



California ISO

July 2023 emergencies and transfer limitations

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CAISO area experienced energy emergencies in July 2023

Date	Alert level	Timeframe	Definition
20-Jul	EEA1	7:30—8:30pm	All resources in use or committed for use, and energy deficiencies are expected.
25-Jul	EEA Watch	7:26—10:00pm	
26-Jul	EEA Watch	6:00—10:00pm	

The emergencies were issued for the time covering the net load peak, which is the most critical period in the grid

Despite the challenging system conditions, the ISO operated the grid reliably without escalating to higher emergency stages or implementing rotating outages

The emergency alerts were driven by real-time conditions that could not be anticipated far in advance

- There were no projections of capacity issues days in advance to trigger further steps in the summer protocol
- The binding day-ahead market did not project any supply shortfalls.
- RA supply was adequate to meet load obligation plus 4,000 MW of uncertainty and over 7,500 MW of exports
- The accuracy of dispatchable capability in the system was hindered by imprecise calculation of storage resources. This inconsistent information may have impacted operators' ability to take proactive actions sooner
- Market optimization accurately assessed available dispatch capability as supply conditions changed and already projected future shortfalls

The emergency alerts were driven by a confluence of rapidly emerging intra-hour conditions in real time

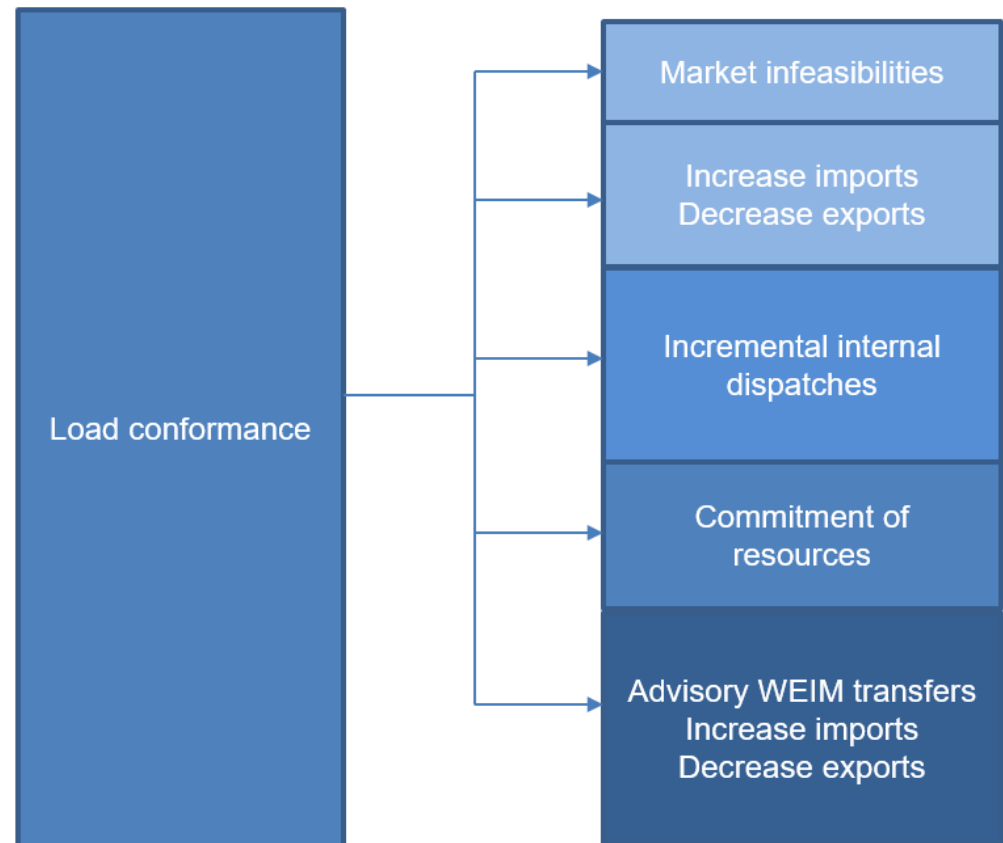
- The emergencies were driven by real-time changing conditions:
 - outages and derates,
 - import cuts due to fire impacts,
 - lower renewable production,
 - resource deviations including exports tags,
 - management of state of charge
 - changes in loads,
 - unrealized import transfers,
 - exacerbated transmission congestion
- The flexible ramp product in real time does not procure capacity to cover all types of supply changes, it is to cover only net-load uncertainty

Load conformance adds demand which will be met by supply or identify infeasibilities in the market clearing process

The overall market economics will determine the mix of supply that meets additional demand from load conformance

Operators rely on HASP/FMM conformance to position resources and secure dispatchable capacity

Different sources of supply provide different levels of certainty



Emerging supply and demand changes in the CAISO area and WEIM at large added uncertainty to balancing the system

- ISO resources were scheduled and exports cleared in the hourly process relying on the availability of all supply, which includes advisory WEIM import transfers
- Transfers in the hourly and pre-dispatch markets are advisory and re-evaluated in the five-minute market, representing an uncertainty as they may not materialize
- Multiple drivers can cause the HASP/FMM advisory transfer levels to not be realized in RTD market
 - Load conformance differences between markets in either WEIM area
 - Renewable forecast differences
 - Load forecast updates
 - Resource deviations
 - Supply changes
 - Any WEIM area operator actions such as manual dispatches or blocking of transitions

On the evening of July 26, ISO started to limit the reliance on dynamic import transfers into the ISO area

- HASP is a process for CAISO area to clear hourly interties
- HASP uses all supply available across the WEIM footprint to match supply and demand
- Limiting dynamic import transfers allowed more reliable market clearing of ISO's load obligation and exports based only on internal resources or supplementary hourly import transactions
- This practice also provided more certainty to flow for cleared exports transactions

ISO started to limit advisory WEIM import transfers to ISO area on July 26

The limitation applied to only:

- import transfers to ISO area; export transfers to other WEIM areas from ISO continued to be available
- dynamic transfers; static transfers were not limited
- peak hours HE19-21 (adjusted over the season based on peak hours)
- hourly and pre-dispatch markets; real-time dispatch was not limited
- hourly ISO intertie transactions were not limited

WEIM balancing areas have the ability to limit transfers

- CAISO's area limitations led to price separation only in FMM:
 - HASP prices are not binding
 - Higher prices in ISO area (one bubble)
 - Lower and economic prices in other WEIM areas (wider bubble)
 - WEIM areas were not detrimentally impacted as it isolated them through congestion
- It resulted in a less optimal solutions than when market runs without transfer limits
- Resources in either areas were still dispatched in merit
- It reduced opportunities for economic displacement of CAISO supply but
- The higher prices in CAISO did not reflect actual lost opportunity for other areas generation because high prices were the product of the limitation
- it did not detrimentally impact other areas balancing because each area still needs to have sufficient capacity to meet their own needs

This practice continued until a series of issues posing operational risks were addressed by November 16

- This practice was in place until the ISO could address three main identified market issues
 - Inaccurate display of dispatchable capability in the market
 - Software fix to the User Interface
 - Scheduling and tagging processes that had enabled participants to not follow export reductions
 - This was socialized through formal BPM changes in PRR1527
 - Inconsistent treatment of intertie transactions between balancing areas that exacerbated congestion
 - Enhanced model of intertie transactions between CAISO and neighboring areas

CAISO has added more transparency in communicating when using transfer limitations

- Given dynamic real-time conditions, July 2023 emergencies were not projected in the day-ahead market to take actions in advance
- Similar circumstances may arise this summer and the ISO may deploy this limitation again
- ISO expects to use this limitation on targeted intervals based on developing real-time conditions
- ISO does not have a net import/export constraint to use like other WEIM areas have in their toolkit
- Everbridge messages have been used to communicate limitation of transfers
- CAISO will additionally use market messages to communicate transfer limits. These messages also flow into OASIS

Further remarks

- CAISO enabled nomogram constraints for FRP on September 7, 2023
- CAISO attempted to enforce contingency constraints for FRP on June 4, 2024 but due to computational performance it has to be deactivated on June 12
- In preparation for RSE phase 3 effort, CAISO is doing analysis on the interplay of hourly exports cleared/reduced at HASP and how effectively they are reflected in the base schedules
- CAISO did not use transfer limitations in the last three weeks of the sustained heatwave that impacted the west in July 2024