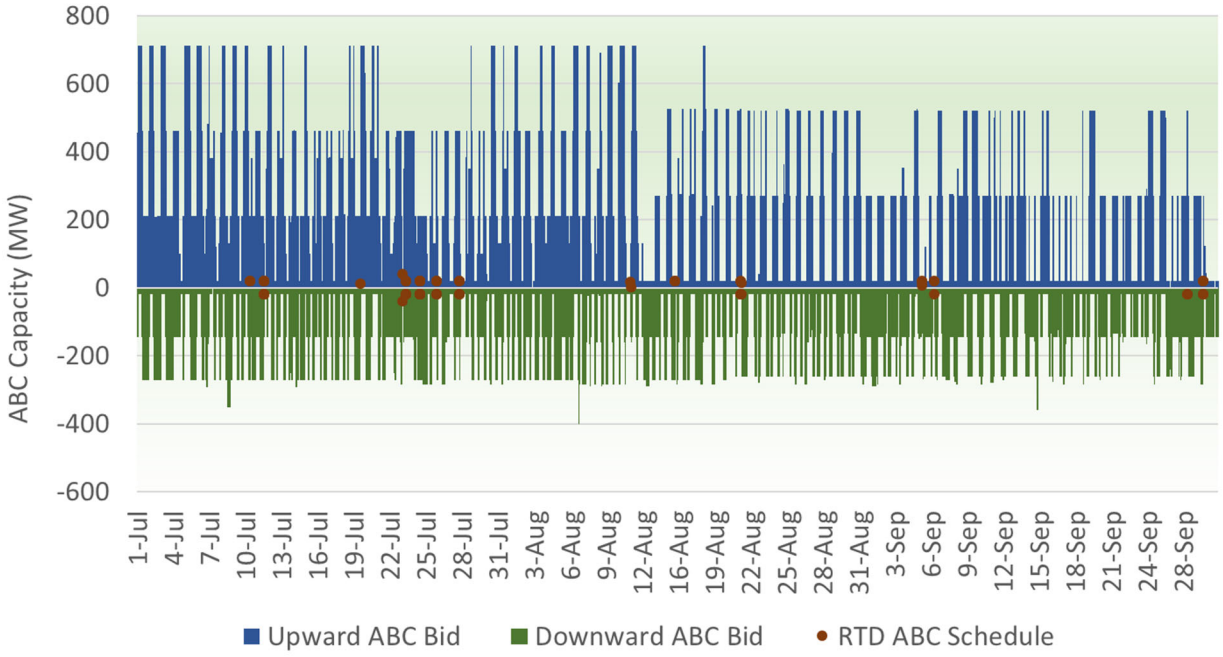


Figure 9: Submitted and Dispatched ABC in the PSE BAA – FMM

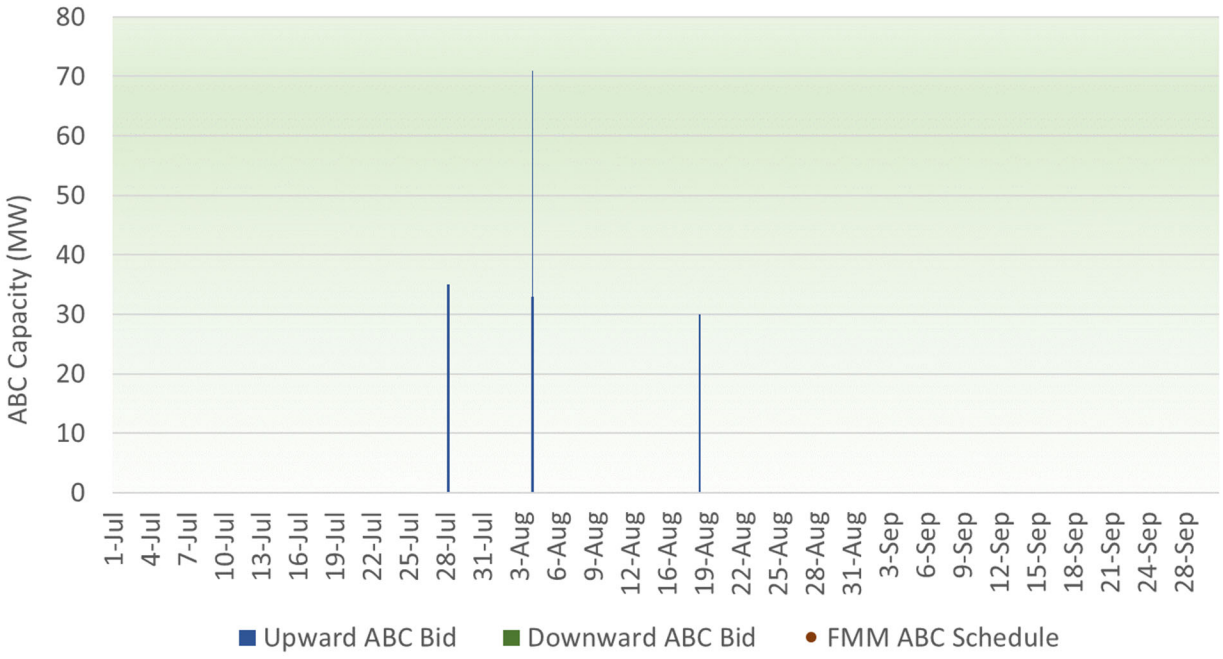


Figure 10: Submitted and Dispatched ABC in the PSE BAA – RTD

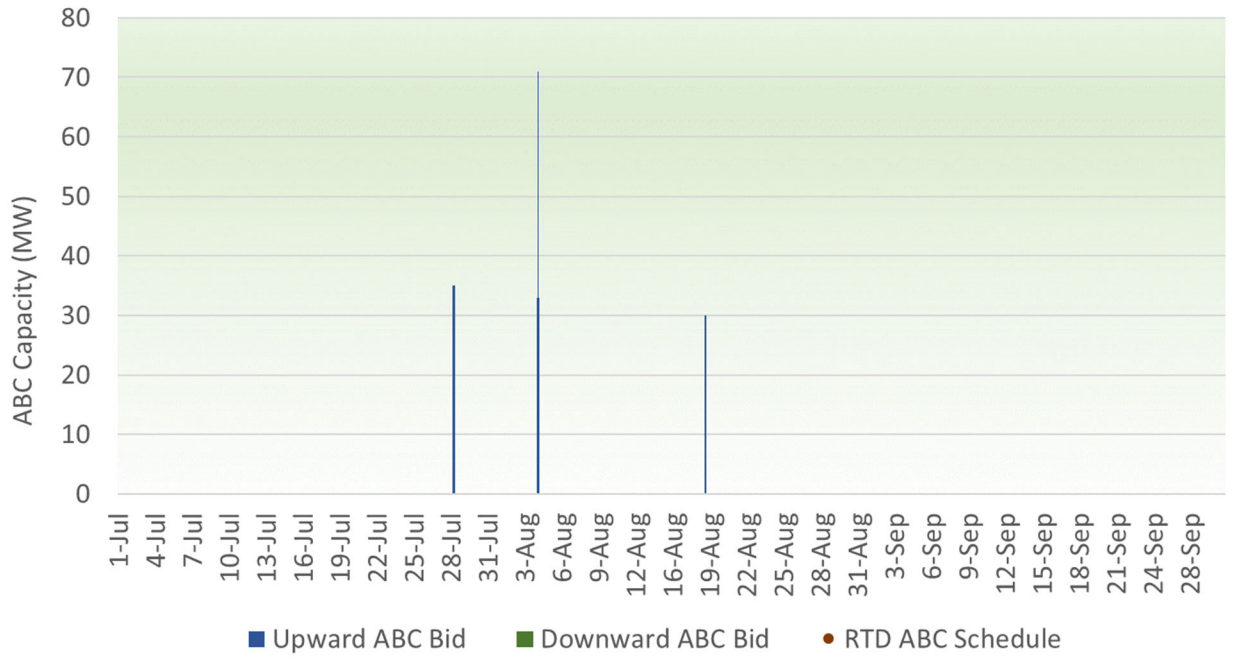


Figure 11: Submitted and Dispatched ABC in the PGE BAA – FMM

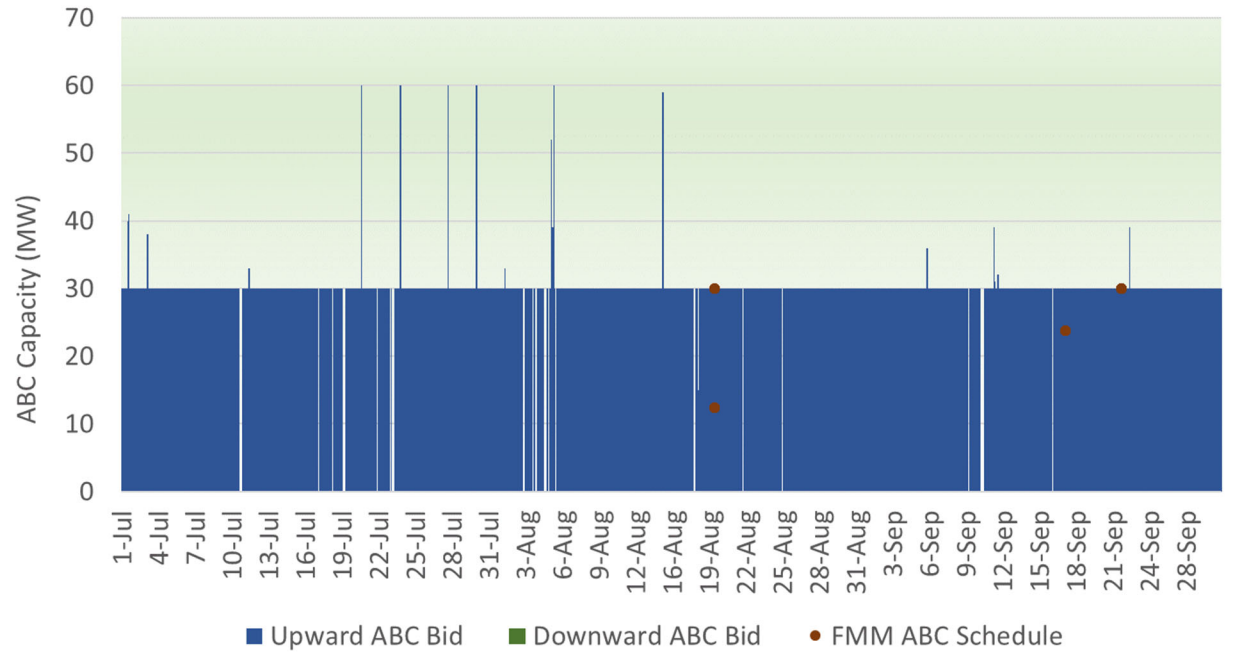


Figure 12: Submitted and Dispatched ABC in the PGE BAA – RTD

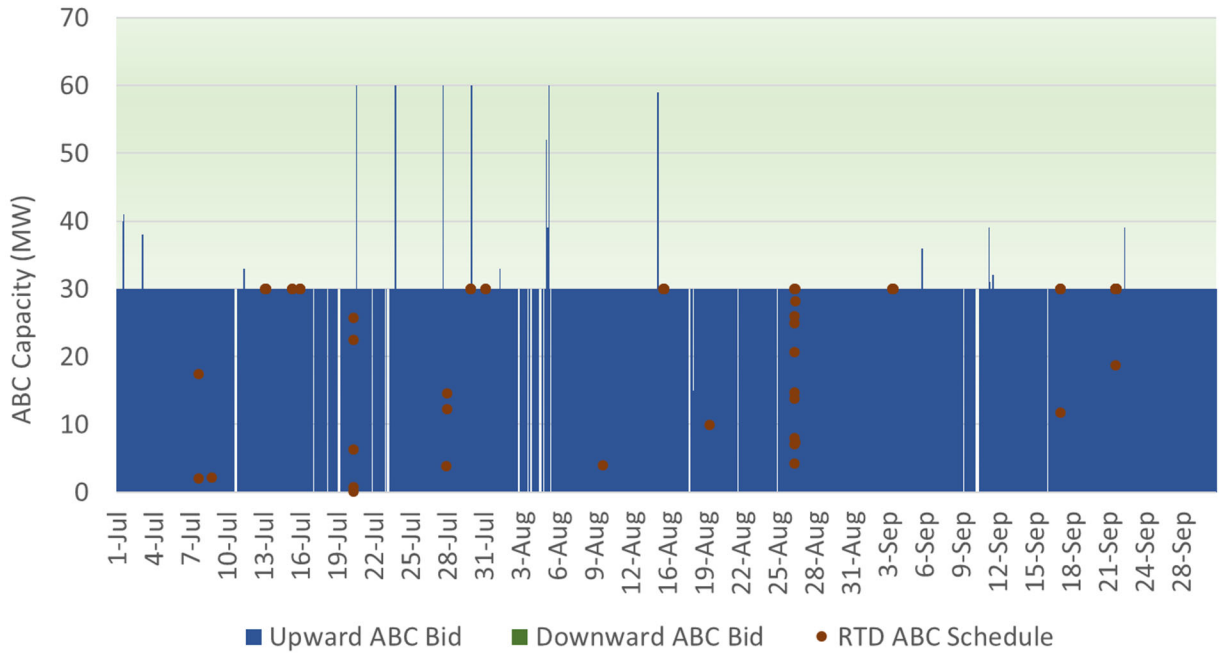


Figure 13: Submitted and Dispatched ABC in the PWRX BAA – FMM

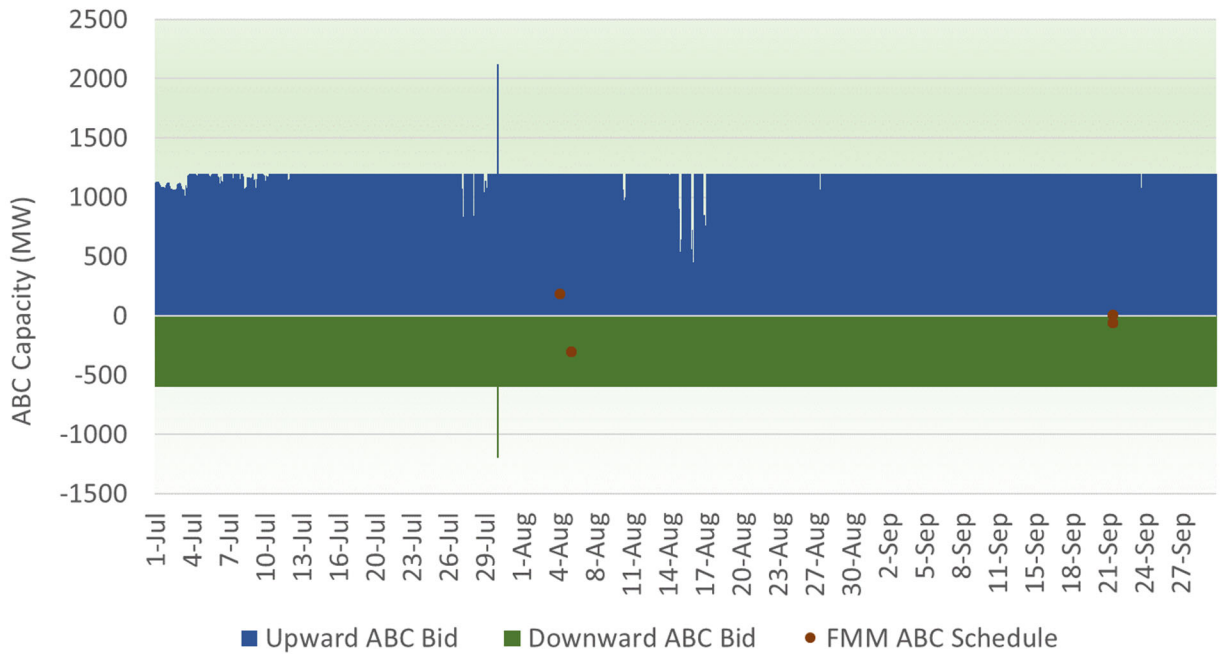


Figure 14: Submitted and Dispatched ABC in the PWRX BAA – RTD

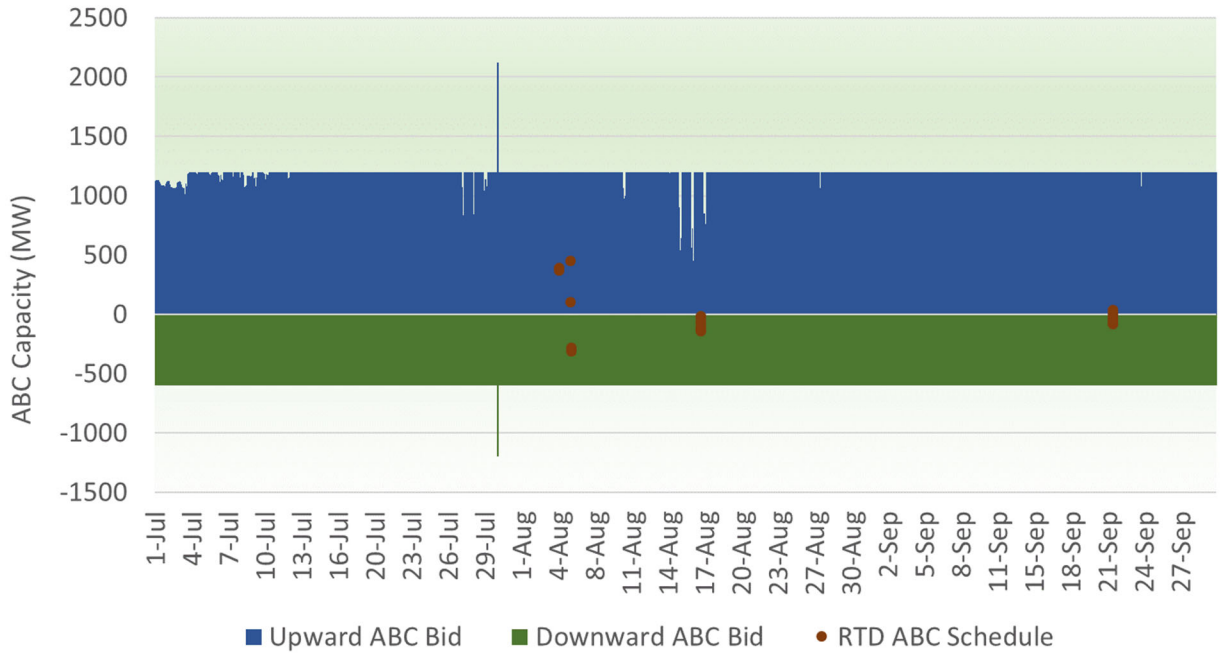


Figure 15: Submitted and Dispatched ABC in the BANCSMUD BAA – FMM

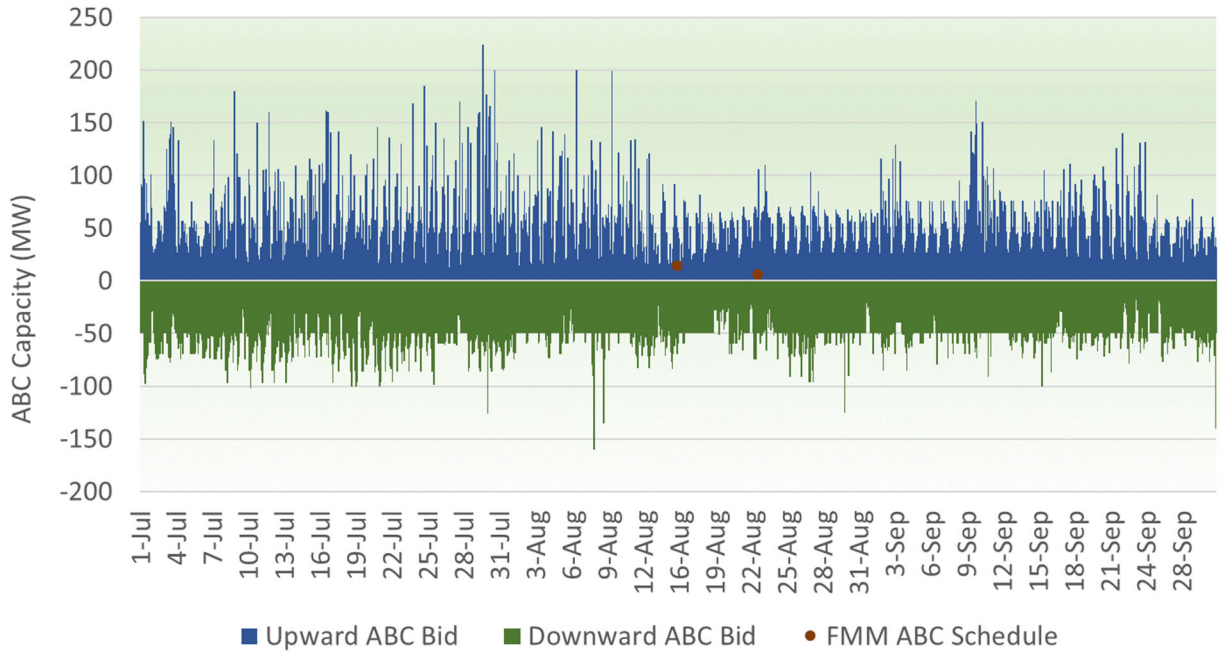


Figure 16: Submitted and Dispatched ABC in the BANCSMUD BAA – RTD

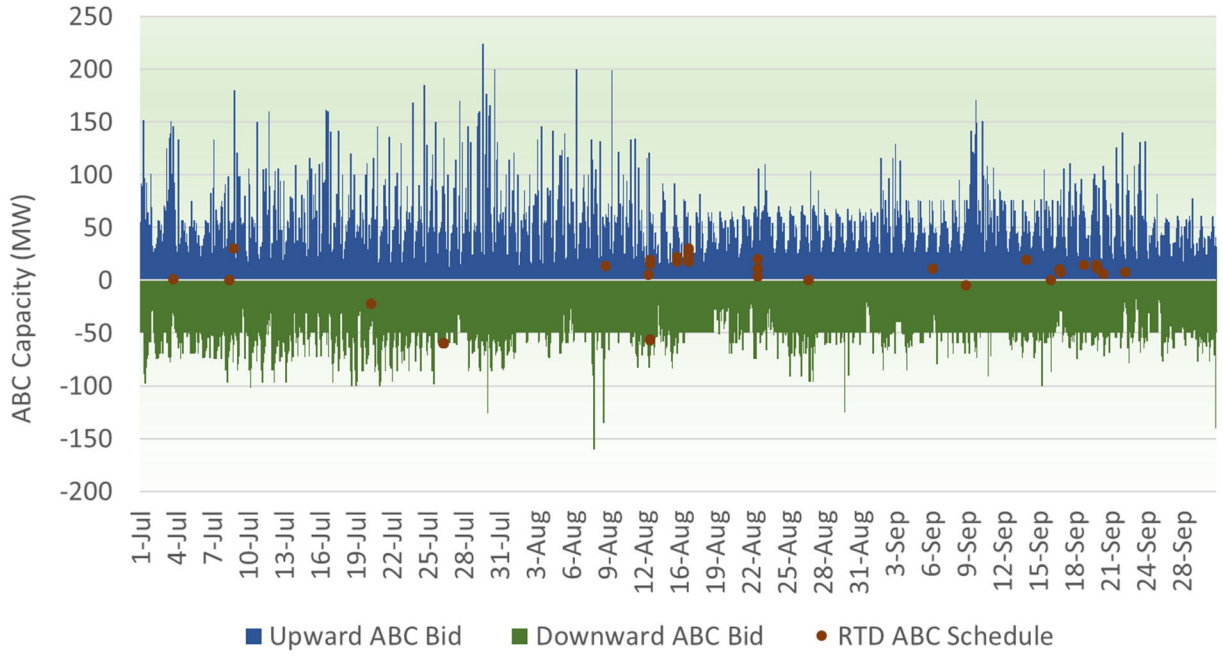


Figure 17: Submitted and Dispatched ABC in the SCL BAA – FMM

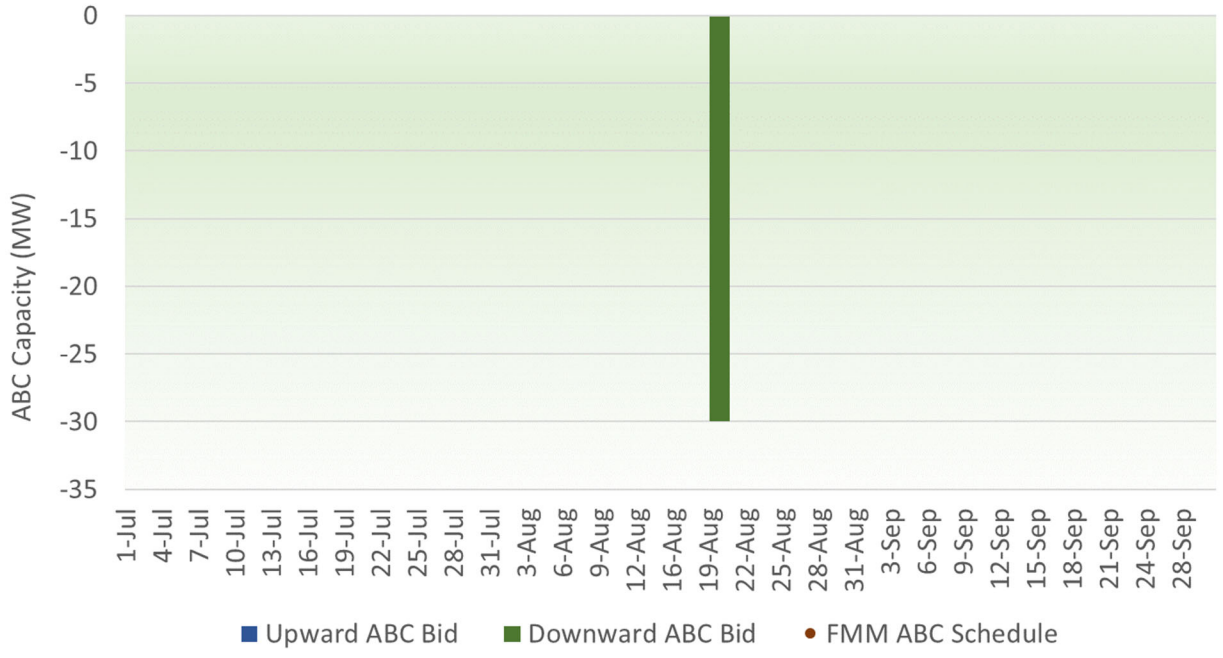


Figure 18: Submitted and Dispatched ABC in the SCL BAA – RTD

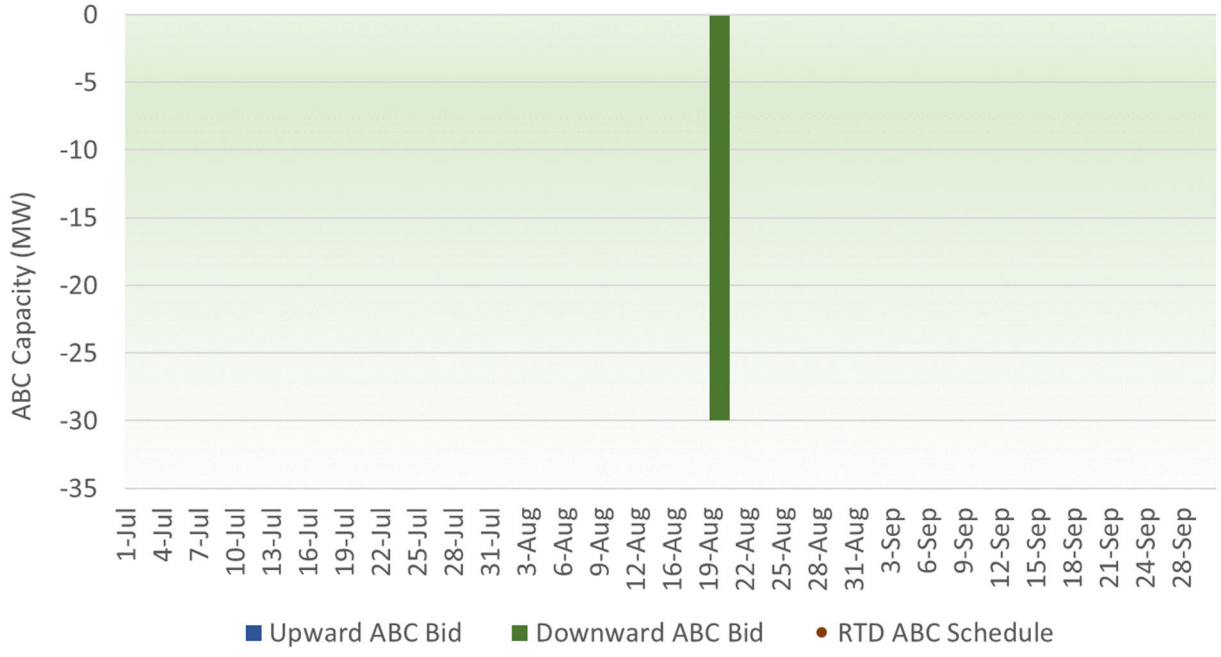


Figure 19: Submitted and Dispatched ABC in the SRP BAA – FMM

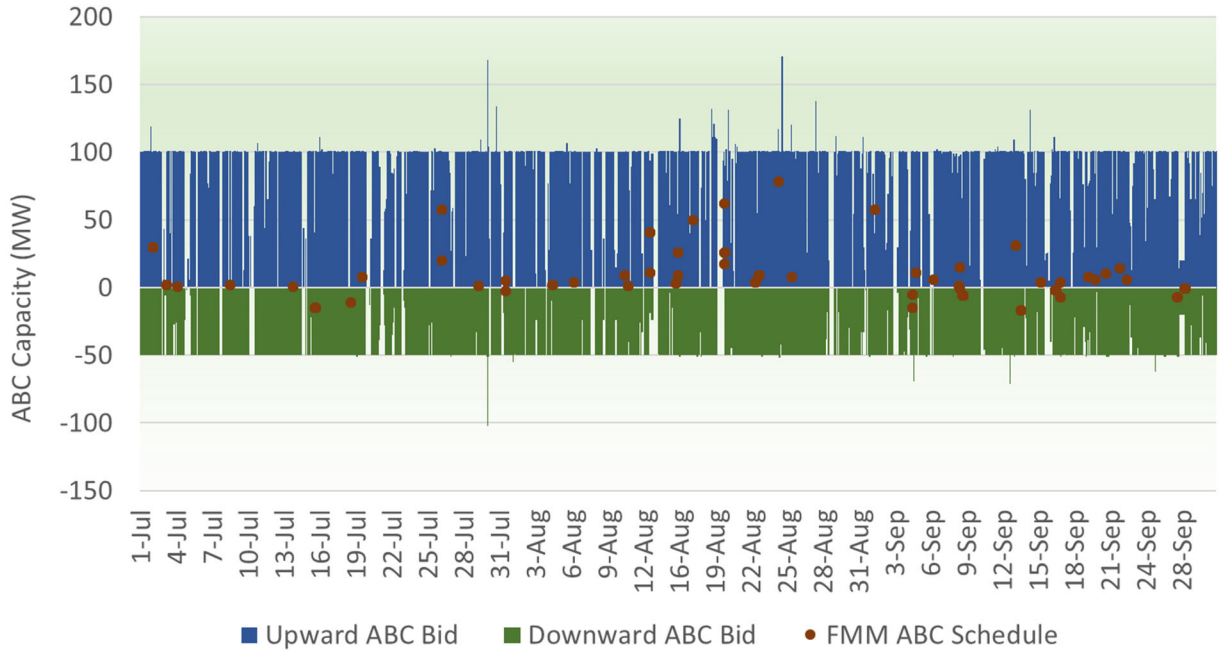


Figure 20: Submitted and Dispatched ABC in the SRP BAA – RTD

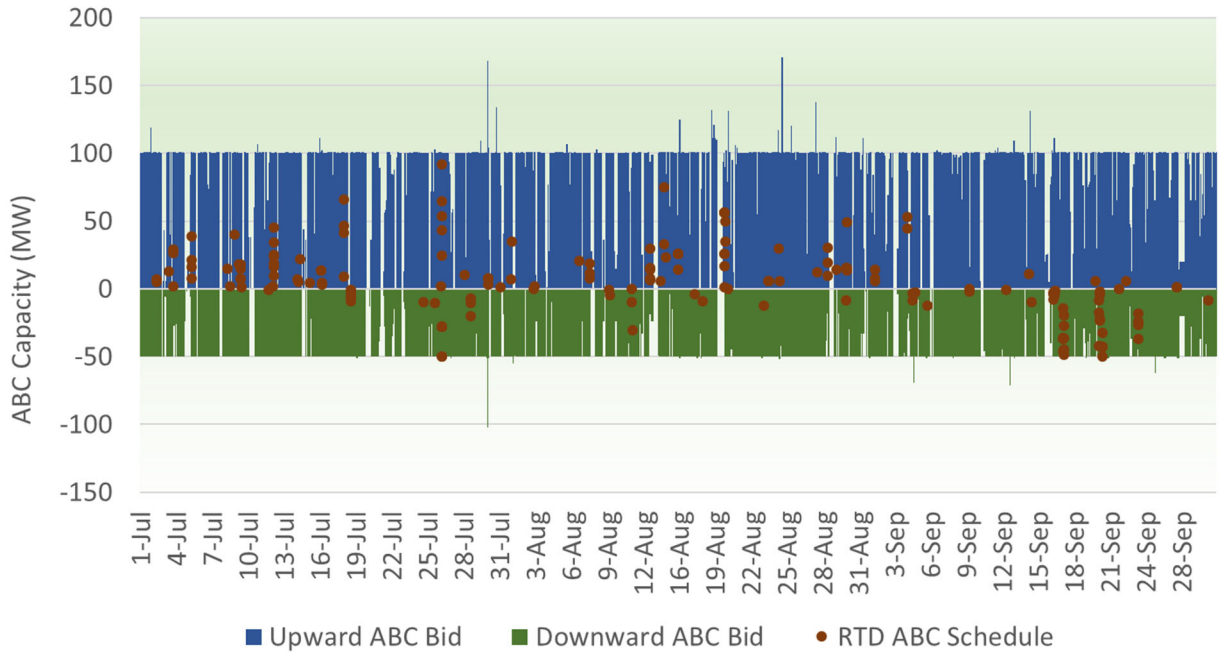


Table 1 summarizes the percentage of intervals in which each EIM entity submitted ABC to the EIM.

Table 1: Frequency of ABC Submitted to the EIM

Balancing Authority Area	Upward Capacity	Downward Capacity
PAC West	23.51%	5.38%
PAC East	15.83%	8.35%
NV Energy	99.43%	99.88%
APS	95.85%	99.06%
PSE	0.36%	0%
IPCO	--	--
PGE	94.32%	0%
PWRX	99.97%	99.97%
BANCSMUD	99.93%	99.84%
SCL	--	1.77%
SRP	84.58%	85.27%

Table 2 shows the frequency of each EIM entity's dispatched ABC, when the EIM entities made ABC available, for both the FMM and RTD.

Table 2: Frequency of EIM Dispatched ABC in the FMM and RTD

Balancing Authority Area	Upward Capacity		Downward Capacity	
	FMM	RTD	FMM	RTD
PAC West	99.23%	99.48%	0%	99.93%
PAC East	0%	0.26%	0%	0.05%
NV Energy	3.14%	3.45%	1.42%	1.17%
APS	0.05%	0.19%	0.01%	0.14%
PSE	0%	0%	0%	0%
IPCO	--	--	--	--
PGE	0.06%	0.31%	0%	0%
PWRX	0.02%	0.02%	0.02%	0.06%
BANCSMUD	0.03%	0.14%	0%	0.06%
SCL	--	--	0%	0%
SRP	0.70%	0.48%	0.35%	0.33%

B. Resources Supporting Available Balancing Capacity

The figures in this section show the number of different resources supporting the ABC the EIM entities submitted to the FMM and RTD in both the upward and downward directions.

Figure 21: Number of Resources Supporting the Submitted ABC in the PAC West BAA

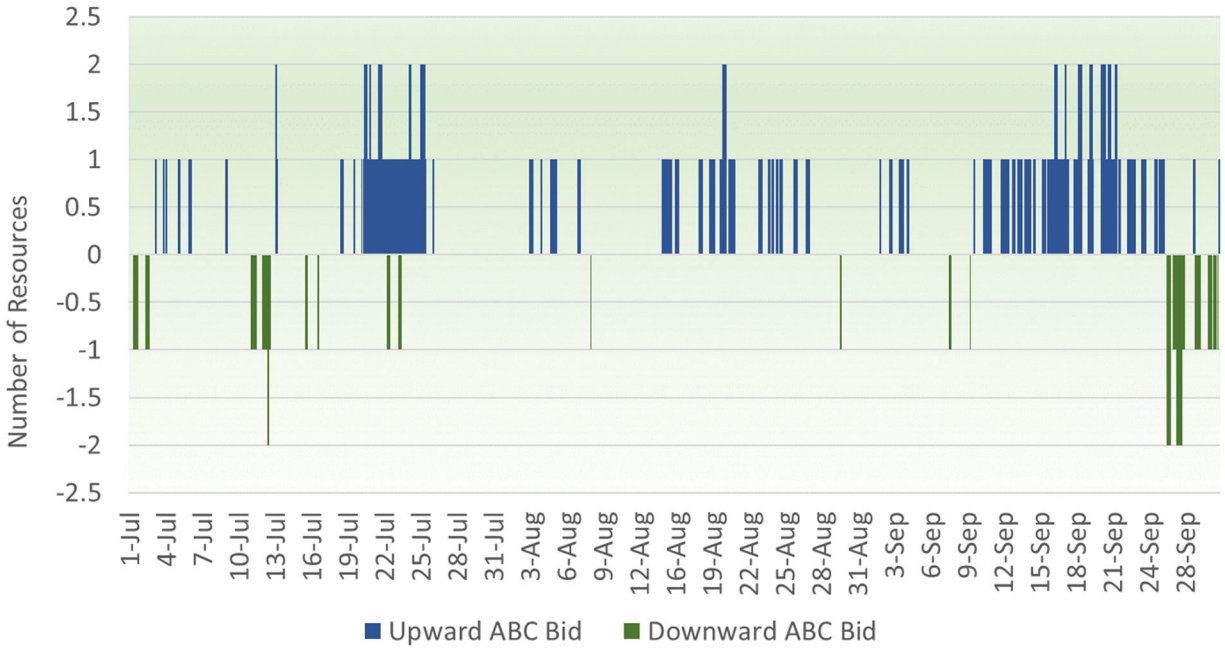


Figure 22: Number of Resources Supporting the Submitted ABC in the PAC East BAA

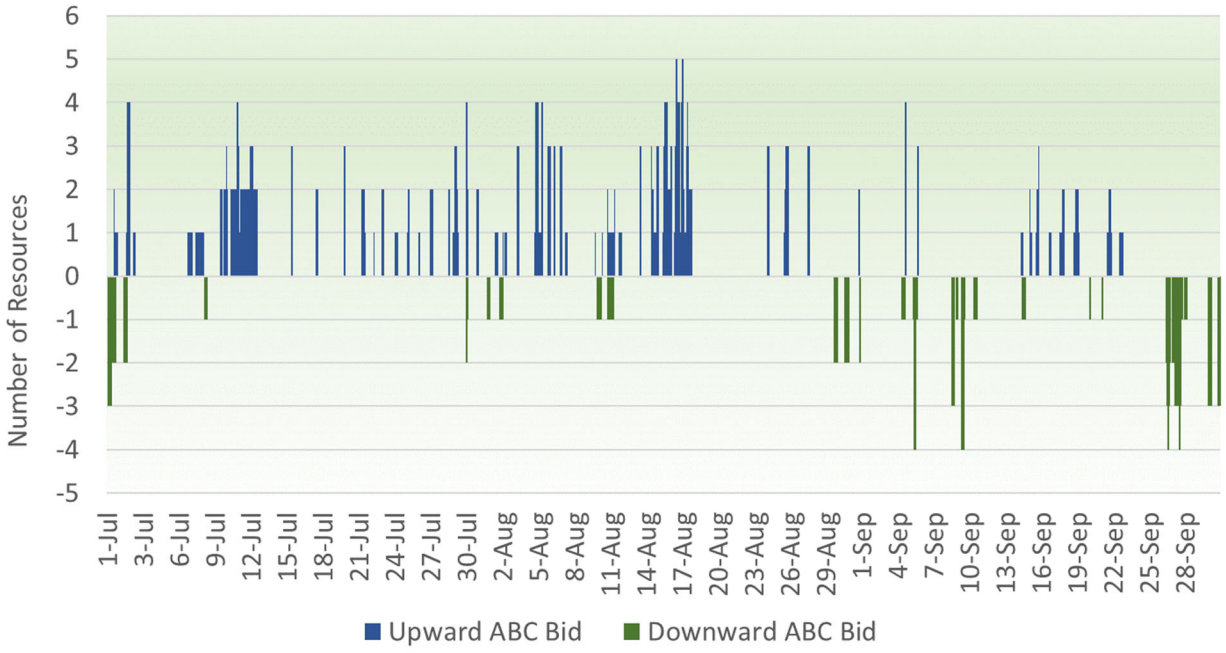


Figure 23: Number of Resources Supporting the Submitted ABC in the NV Energy BAA

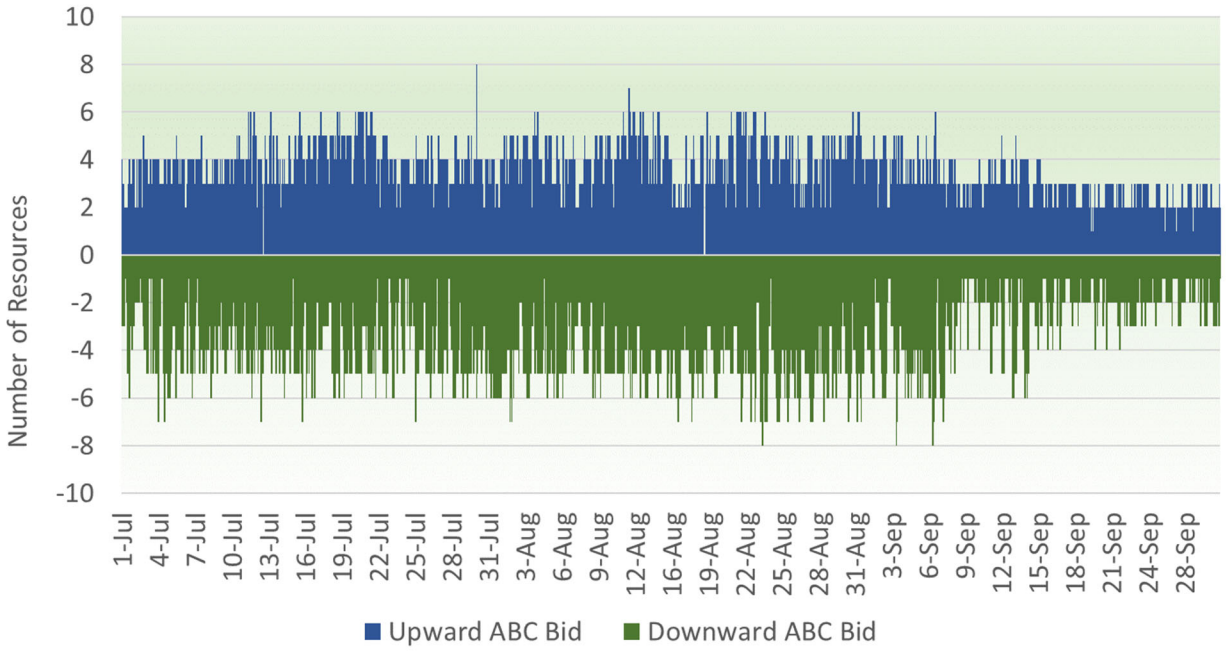


Figure 24: Number of Resources Supporting the Submitted ABC in the APS BAA

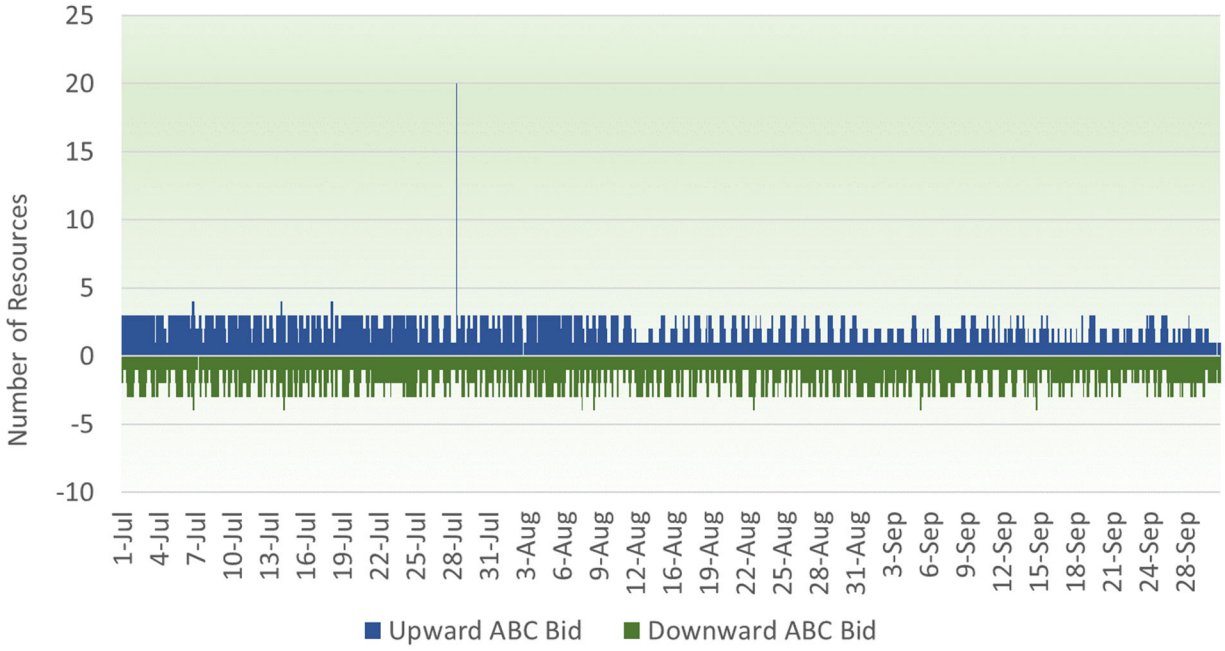


Figure 25: Number of Resources Supporting the Submitted ABC in the PSE BAA

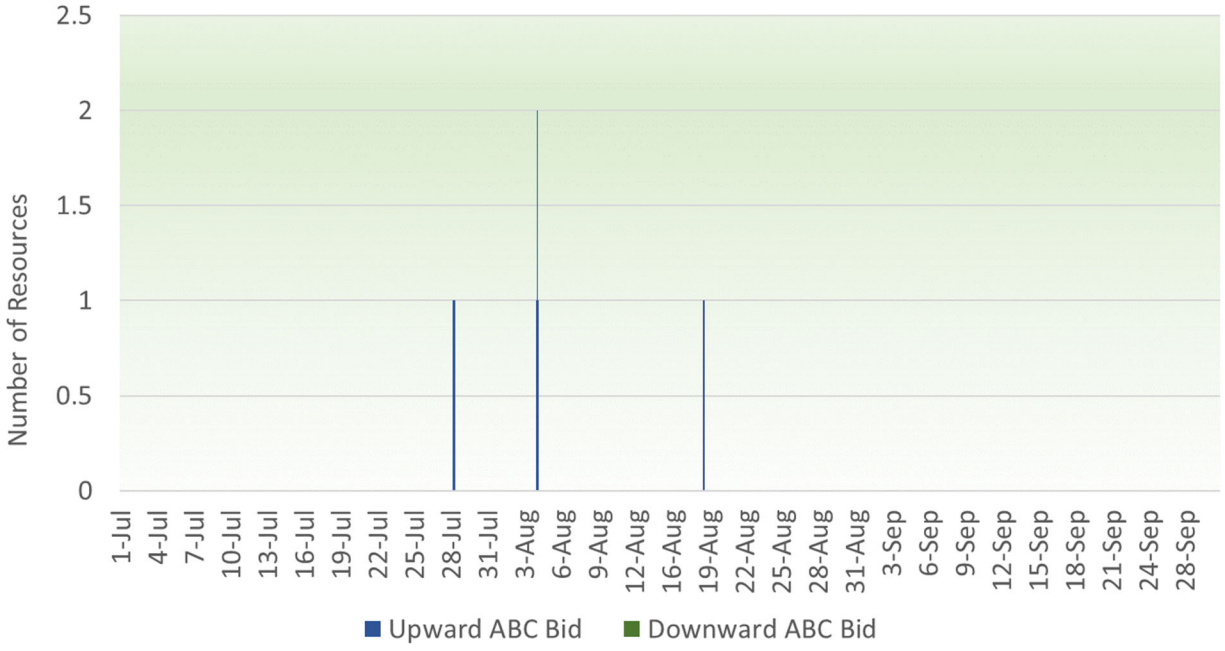


Figure 26: Number of Resources Supporting the Submitted ABC in the PGE BAA

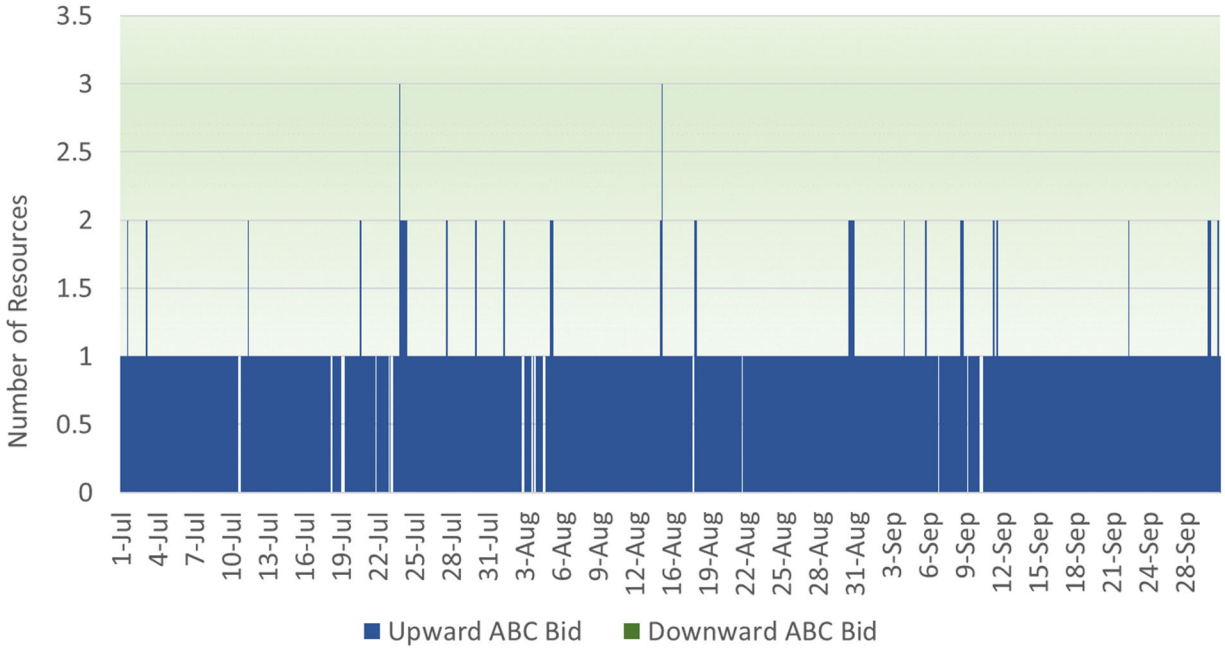


Figure 27: Number of Resources Supporting the Submitted ABC in the PWRX BAA

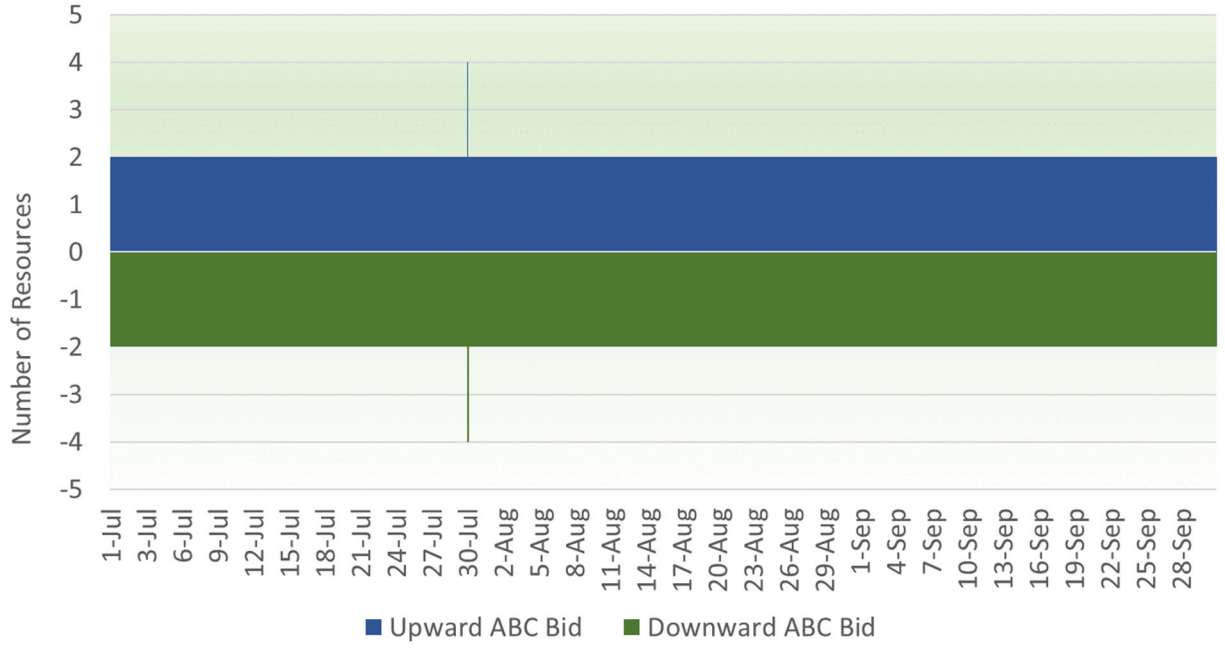


Figure 28: Number of Resources Supporting the Submitted ABC in the BANCSMUD BAA

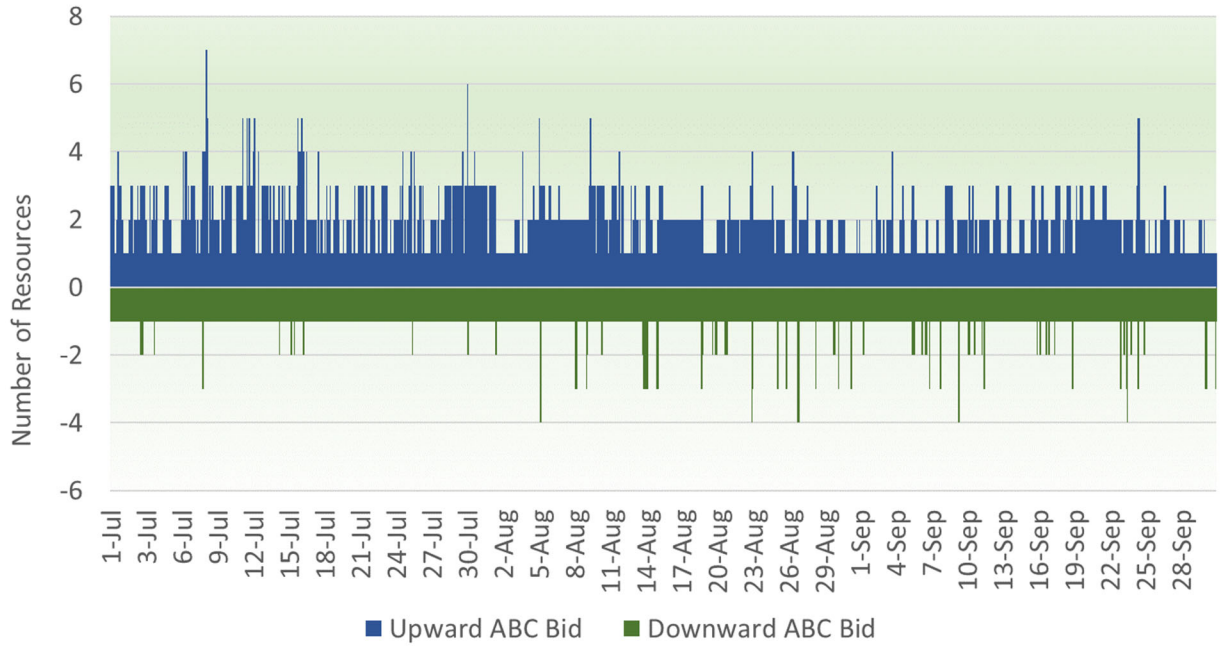


Figure 29: Number of Resources Supporting the Submitted ABC in the SCL BAA

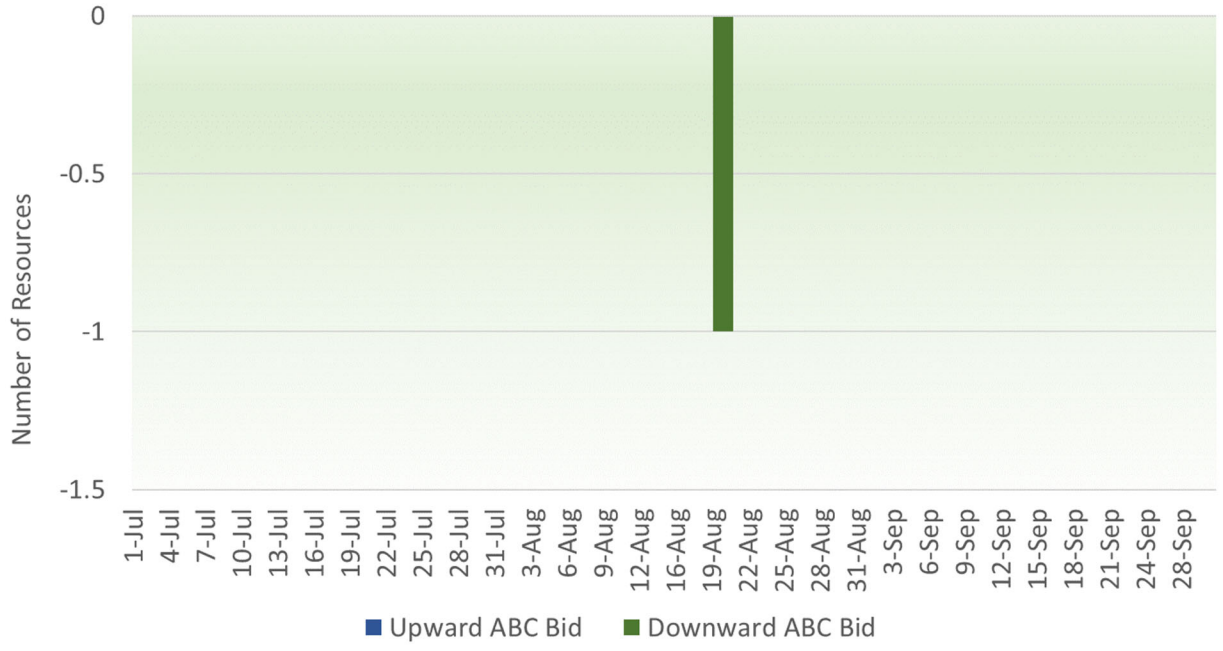
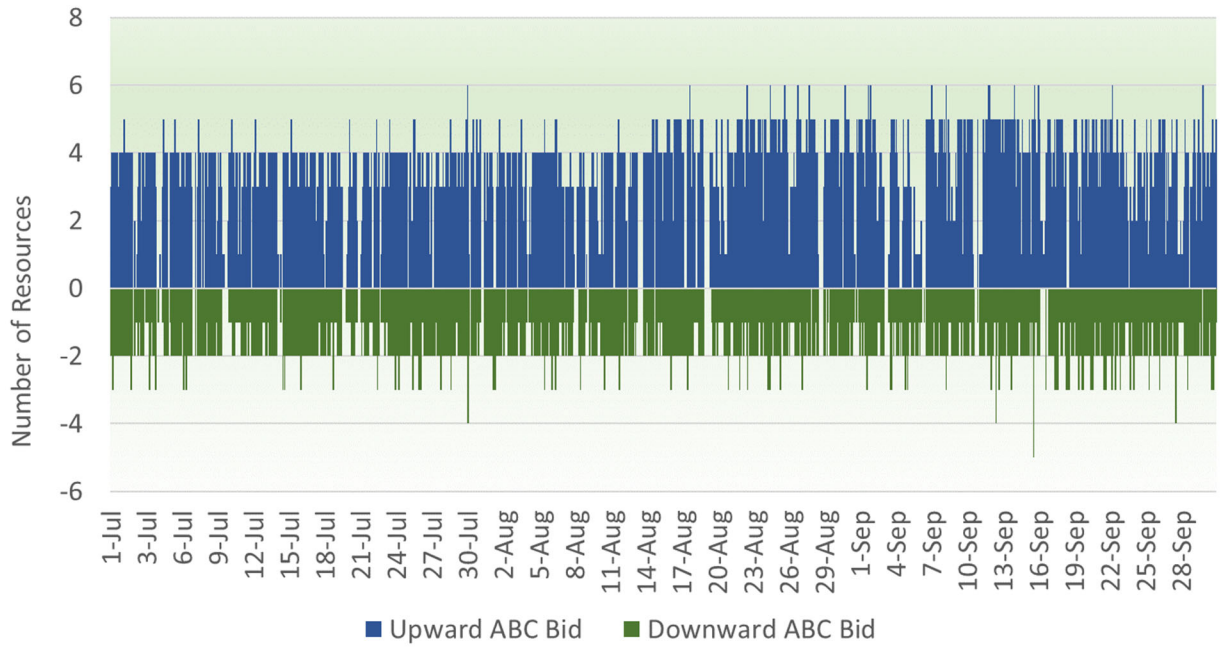


Figure 30: Number of Resources Supporting the Submitted ABC in the SRP BAA



C. Available Balancing Capacity and Power Balance Constraint Infeasibilities

The purpose of the ABC enhancement is to make capacity available that otherwise would not be visible to the EIM. The primary objective in making such capacity available is that the EIM can recognize and access that capacity when the conditions warrant its use, namely when the EIM is running out of capacity made available through economic bids. The ABC is capacity stacked above economic bids, but below the power balance constraint relaxation penalty price. When the market is tight in supply and it has exhausted all effective economic bids, the market clearing process will access the ABC. If there is sufficient ABC, the EIM will relax the power balance constraint to clear the market. As such, the market clearing process uses the ABC to resolve the power balance infeasibility. If instead the ABC identified is not sufficient to cure the infeasibility, the ABC may be exhausted and there may still be the need to relax the power balance constraint in order to clear the EIM.

The figures in this section show the amount of ABC bids submitted in the FMM and RTD, along with the power balance constraint infeasibilities, separately. IPCO did not submit ABC bids for the quarter covered in this report, however the PBC infeasibilities in the IPCO BAA are displayed graphically below.

Figure 31: Submitted ABC and Power Balance Constraint Infeasibilities in the PAC West BAA – FMM

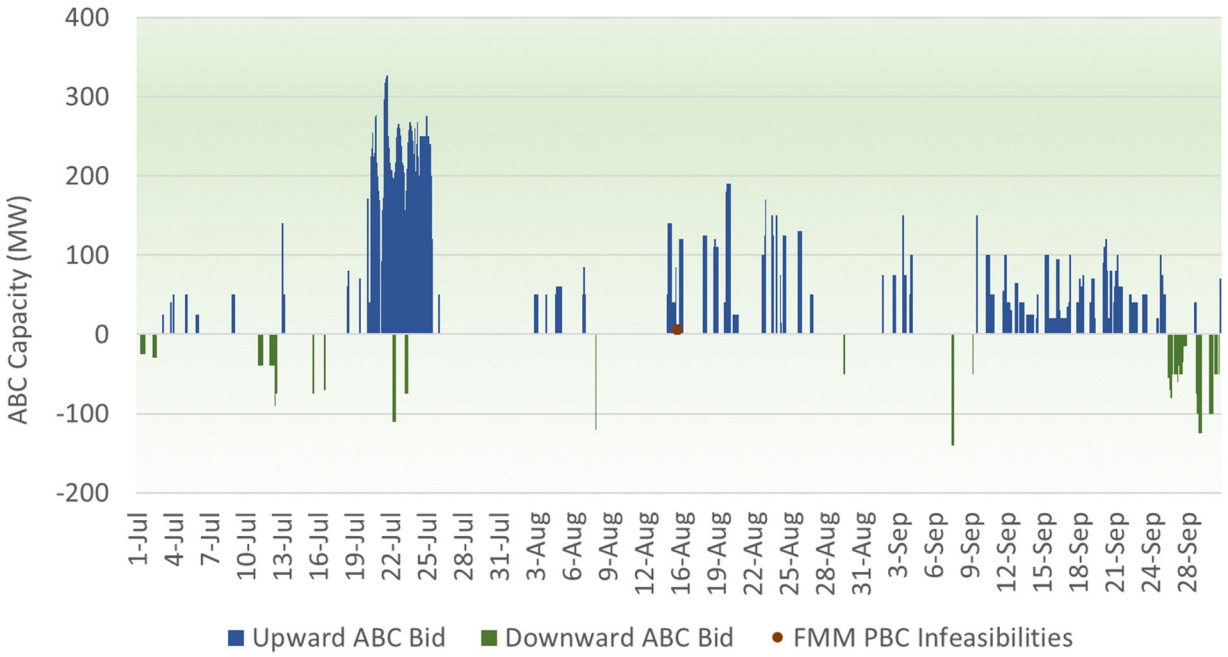


Figure 32: Submitted ABC and Power Balance Constraint Infeasibilities in the PAC West BAA – RTD

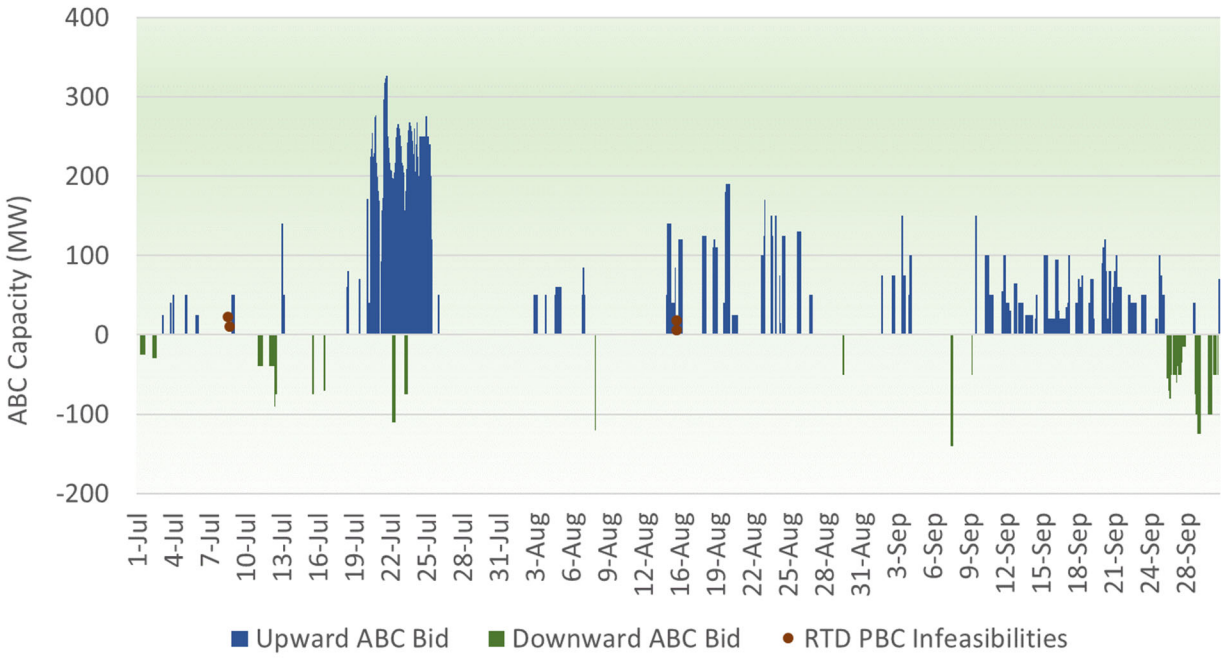


Figure 33: Submitted ABC and Power Balance Constraint Infeasibilities in the PAC East BAA – FMM

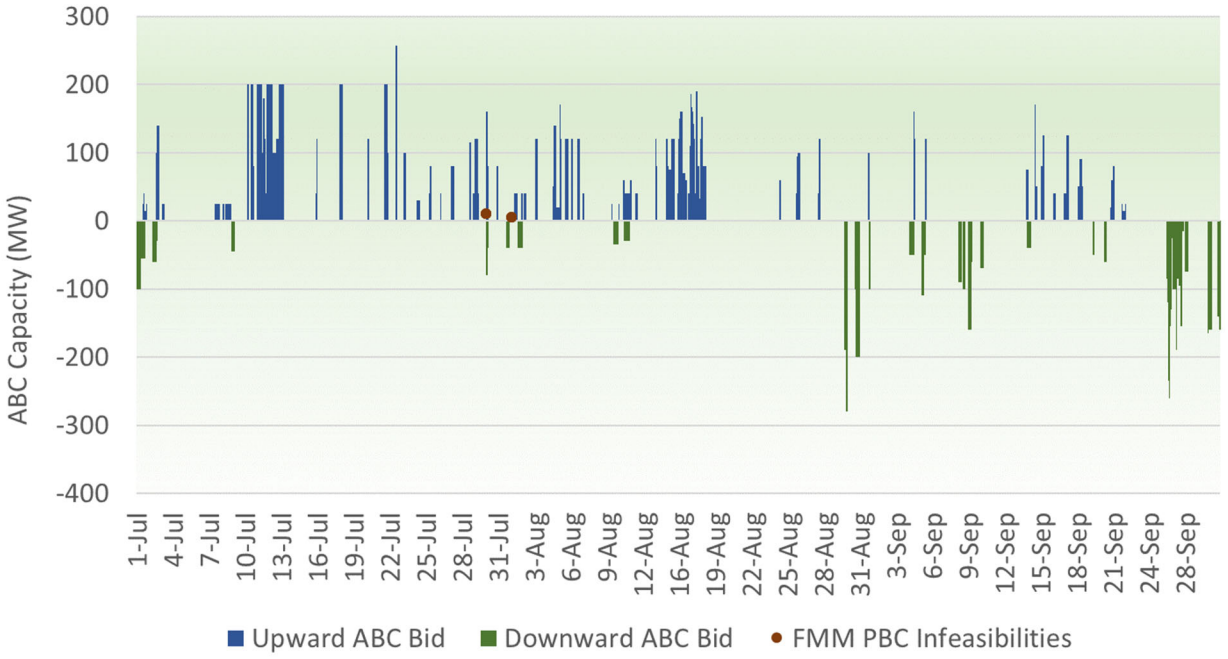


Figure 34: Submitted ABC and Power Balance Constraint Infeasibilities in the PAC East BAA – RTD

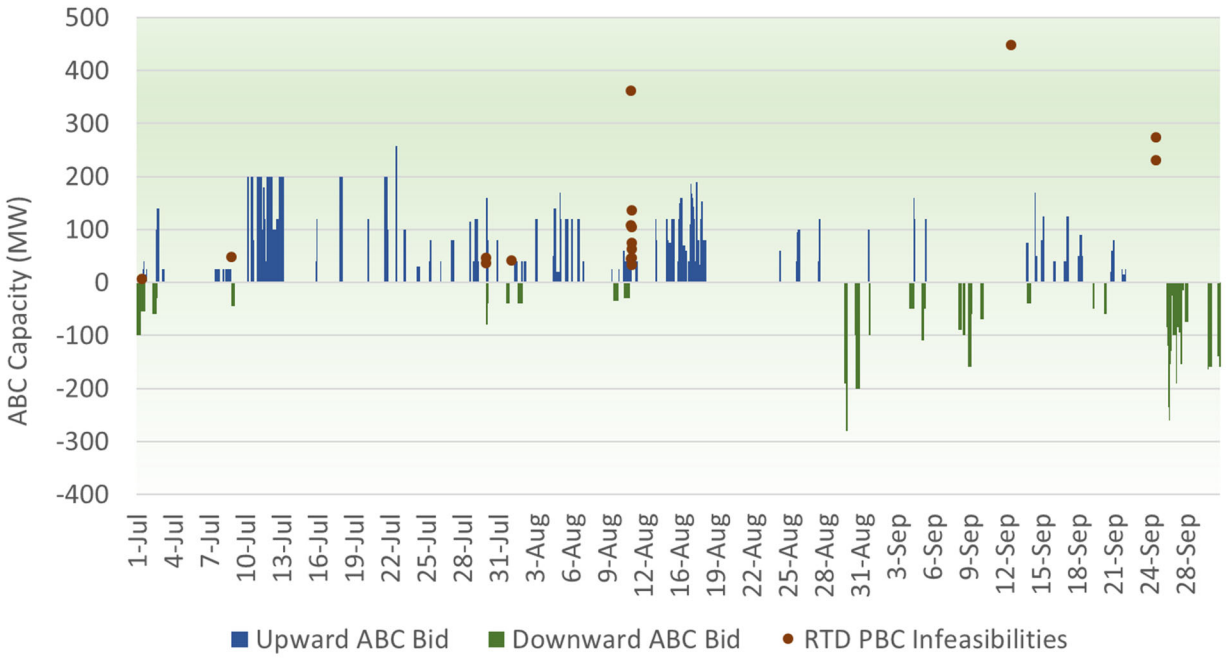


Figure 35: Submitted ABC and Power Balance Constraint Infeasibilities in the NV Energy BAA – FMM

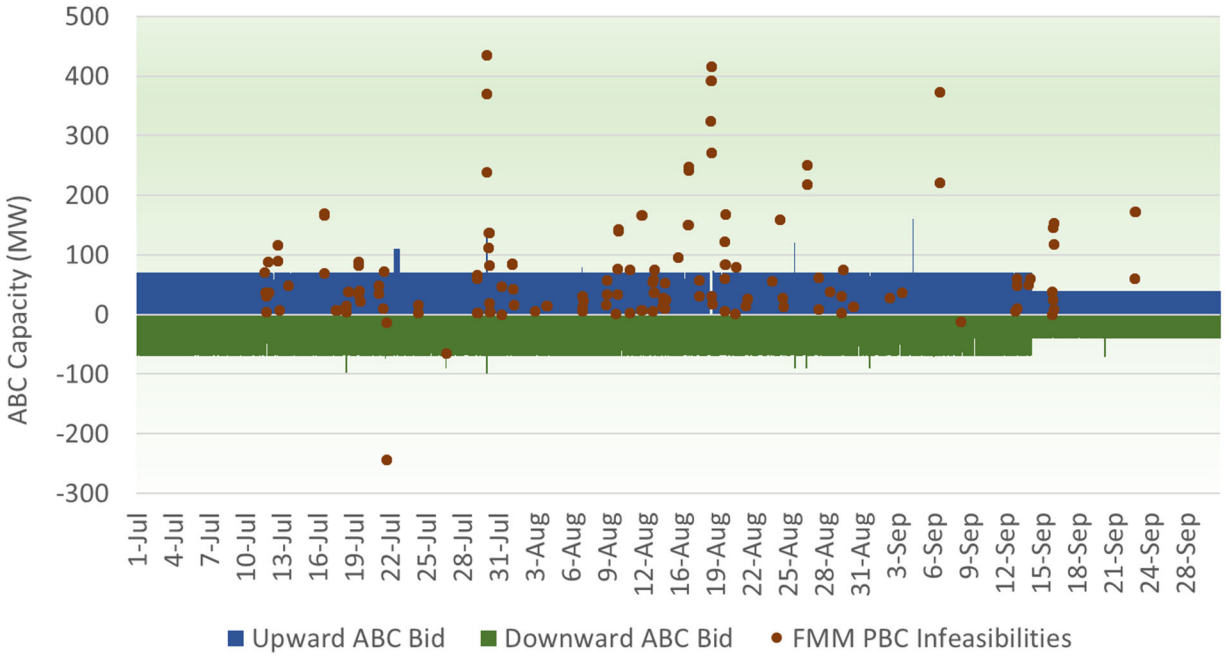


Figure 36: Submitted ABC and Power Balance Constraint Infeasibilities in the NV Energy BAA – RTD

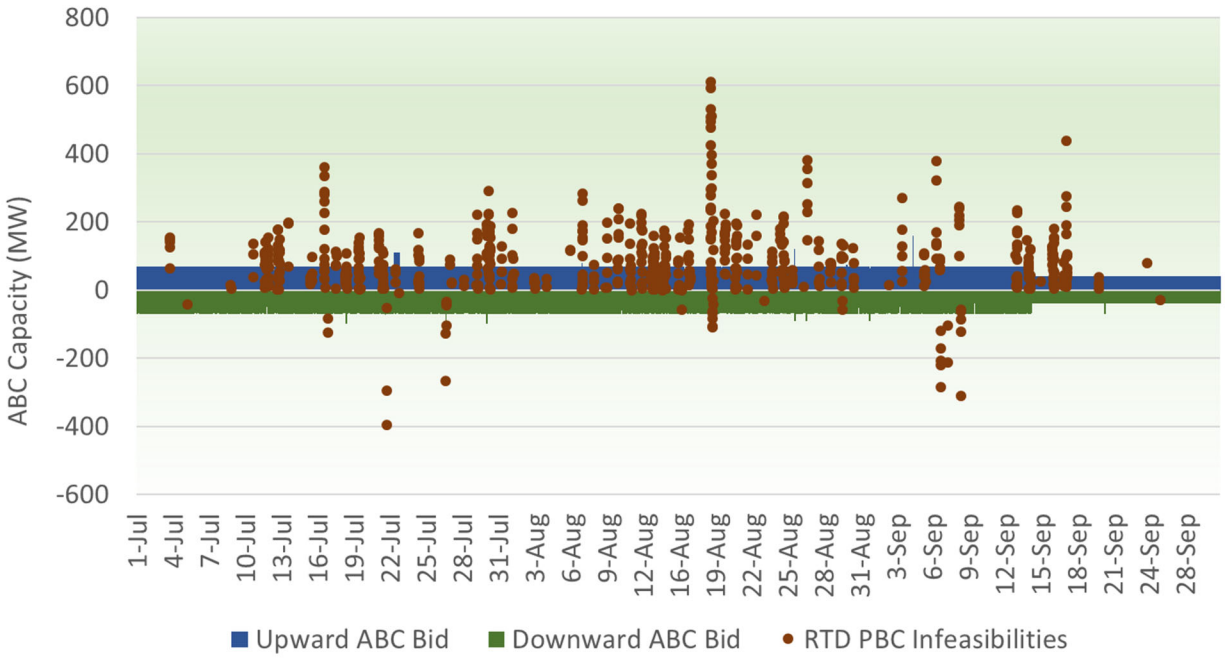


Figure 37: Submitted ABC and Power Balance Constraint Infeasibilities in the APS BAA – FMM

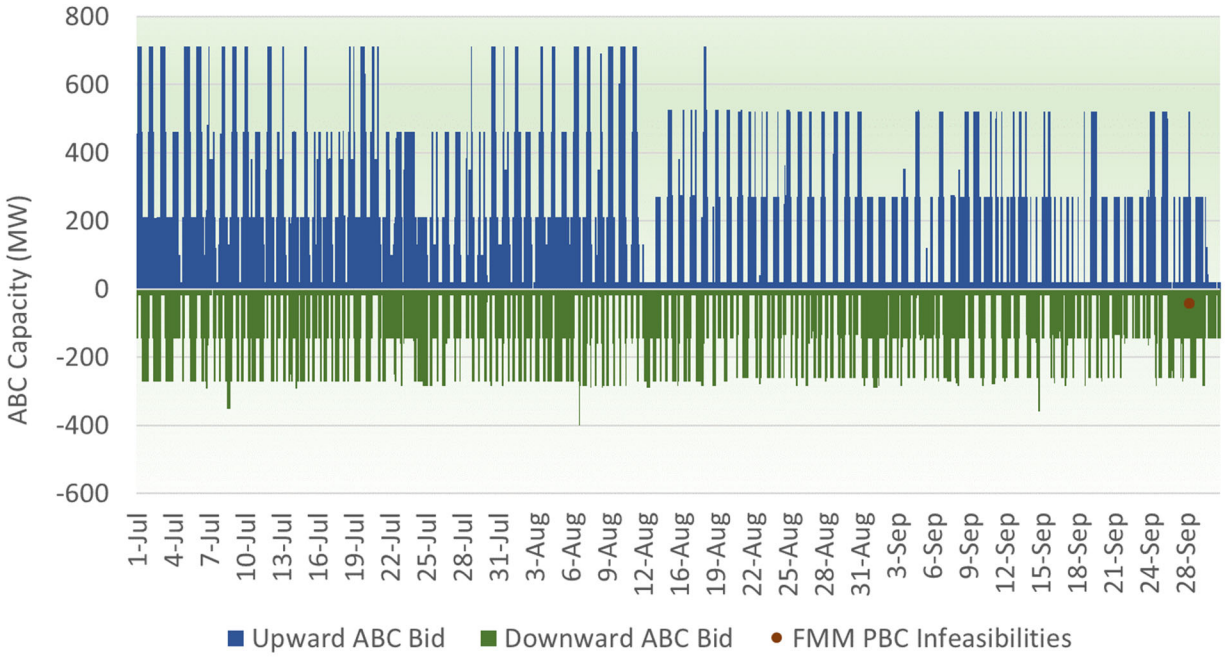


Figure 38: Submitted ABC and Power Balance Constraint Infeasibilities in the APS BAA – RTD

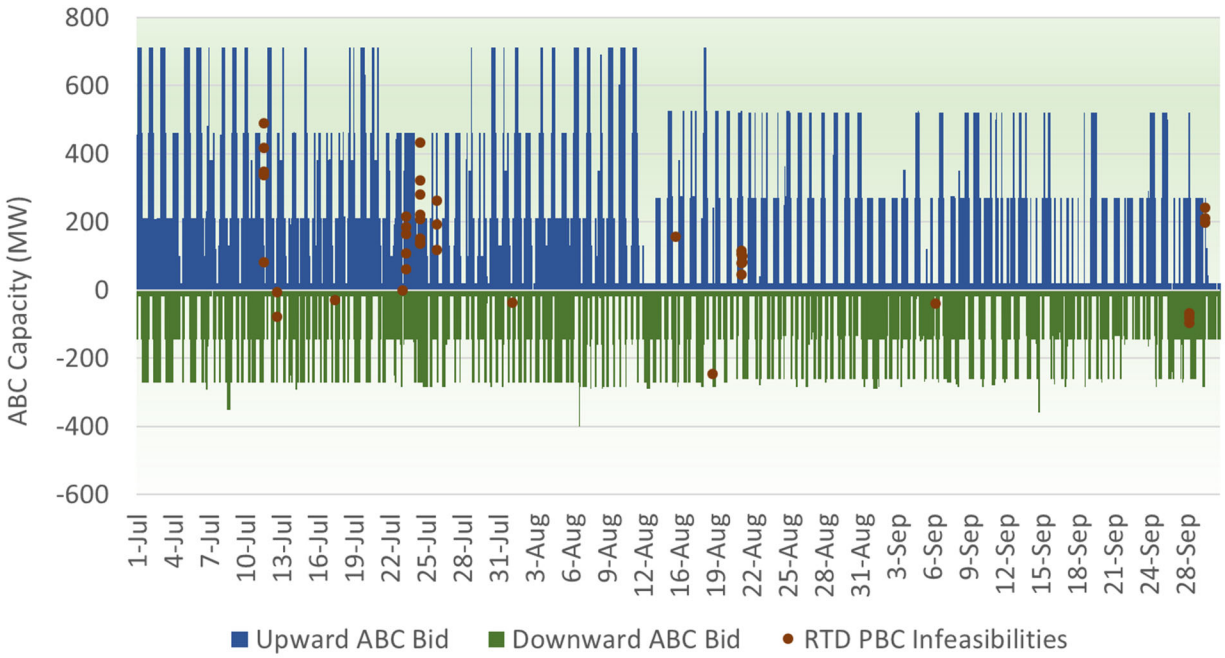


Figure 39: Submitted ABC and Power Balance Constraint Infeasibilities in the PSE BAA – FMM

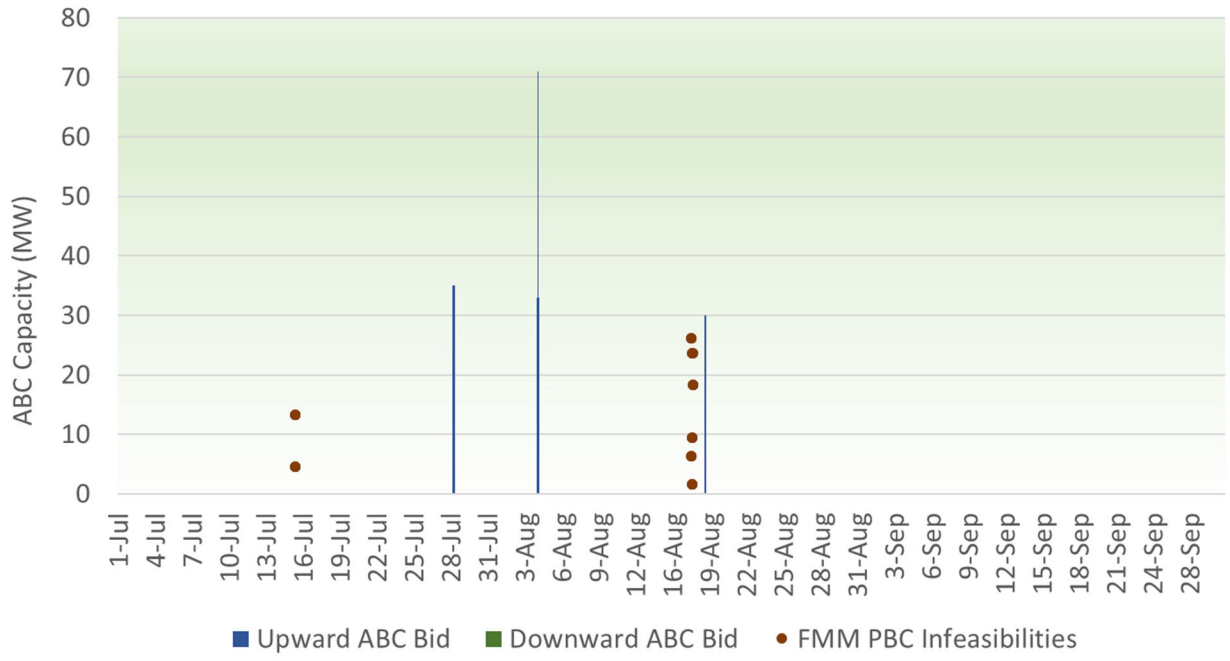


Figure 40: Submitted ABC and Power Balance Constraint Infeasibilities in the PSE BAA – RTD

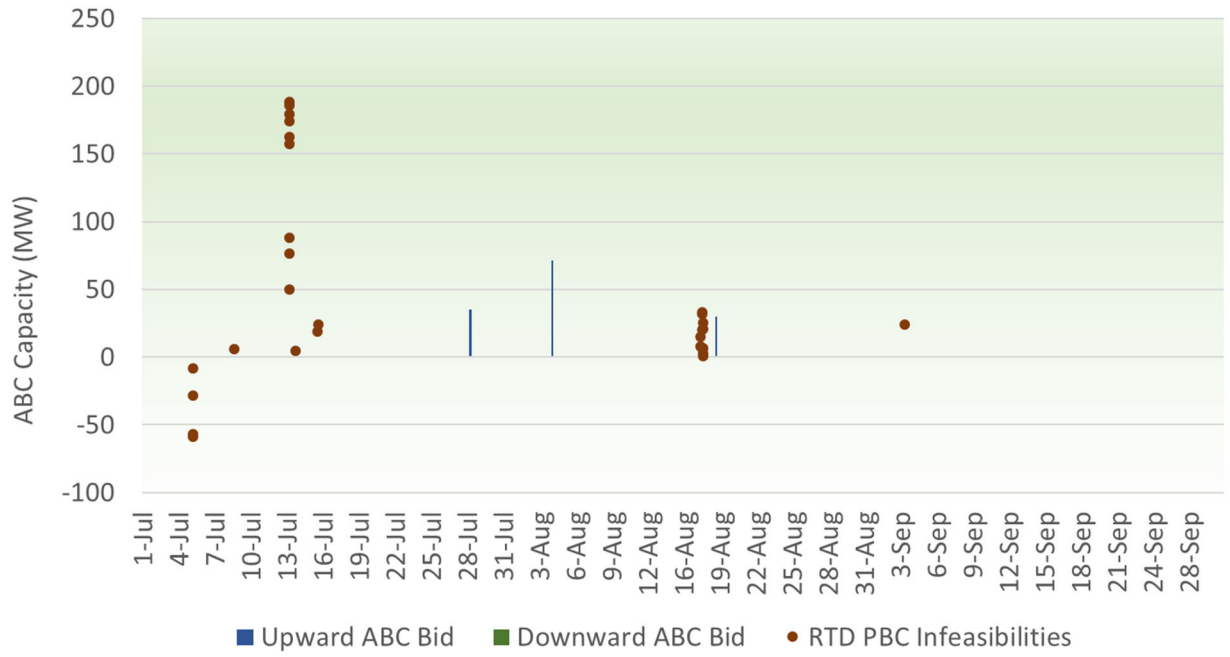


Figure 41: Submitted ABC and Power Balance Constraint Infeasibilities in the IPCO BAA – FMM

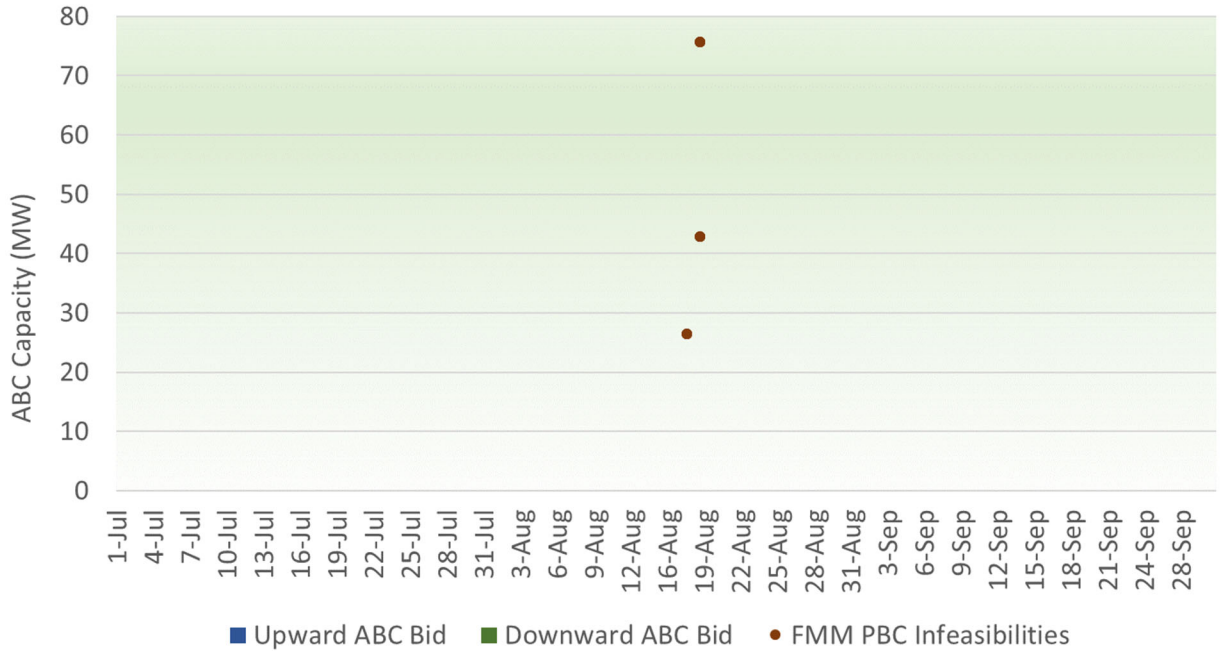


Figure 42: Submitted ABC and Power Balance Constraint Infeasibilities in the IPCO BAA – RTD

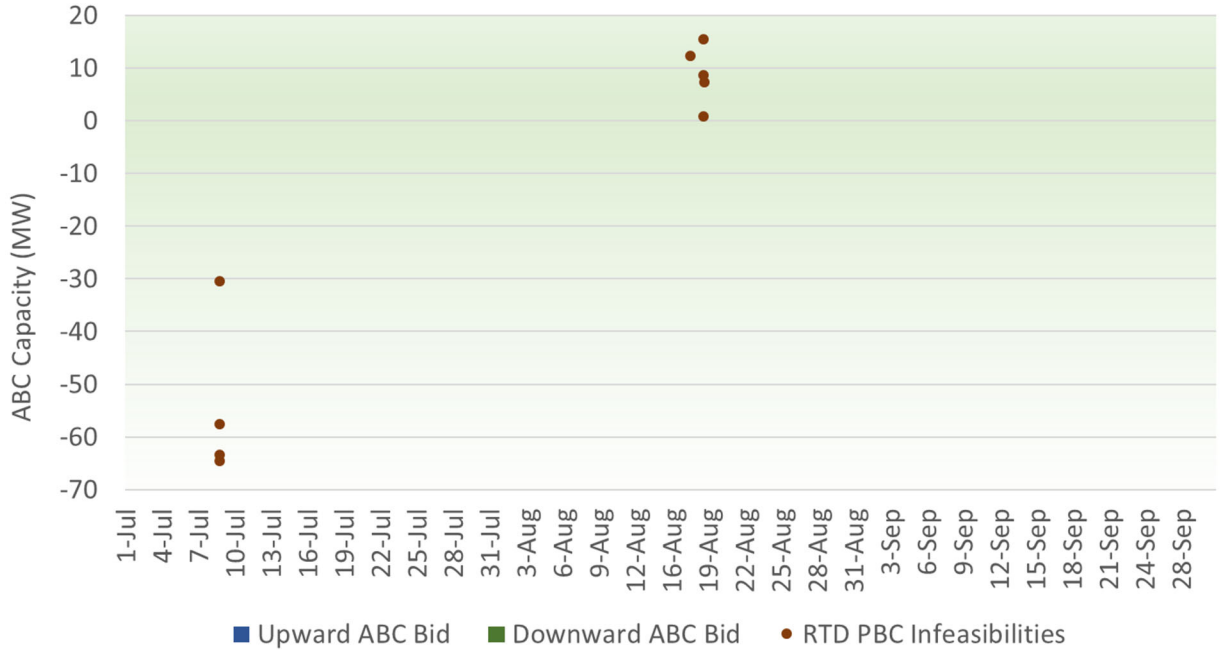


Figure 43: Submitted ABC and Power Balance Constraint Infeasibilities in the PGE BAA – FMM

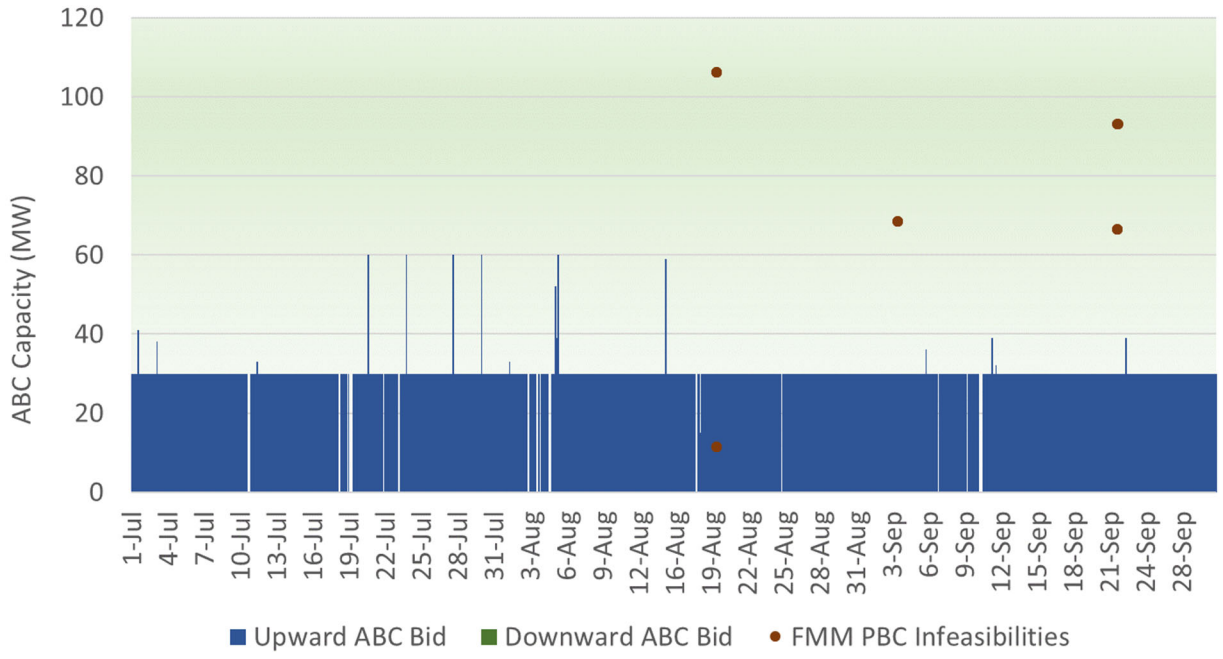


Figure 44: Submitted ABC and Power Balance Constraint Infeasibilities in the PGE BAA – RTD

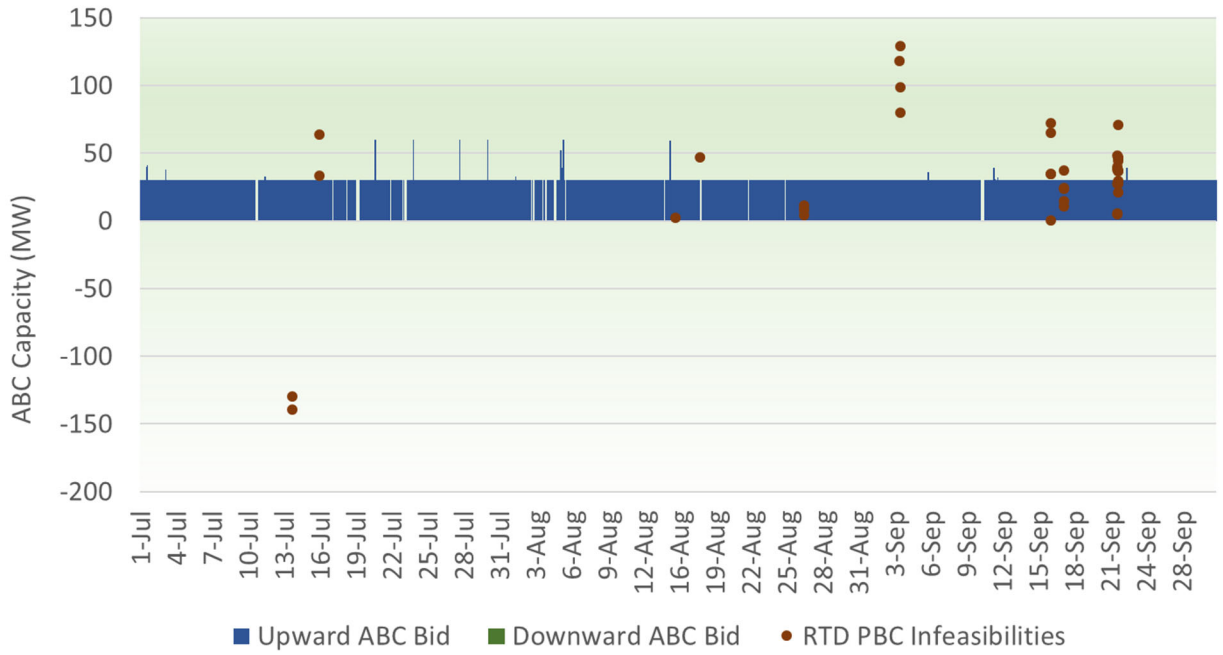


Figure 45: Submitted ABC and Power Balance Constraint Infeasibilities in the PWRX BAA – RTD

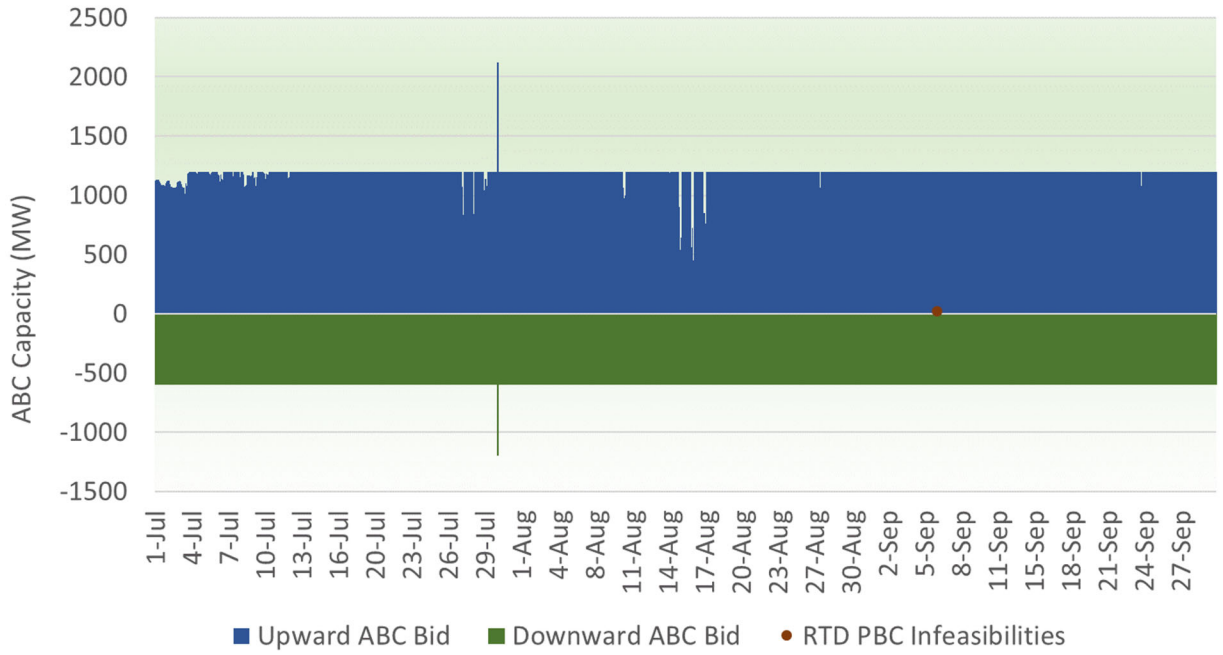


Figure 46: Submitted ABC and Power Balance Constraint Infeasibilities in the BANCSMUD BAA – FMM

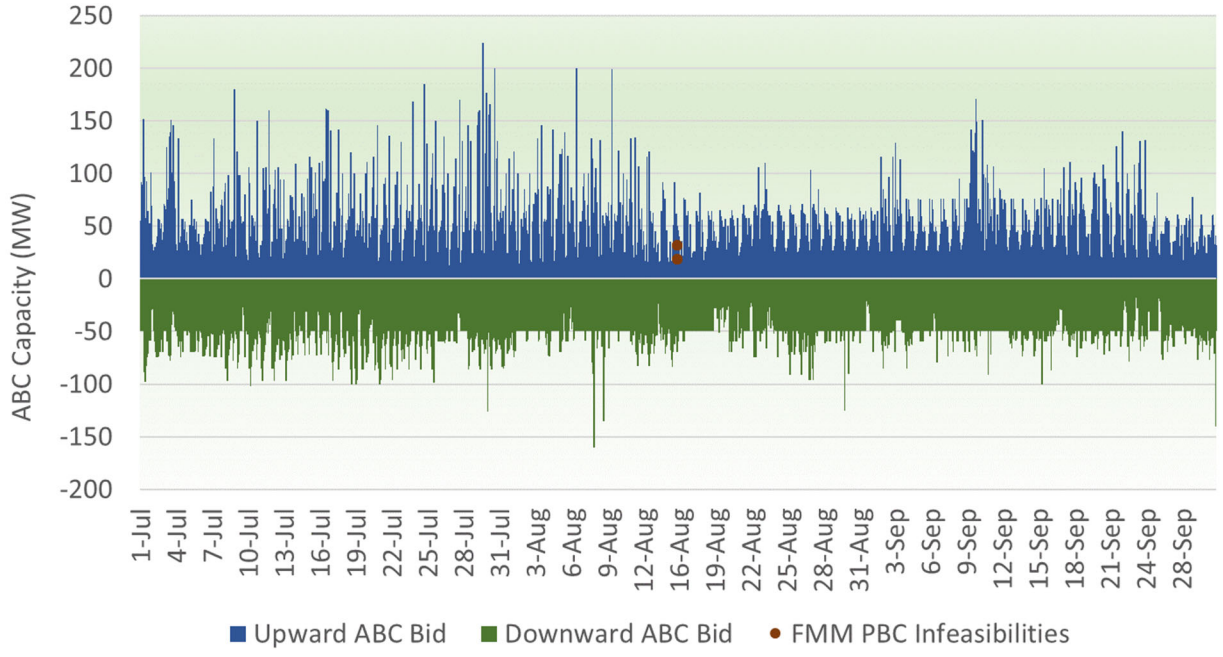


Figure 47: Submitted ABC and Power Balance Constraint Infeasibilities in the BANCSMUD BAA – RTD

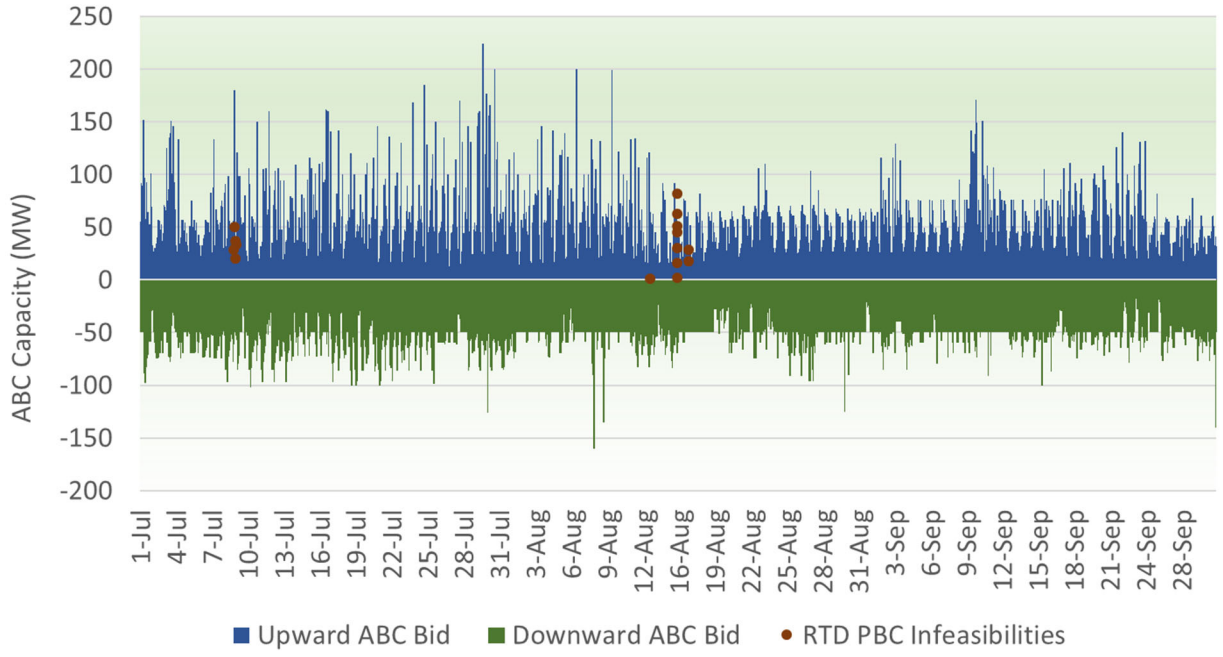


Figure 48: Submitted ABC and Power Balance Constraint Infeasibilities in the SCL BAA – FMM

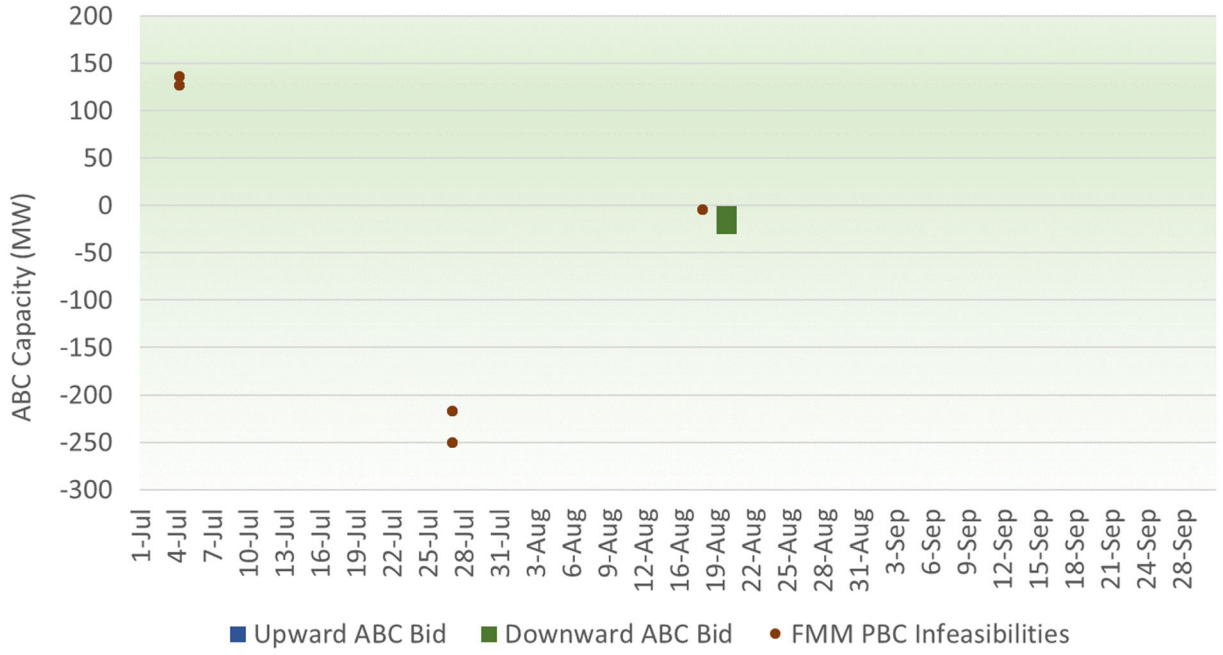


Figure 49: Submitted ABC and Power Balance Constraint Infeasibilities in the SCL BAA – RTD

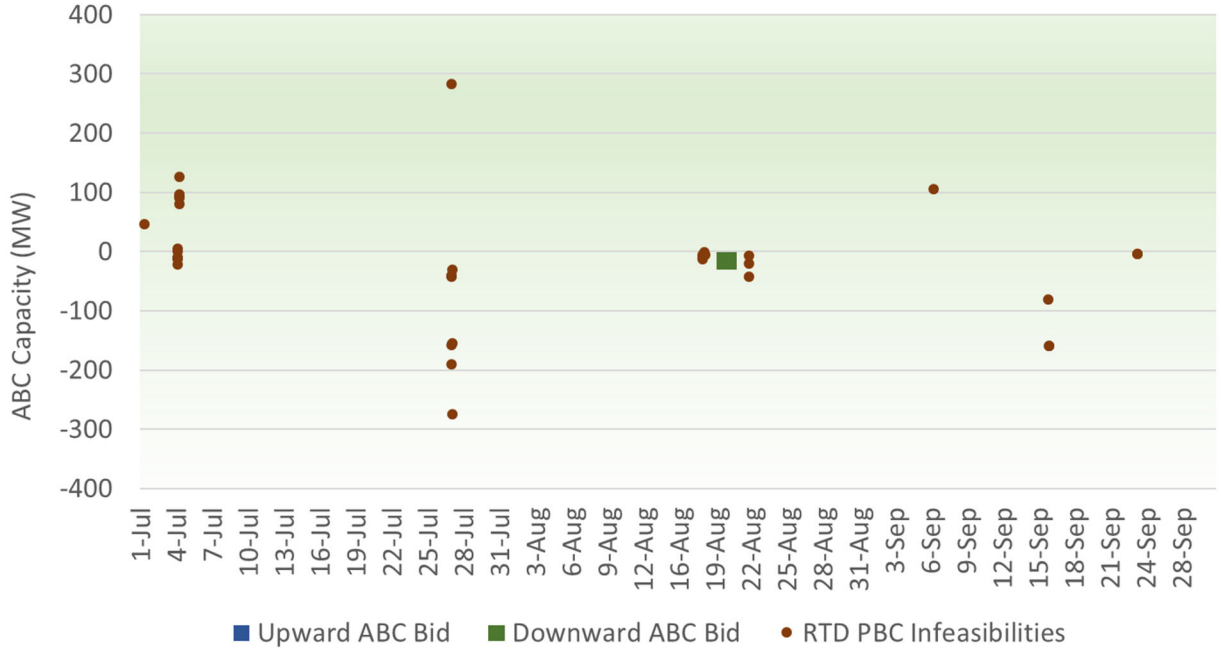


Figure 50: Submitted ABC and Power Balance Constraint Infeasibilities in the SRP BAA – FMM

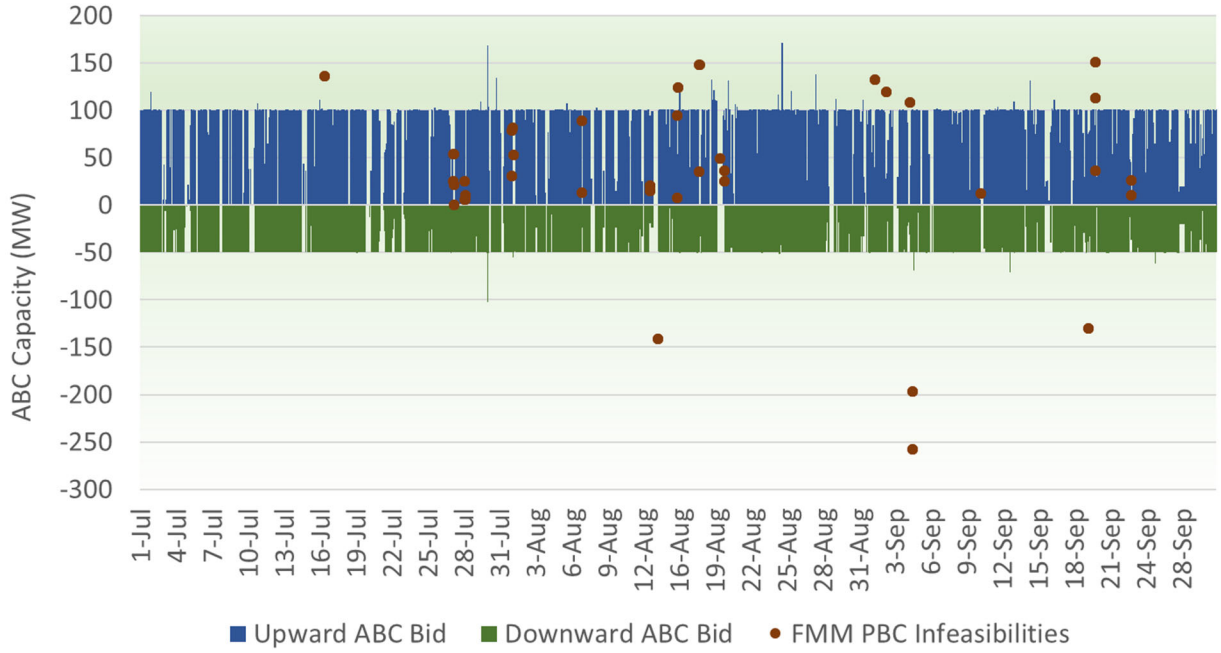
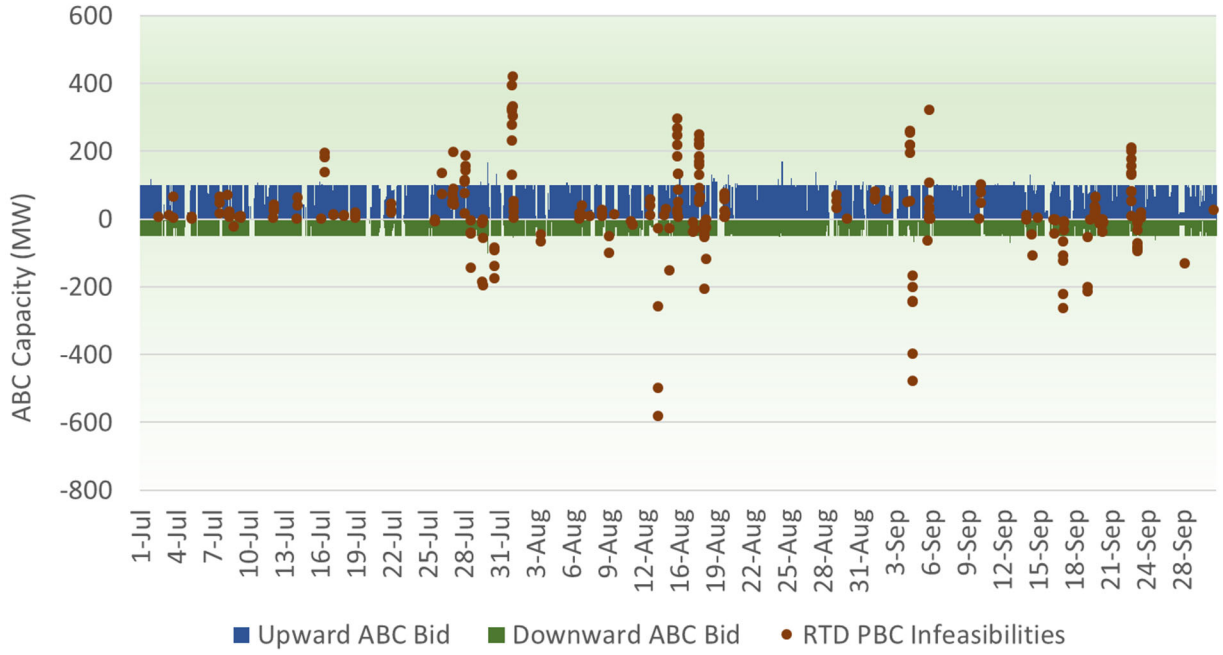


Figure 51: Submitted ABC and Power Balance Constraint Infeasibilities in the SRP BAA – RTD



Based on the data provided in the figures above, Table 3 shows the frequency of intervals in which the EIM entities did not make any ABC available to the EIM, which caused the power balance constraint to relax. Specifically, the data in Table 3 provides the percentage amount of over-supply infeasibilities where downward ABC was needed, and under-supply infeasibilities where upward ABC was needed. For example, if the metric for the RTD for undersupply was 100 percent, this indicates that in all intervals when an undersupply infeasibility was observed in the RTD, the EIM entity did not submit any ABC to the EIM.

Table 3: Frequency of Power Balance Infeasibilities When no ABC was Available in the Market

	Over-supply		Under-supply	
BAA	FMM	RTD	FMM	RTD
PAC West	0%	0%	100%	100%
PAC East	0%	0%	100%	100%
NV Energy	0%	7.69%	4.52%	5.61%
APS	0%	0%	0%	0%
PSE	0%	100%	100%	100%
IPCO	0%	0%	100%	100%
PGE	0%	100%	0%	16.67%
PWRX	0%	0%	0%	0%
BANCSMUD	0%	0%	0%	0%
SCL	100%	100%	100%	100%
SRP	25%	38.89%	69.70%	60.23%

Through its evaluation of the ABC performance, the CAISO has observed two additional scenarios that can occur in the EIM:

1. Use of ABC related to resource constraints: The CAISO market optimization software recognizes the resource constraints and characteristics of capacity identified as ABC, just as it does of any other participating capacity in the market. Therefore, at times the market is constrained from utilizing the identified capacity due to the operational characteristics of the resources identified as such. The CAISO has observed that in several instances when the power balance constraint was relaxed, the ABC identified by the EIM entity was not sufficient to resolve the power balance infeasibility because of the operational ramp limitations of the resources. In some cases, the resource's ramp rate may be very limited because of the resource's operating point at any given point in time. In other cases, the resource is not available because in that particular interval the resource must cross a forbidden region first in order to access the ABC and that may take several market intervals, thereby preventing the market optimization software from utilizing the identified capacity. In some instances, a resource is required to cross the operational range where the ABC is defined, and given its ramp rate, the only way for the resource to reach an expected operating point is by dispatching it within the operating region with ABC.
2. Use of ABC related to congestion management: The CAISO market systems release the ABC in the scheduling run based on the scheduling run's assessment of system conditions. However, the CAISO schedules and prices resources in the CAISO markets. The ABC is considered as

part of the market clearing process in the pricing run. The pricing run will optimize the entire EIM BAA, which is the combination of all BAAs that participate in the EIM, including the CAISO's BAA. The market software will simultaneously consider the ABC in clearing the least-cost congestion management solution based on resource constraints and system conditions it observes. Consequently, in some instances, when the market clearing process released the ABC in the EIM BAA it was necessary to release the capacity to address congestion in either the EIM or elsewhere in the system. The ABC is considered as part of the single market optimization for the entire EIM BAA; the need to re-dispatch resources to manage congestion efficiently would have resulted in the re-allocation of resources such that the ABC would need to be released to ensure the EIM could operate its system reliably.

However, because the CAISO aims to ensure the EIM BAA can operate its system reliably with the use of the ABC it identifies, the CAISO enforces a constraint that ensures that when the market clearing process clears ABC, it stays within the EIM entity BAA. While the CAISO is not able to isolate the electrons, the constraint ensures that EIM does not export the ABC to another BAA to the detriment of the specific EIM BAA by ensuring that the exports from the EIM BAA are net of the ABC released in an EIM entity BAA.

IV. EIM Performance

This section provides the information the CAISO previously provided in its monthly informational reports submitted during an EIM entity's first six-month transition period.

A. Prices

The figures in this section show the EIM load aggregation point (ELAP) prices[5] for the FMM and RTD in each EIM BAA. The red line represents FMM ELAP prices, the blue line represents RTD ELAP prices, and the dashed line represents proxy prices; there are no proxy prices to report for Powerex or Seattle City Light. These trends show only the factual prices, which are financially binding. In prior reports, the CAISO provided these factual prices in comparison to counterfactual prices in order to show the effect of using the pricing waiver of the price discovery mechanism.[6]

The CAISO may correct prices posted on its Open Access Same-time

[5] The ELAP provides aggregate prices that are representative of pricing in the overall BAA.

[6] In Docket ER15-402, the CAISO reported on prices based on the price discovery mechanism in effect during the term of the Commission's waiver granted in that docket and the prices as they would be if the waiver was not in effect, *i.e.*, what prices would have been had they been on the penalty prices in the CAISO tariff. Because pricing under the waiver pricing is based on the last economic bid price signal, these prices are a proxy of what the prices would have been absent the seven category of learning curve type issues experience in that market. The difference between the counterfactual pricing and the price in effect during the term of the reports in that docket illustrated the market impact of the waiver pricing.

Information System (OASIS) pursuant to the CAISO's price correction authority in section 35 of the CAISO tariff, if it finds: (1) that the prices were the product of an invalid market solution; or (2) the market solution produced an invalid price due to data input failures, hardware or software failures; or (3) a result that is inconsistent with the CAISO Tariff.

The prices presented in the figures below include all prices produced by the CAISO consistent with the CAISO tariff requirements. That is, the trends below represent: (1) prices as produced in the market for which the CAISO deemed valid; (2) prices that the CAISO could and did correct pursuant to section 35; and (3) any prices the CAISO adjusted pursuant to transition period pricing reflected in section 29.27 of the CAISO tariff.

Table 4 shows the average ELAP prices for all EIM BAAs observed in the quarter covered by this report.

Table 4: Average ELAP Prices for the Various EIM BAAs

BAA	FMM ($/MWh)	RTD ($/MWh)
PAC West	21.18	20.83
PAC East	29.88	27.49
NV Energy	54.19	53.70
APS	36.62	32.14
PSE	21.11	20.88
IPCO	28.79	26.26
PGE	21.23	21.43
PWRX	16.42	16.11
BANCSMUD	34.24	30.48
SCL	20.76	20.24
SRP	36.36	31.06

Figure 52: Daily Average Price for the PAC West BAA ELAP

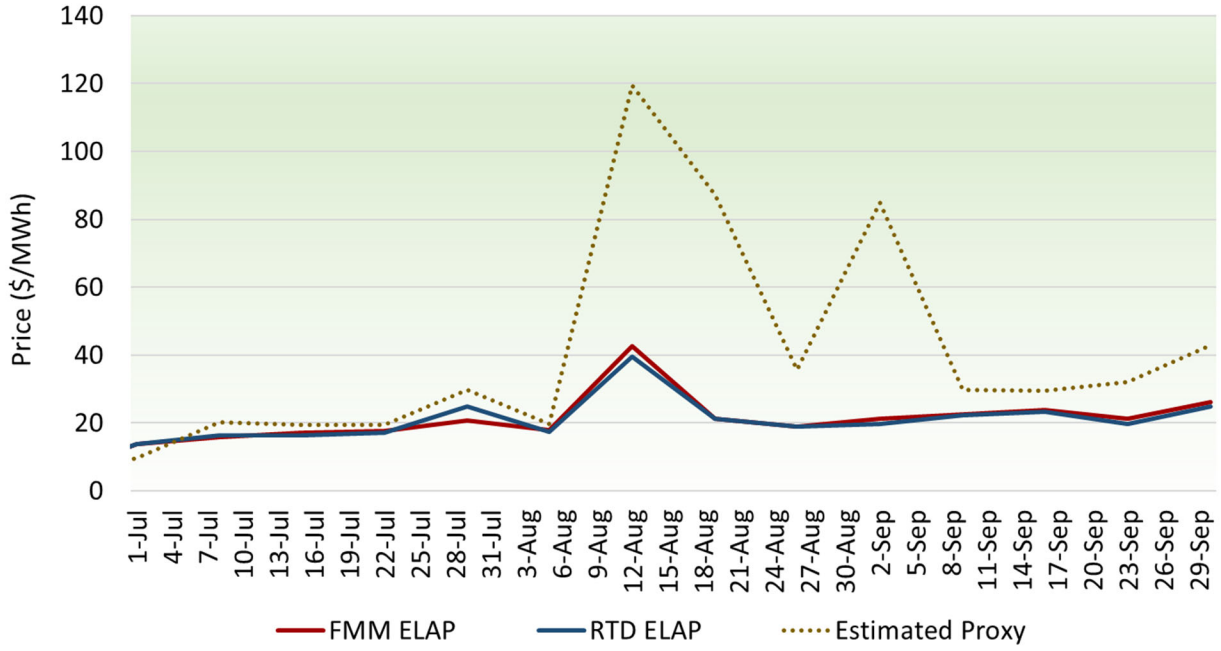


Figure 53: Daily Average Price for the PAC East BAA ELAP

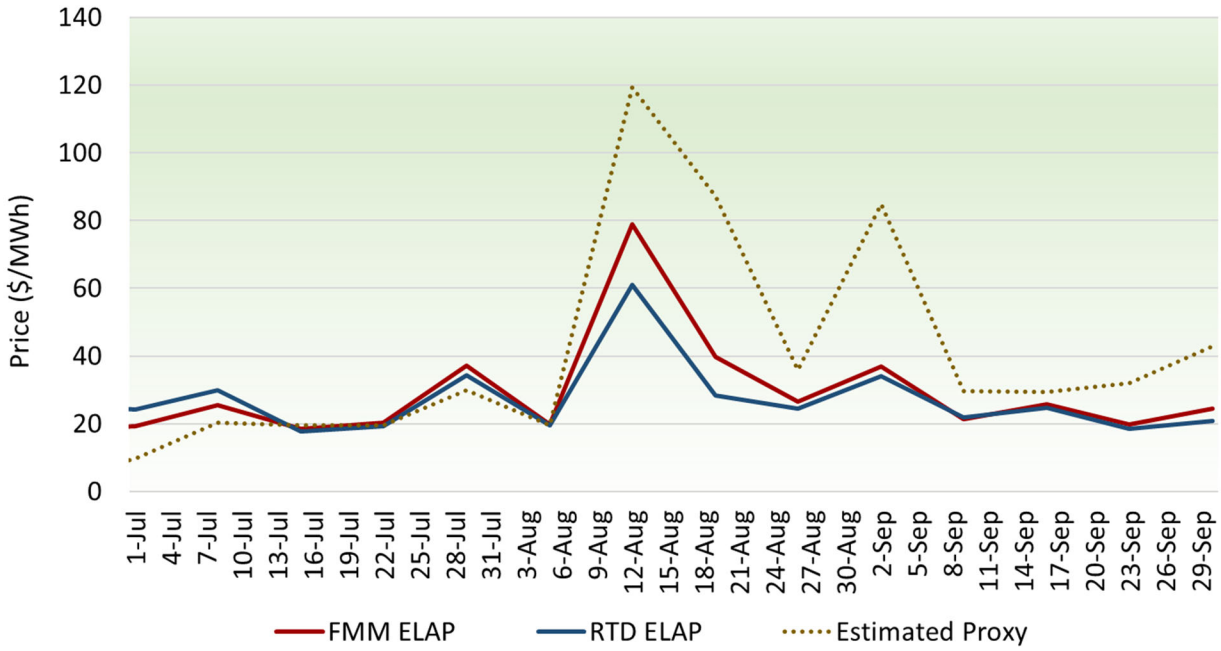


Figure 54: Daily Average Price for the NV Energy BAA ELAP

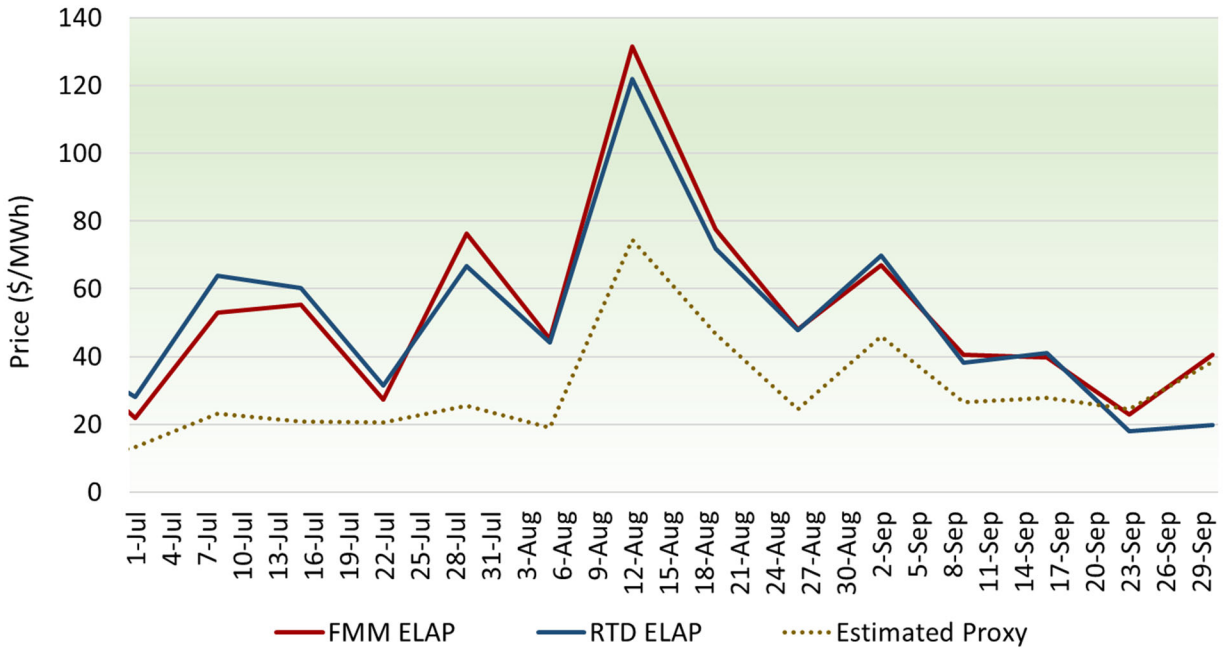


Figure 55: Daily Average Price for the APS BAA ELAP

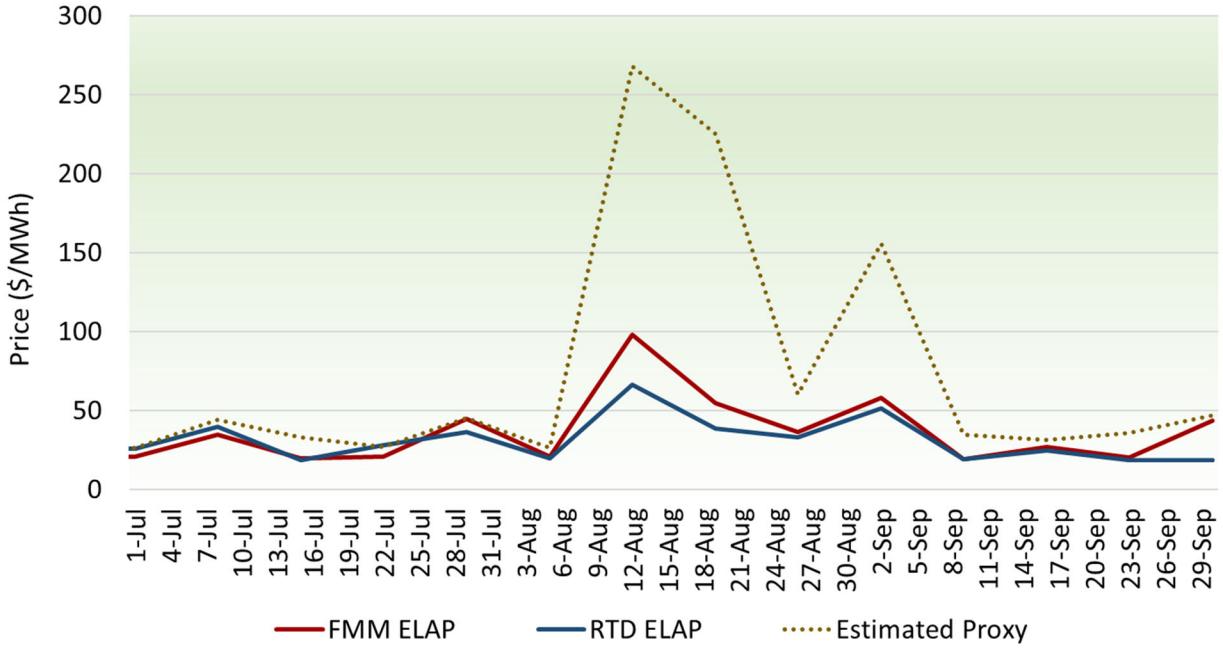


Figure 56: Daily Average Price for the PSE BAA ELAP

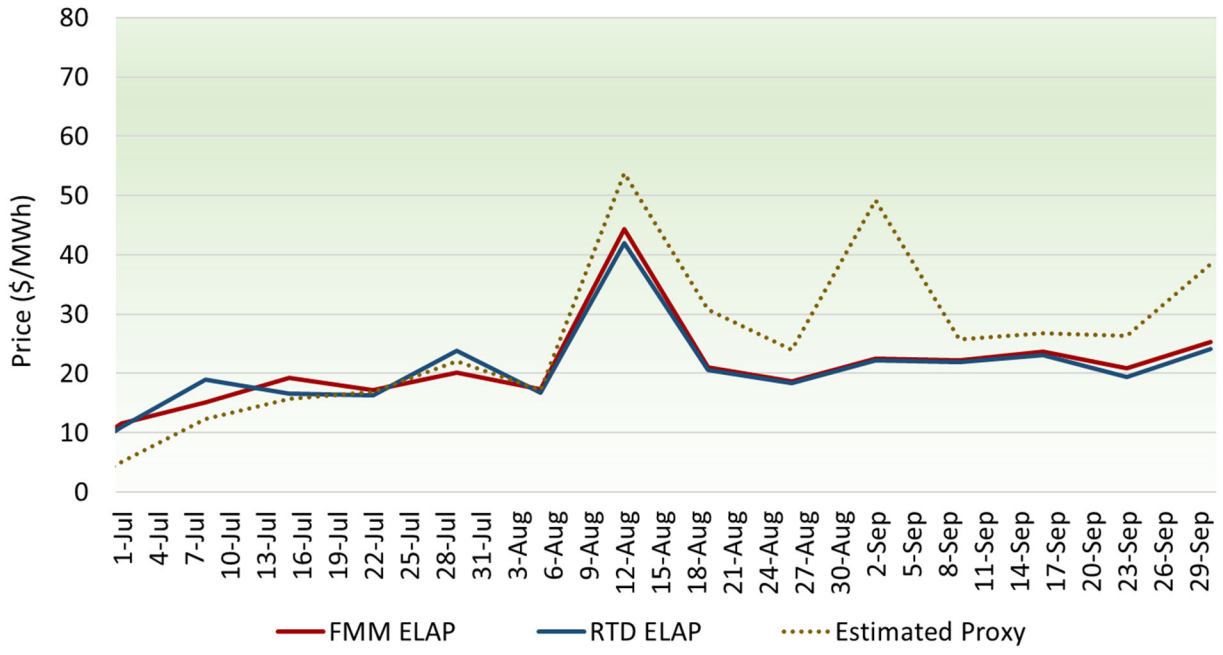


Figure 57: Daily Average Price for the IPCO BAA ELAP

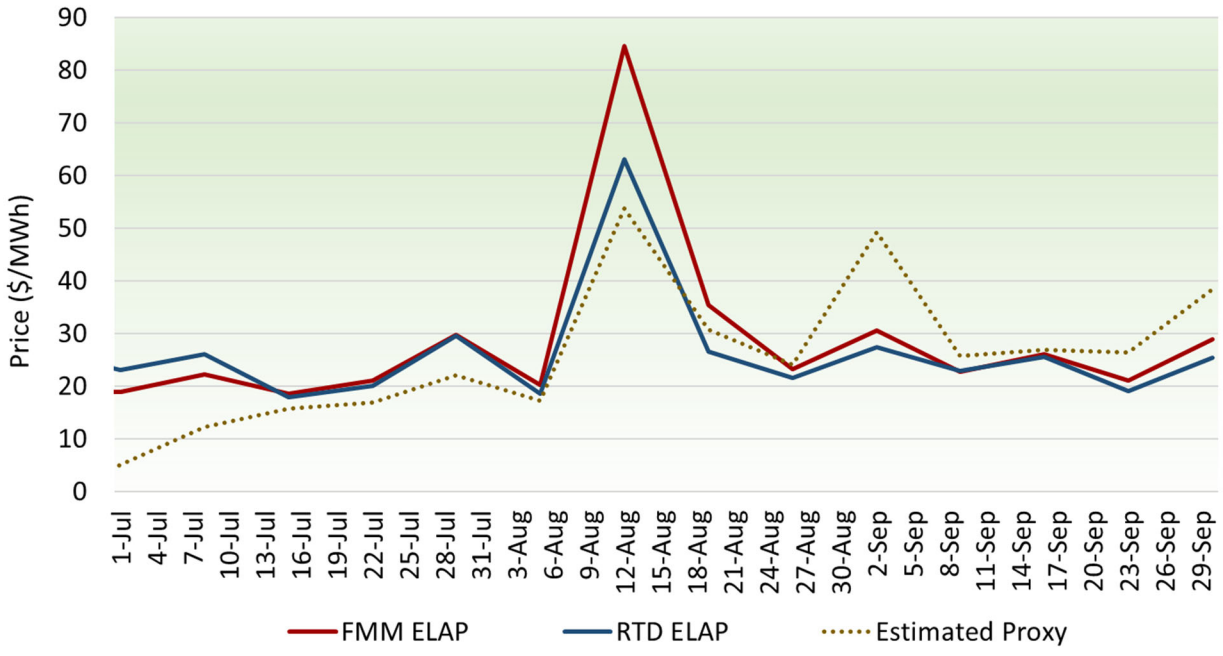


Figure 58: Daily Average Price for the PGE BAA ELAP

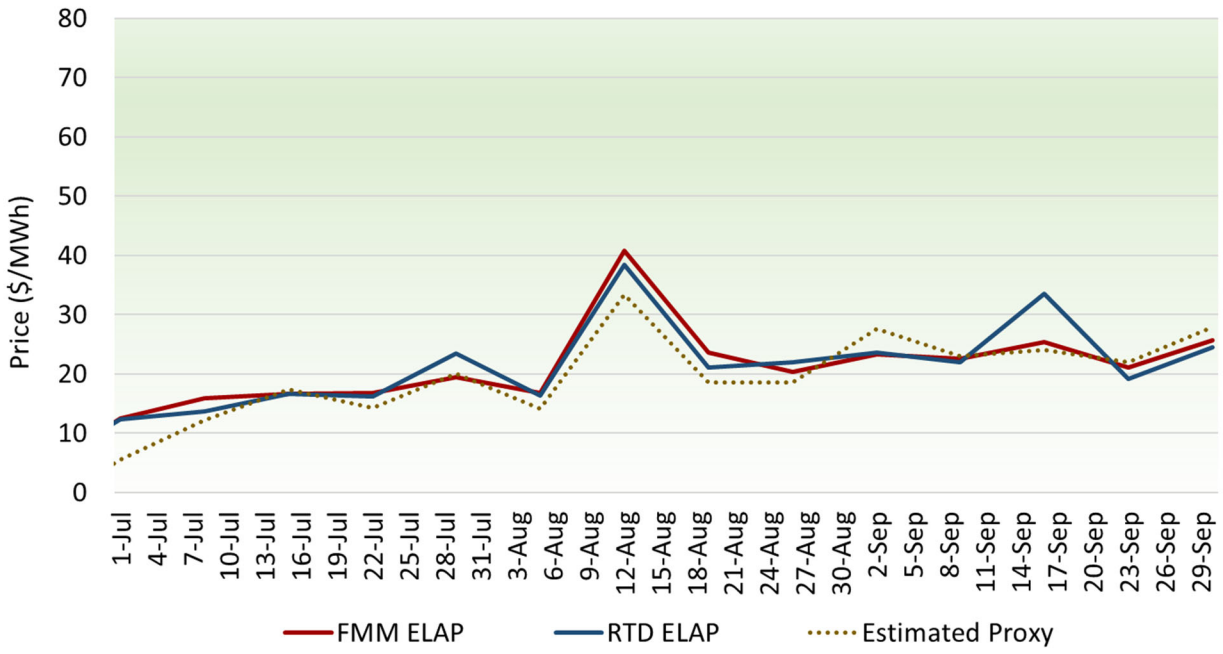


Figure 59: Daily Average Price for the PWRX BAA ELAP

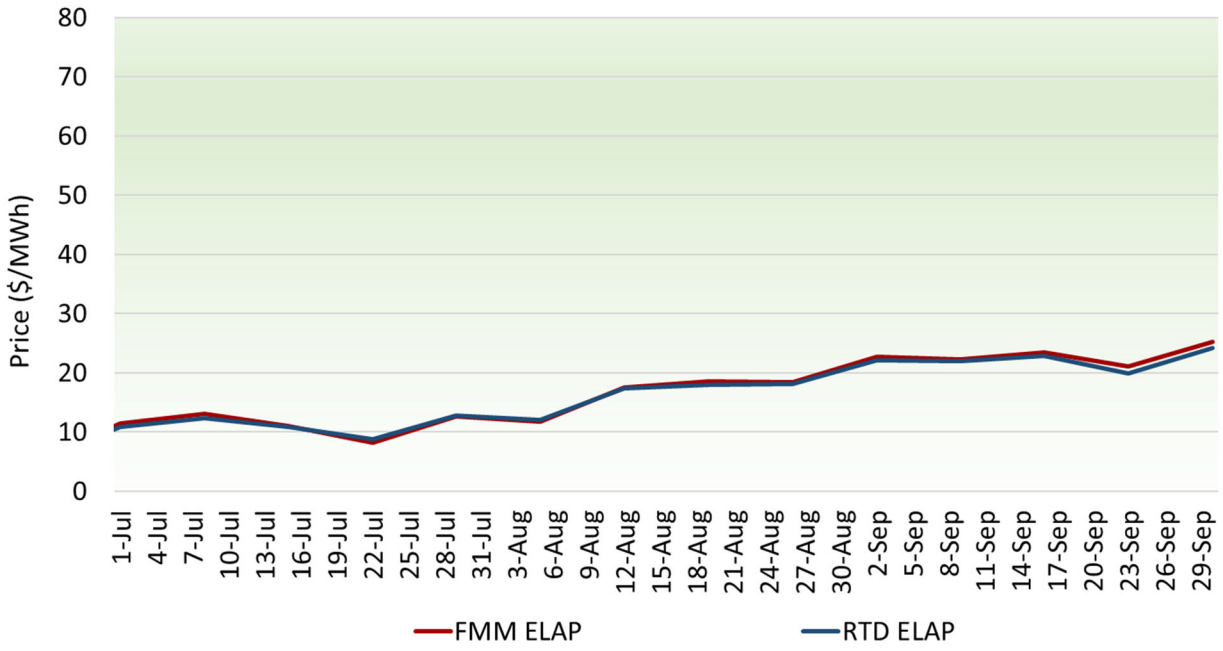


Figure 60: Daily Average Price for the BANCSMUD BAA ELAP

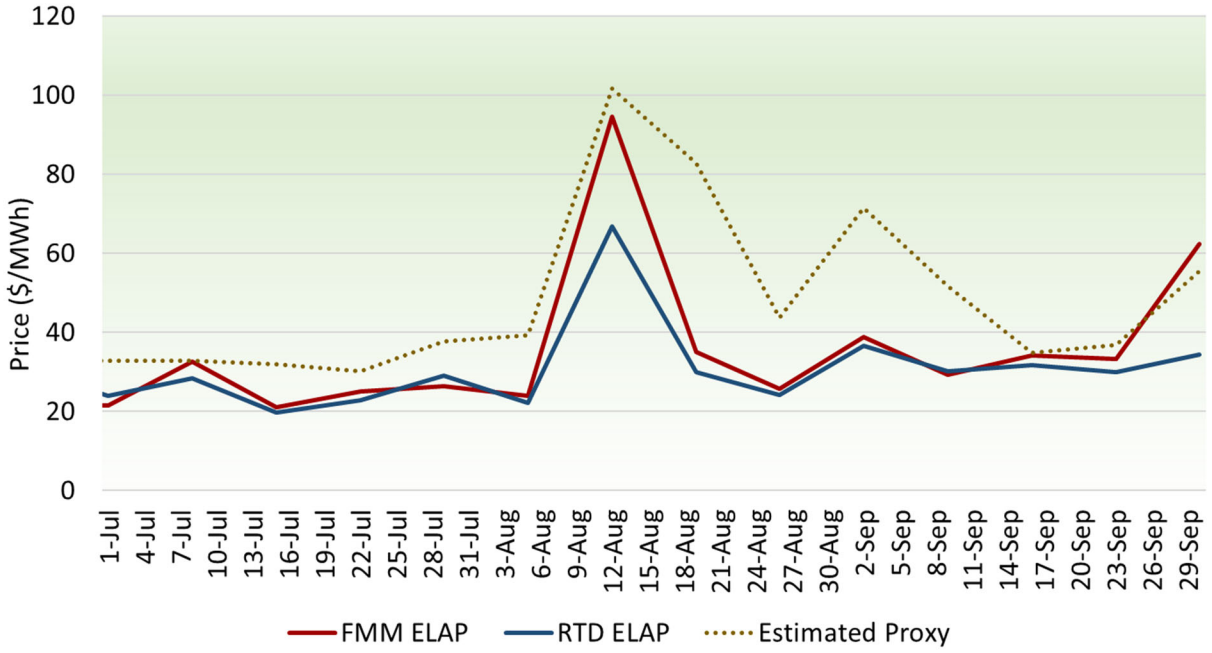


Figure 61: Daily Average Price for the SCL BAA ELAP

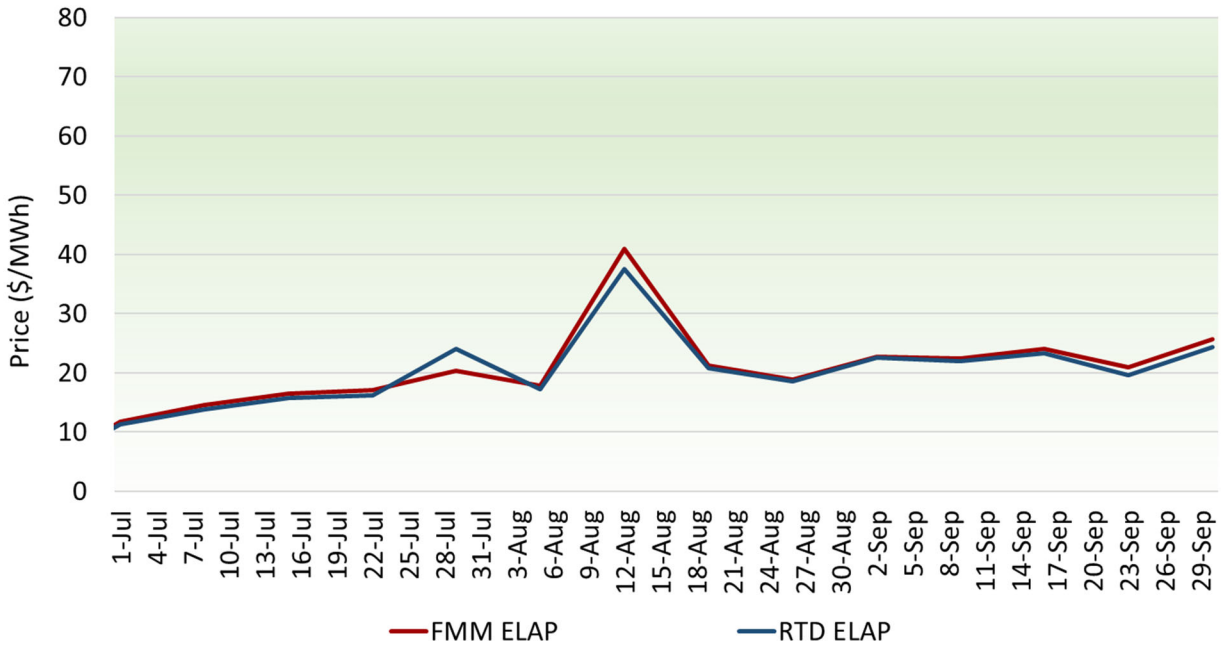
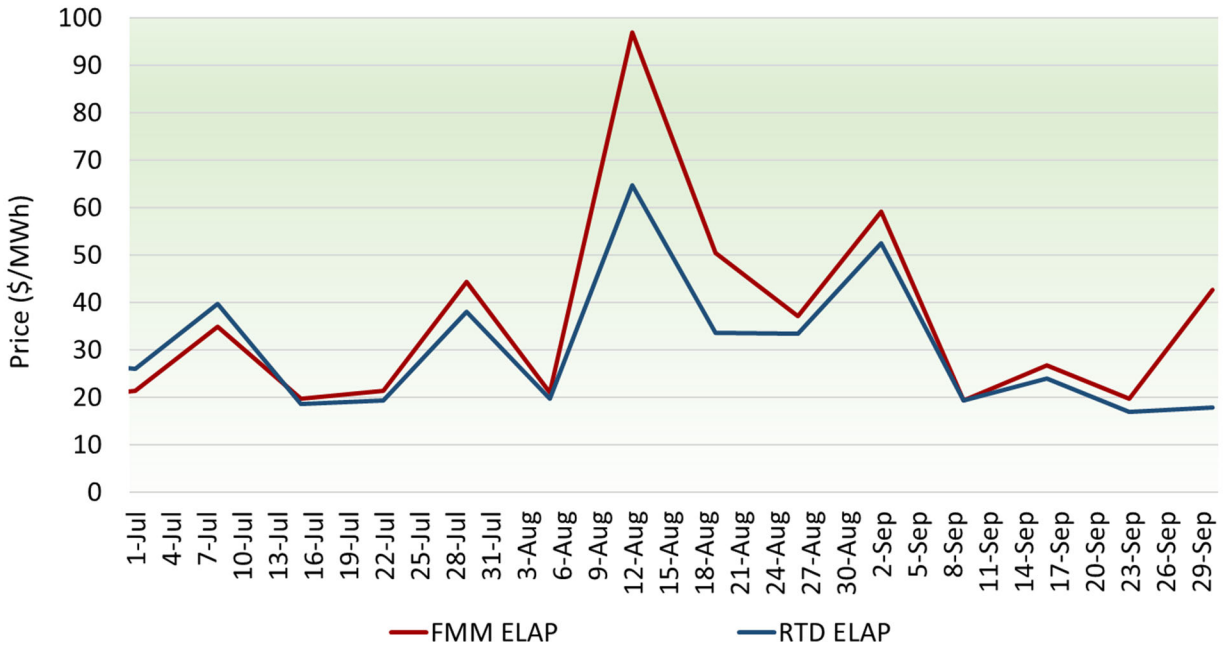


Figure 62: Daily Average Price for the SRP BAA ELAP



B. Frequency of Power Balance Constraint Relaxation

The figures in this section show the frequency of intervals in which the power balance constraint was relaxed in each EIM BAA for under-supply conditions in the FMM and RTD, respectively. A bar with positive frequency represents an under-supply power balance constraint infeasibility. The CAISO excluded invalid infeasibilities and therefore these frequencies reflect only actual infeasibilities. Invalid infeasibilities are power balance constraint infeasibilities for intervals that were subject to a price correction under the provisions of the CAISO tariff.

The CAISO uses a load conformance limiter in the CAISO BAA and the EIM BAAs to prevent over-adjustments through use of load conformance, and thus prevent an artificial infeasibility – that is, one that does not reflect actual scarcity. When the quantity of the infeasibility is less than the operator's adjustment, and the infeasibility is in the same direction as the adjustment, the load conformance limiter automatically limits the operator's adjustments to at least the feasibility level. In the pricing run, the limiter will remove an infeasibility that is less than or equal to the operator's adjustment, *i.e.*, the load conformance. The limiter will not apply to infeasibilities greater than or in the opposite direction of the load conformance. Use of the load conformance limiter avoids invalid constraints that arise through operations rather than because of real supply issues.[7] This feature applies to either over- or under-supply infeasibilities.

[7] The CAISO amended its tariff to include enhancements to the limiter later in 2018, which were approved and became effective in February 2019: http://www.caiso.com/Documents/DraftTariffLanguage_ImbalanceConformanceEnhancements.docx

The table below shows the number of valid under-supply infeasibilities and number of instances covered by the load conformance limiter, for both FMM and RTD.

Table 5: Frequency of Under-Supply Infeasibilities in the FMM and RTD

Balancing Authority Area	Under-supply Infeasibilities		Instances covered by Load Conformance Limiter	
	FMM	RTD	FMM	RTD
PAC West	3	4	0	0
PAC East	6	17	0	0
NV Energy	365	557	33	49
APS	0	31	0	1
PSE	24	21	0	4
IPCO	9	5	3	3
PGE	15	36	0	21
PWRX	0	1	0	0
BANCSMUD	6	15	0	0
SCL	6	10	0	0
SRP	99	171	15	34

Figure 63: Frequency of FMM Power Balance in Feasibilities in the PAC West BAA

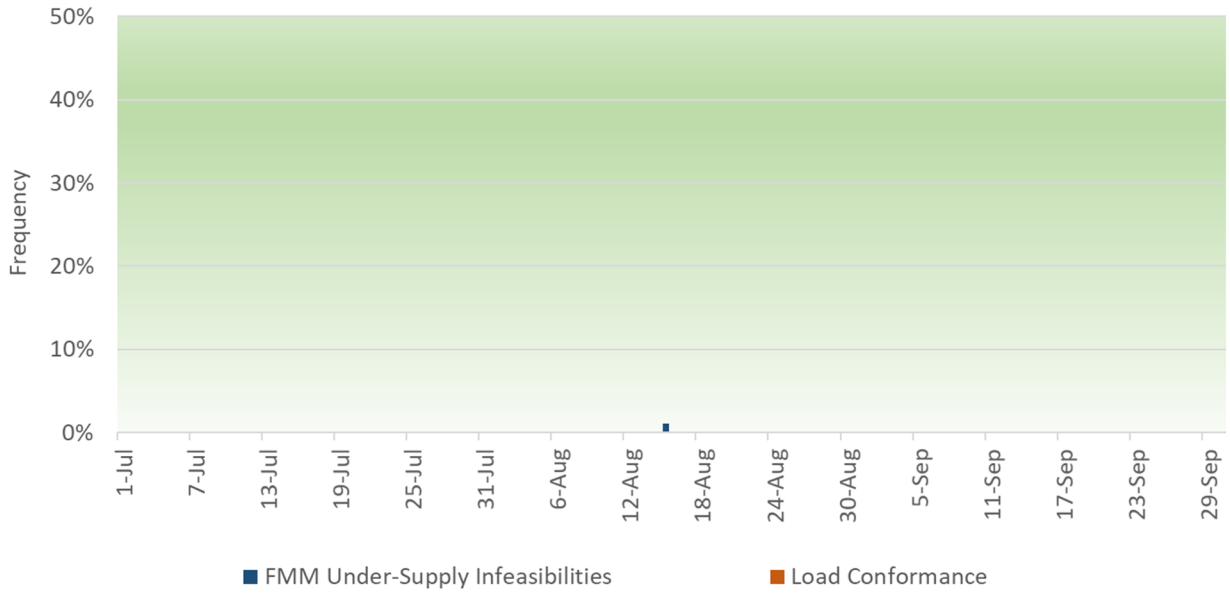


Figure 64: Frequency of RTD Power Balance in Feasibilities in the PAC West BAA

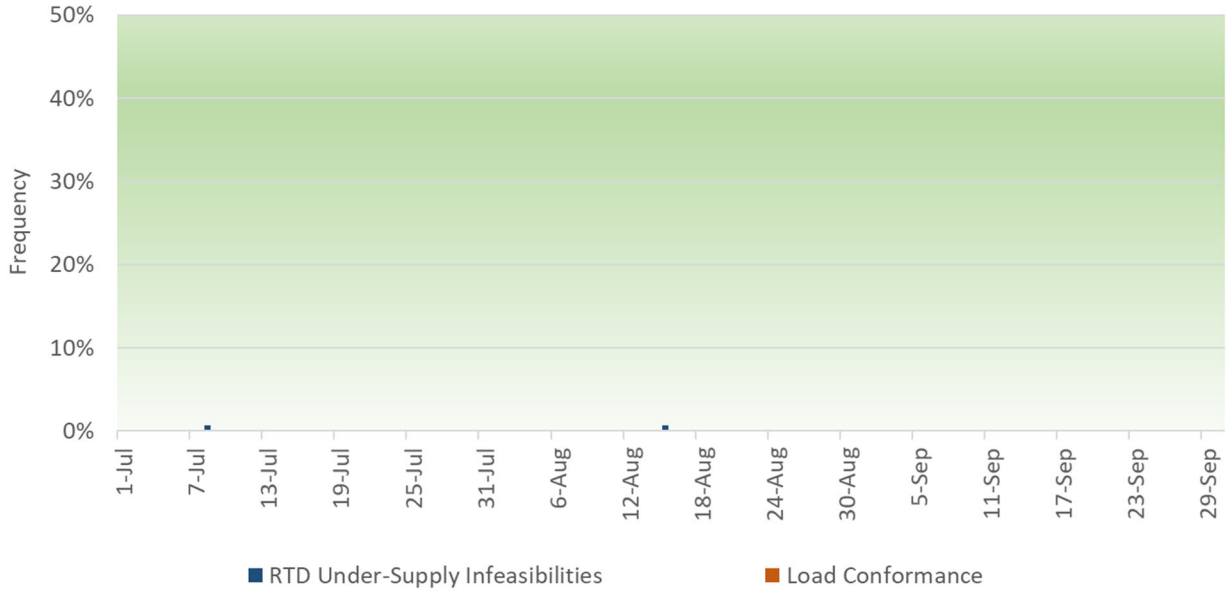


Figure 65: Frequency of FMM Power Balance in Feasibilities in the PAC East BAA

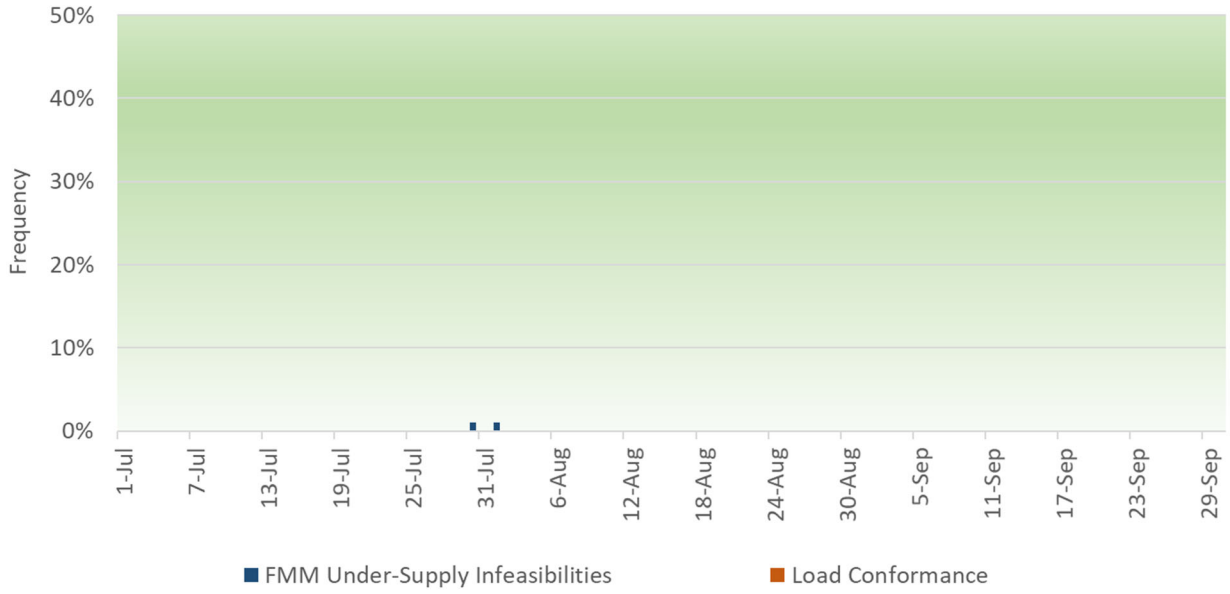


Figure 66: Frequency of RTD Power Balance Infeasibilities in PAC East BAA

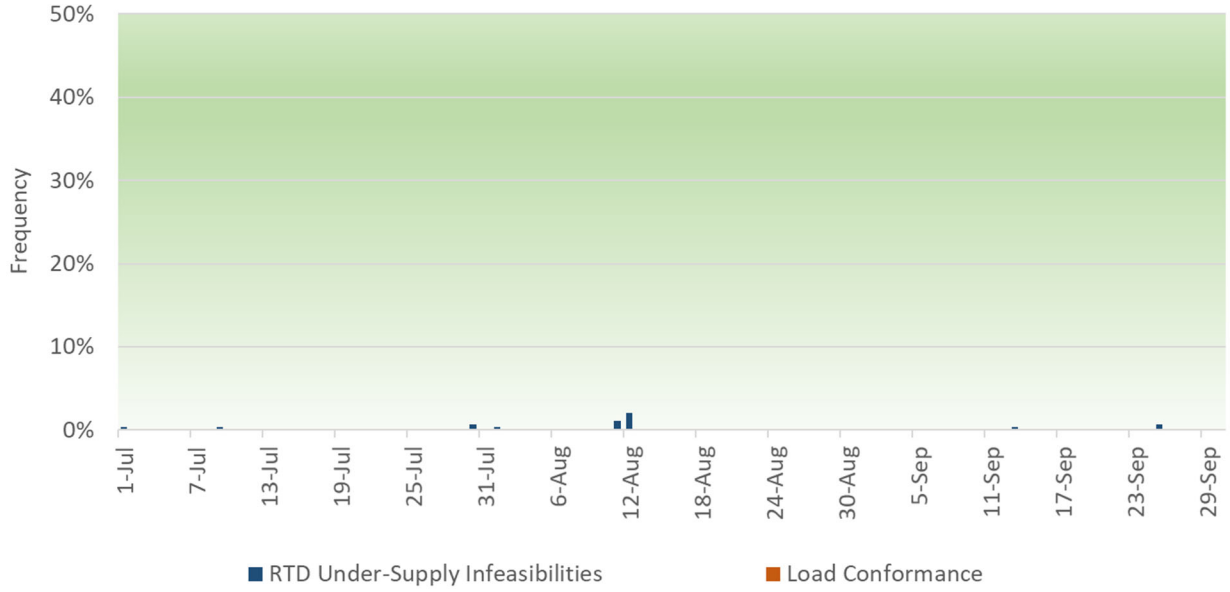


Figure 67: Frequency of FMM Power Balance Infeasibilities in the NV Energy BAA

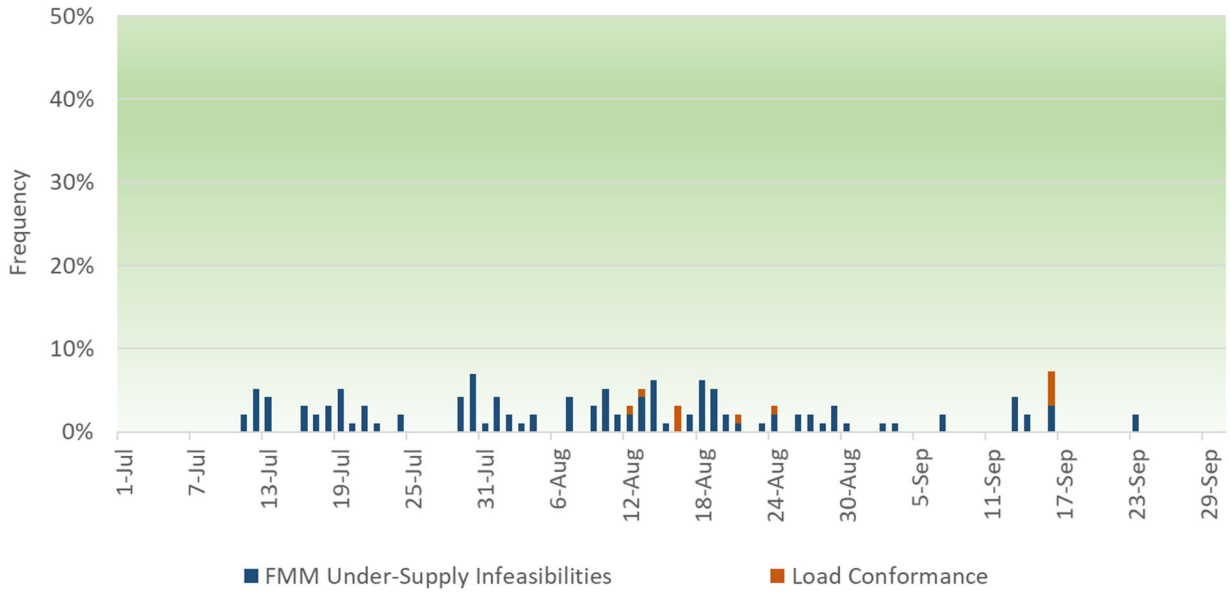


Figure 68: Frequency of RTD Power Balance infeasibilities in the NV Energy BAA

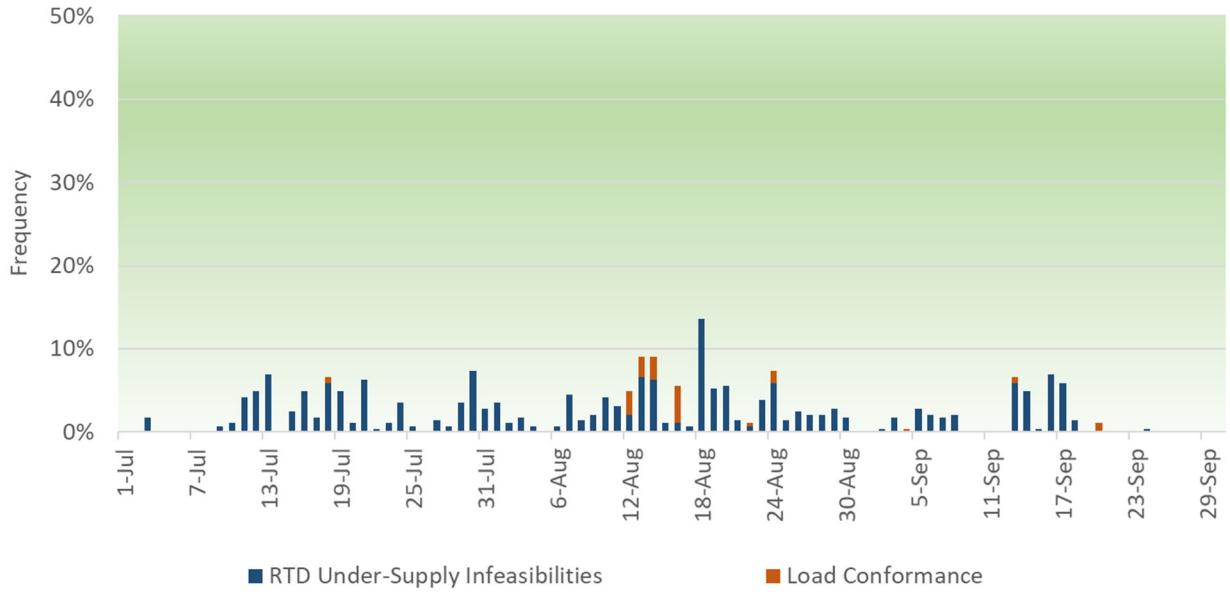


Figure 69: Frequency of RTD Power Balance Infeasibilities in the APS BAA

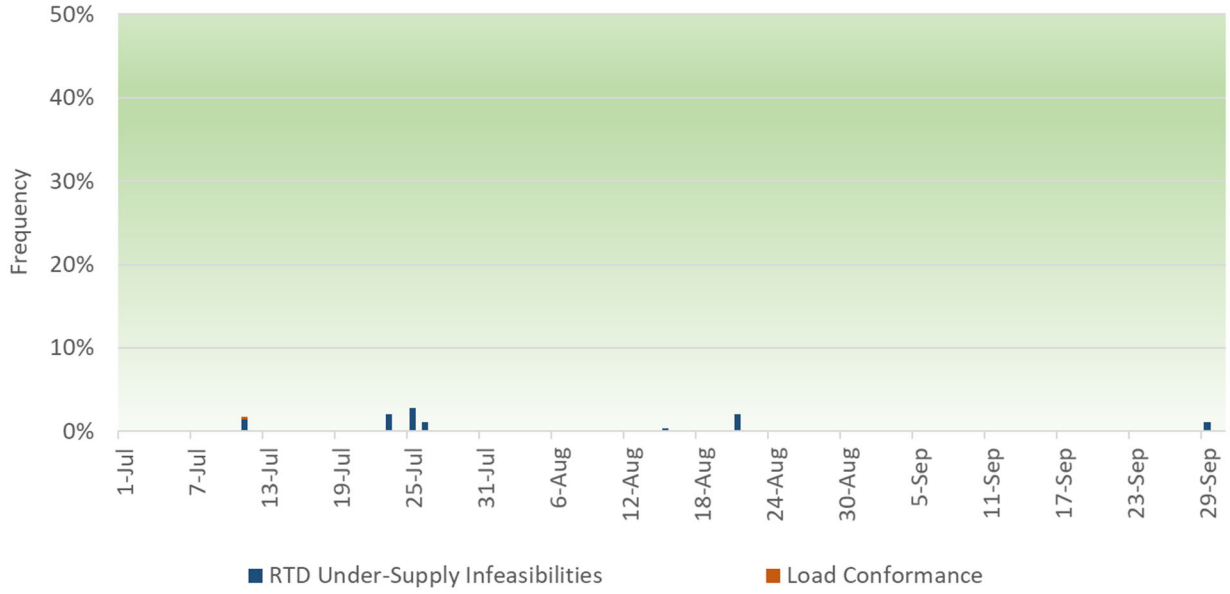


Figure 70: Frequency of FMM Power Balance Infeasibilities in the PSE BAA

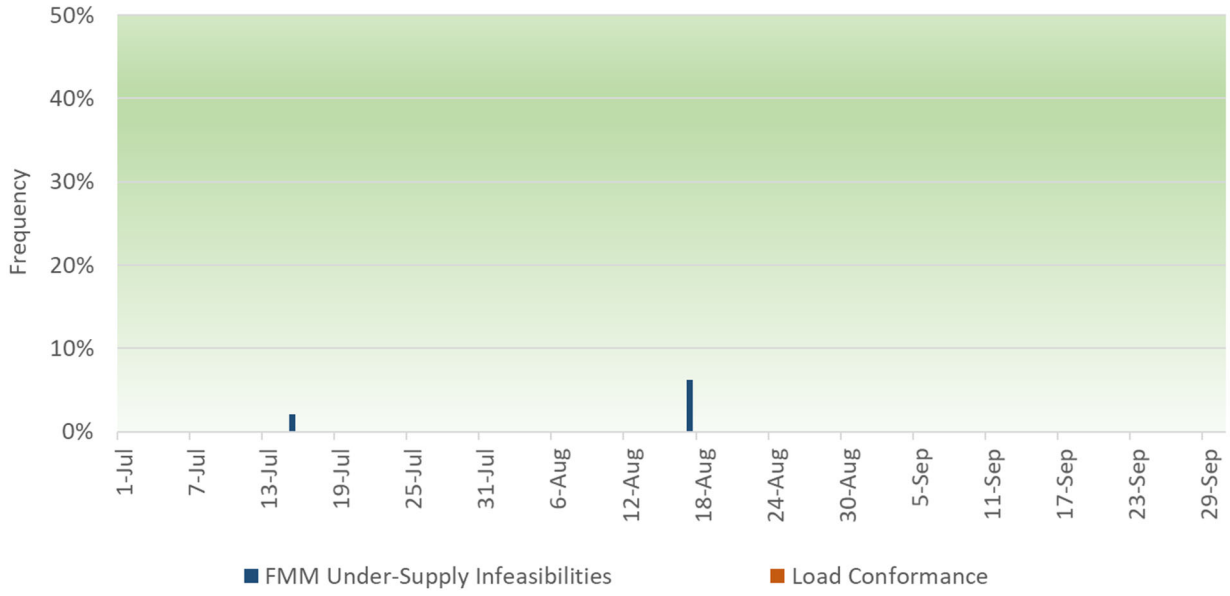


Figure 71: Frequency of RTD Power Balance Infeasibilities in the PSE BAA

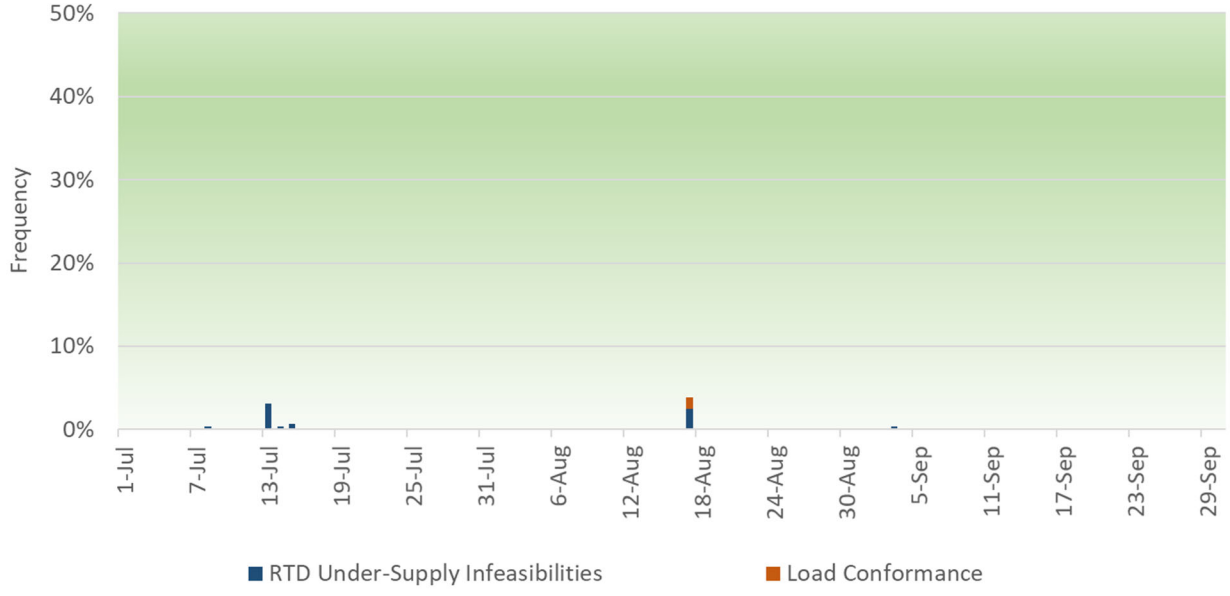


Figure 72: Frequency of FMM Power Balance Infeasibilities in the IPCO BAA

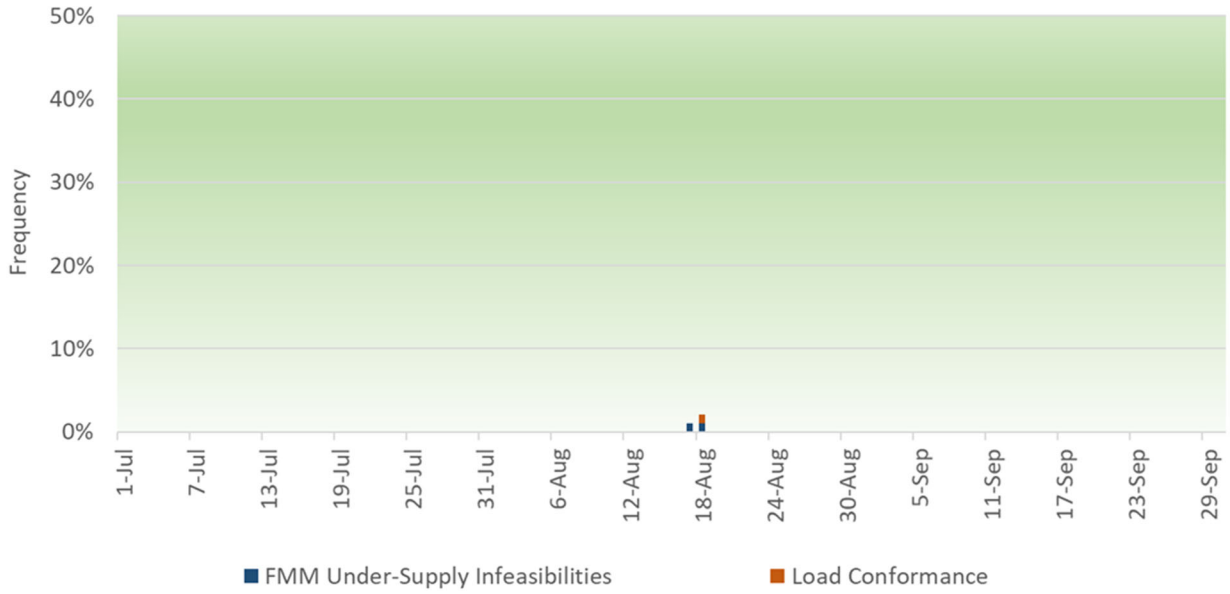


Figure 73: Frequency of RTD Power Balance Infeasibilities in the IPCO BAA

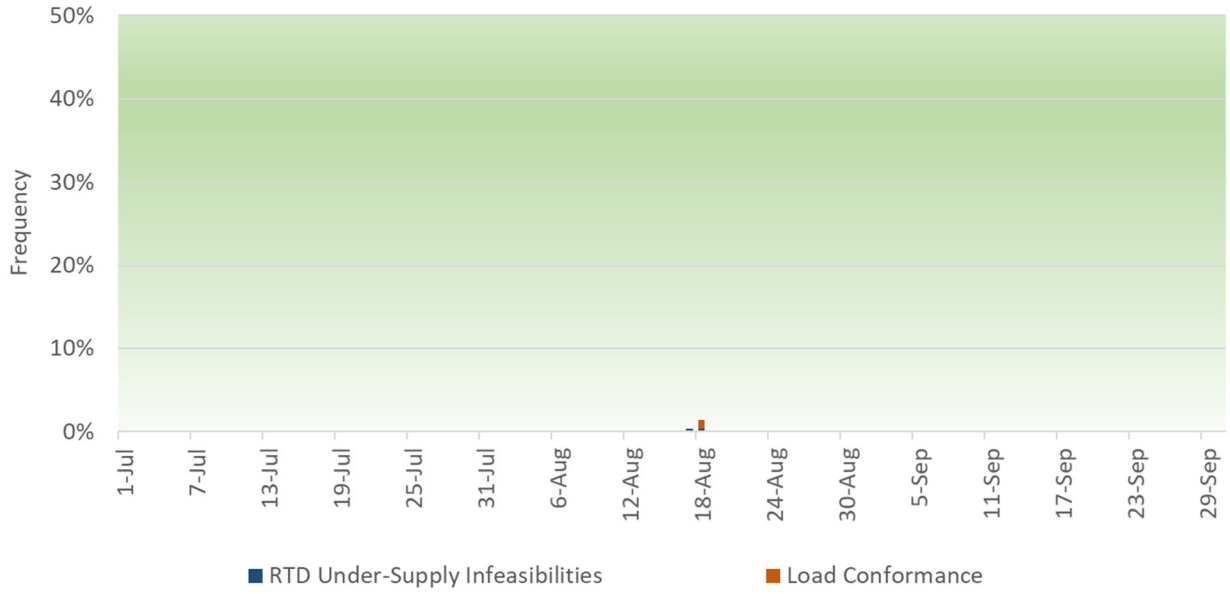


Figure 74: Frequency of FMM Power Balance Infeasibilities in the PGE BAA

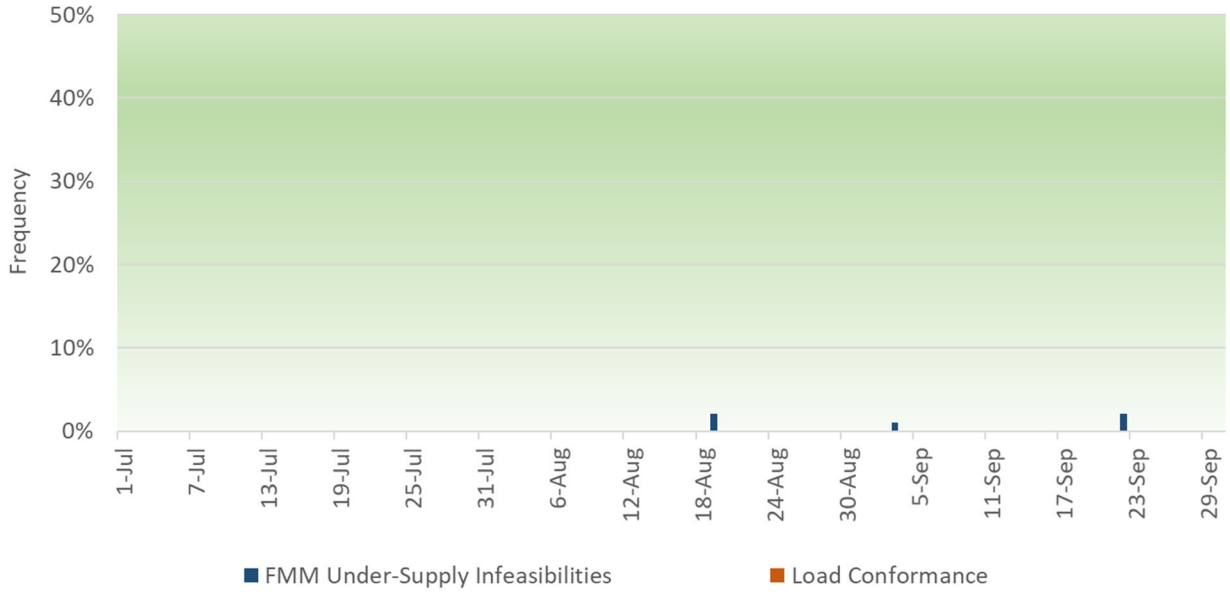


Figure 75: Frequency of RTD Power Balance Infeasibilities in the PGE BAA

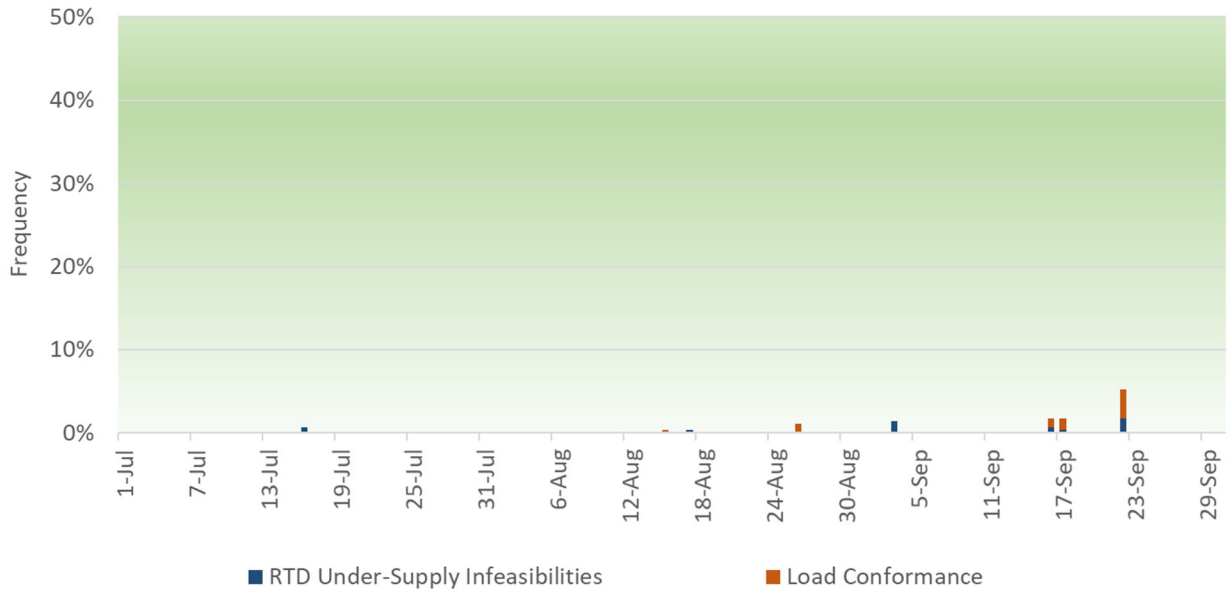


Figure 76: Frequency of RTD Power Balance Infeasibilities in the PWRX BAA

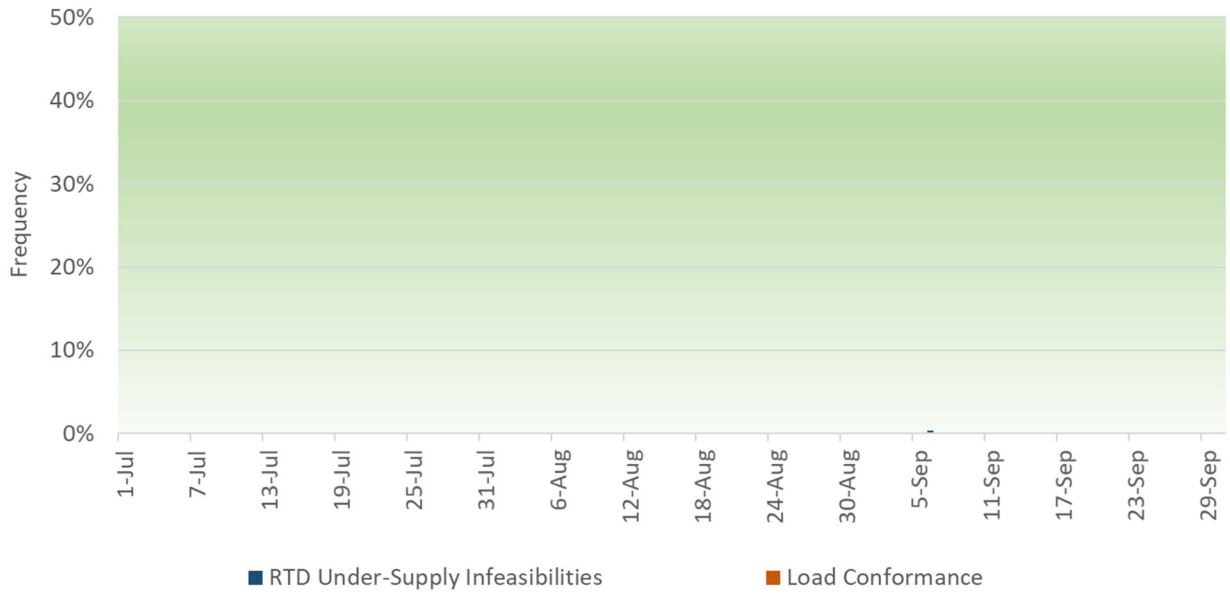


Figure 77: Frequency of FMM Power Balance Infeasibilities in the BANCSMUD BAA

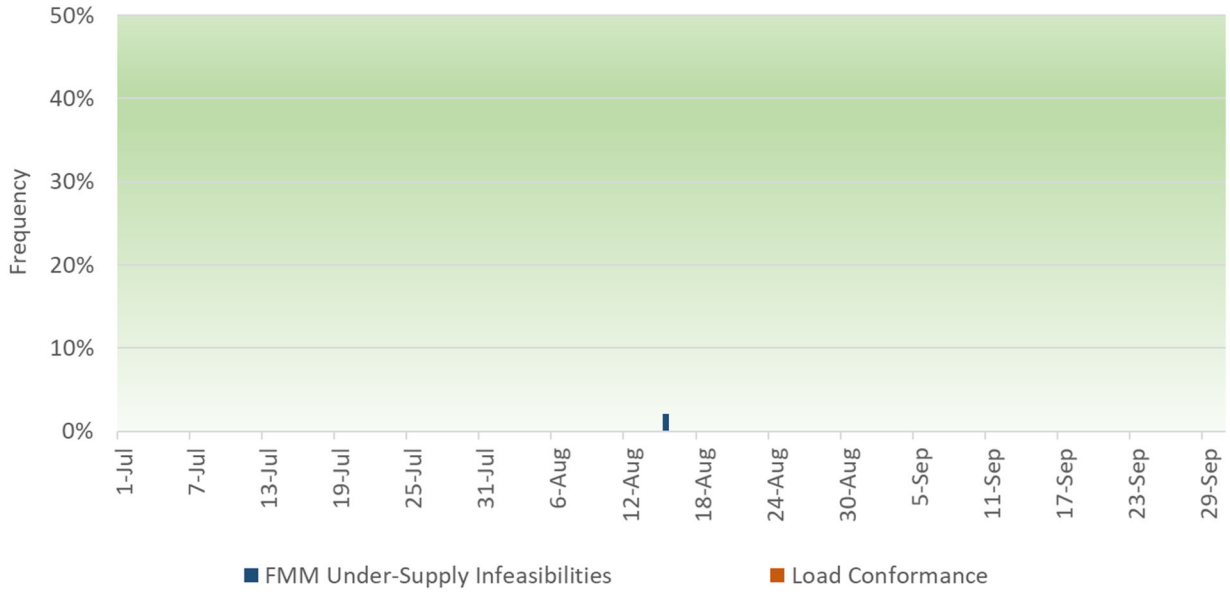


Figure 78: Frequency of RTD Power Balance Infeasibilities in the BANCSMUD BAA

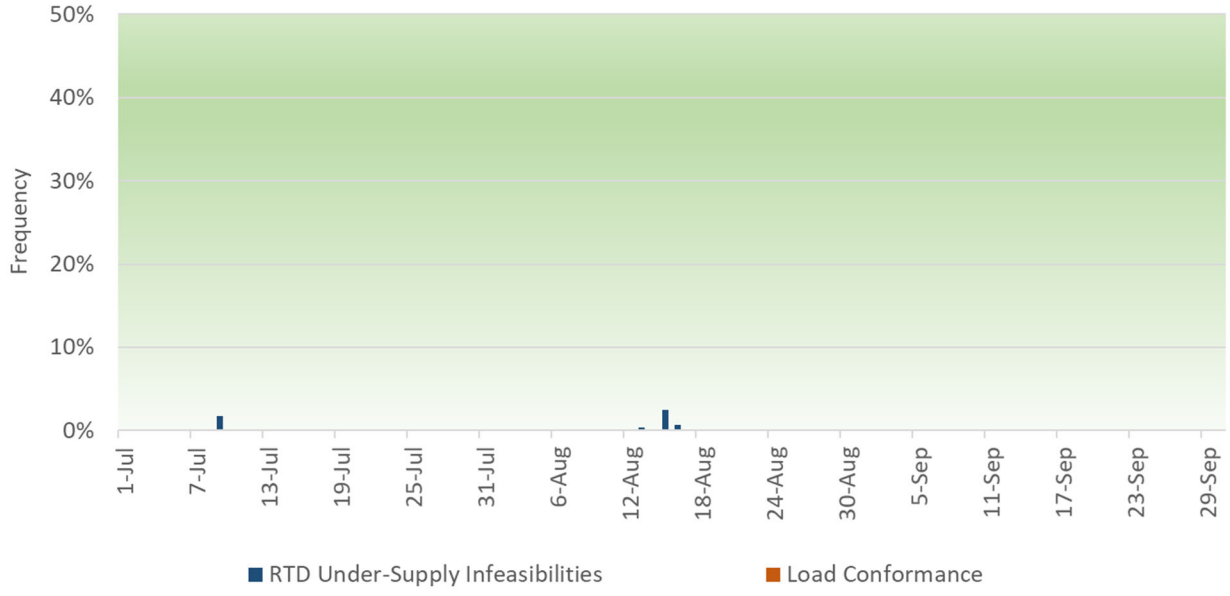


Figure 79: Frequency of FMM Power Balance Infeasibilities in the SCL BAA

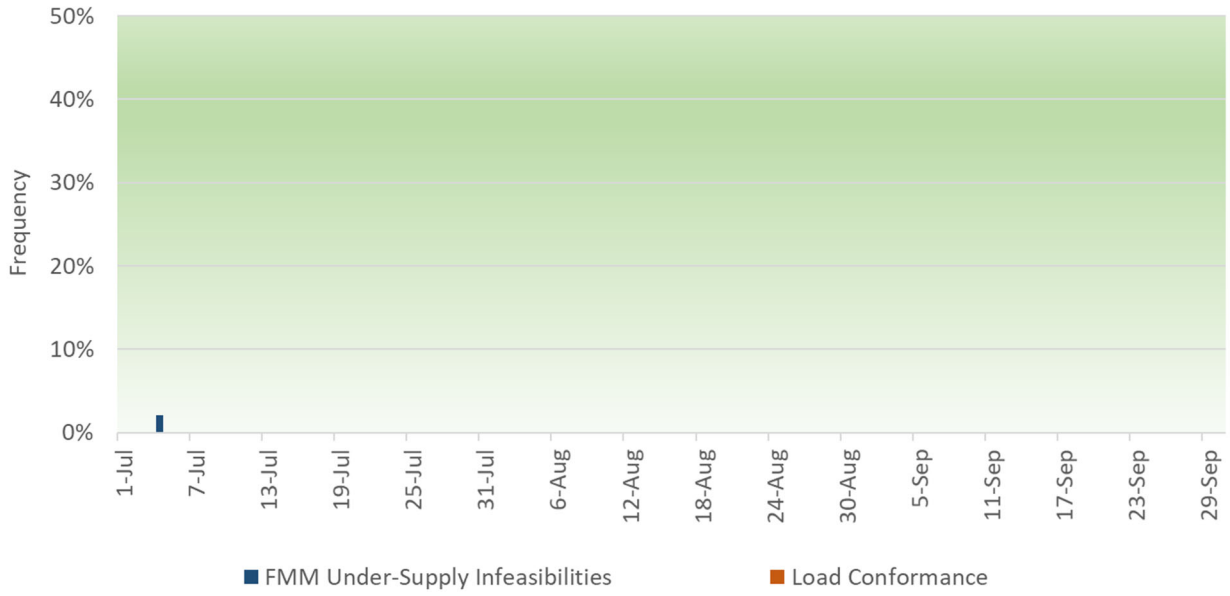


Figure 80: Frequency of RTD Power Balance Infeasibilities in the SCL BAA

Figure 81: Frequency of FMM Power Balance Infeasibilities in the SRP BAA

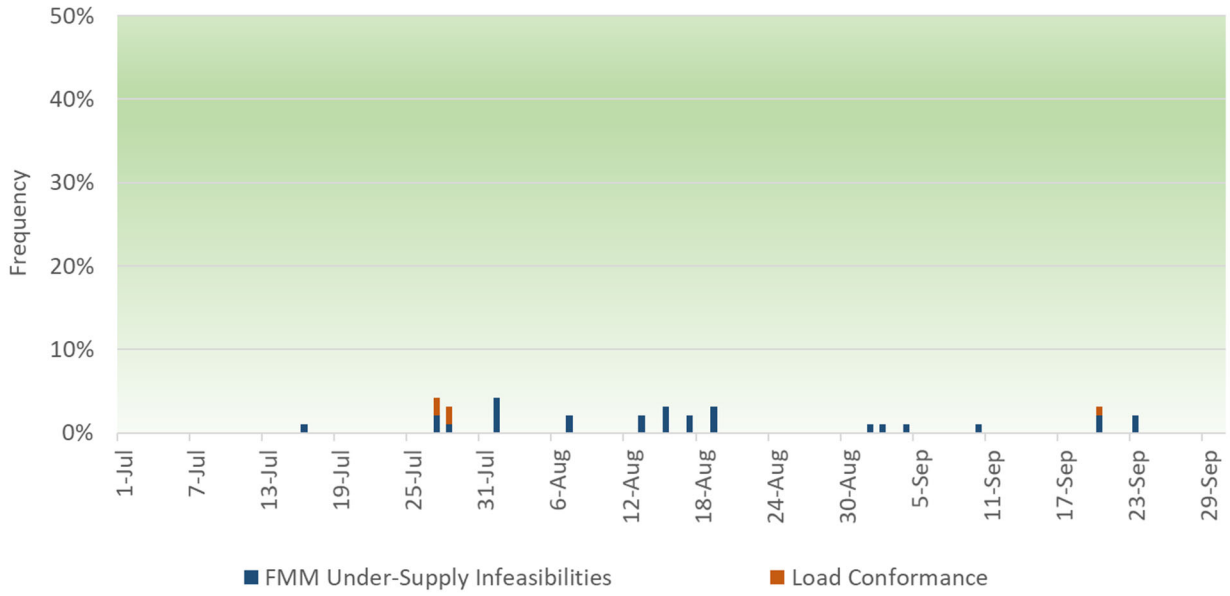
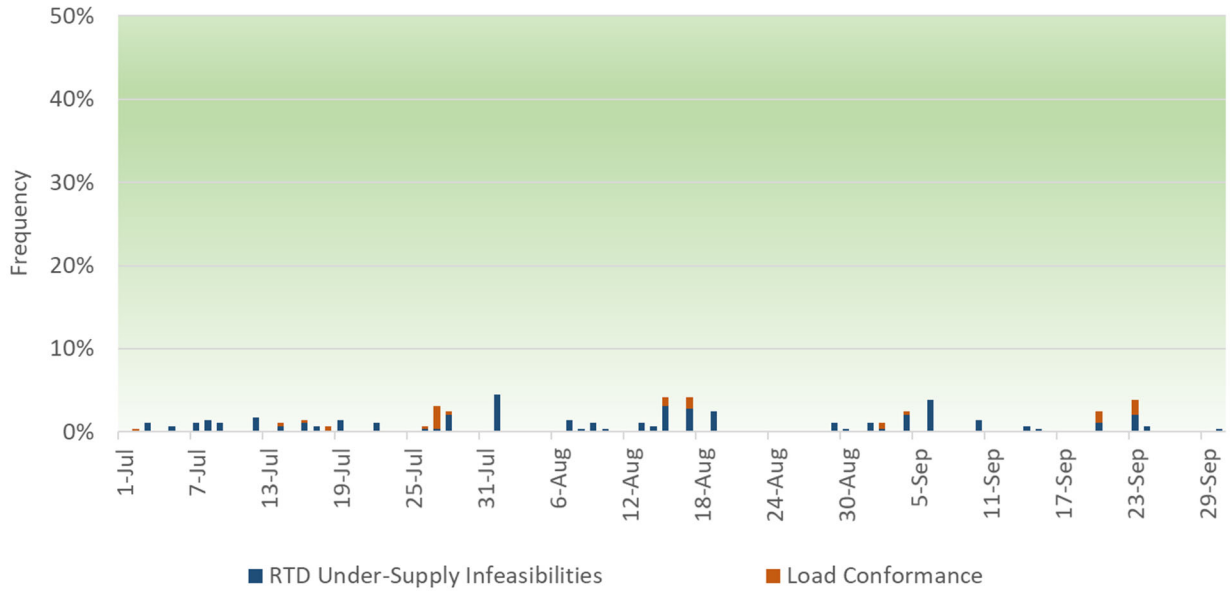


Figure 82: Frequency of RTD Power Balance Infeasibilities in the SRP BAA



C. Balancing and Sufficiency Test Failures

The figures in this section show the trend of balancing test failures for the quarter covered by this report, for each of the EIM entity BAAs. The CAISO performs the balancing test pursuant to Section 29.34(k) of the CAISO tariff. Powerex is not subject to the balancing test.

The table below shows the frequency each BAA passed the balancing test, as well as what percentage of balancing test failures were due to under-scheduling. In most cases, these failures are within normal ranges and reflect the incidence of the forecasting and balancing processes that have occurred at a frequency that is well within expected performance tolerances.

Table 6: Frequency of Passing Balancing Test

Balancing Authority Area	% Time Passing Balancing Test	% of Failures due to Under-Scheduling
PAC West	99.5%	33.3%
PAC East	99.5%	36.4%
NV Energy	98.2%	33.3%
APS	98.8%	50%
PSE	97.8%	68.1%
IPCO	99.6%	62.5%
PGE	99.1%	55%
BANCSMUD	99.3%	66.7%
SCL	99.5%	70%
SRP	97.8%	61.2%

Figure 83: Frequency of Balancing Test Failures for the NV Energy BAA

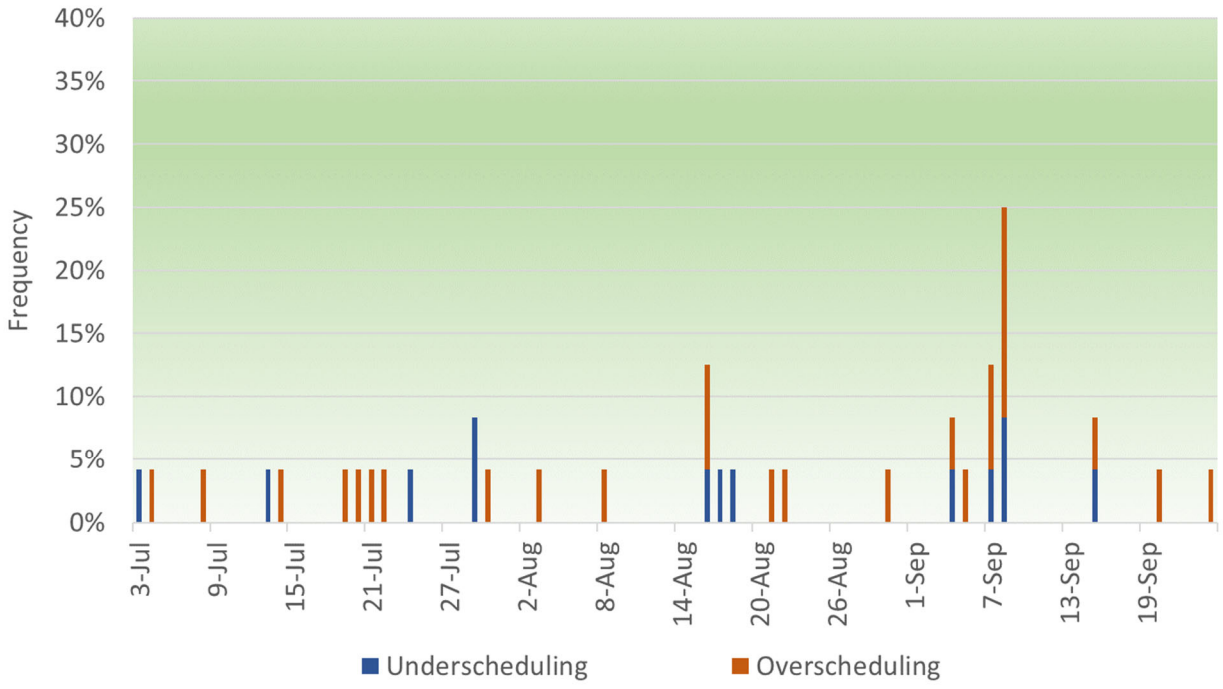


Figure 84: Frequency of Balancing Test Failures for the PAC West BAA

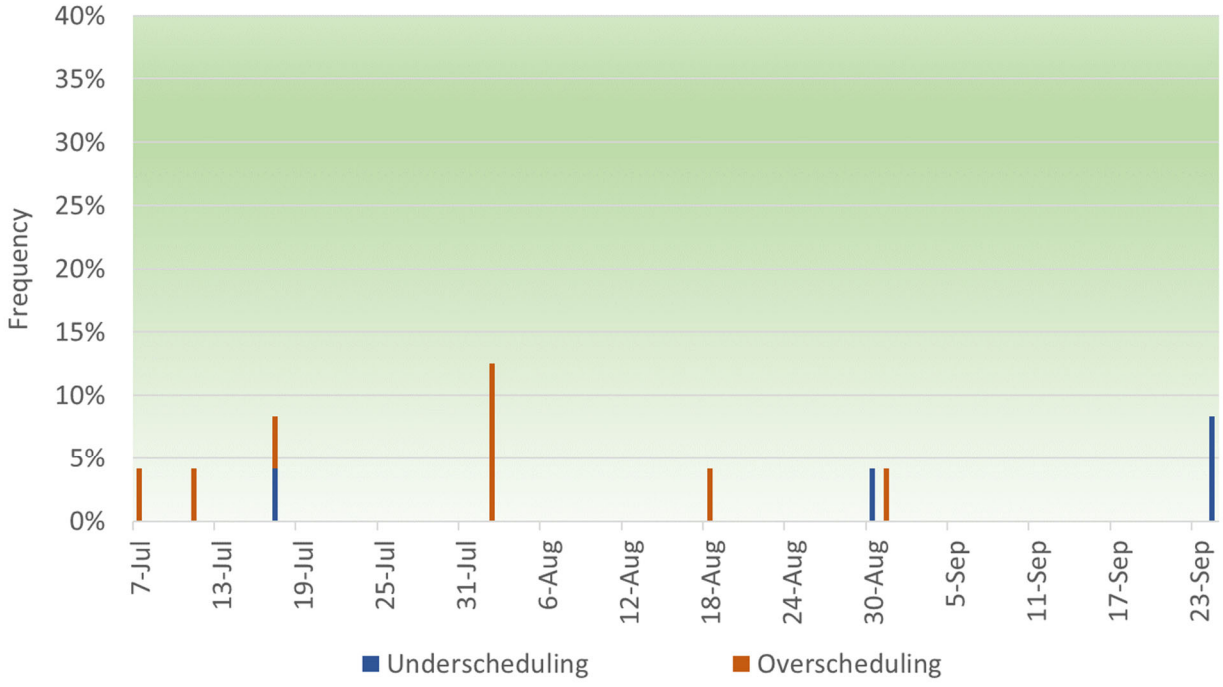


Figure 85: Frequency of Balancing Test Failures for the PAC East BAA

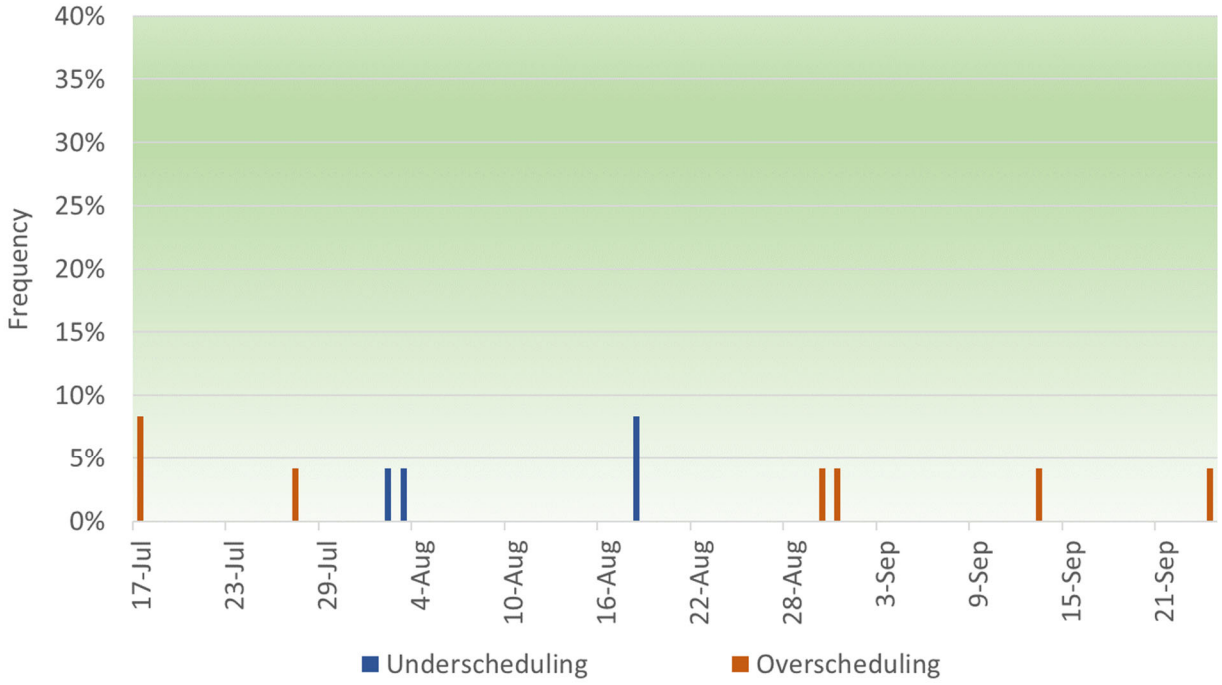


Figure 86: Frequency of Balancing Test Failures for the APS BAA

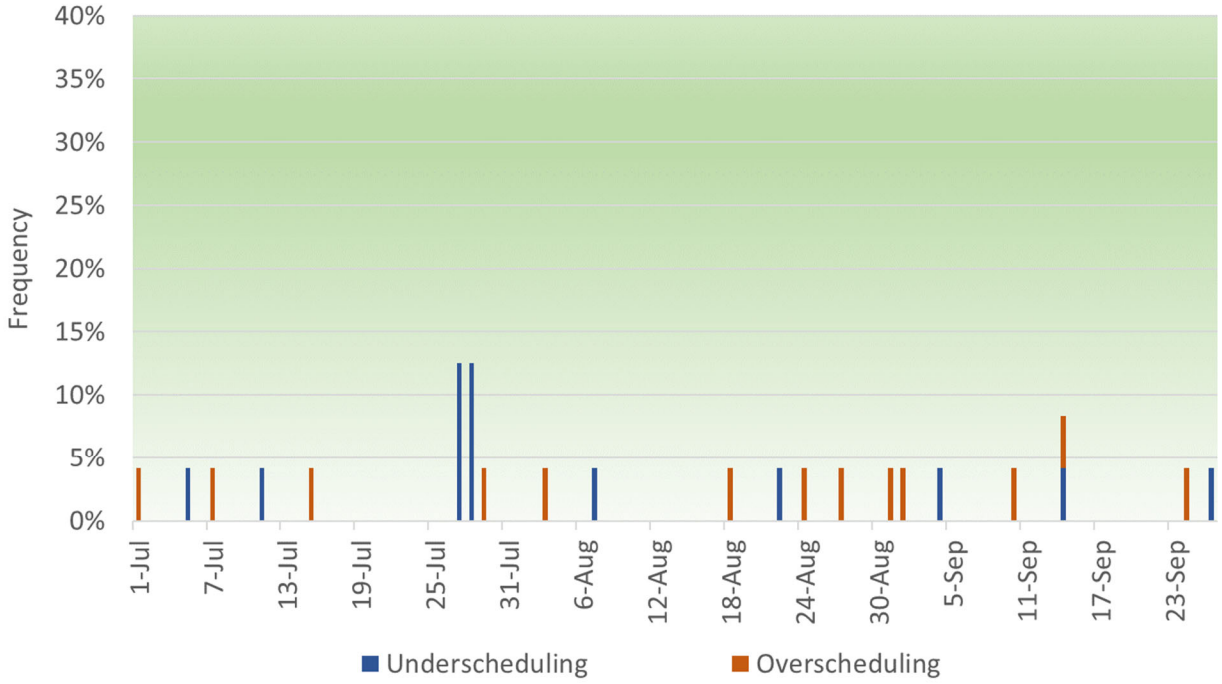


Figure 87: Frequency of Balancing Test Failures for the PSE BAA

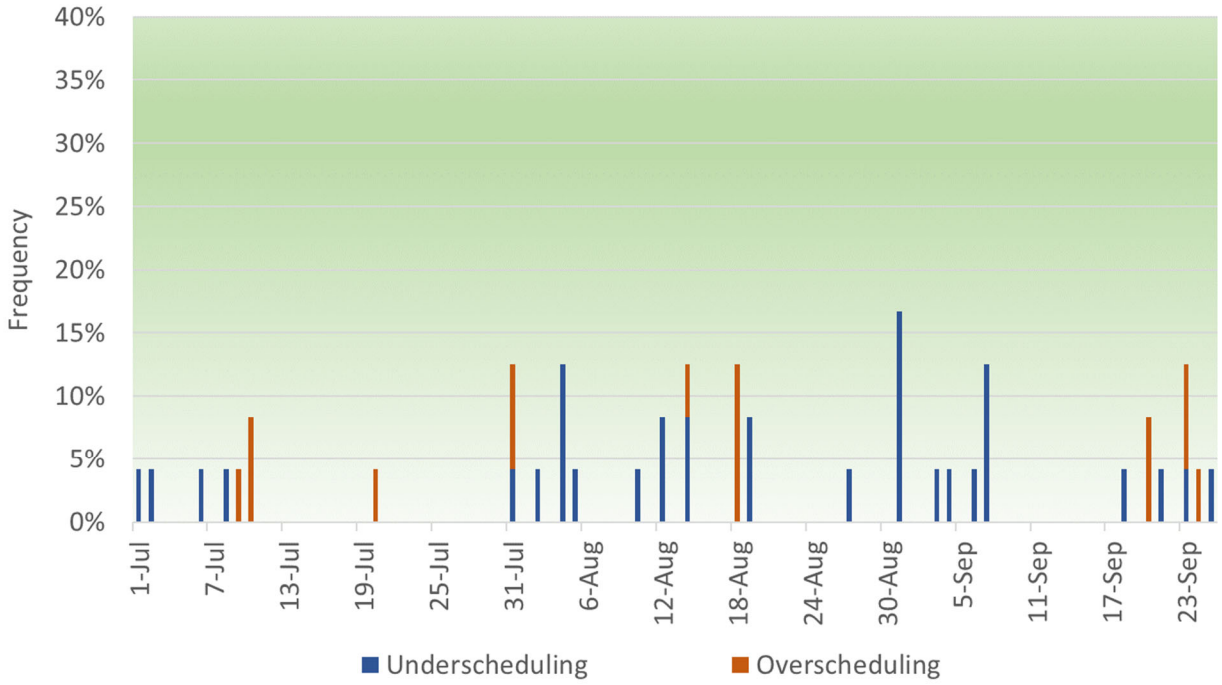


Figure 88: Frequency of Balancing Test Failures for the IPCO BAA

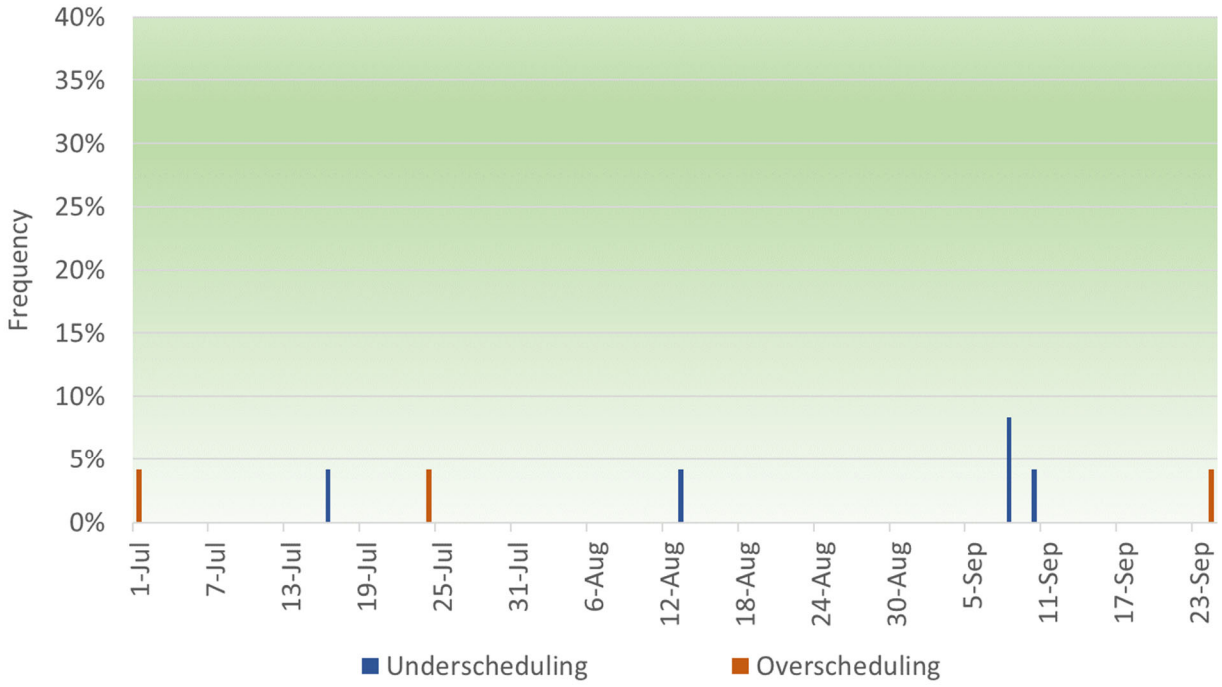


Figure 89: Frequency of Balancing Test Failures for the PGE BAA

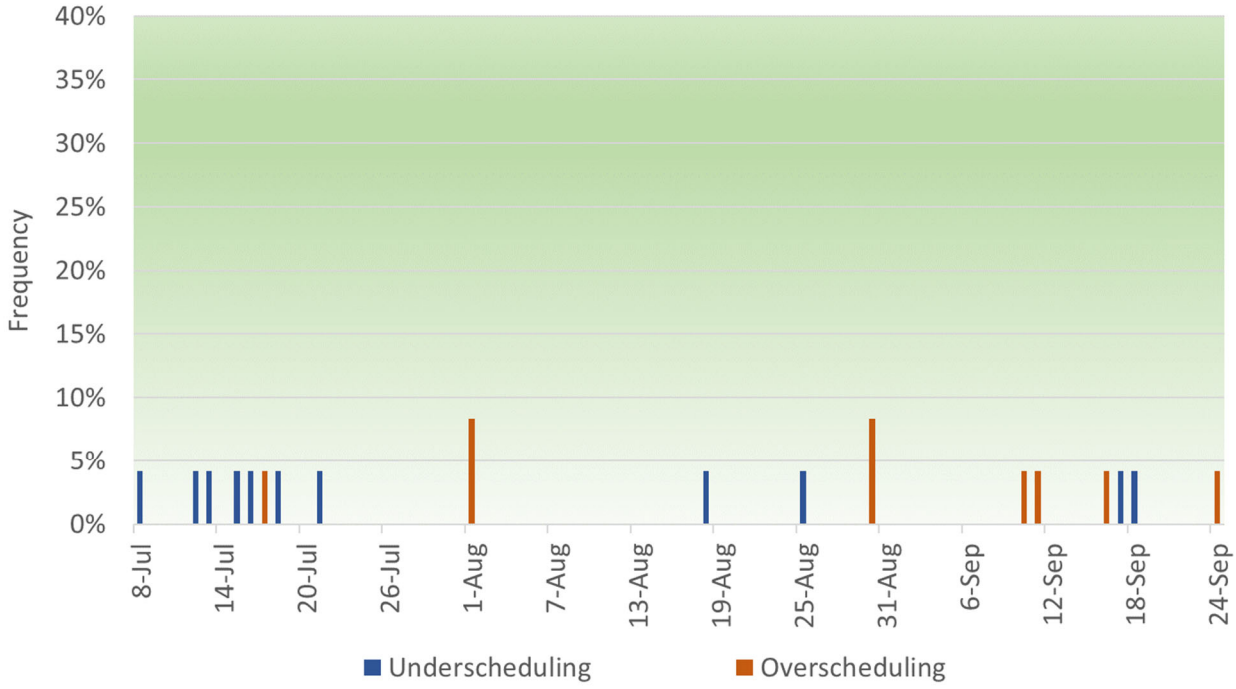


Figure 90: Frequency of Balancing Test Failures for the BANCSMUD BAA

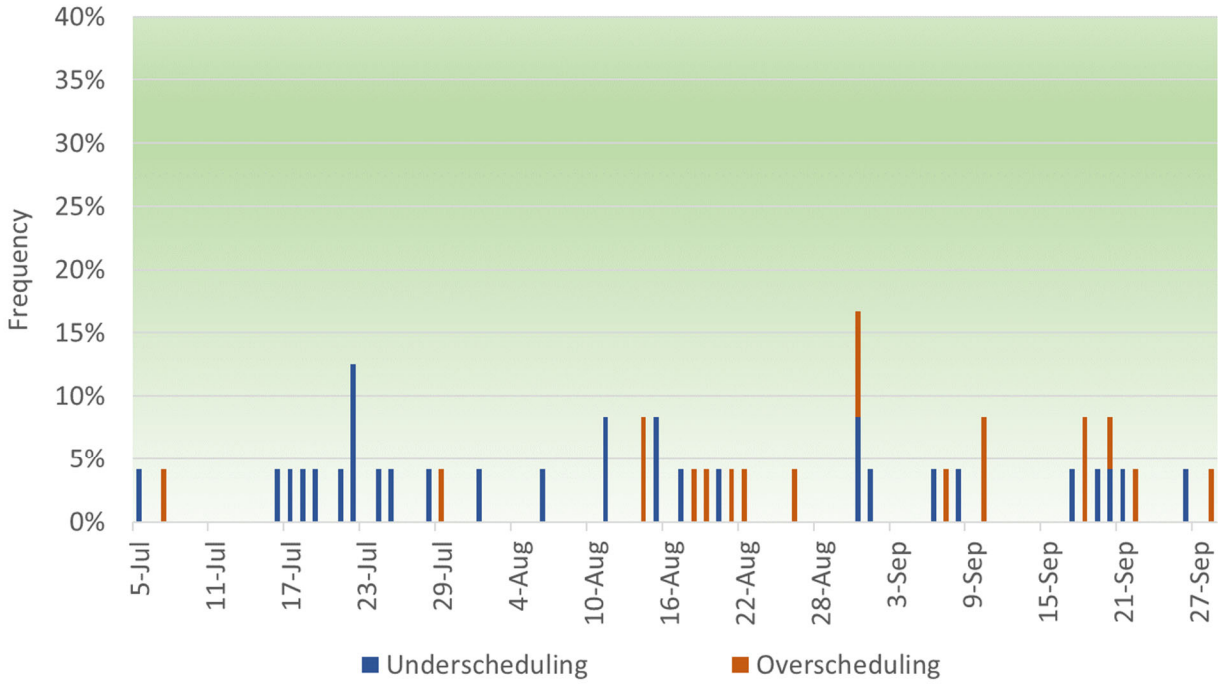


Figure 91: Frequency of Balancing Test Failures for the SCL BAA

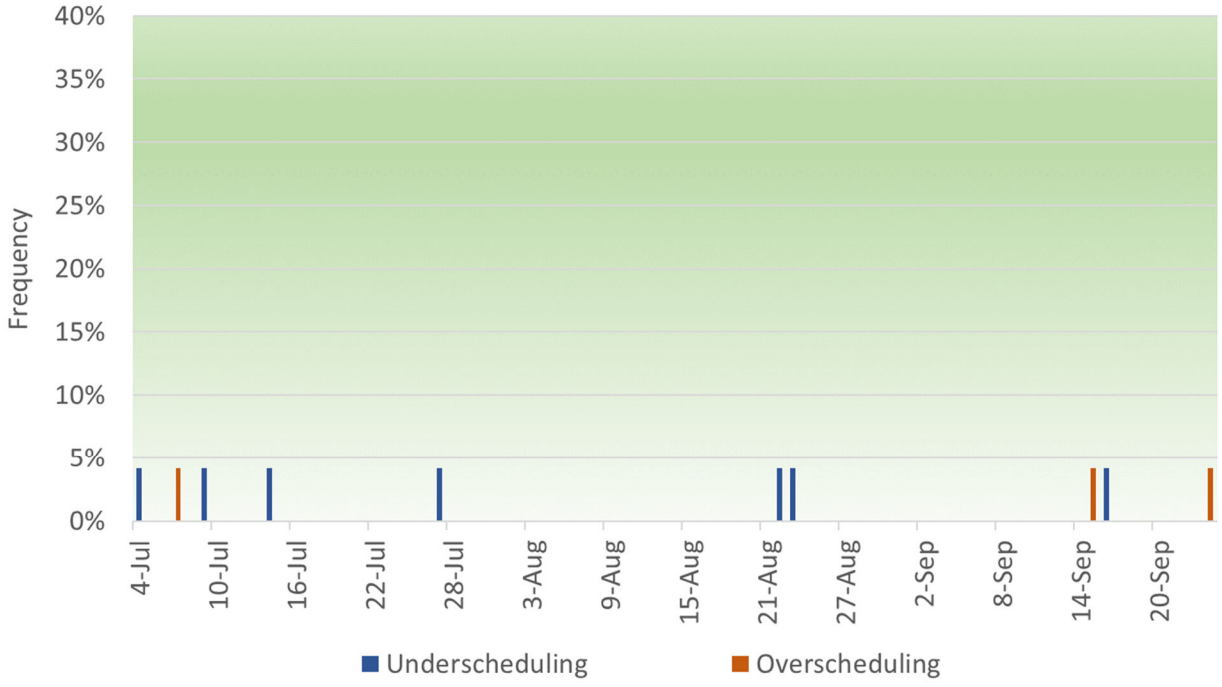
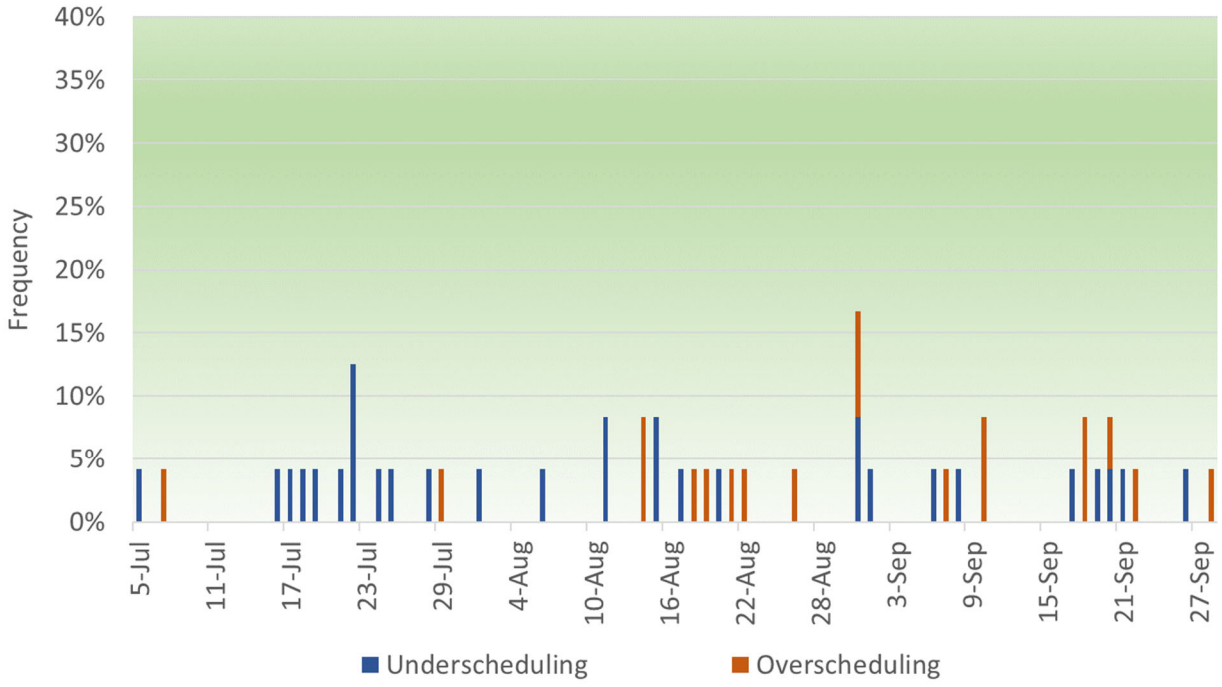


Figure 92: Frequency of Balancing Test Failures for the SRP BAA



The figures below represent the flexible ramping sufficiency test trends in each of the EIM entity's BAA for the quarter covered in this report. The table below shows the percentage of hours in which each BAA passed the flexible ramping sufficiency test.

Table 7: Frequency of Passing Flexible Ramping Sufficiency Test

Balancing Authority Area	% Hours Passing Flex Ramp Test
PAC West	99.9%
PAC East	99.9%
NV Energy	93.9%
APS	99.8%
PSE	99.6%
IPCO	99.9%
PGE	99.7%
PWRX	99.7%
BANCSMUD	99.9%
SCL	99.7%
SRP	98.7%

Figure 93: Frequency of Flexible Ramping Sufficiency Test Failures in the PAC West BAA

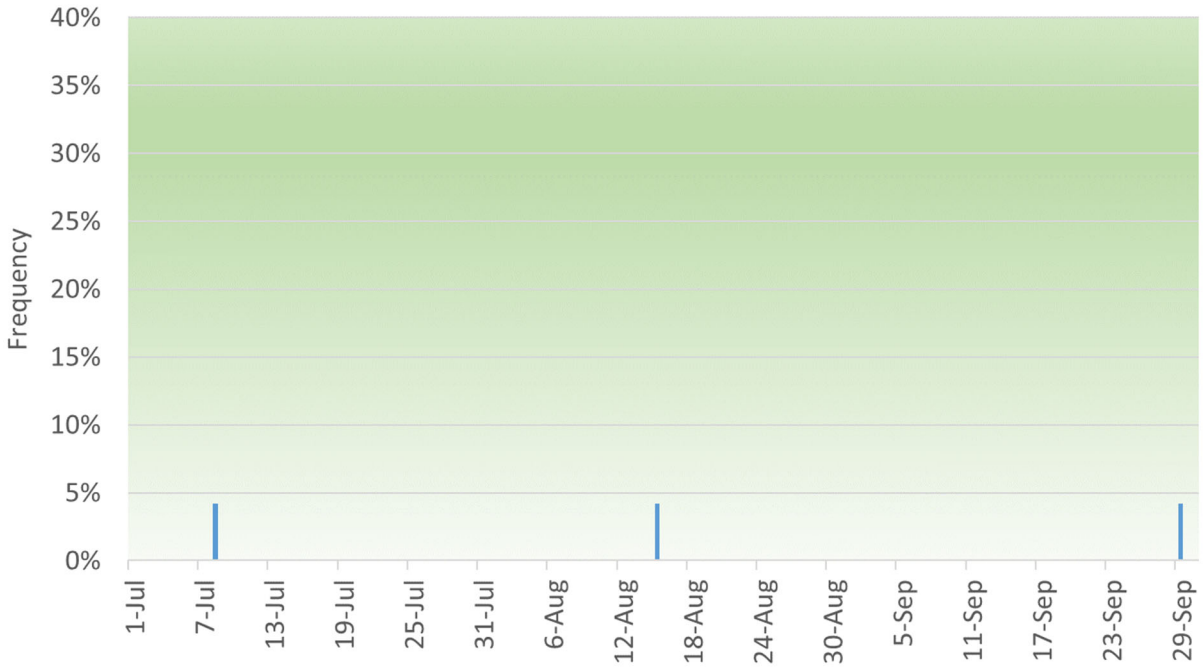


Figure 94: Frequency of Flexible Ramping Sufficiency Test Failures in the PAC East BAA

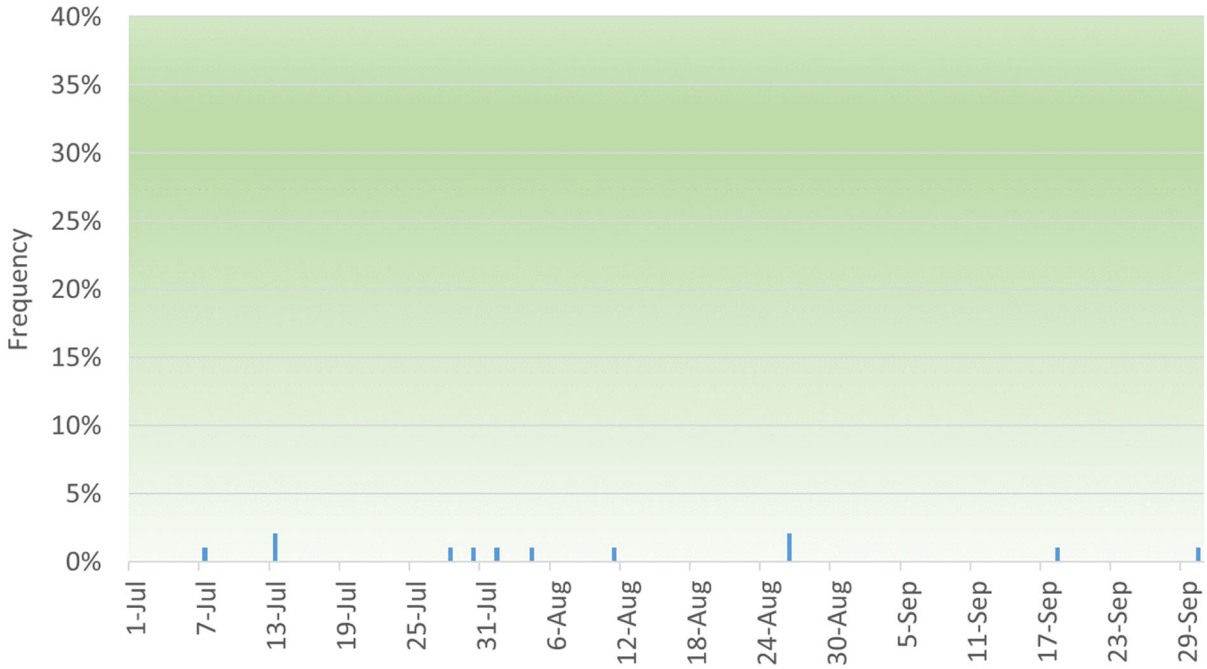


Figure 95: Frequency of Flexible Ramping Sufficiency Test Failures in the NV Energy BAA

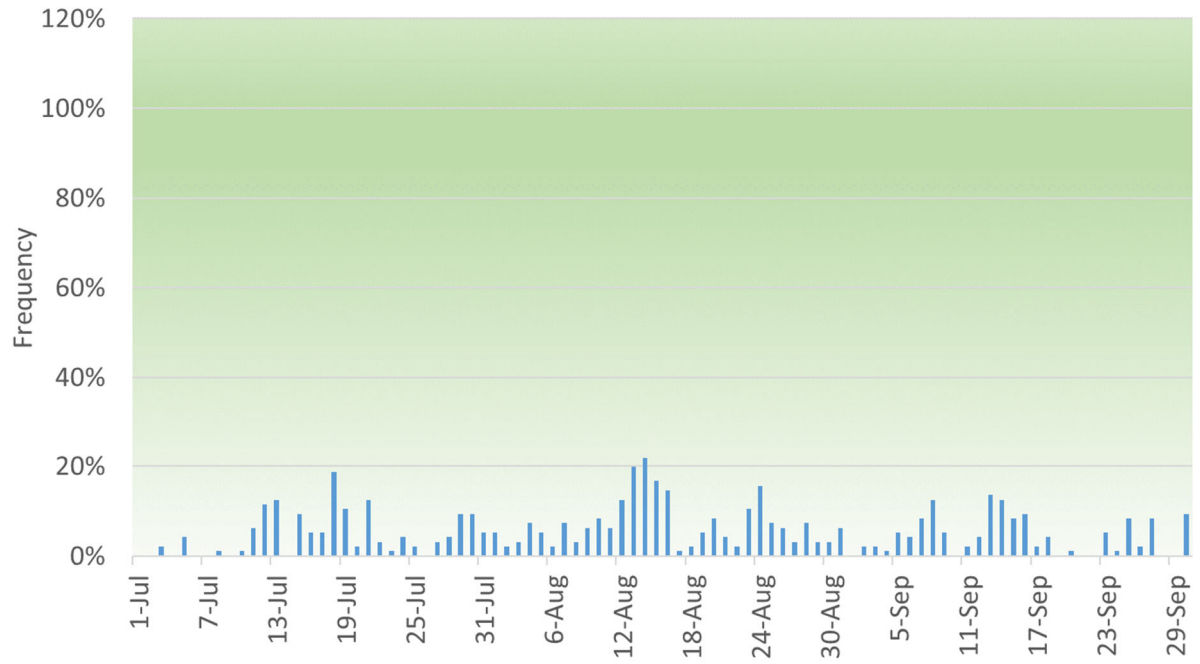


Figure 96: Frequency of Flexible Ramping Sufficiency Test Failures in the APS BAA

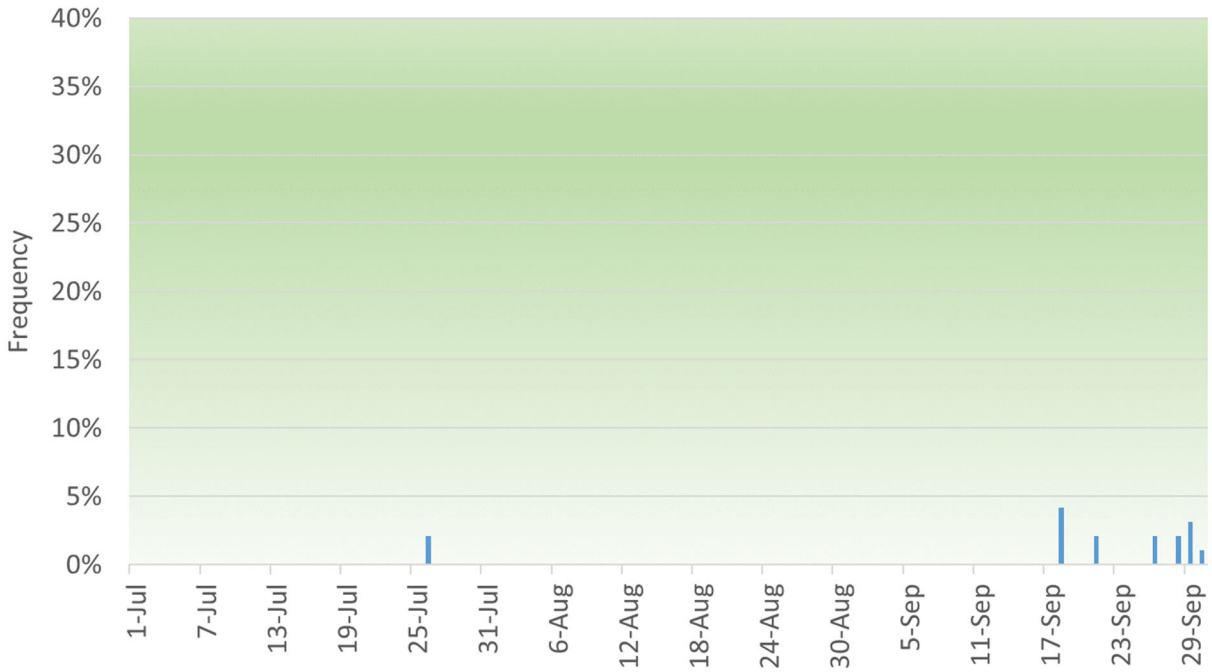


Figure 97: Frequency of Flexible Ramping Sufficiency Test Failures in the PSE BAA

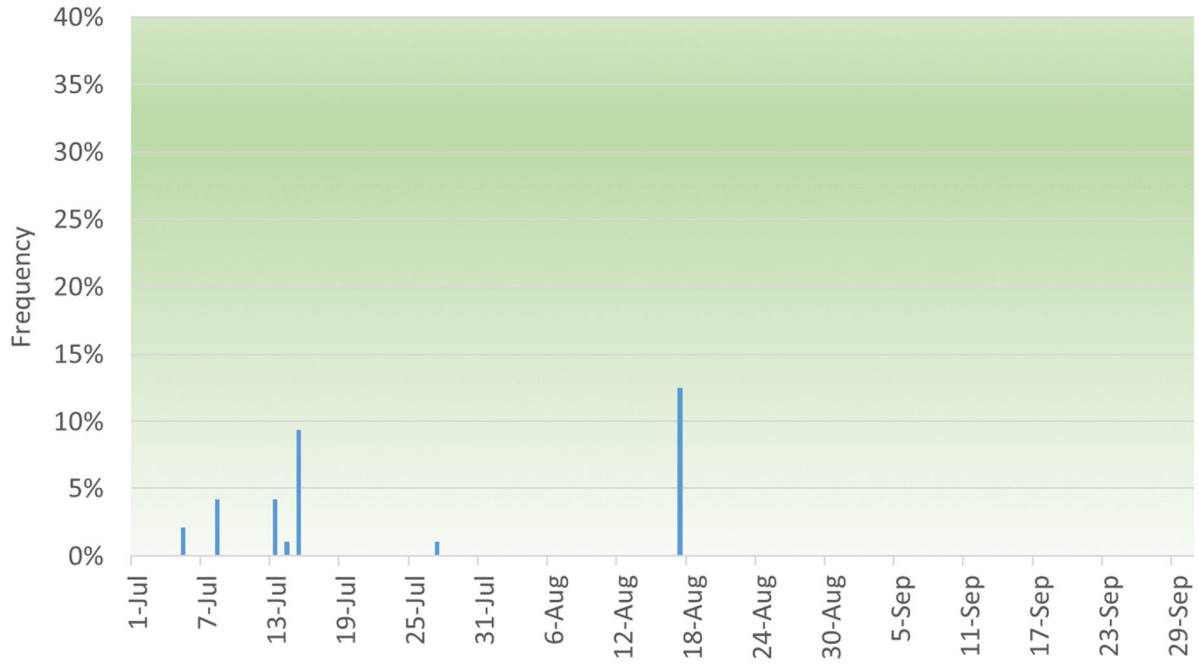


Figure 98: Frequency of Flexible Ramping Sufficiency Test Failures in the IPCO BAA

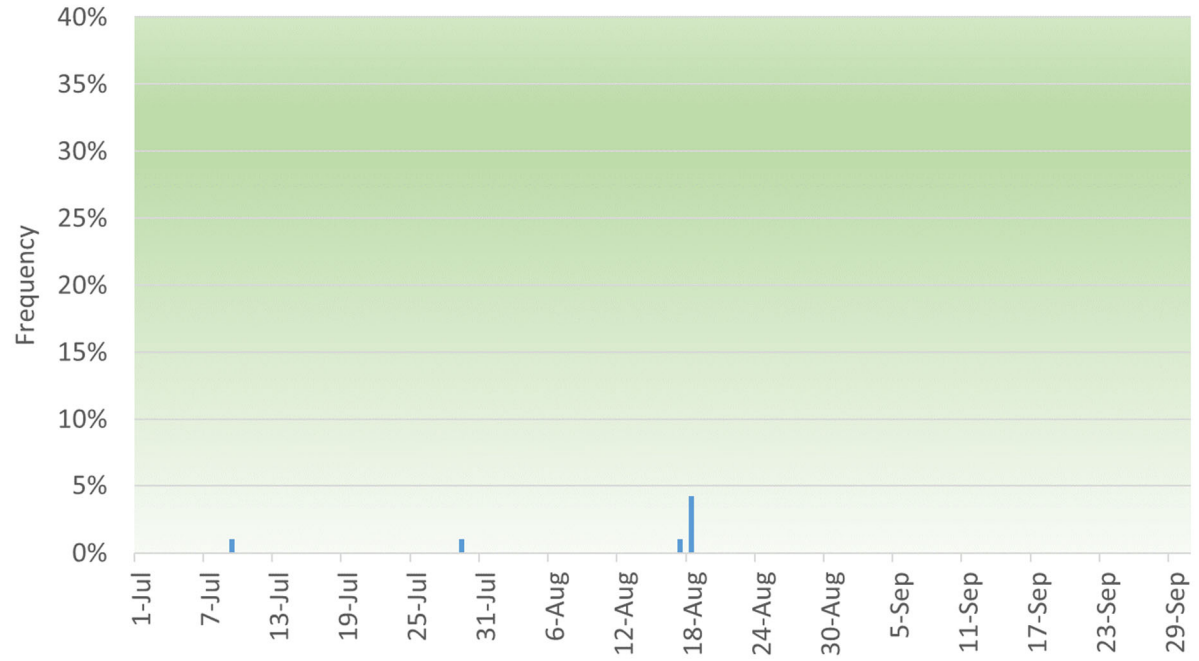


Figure 99: Frequency of Flexible Ramping Sufficiency Test Failures in the PGE BAA

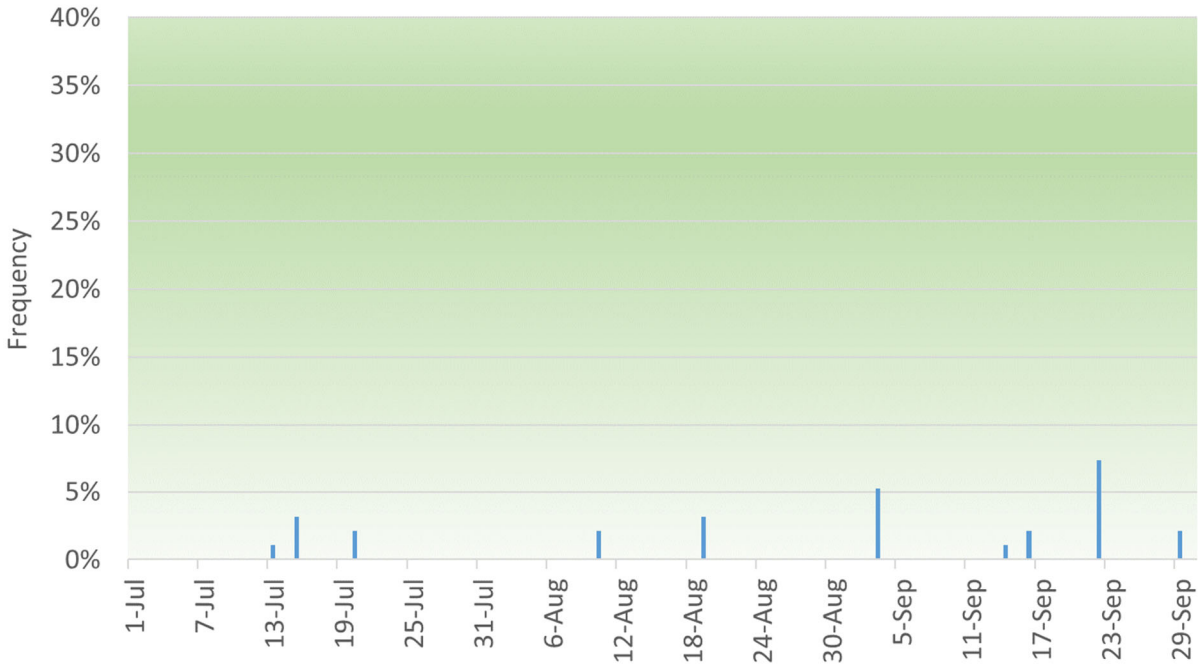


Figure 100: Frequency of Flexible Ramping Sufficiency Test Failures in the PWRX BAA

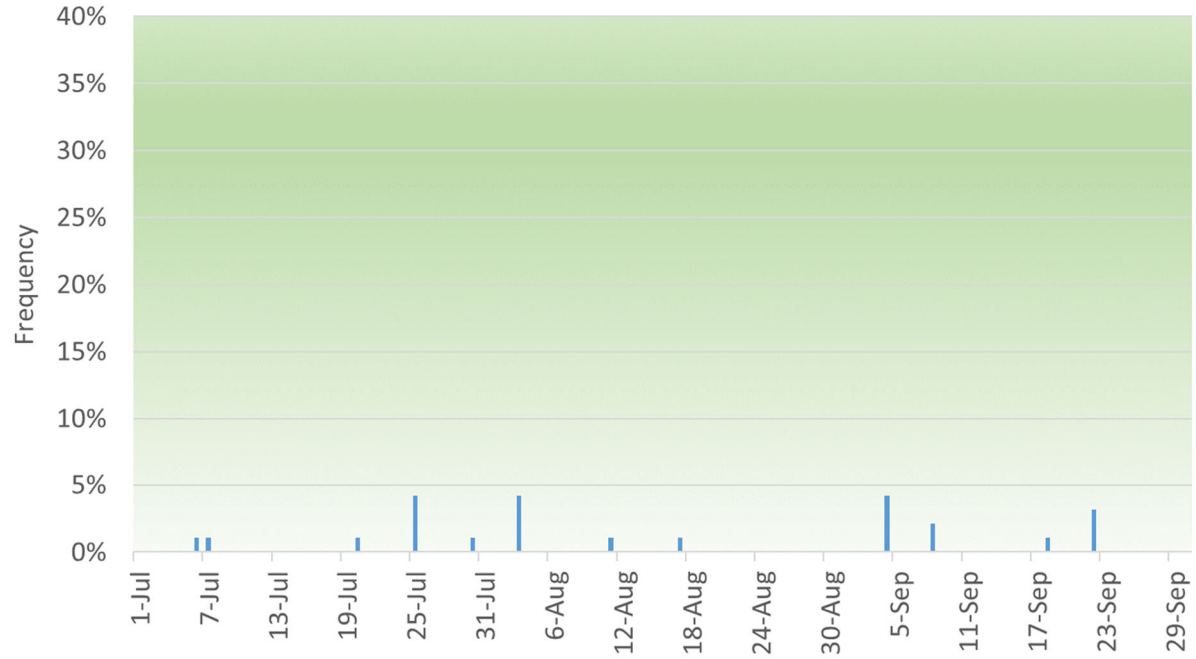


Figure 101: Frequency of Flexible Ramping Sufficiency Test Failures in the BANCSMUD BAA

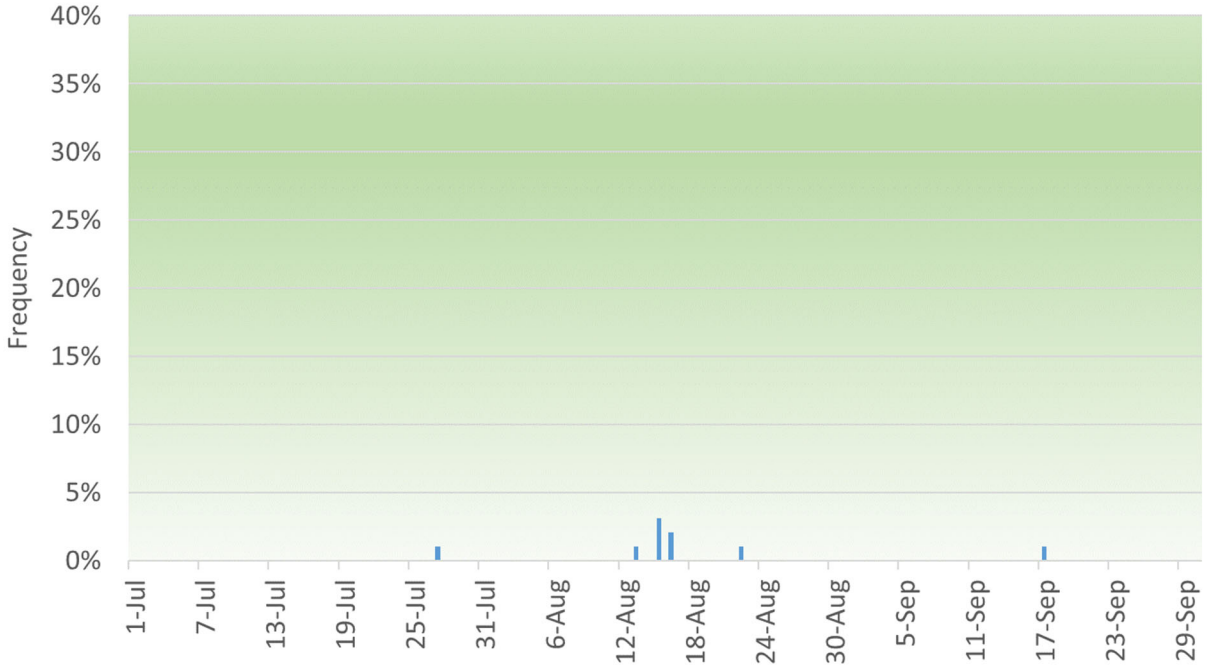


Figure 102: Frequency of Flexible Ramping Sufficiency Test Failures in the SCL BAA

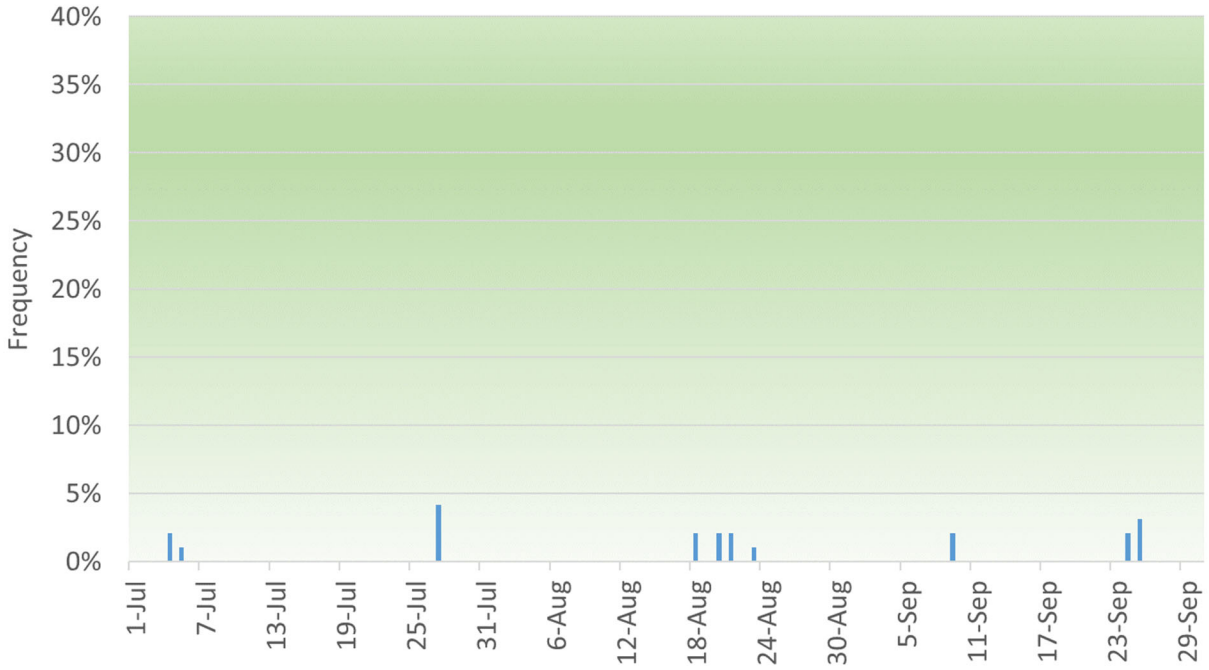
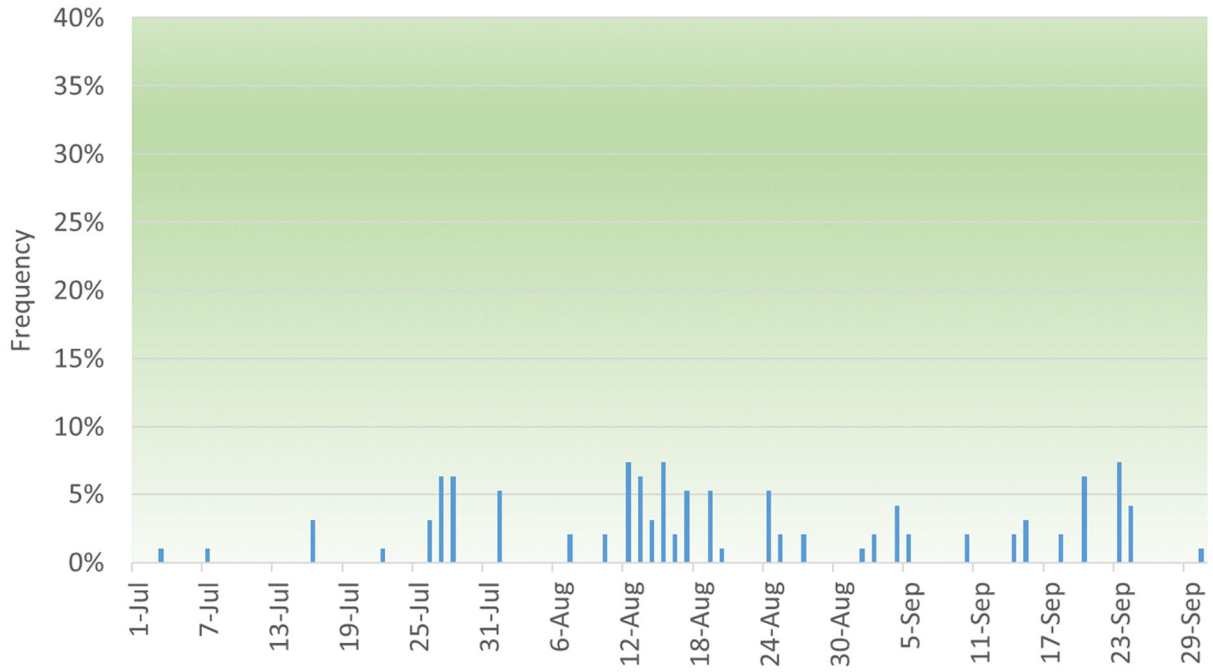


Figure 103: Frequency of Flexible Ramping Sufficiency Test Failures in the SRP BAA



D. Flexible Ramping Constraint Infeasibilities

The CAISO implemented the flexible ramping product on November 1, 2016. The flexible ramping product uses a price-responsive demand curve. Consequently, there no longer are constraint infeasibilities related to the flexible ramping constraint to report.

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service list in the above-referenced proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California, this 12th day of April 2021.

/s/ Anna Pascuzzo

Anna Pascuzzo