

EIM Resource Sufficiency

Flexible Ramping Sufficiency Test Enhancements

EIM Resource Sufficiency: Progress to Date

- **Resource Sufficiency framework was new for the EIM**
 - Unsurprising that enhancements are necessary, as EIM experience is gained
- **Powerex appreciates CAISO's efforts and progress in multiple related areas**
 - Incremental EIM RS improvements (through Business Practice Manual changes)
 - Additional metrics/transparency (Market Performance & Planning Forum)
 - Intertie Deviation Settlement Initiative
 - Resource Adequacy Enhancements
- **However, Powerex believes Resource Sufficiency is not working as intended from a flexibility perspective and needs to be overhauled**
 - Flexible Ramping Sufficiency Test is leading to counterintuitive results

Evaluating EIM Flexible Ramping Sufficiency Test (FRST)

- **EIM FRST results appear **inconsistent** with actual system conditions**

Actual Grid Conditions

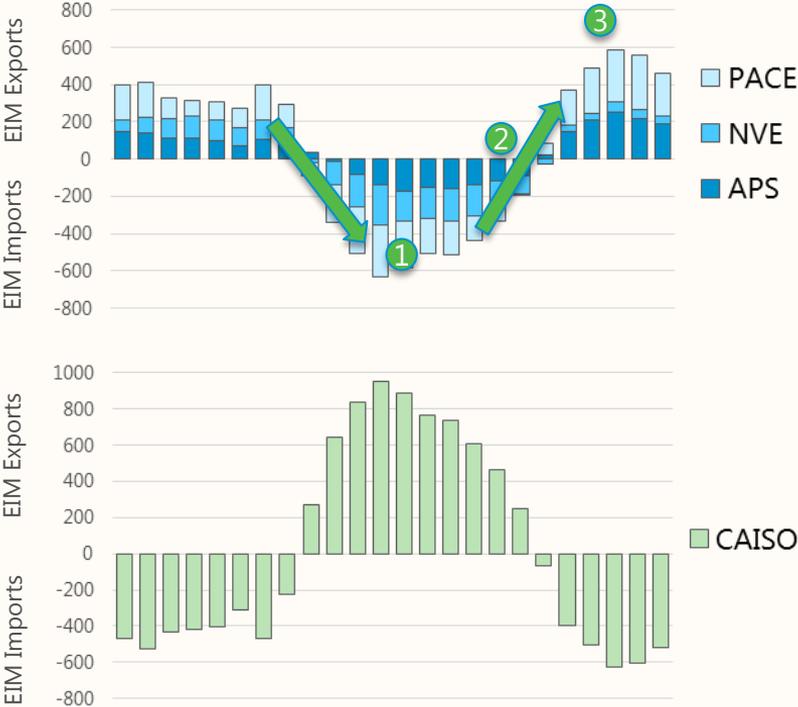
- **California's** capacity and flexibility challenges are **growing** as the resource mix evolves
- EIM Entities **provide surplus flexibility** to California to help balance the grid in Real-Time

EIM FRST Results

- CAISO appears to **rarely**, if ever, fail RS
- EIM Entities have **difficulty** passing the Flexible Ramping Sufficiency Test

EIM Entities Generally Provide Surplus Flexibility to EIM Area

Average Hourly EIM Transfers 2018

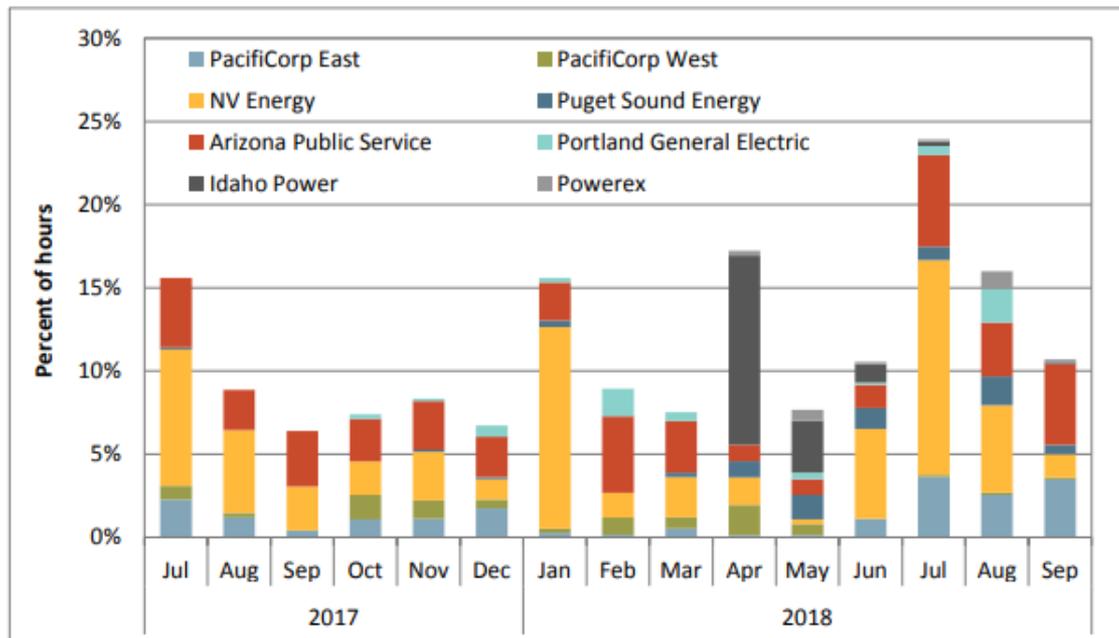


Time Period	EIM Entities
1 Mid-Day	EIM Entities generally provide flexibility by backing down dispatchable generation
2 Evening Net Load Ramp	EIM Entities generally provide flexibility by quickly increasing dispatchable generation
3 Evening Peak Load	EIM Entities generally provide flexibility from dispatchable generation to support exports during their own evening peak

Source: CAISO OASIS

Yet EIM Entities Continue to Have Difficulty Passing FRST

Frequency of Upward FRST Failures



Evaluating the EIM Resource Sufficiency Framework: Next Steps

- **Performing an accurate real-time flexibility test is complex**
 - Relies on “just in time” information about actual system conditions each hour
 - Requires a method to account for EIM transfers that have already occurred (e.g., flex credits)
- **Powerex recognizes CAISO has many competing initiatives**
 - But, it should be recognized that FRST is not working from a flexibility perspective
- **Powerex supports CAISO’s proposal for a holistic review of EIM Resource Sufficiency during EDAM initiative (mid-2019)**
 - Progress in other CAISO BAA initiatives (RA Enhancements, Intertie Deviations) are both complimentary and necessary

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Thank You

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