



California ISO

Western Energy Imbalance Market (WEIM) Resource Sufficiency Evaluation Enhancements

Stakeholder Meeting

June 28, 2022

Background

- In February 2022 CAISO committed to further analyze specific areas of interest for the Resource Sufficiency Evaluation Enhancements
- There were two rounds of preliminary analysis prior to posting the final reports
- The analysis covers
 - Interaction of WEIM transfers and hourly intertie
 - Implications of load conformance in the RSE
 - Enhanced calculation of FRP requirements
 - Assessment of the intertie deviation adder

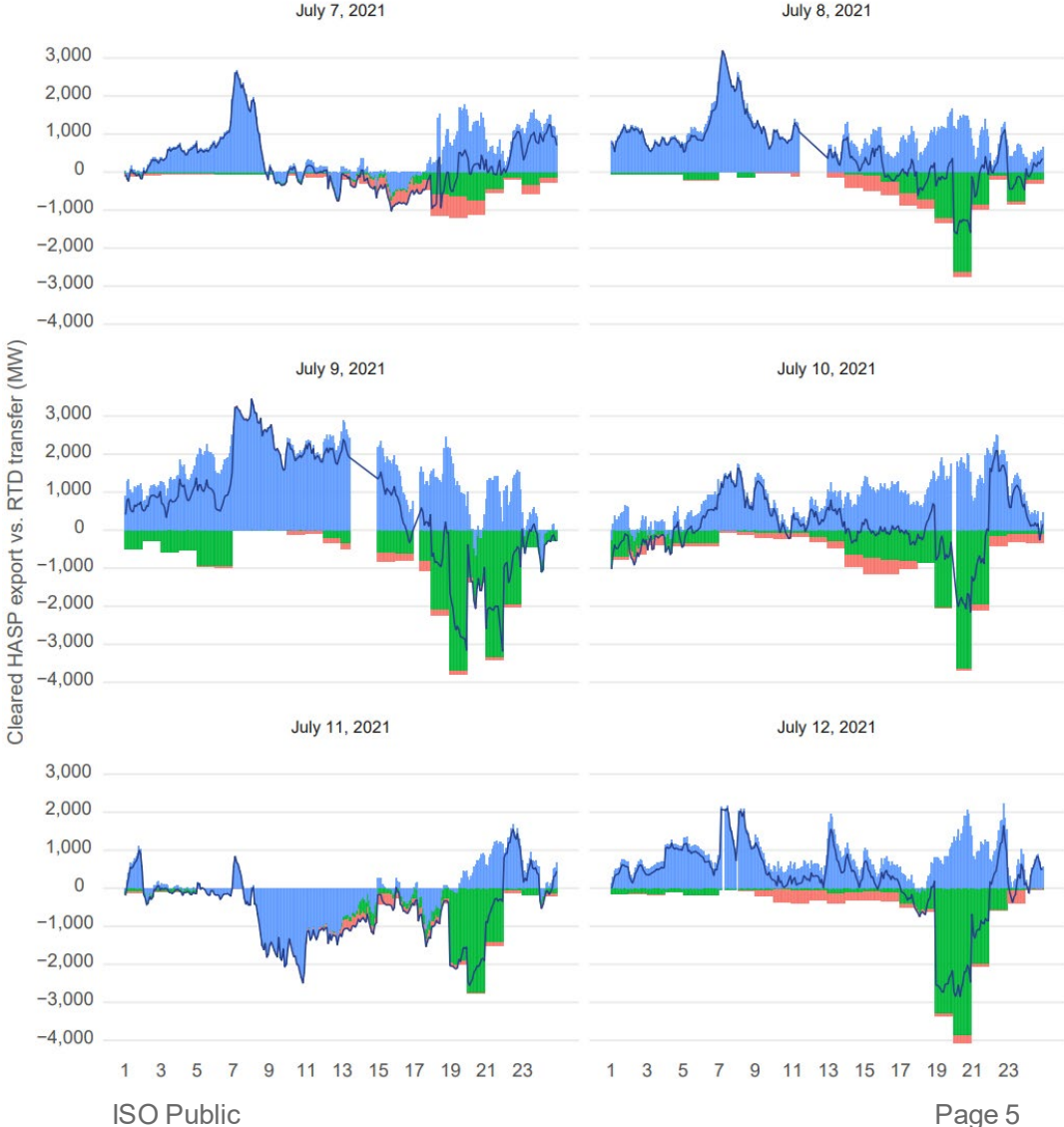
WEIM Transfers and Hourly Interties

WEIM import transfers into CAISO area are consistently unrealized from the HASP and FMM during peak hours market to the RTD market



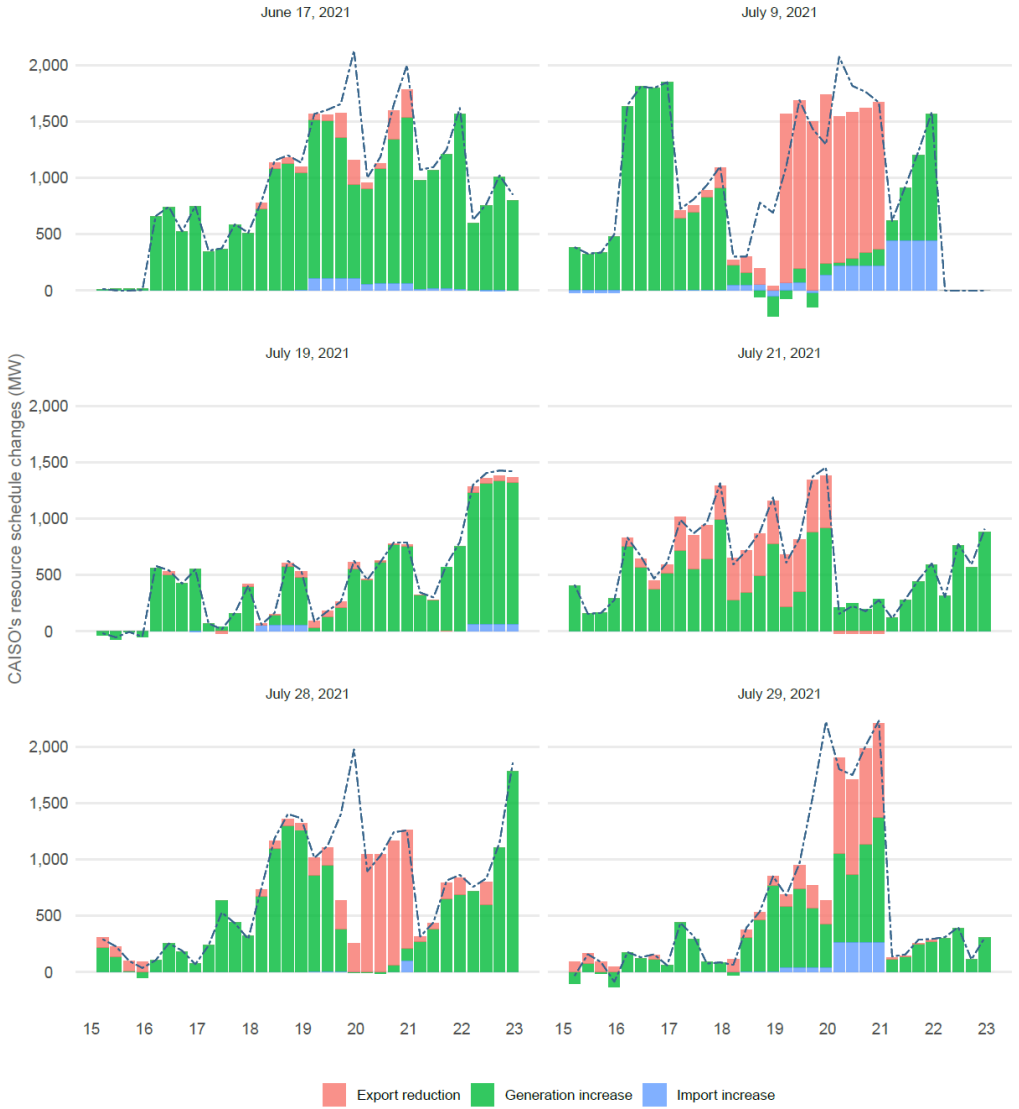
During peak hours in tight-supply summer days, CAISO was a net exporter

Exports cleared in RTM are additional Requirements in both real time and in the capacity test but unrealized WEIM advisory transfers are not counted as additional supply



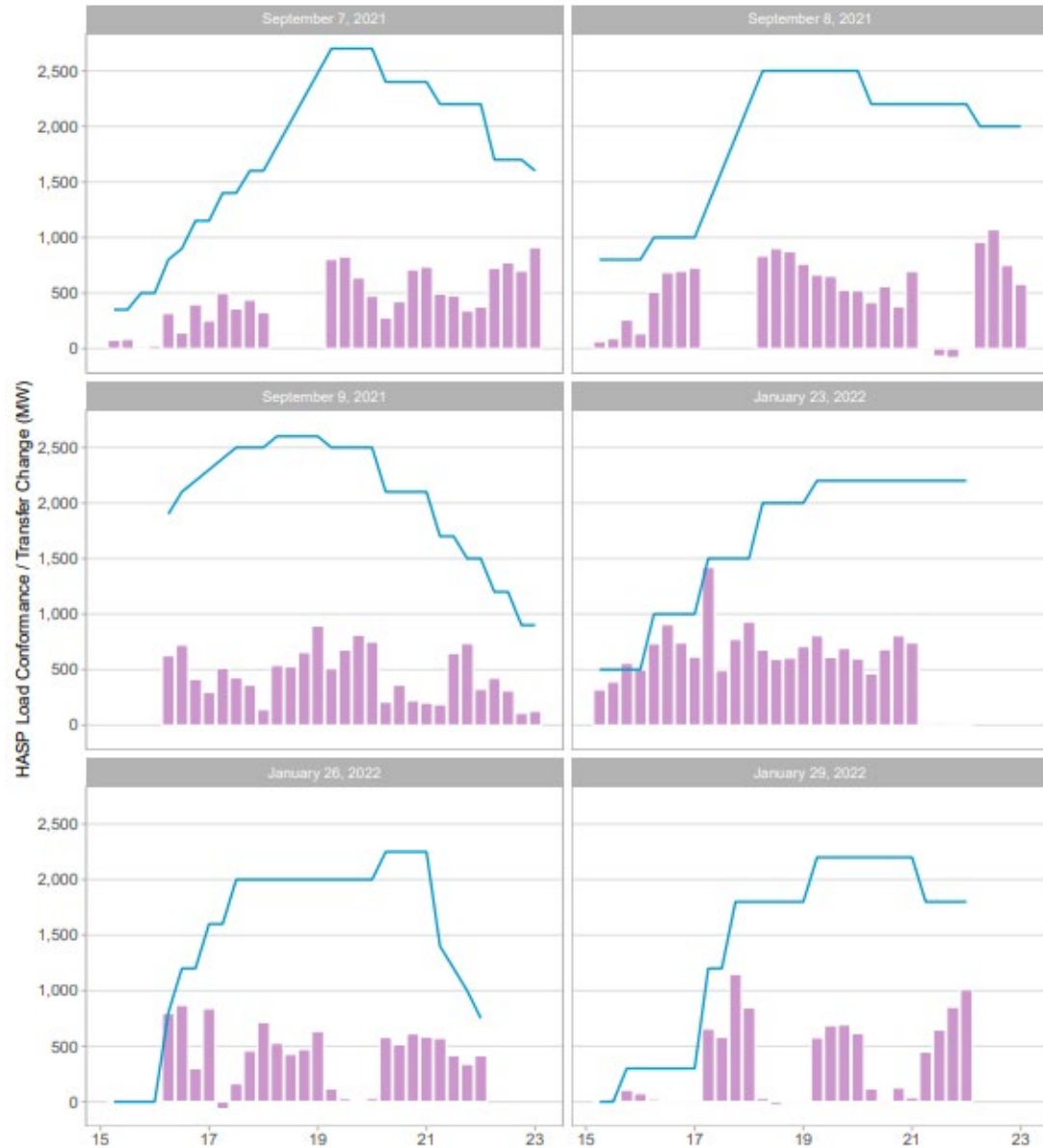
The unrealized WEIM import transfers in RTD had supported up to 1,500MW of real-time hourly exports

In other cases, the unrealized WEIM import transfer displaced economically CAISO's internal supply that is later bought back in RTD

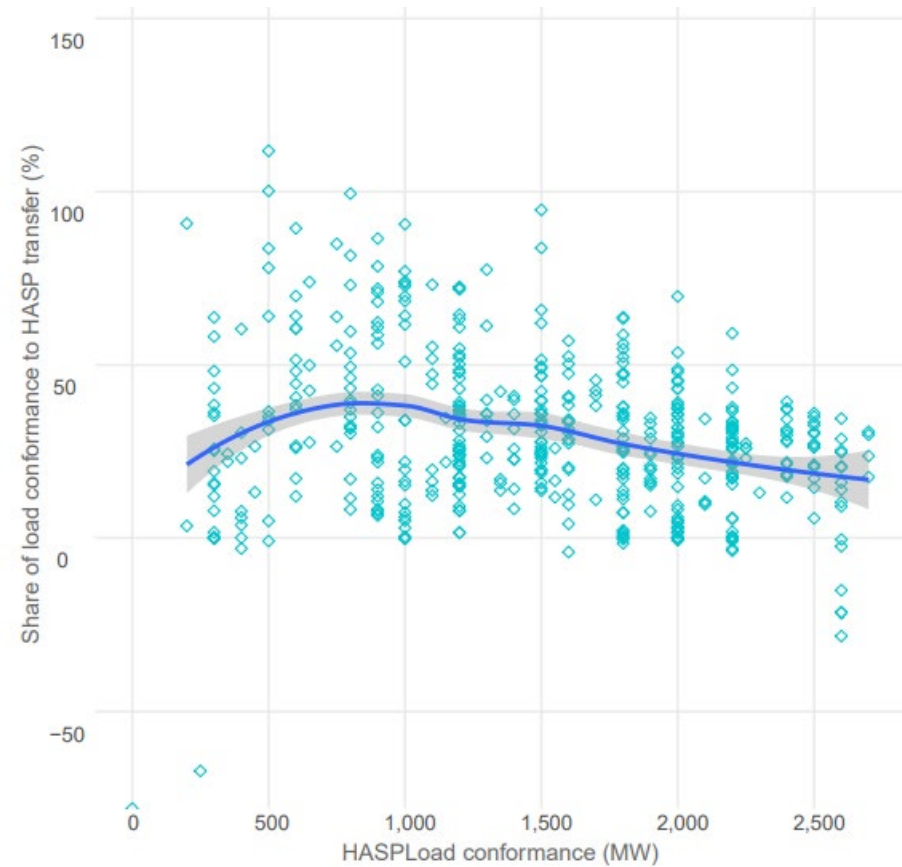
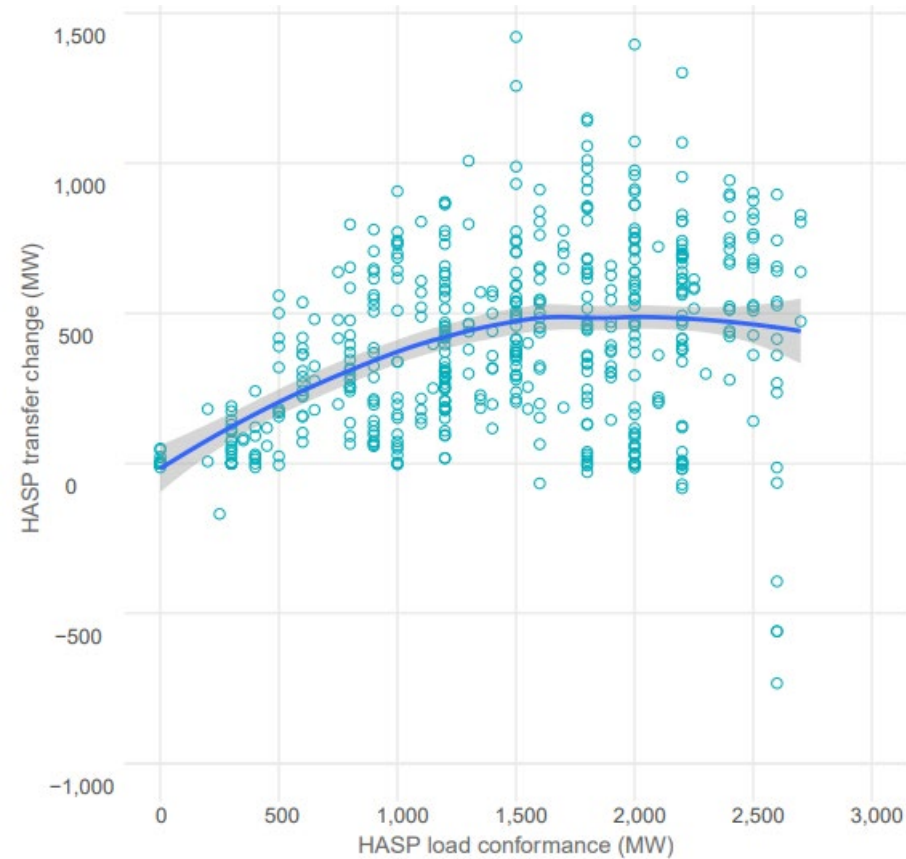


Load Conformance and RSE

Data shows that HASP/FMM load conformance results only in a fraction of it reflected as increases of advisory WEIM import transfers into CAISO

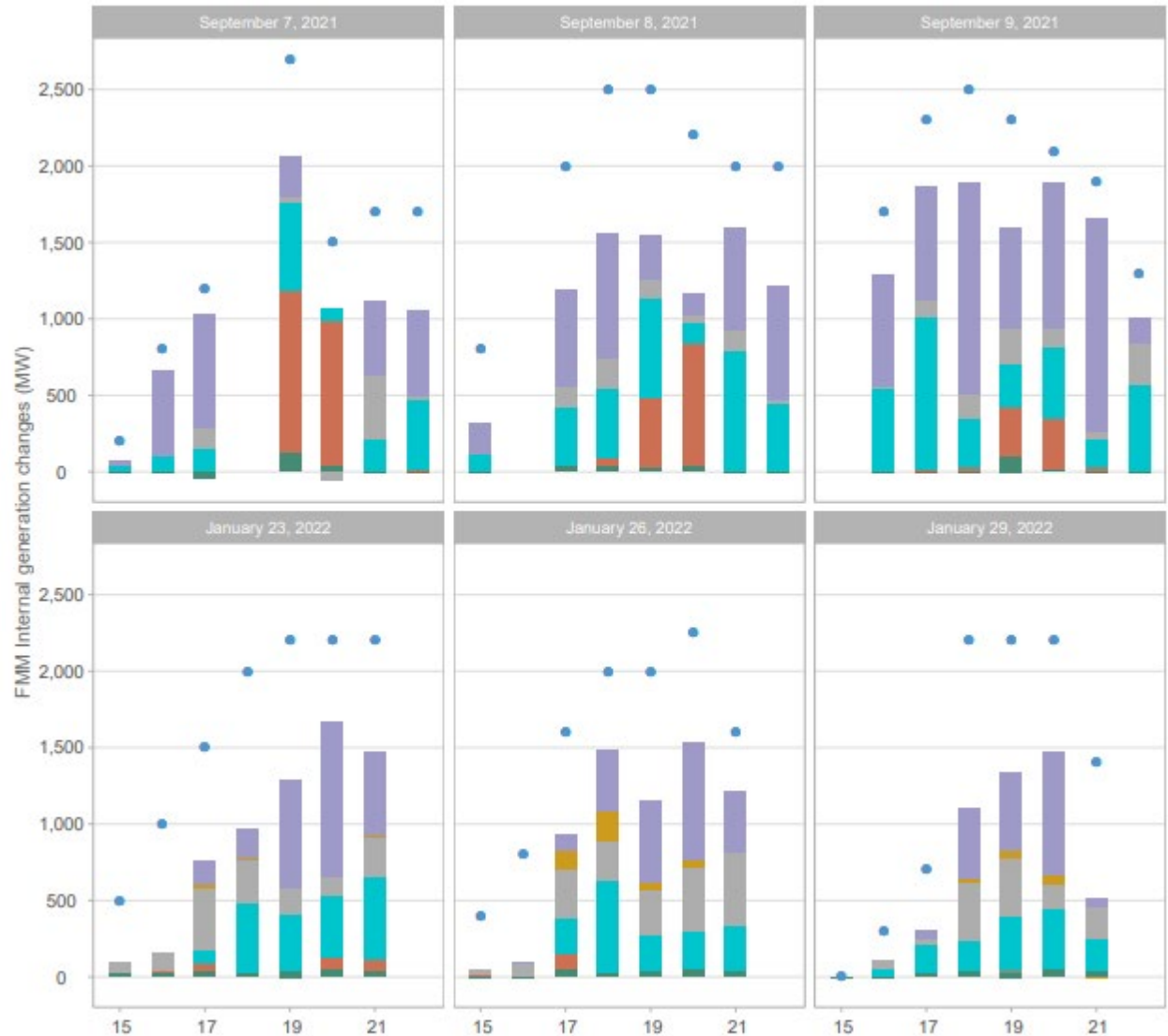


For a given load conformance value, the level of advisory import transfers induced in the market can vary largely



The use of Load conformance in HASP and FMM results can be detrimental to CAISO's position to pass the flex test

Load conformance results in incremental schedules to CAISO resources, using upfront the available flex capability



FRP requirement calculation

Enhancement to the Flexible Ramp Product Uncertainty Requirement Calculation

- The ISO proposes the Mosaic model incorporating weather information into estimation of uncertainty requirement.
 - The mosaic model utilizes quantile regression; where load, wind, and solar data are regressors.
- Compared to the Histogram approach, the Mosaic approach has:
 - Similar coverages
 - Less requirement on average
 - Closer proximity to the observed uncertainty
 - Comparable exceeding number
 - Less impact of seasonality

The enhanced quantile approach provides marginal improvements to the uncertainty requirement calculation

BAA	FRU_H	FRU_M	FRD_H	FRD_M
APS	150.68	135.89	-127.24	-117.99
BANC	60.52	41.45	-49.14	-43.81
BCHA	157.49	151.57	-169.00	-161.67
CISO	1142.37	1042.13	-943.51	-850.52
IPCO	105.89	101.74	-132.72	-124.42
LADWP	152.43	147.32	-148.52	-135.85
NEVP	165.02	141.58	-139.53	-129.69
NWMT	81.15	77.15	-98.52	-91.95
PACE	250.80	241.12	-286.39	-273.01
PACW	112.55	106.14	-98.53	-92.13
PGE	130.70	121.66	-118.67	-112.25
PNM	136.49	137.04	-166.43	-161.23
PSEI	94.00	90.04	-101.46	-98.19
SRP	113.68	102.66	-109.17	-97.01

Requirement with proposed approach is lower than with current approach

Detailed Description of the Requirement Calculation

- In order to increase transparency on the proposed Quantile methodology and enable interested parties to replicate the calculation, CAISO posted the step-by-step description of the methodology. The document is available at

<http://www.caiso.com/Documents/BusinessRequirementsSpecifications10-FlexibleRampProduct-RequirementsEnhancements.pdf>

FRP requirement impact on RSE

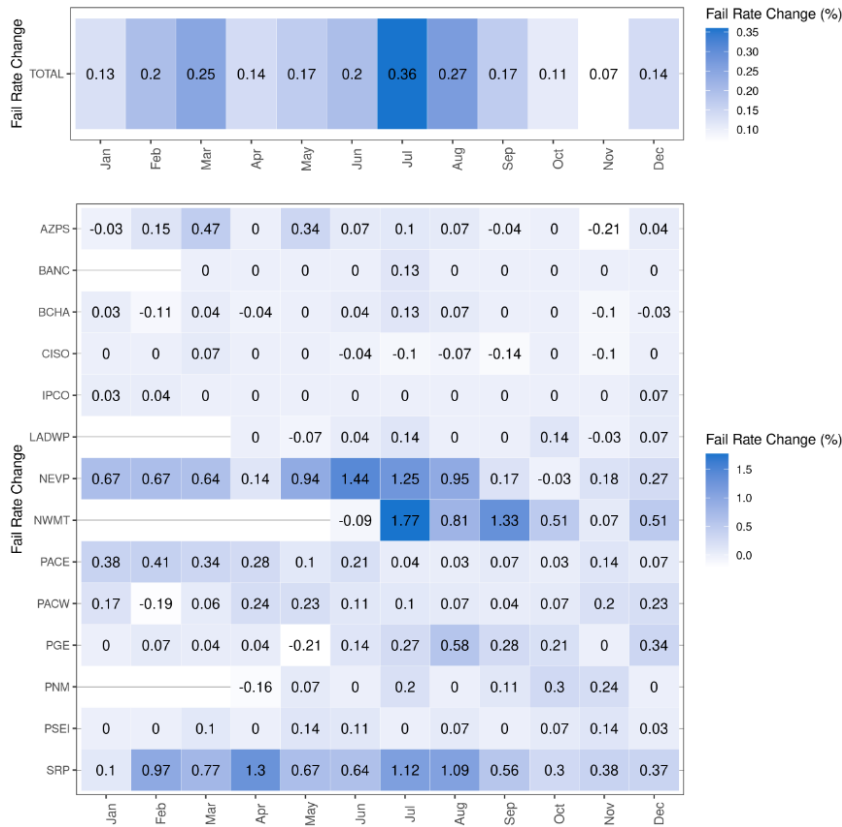
Proposed enhanced requirement affects the outcome of 0.33% of the flexible ramping test for a net increase in failures of 0.19%, mostly driven by a few BAAs

2021 flexible ramping test results using proposed enhanced requirement

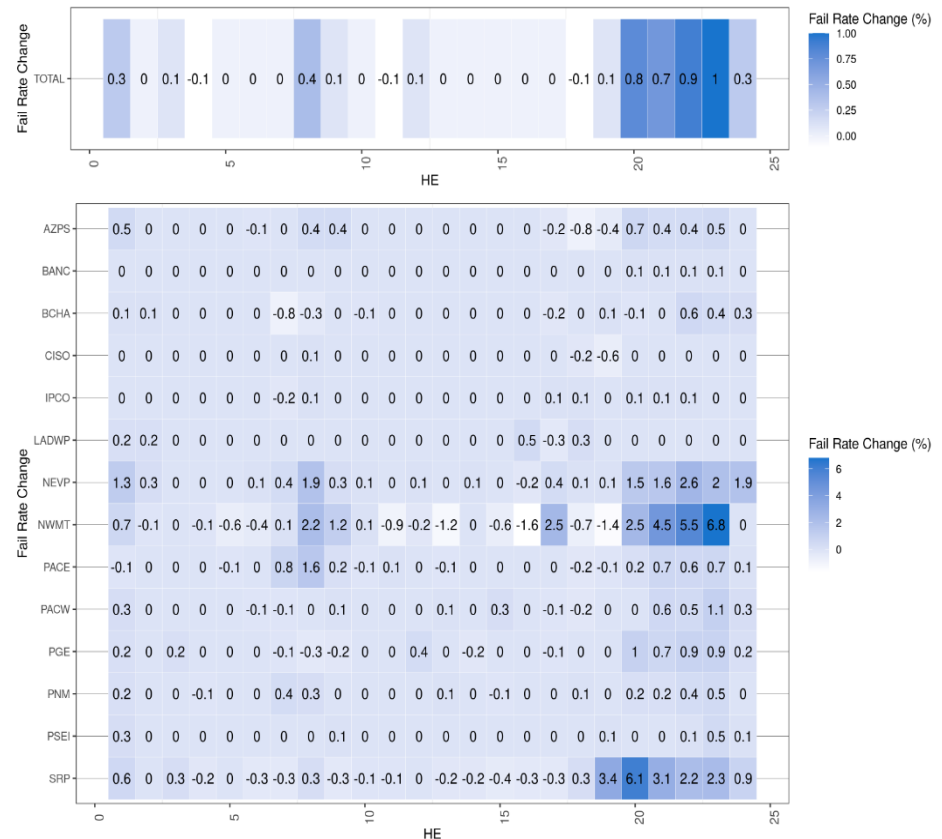
	BAA	NO_CHANGE	PASS_TO_FAIL	FAIL_TO_PASS	TOTAL	PTOF_PERC	FTOP_PERC
1	AZPS	34772	50	22	34844	0.14	0.06
2	BANC	26540	4	0	26544	0.02	0.00
3	BCHA	34813	29	28	34870	0.08	0.08
4	CISO	34853	3	14	34870	0.01	0.04
5	IPCO	34777	7	3	34787	0.02	0.01
6	LADWP	25940	12	4	25956	0.05	0.02
7	NEVP	34619	231	19	34869	0.66	0.05
8	NWMT	18055	267	126	18448	1.45	0.68
9	PACE	34780	75	15	34870	0.22	0.04
10	PACW	34802	54	14	34870	0.15	0.04
11	PGE	34648	77	26	34751	0.22	0.07
12	PNM	25907	32	9	25948	0.12	0.03
13	PSEI	34845	19	0	34864	0.05	0.00
14	SRP	34467	291	52	34810	0.84	0.15
15	TOTAL	443818	1151	332	445301	0.26	0.07

Additional failures due with the enhanced requirement calculation are concentrated in net load peak hours and summer months

Change in failure rates by month



Change in failure rates by trading hour

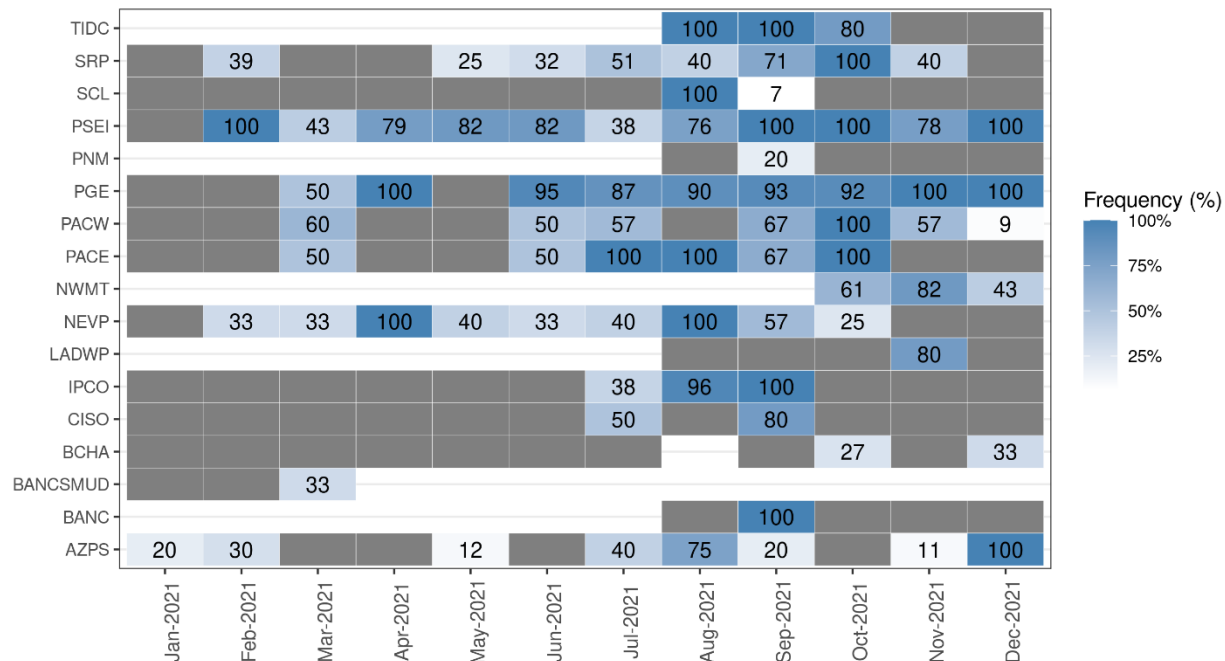


E.g. – If a BAA failed 1.20% of the tests using the current requirement and 1.30% of the tests using the proposed enhanced requirement, table would show as a positive 0.10%

Intertie Deviation Adder

Impact of NSI Uncertainty Requirement on Capacity Test in 2021

- Analysis performed for Jan – Dec 2021 to investigate frequency of upward capacity test failures due to inclusion of NSI uncertainty requirement
- Overall, larger % of failures driven by NSI uncertainty requirement during summer/fall months, with some outliers among BAAs



Counterfactual Analysis using Actual NSI Deviation in Capacity Test in 2021

- Replaced NSI uncertainty requirement with actual NSI deviation for each hour and re-evaluated upward capacity test for Jan – Dec 2021 for all BAAs
- Provides a measure of how much more, or less, frequently BAAs would have passed the test if the methodology for calculating the NSI uncertainty requirement had been exactly precise all the time

Month, Year	BAA	Number of Failures, Initial	Number of Failures, Counterfactual	Incremental Frequency of Failure
September 2021	BANC	1	0	100%
July 2021	AZPS	5	4	20%
May 2021	PACW	1	4	-300%
November 2021	SCL	0	4	-Inf

Counterfactual Analysis Results for 2021

- A perfect estimation of the NSI uncertainty requirement in the capacity test generally yielded less upward capacity failures across BAAs
- Months where the counterfactual did not perform well (i.e. negative frequency) were sporadic and inconsistent among BAAs

