Analysis on BAA Market Power Mitigation Price Formation Enhancements

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Overview

- Market Power Mitigation (MPM) process review
- Assessment of CAISO competitiveness
- Grouping approach: Counterfactual study

Review of MPM process

This analysis is focused on the DCPA

Full market run with submitted bids

- Identifies binding transmission constraints and BAAs that are price separated from the rest of the system

Dynamic Competitive Path Assessment (DCPA)

- Evaluates binding transmission constraints and price separated BAAs for competitiveness

Bid mitigation criteria applied

- If the resource impacts a non-competitive constraint and the bid > competitive LMP, the bid is mitigated

Review of Dynamic Competitive Path Assessment (DCPA) – High Level Overview

- The DCPA is a process to determine if a given constraint or BAA is competitive
- The top 3 supply companies with the largest potential to impact flow on the constraint are labeled as Pivotal Suppliers
- If there is enough supply to meet the demand on the constraint without the Pivotal Suppliers contribution, then the constraint is deemed competitive
- The result of the DCPA is measured with the Residual Supply Index (RSI) as the ratio of competitive supply to demand
- If the RSI is less than 1, constraint is not competitive.

DCPA – Evaluation of WEIM BAAs

- The DCPA for WEIM BAAs is triggered when there is positive price separation between the BAA and the rest of the system
- This is most often caused by binding WEIM Transfer constraints (most often failed upward RSE tests) or individual ETSRs binding in the import direction
- The BAA as a whole is then evaluated for competitiveness by applying the logic of the DCPA to the participating resources within that BAA
- CAISO is not currently evaluated and is assumed to be always competitive

The ISO has done a counterfactual run of MPM to assess CAISO BAA competitiveness

- FMM binding interval only
- Replicates existing RSI logic for other BAAs
- No inter-ties considered
- Calculations were set up to mimic current market logic as close as possible
- The second half of 2024 was used as a sample period as it captures both summer and non-summer conditions

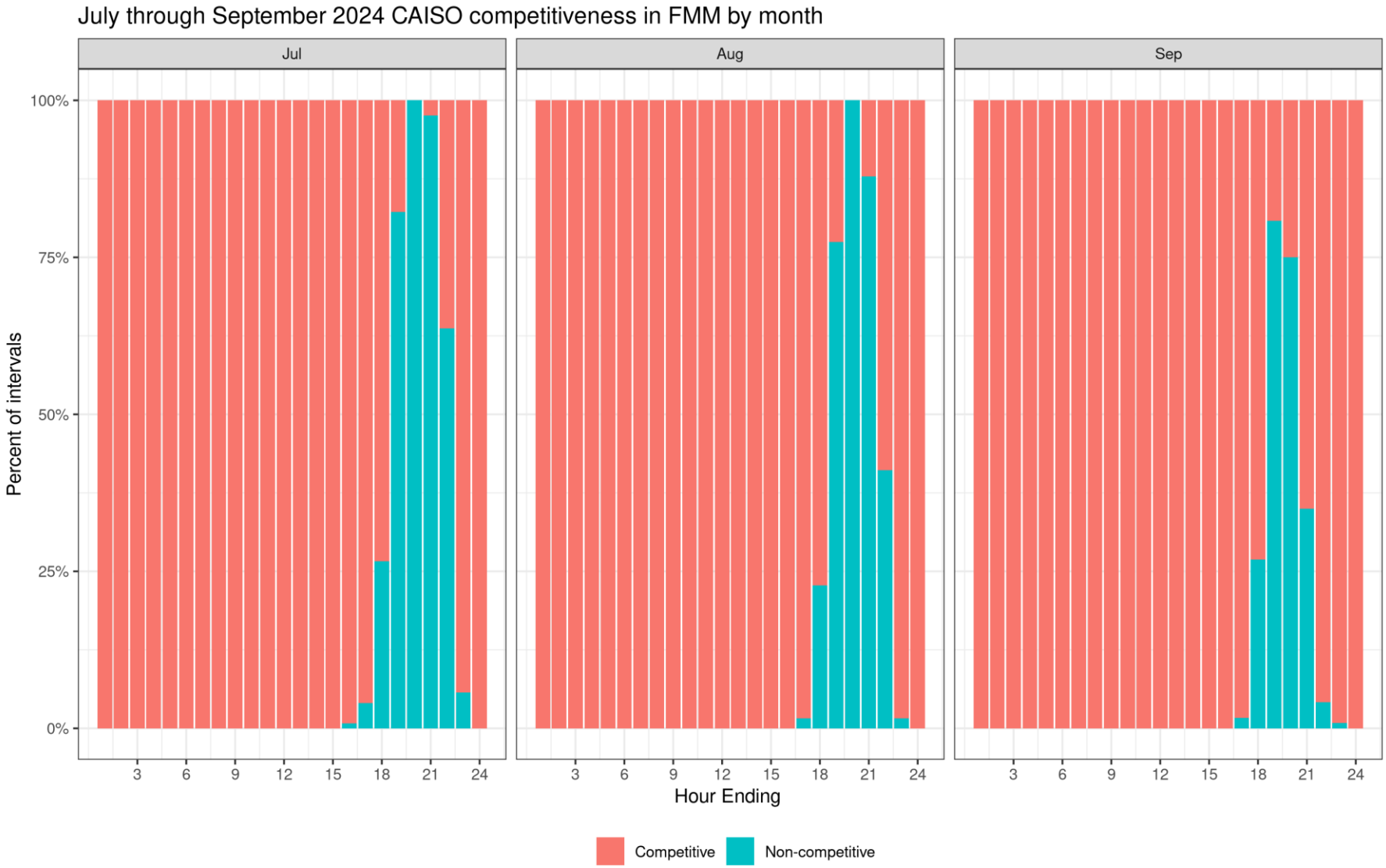
Overview – CAISO would often be non-competitive across the evening peak, especially in summer

Month	Average RSI	Minimum RSI	Maximum RSI	Non-competitive intervals	Total Intervals	% Non-competitive
Jul	1.14	0.90	1.39	472	2970	15.89%
Aug	1.15	0.90	1.43	412	2963	13.90%
Sep	1.18	0.91	1.45	269	2876	9.35%
Oct	1.20	0.90	1.51	219	2970	7.37%
Nov	1.20	0.89	1.53	128	2881	4.44%
Dec	1.23	0.95	1.56	18	2971	0.61%

The BAA level assessment triggers only when there is positive price separation for a BAA (constraints import limiting the BAA). The CAISO EIM transfers were import constrained in 3 FMM intervals in 2024, all of which were competitive.

This metric assess RSI for all intervals of the study period regardless of whether the CAISO BAA was import limited.

CAISO area is assessed as non competitive mainly for peak hours



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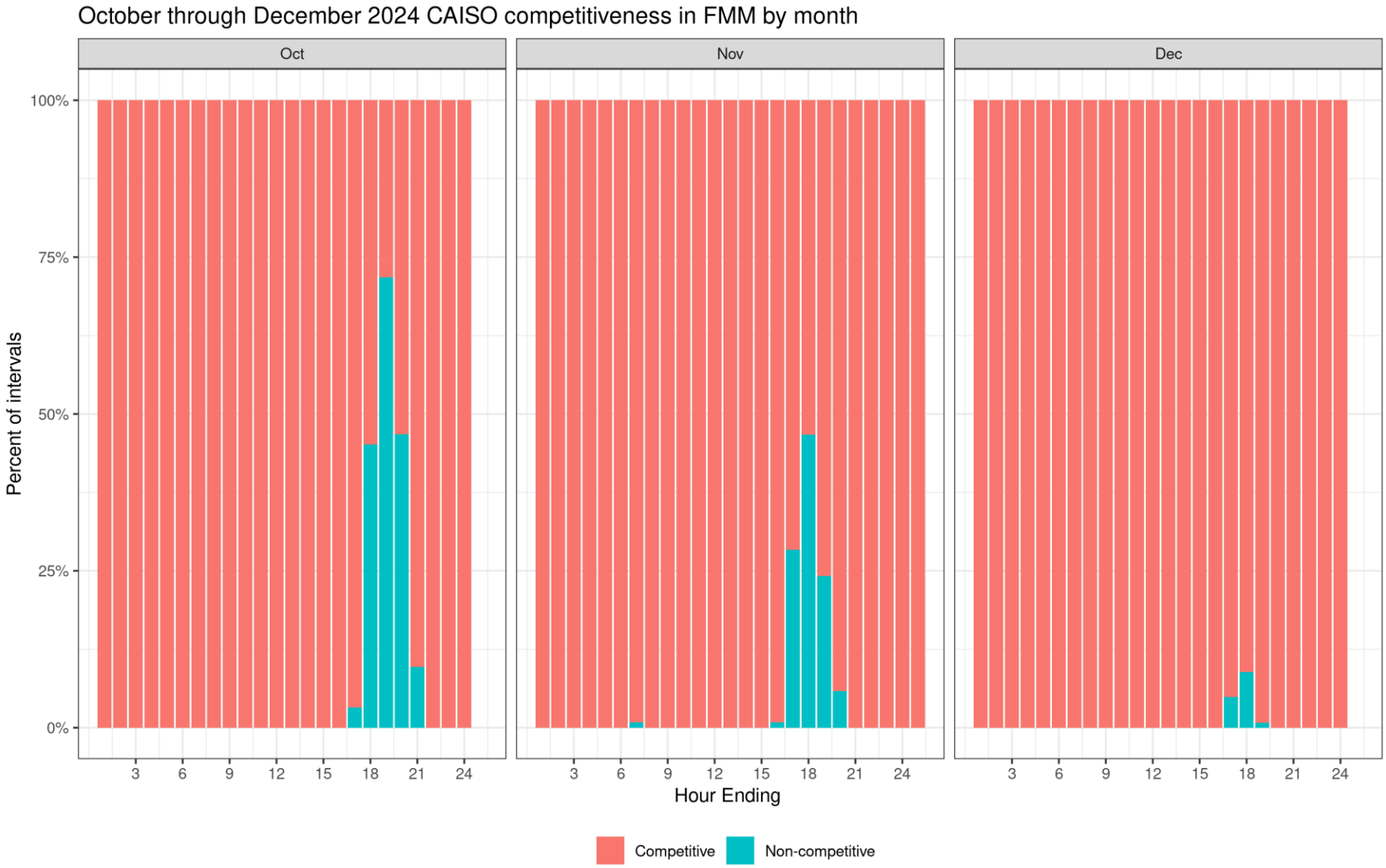


Summary

- CAISO would often be non-competitive during solar ramp down/evening peak hours during the summer based on the current RSI test
- Intuition of the FMM RSI test: Is there enough upward ramp to meet demand when the 3 largest participants ramp down as fast as possible?
- For the CAISO, most of the time yes, but not during the summer peaks due to the steep solar ramp down

Grouping approach

- Current approach:
  - Tests BAAs individually and does not consider supply contributions from other BAAs
  - May lead to excess mitigation

- Grouping approach:
  - Potentially reduces unnecessary mitigation by considering available supply in multi-BAA broader areas
  - Potentially better reflects the actual market conditions and competitiveness

Grouping approach: Example 1

Data: 09/04/2024 hour ending 13

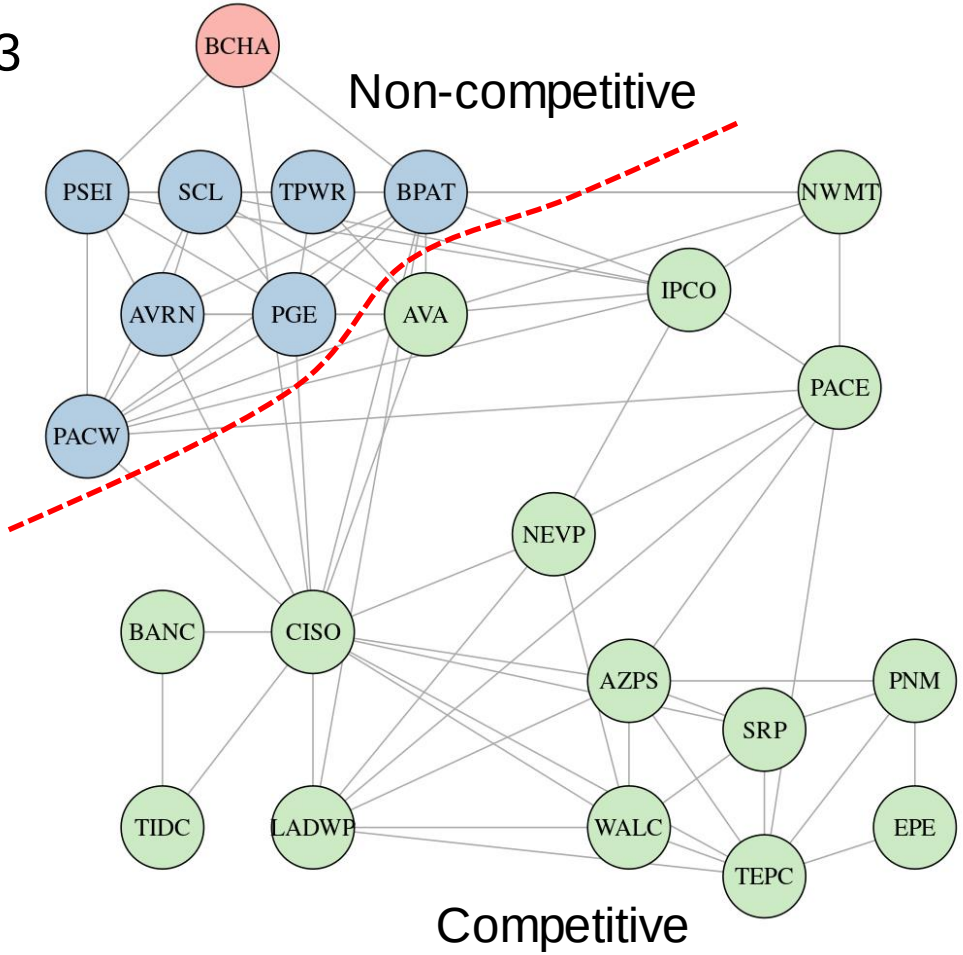
Original results:

- Non-competitive BAAs:

  AVRN, BCHA, BPAT, PACW, PGE, PSEI, SCL, TPWR

- Competitive BAAs:

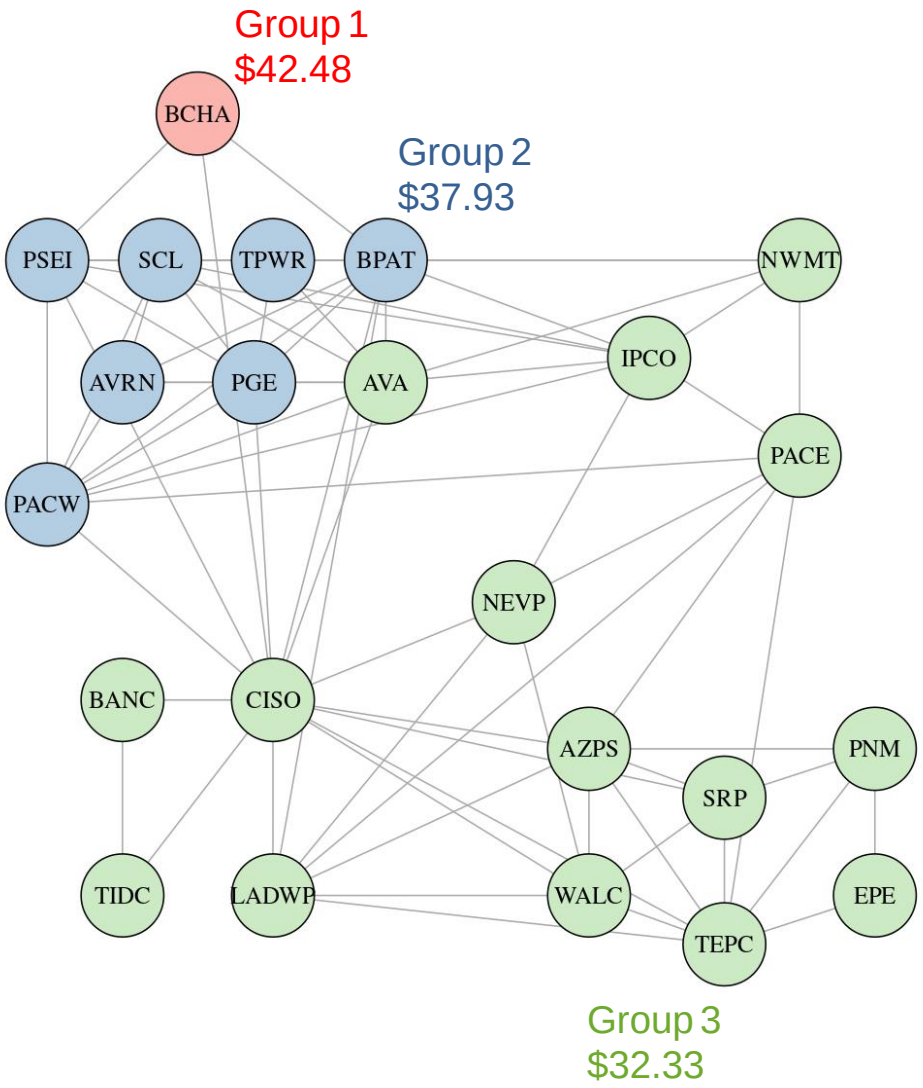
  AVA, AZPS, BANC, CISO, EPE, IPCO, LADWP, NEVP, NWMT, PACE, PNM, SRP, TEPC, TIDC, WALC



Grouping approach: Example 1

BAA MECs (Marginal Energy Component) can be partitioned into 3 groups:

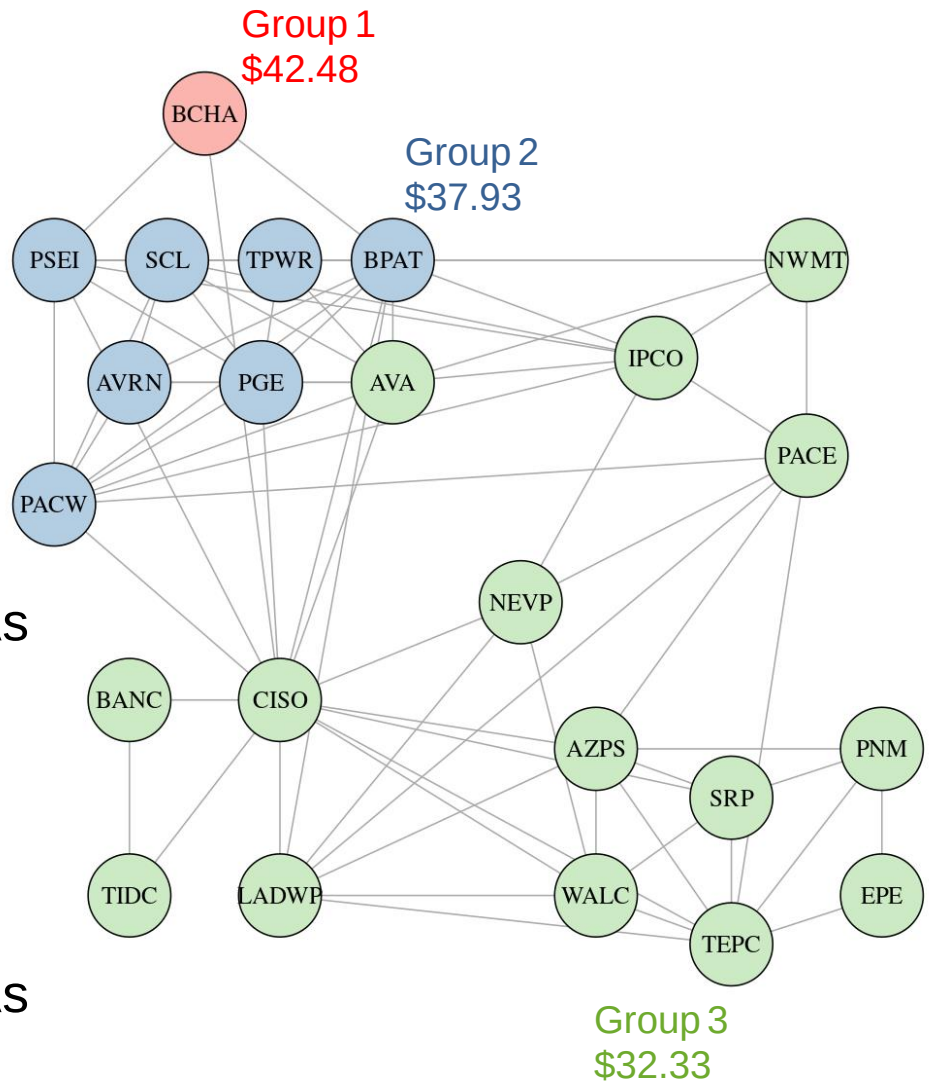
- Group 1: BCHA @$42.48
- Group 2: AVRN, BPAT, PACW, PGE, PSEI, SCL, TPWR @$37.93
- Group 3: AVA, AZPS, BANC, CISO, EPE, IPCO, LADWP, NEVP, NWMT, PACE, PNM, SRP, TEPC, TIDC, WALC @$32.33



Grouping approach: Example 1

Grouping Algorithm:

1) Test group {1}:
   - Fail
   - Non-competitive: group1 BAA
2) Test group {1, 2}:
   - Pass
   - Competitive: group 2 BAAs
   - Competitive LMP $37.93 for group 1 BAA
3) Test group {1, 2, 3}:
   - Pass
   - Competitive: group 3 BAAs



Grouping approach: Example 2

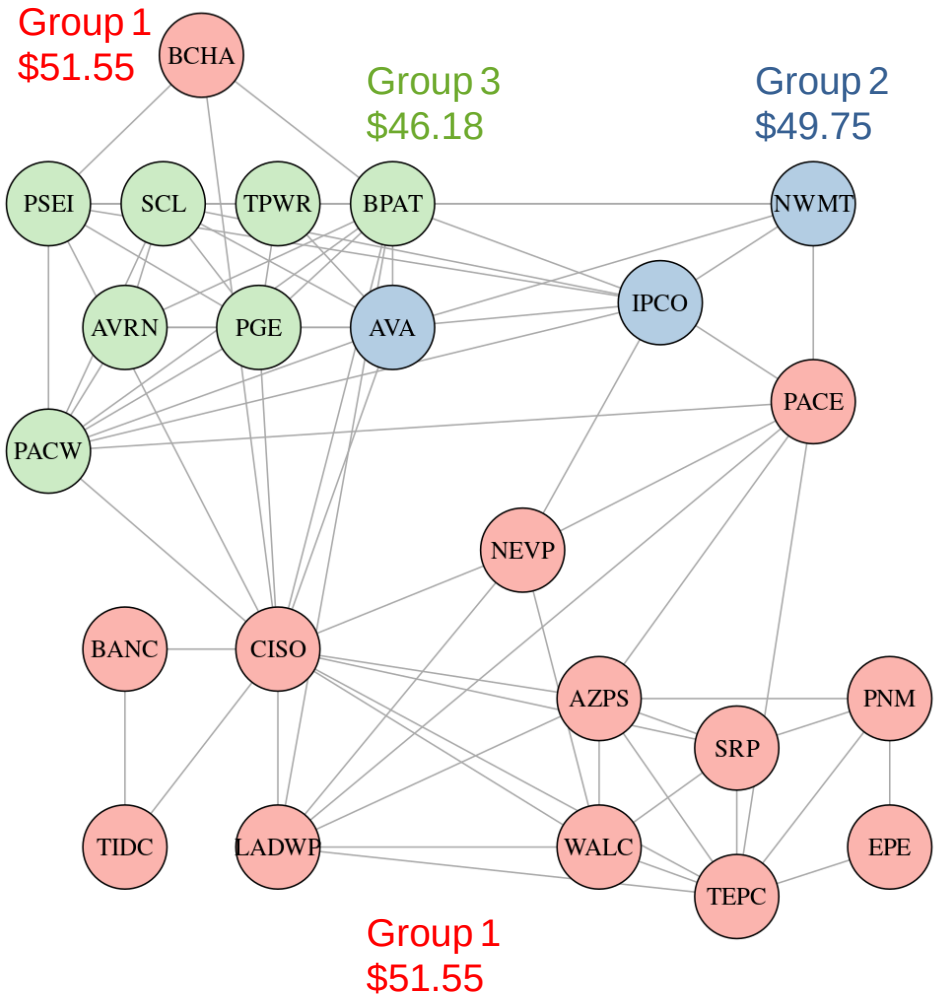
Data: 08/12/2024 hour ending 21

Original results:

- All BAAs were competitive

BAA MECs groups:

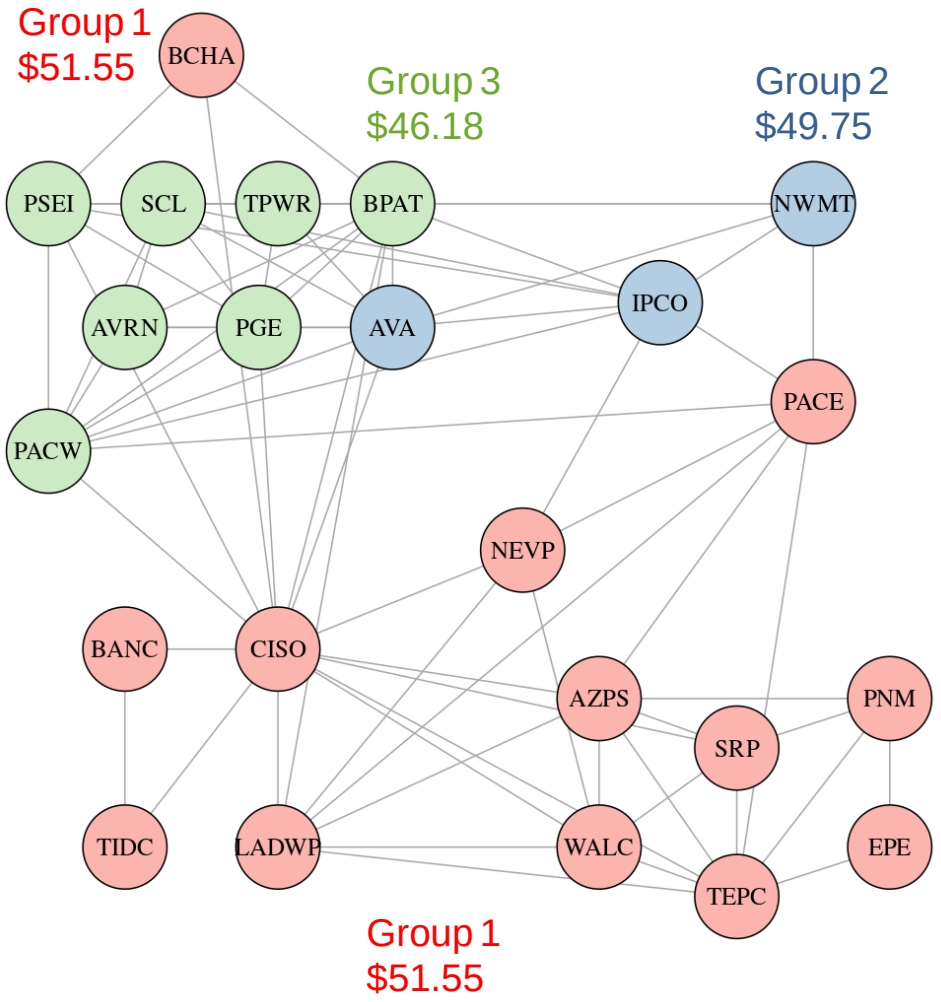
- Group 1 @$51.55: AZPS, BANC, BCHA, CISO, EPE, LADWP, NEVP, PACE, PNM, SRP, TEPC, TIDC, WALC
- Group 2 @$49.75: AVA, IPCO, NWMT
- Group 3 @$46.18: AVRN, BPAT, PACW, PGE, PSEI, SCL, TPWR



Grouping approach: Example 2

Grouping Algorithm:

1) Test group {1}:
   - Fail
   - Non-competitive: group1 BAAs
2) Test group {1, 2}:
   - Pass
   - Competitive: group 2 BAAs
   - Competitive LMP $49.75 for group 1 BAAs.
3) Test group {1, 2, 3}:
   - Fail
   - Non-competitive: group 3 BAAs
   - No competitive LMP for group 3 BAAs

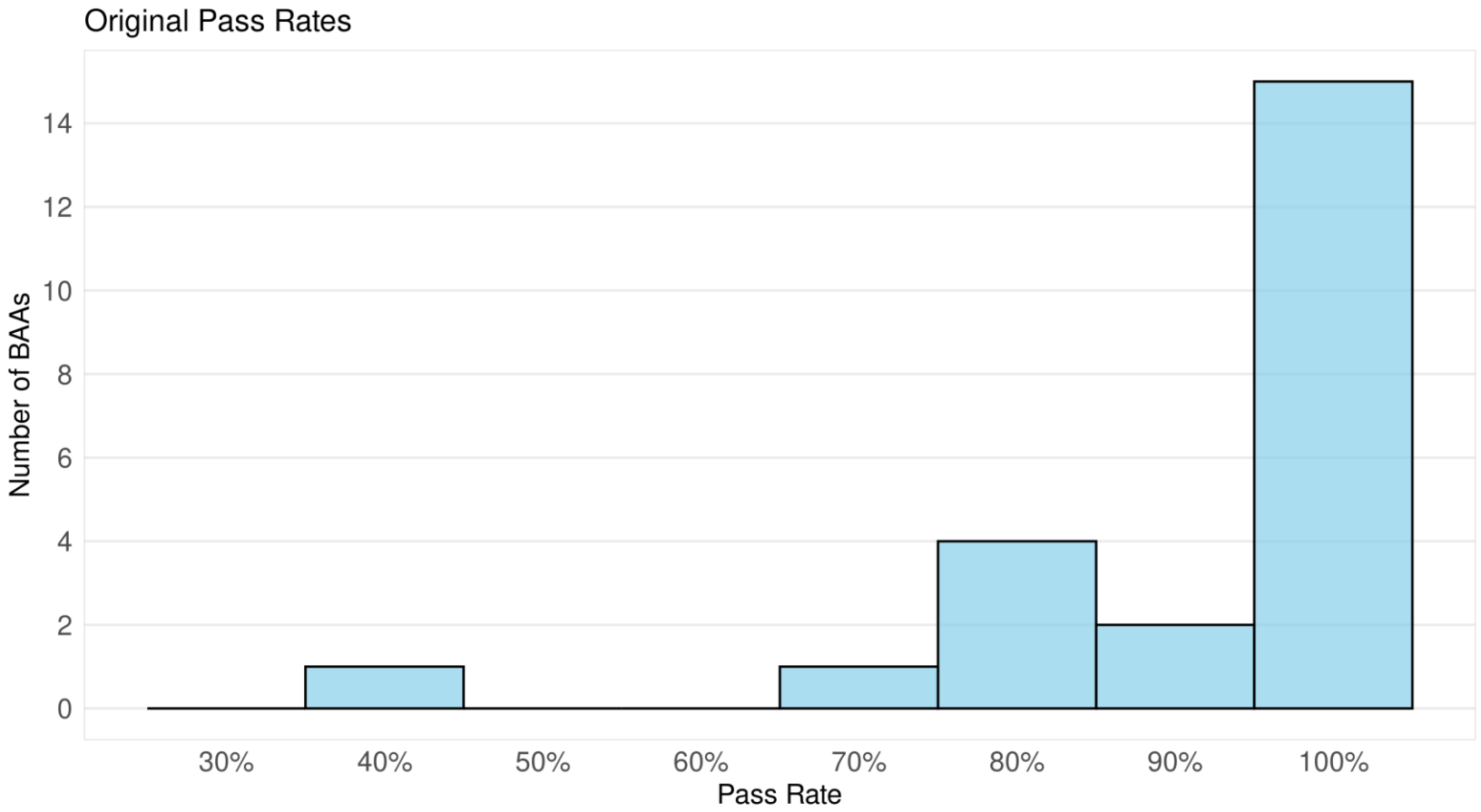


Counterfactual study: evaluating the impact of the grouping approach

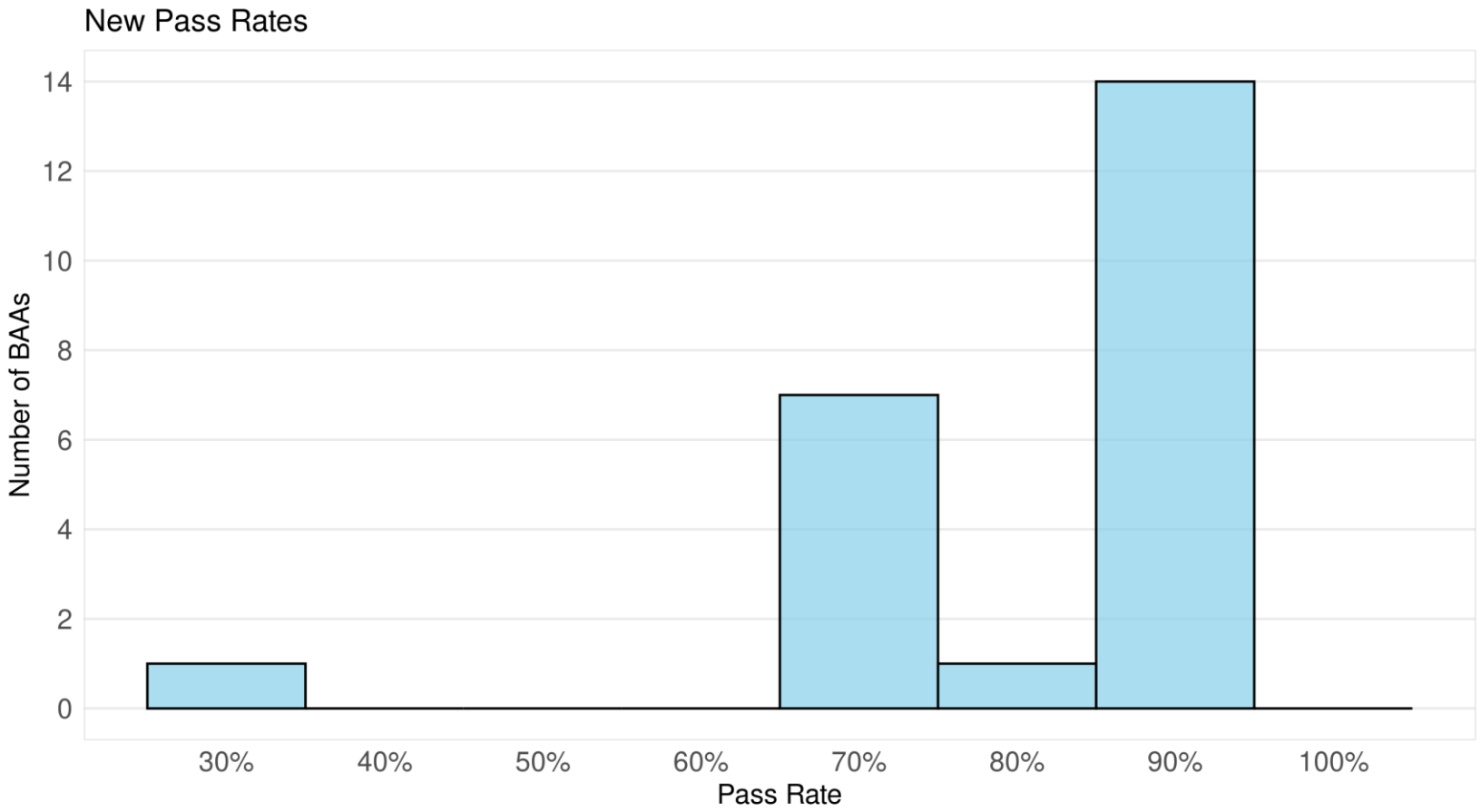
Factors considered in the analysis:

- Range: 2024 Q3 (July 1st – September 30th)
- FMM LMPM results
- Master file registered ETSR mapping is used as the reference for connectivity among BAAs
- Competitive LMP of a passing group is set by the lowest MEC in the group
- CAISO is not assumed to be always competitive

A BAA is considered as Pass in BAA-level MPM if it is not import-transfer constrained, or passed the RSI test



Under the grouping approach with CAISO tested, overall pass rates dropped for all BAAs



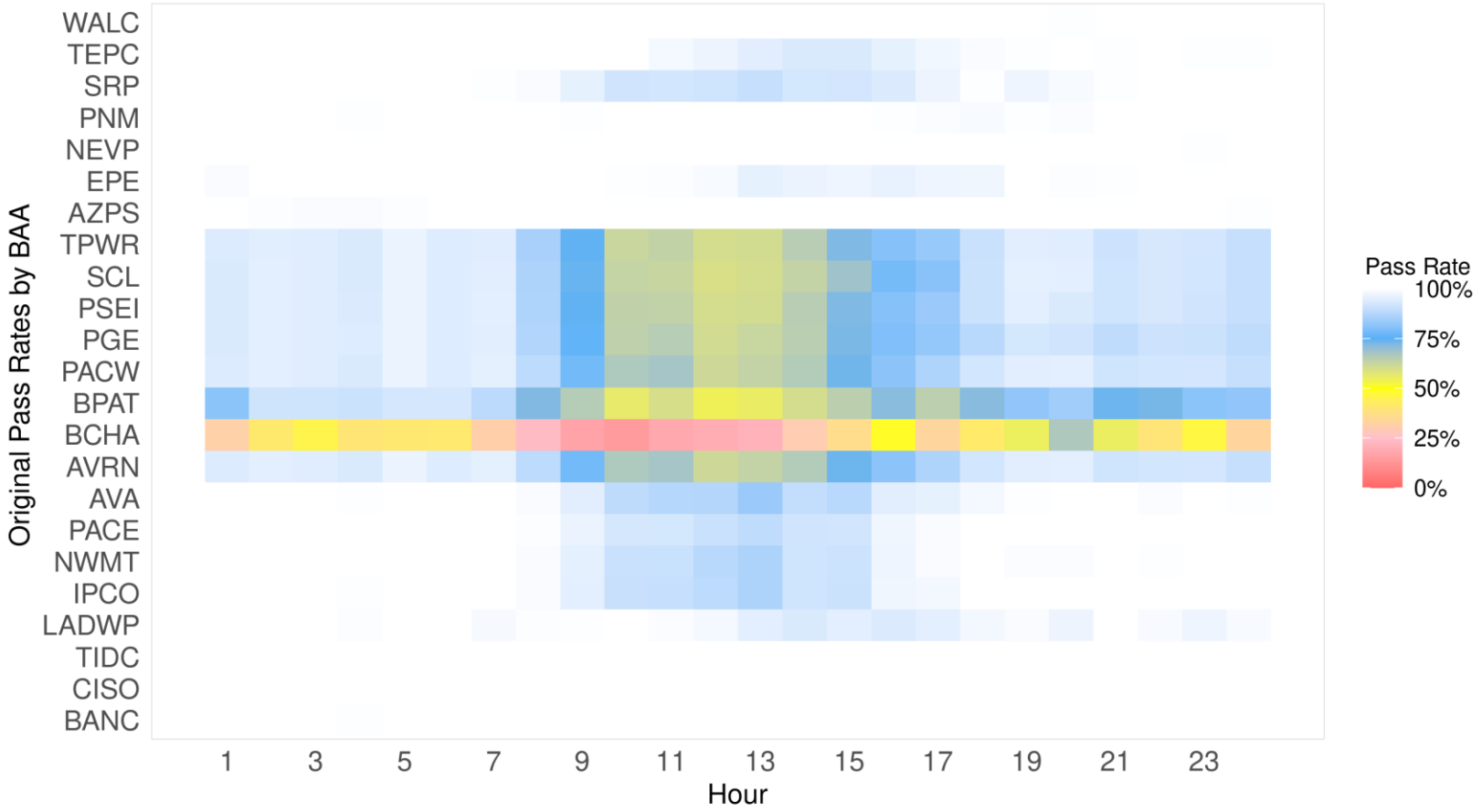
Overall pass rates on the BAA level dropped with CAISO being part of the test under the grouping approach

BAA	Pass Rate Original	Pass Rate New	Pass Rate Delta	Fail Given Pass *
AVA	96.05%	84.20%	-11.85%	12.87%
AVRN	85.14%	73.46%	-11.68%	14.24%
AZPS	99.85%	87.48%	-12.37%	12.39%
BANC	99.99%	87.60%	-12.39%	12.39%
BCHA	36.50%	28.86%	-7.64%	21.68%
BPAT	74.97%	65.39%	-9.58%	13.46%
CISO	100.00%	87.63%	-12.37%	12.37%
EPE	98.94%	86.83%	-12.11%	12.41%
IPCO	96.93%	85.02%	-11.92%	12.78%
LADWP	98.09%	85.95%	-12.15%	12.38%
NEVP	99.99%	87.58%	-12.41%	12.41%
NWMT	96.93%	85.02%	-11.92%	12.68%
PACE	97.53%	85.45%	-12.08%	12.72%
PACW	85.13%	73.45%	-11.68%	14.24%
PGE	83.73%	72.38%	-11.35%	14.10%
PNM	99.83%	87.51%	-12.32%	12.34%
PSEI	84.07%	72.51%	-11.57%	14.30%
SCL	83.56%	71.93%	-11.64%	14.51%
SRP	97.07%	85.02%	-12.06%	12.50%
TEPC	98.65%	86.46%	-12.19%	12.54%
TIDC	100.00%	87.63%	-12.37%	12.37%
TPWR	83.94%	72.37%	-11.57%	14.35%
WALC	99.99%	87.63%	-12.36%	12.36%

		After	
	Bef → Aft	Pass	Fail
Before	Pass	79.20%	11.97%
	Fail	0.25%	8.59%

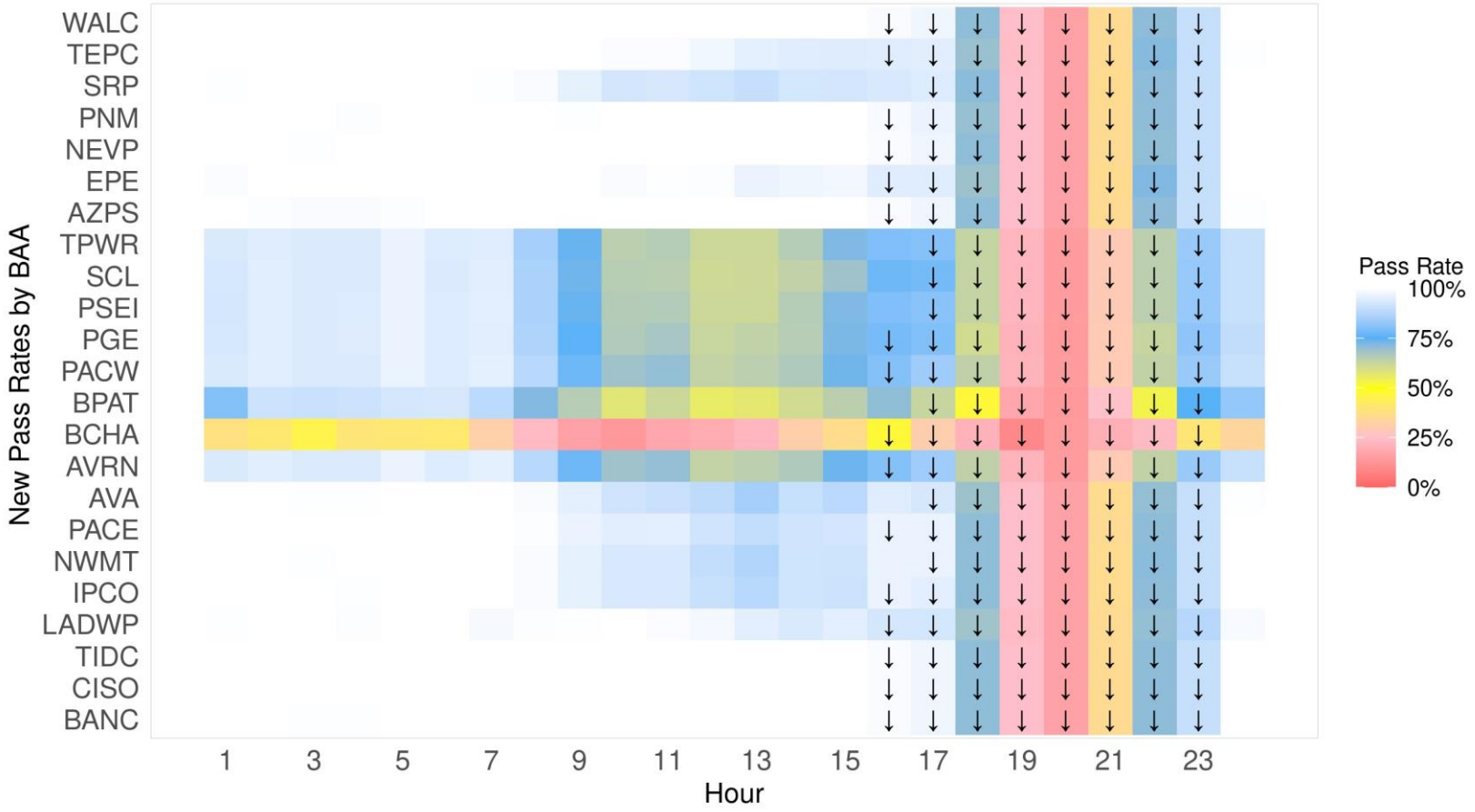
* The percentage of previously passed BAA tests that failed under the grouping approach with CAISO tested.

Original pass rates by BAA mainly concentrated in midday hours when BAAs are import constrained

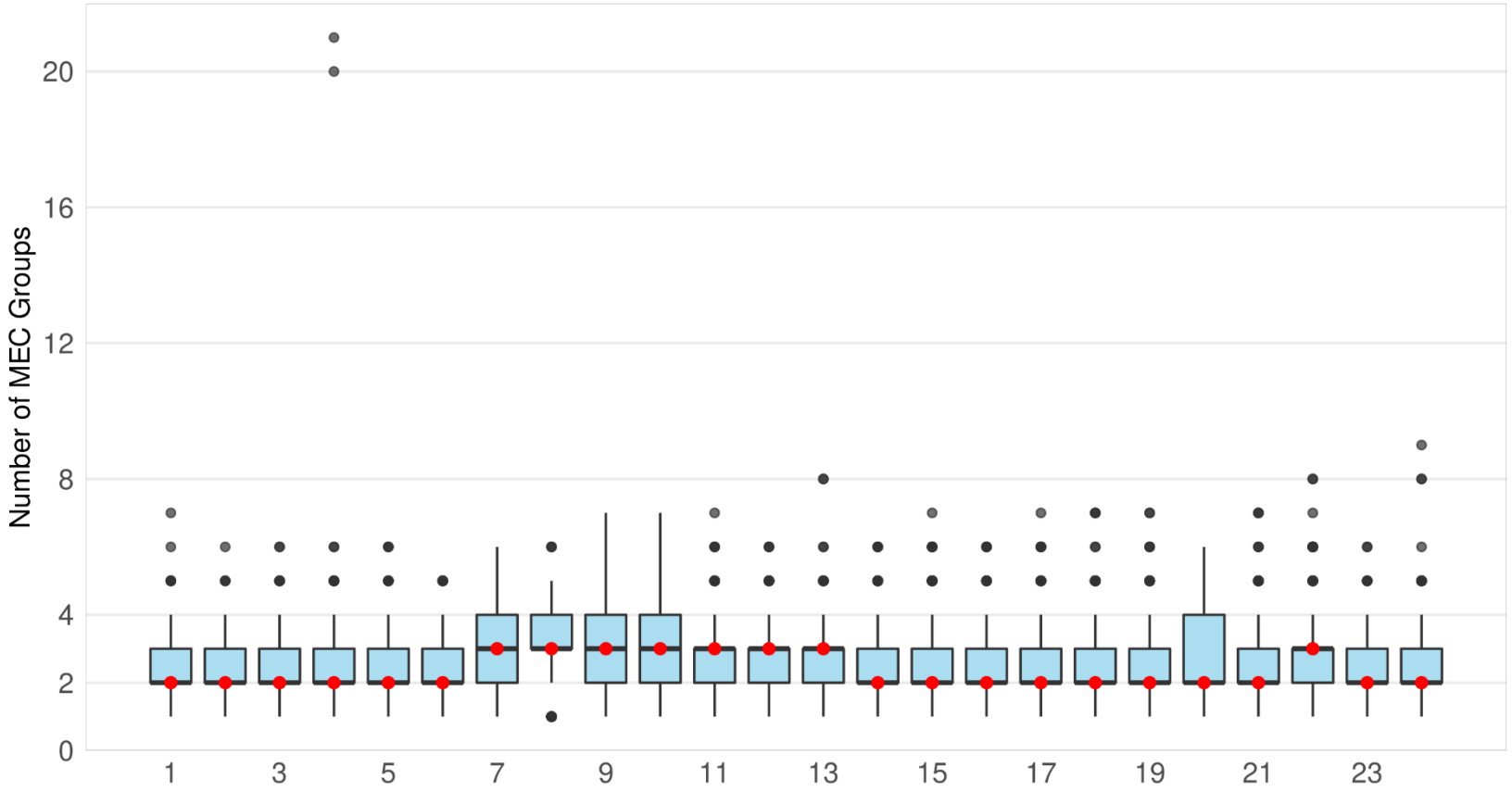


Primarily due to the abundant solar supply in the system

Pass rates drop significantly, comparing to the original pass rate, during afternoon peak hours under grouping approach with CAISO being part of the test

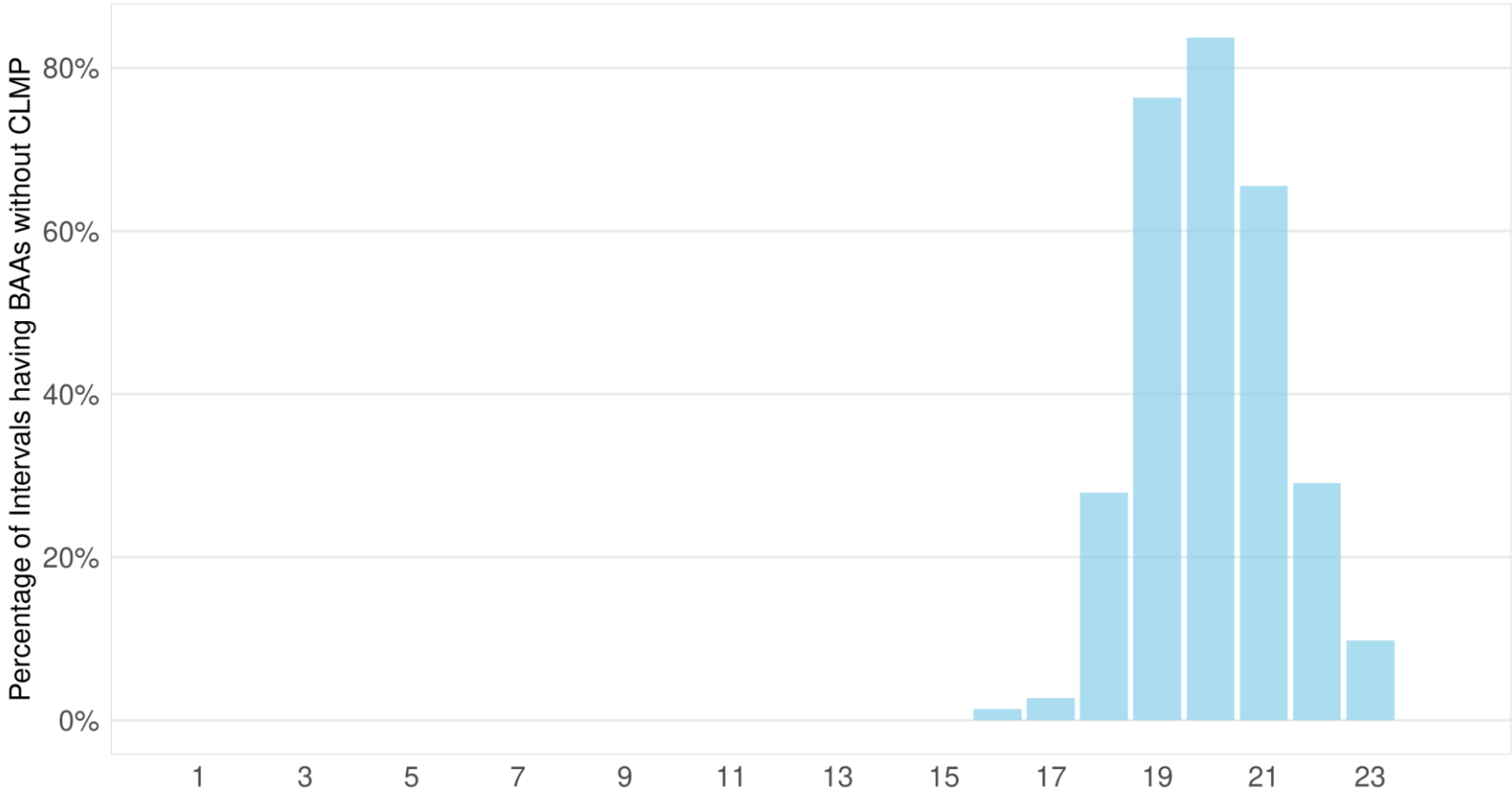


Majority of the time, all BAA MECs fall into either 2 or 3 groups.



Number of groups tend to be higher in morning peak and hour ending 20

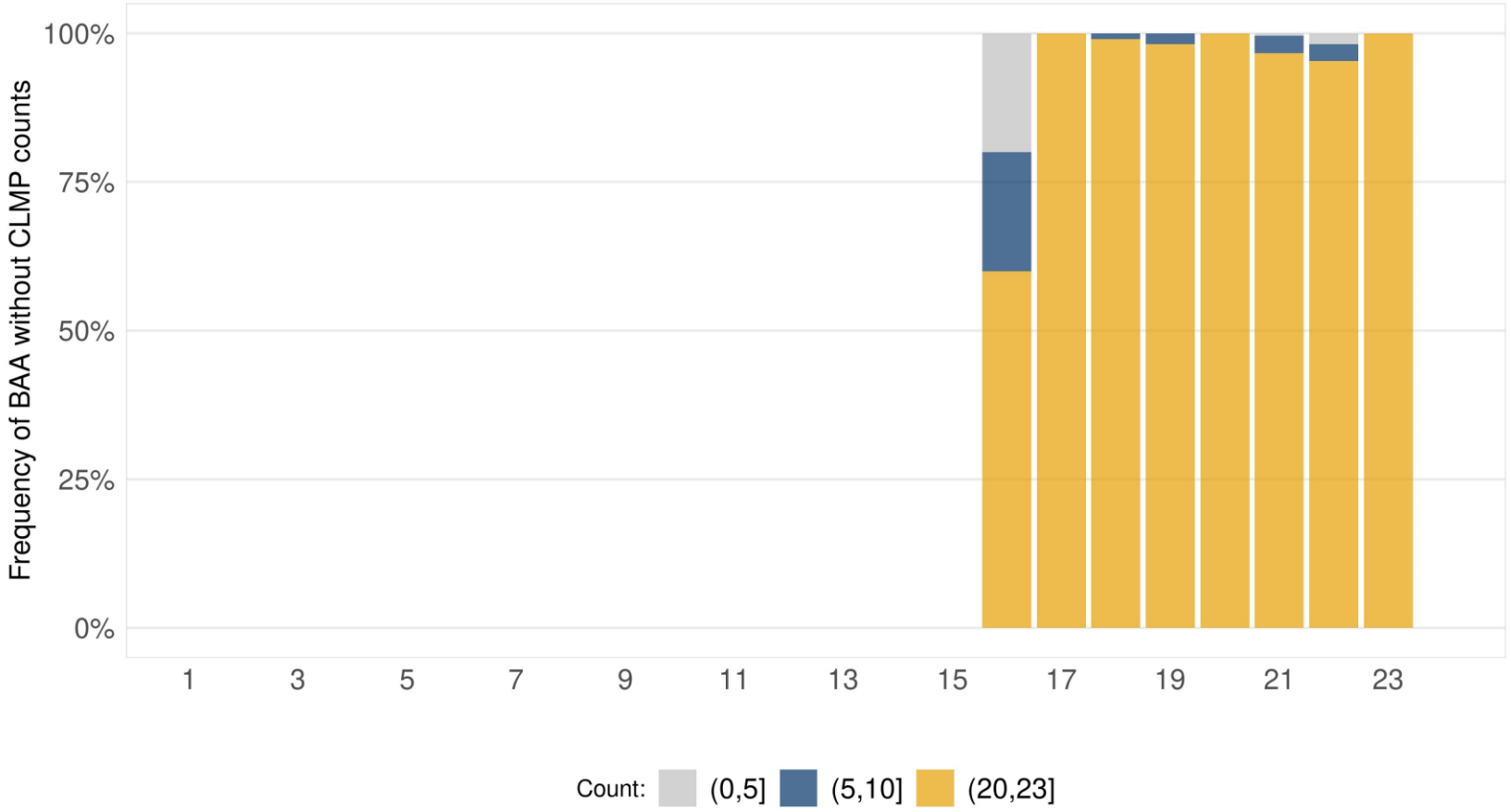
Percentage of intervals having any BAA without CLMP under grouping approach is high during afternoon peak hours



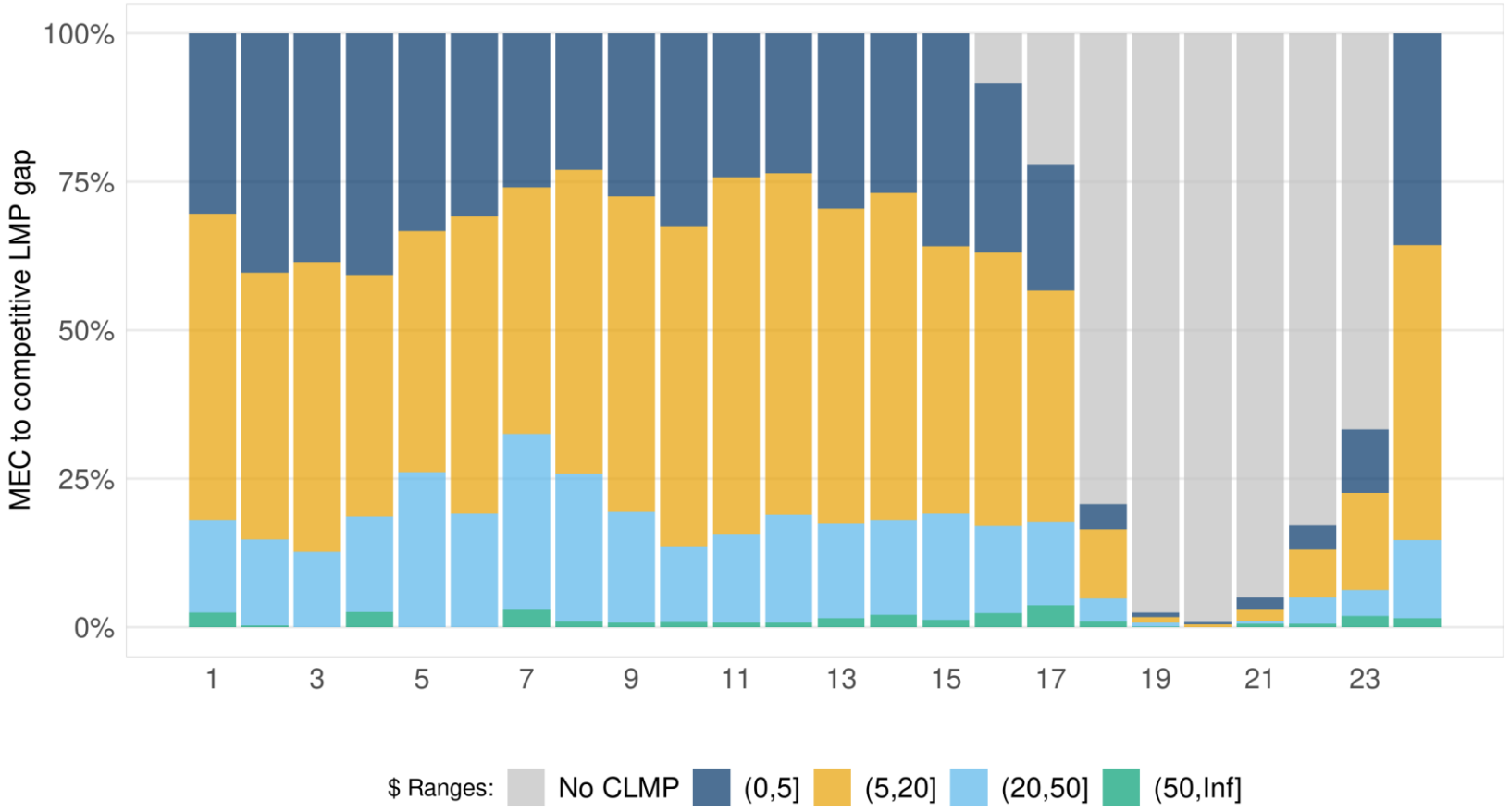
The "last test" of the grouping approach in this study is testing with the whole WEIM footprint. If the last test fails, some BAAs may not get assigned a competitive LMP (CLMP).

What price is to be used remains as one of the policy questions for discussion

If the last test of the grouping approach fails, majority of the BAAs were not assigned competitive LMPs



During the afternoon peak hours, the biggest group is no competitive LMP



Price buckets for MEC to competitive LMP deltas for failed tests in grouping approach: the differences between MECs and competitive LMPs primarily fall between $0 to $20.