EIM Winter 2017

Reliability notes and processes for EIM entities

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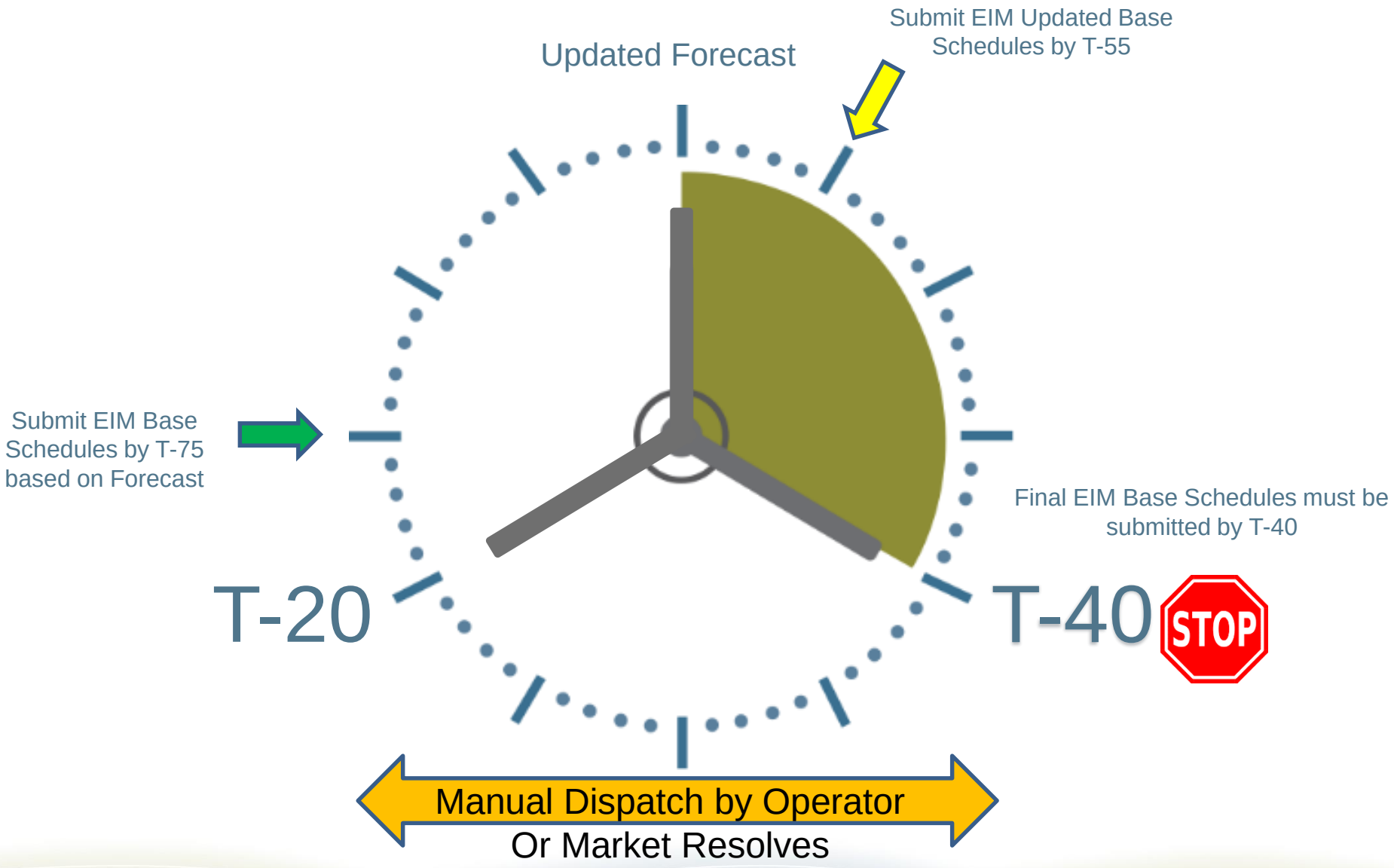
Training and Readiness

Current Options for Schedule Changes after T-40

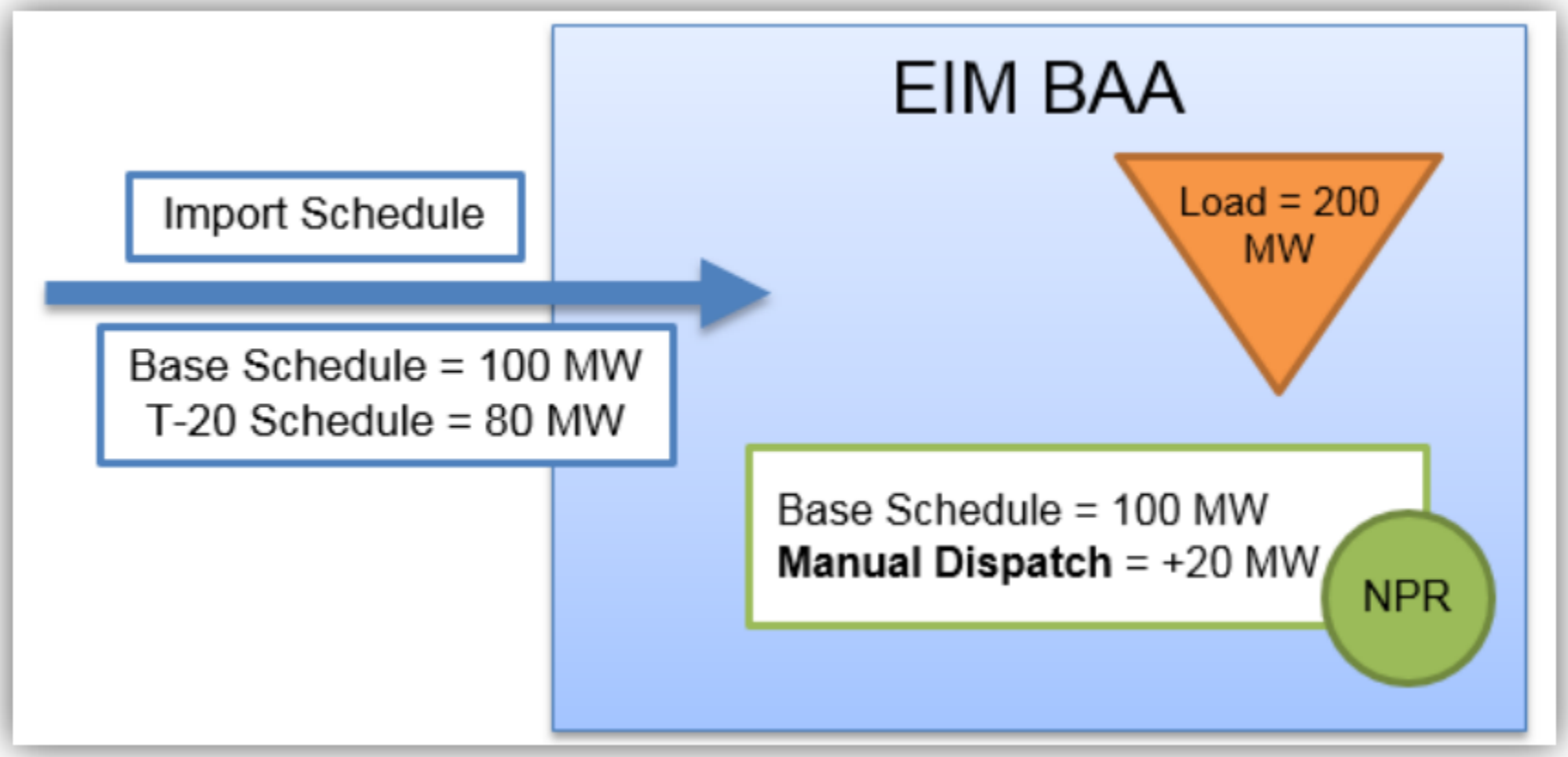
- Option 1: Operator manually dispatches a resource internal to the EIM BAA to resolve the imbalance.
- Option 2: Market resolves the imbalance by using the available bid stack.

Manual dispatches take time and are prone to errors, but maintain the available bid stack for use in the real-time market. Market solutions resolve the imbalance but reduce the energy available for use in the real-time.

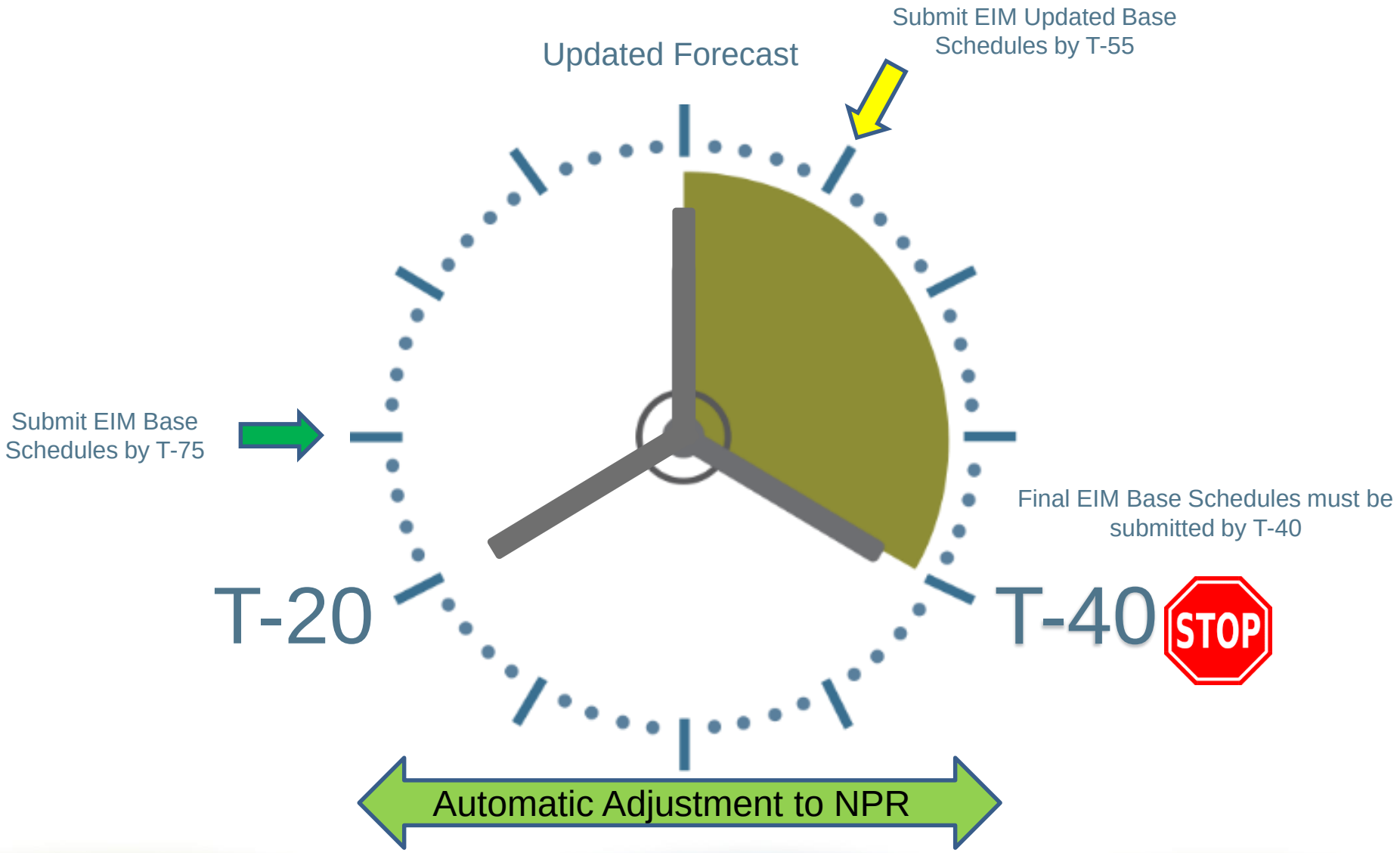
Current Options



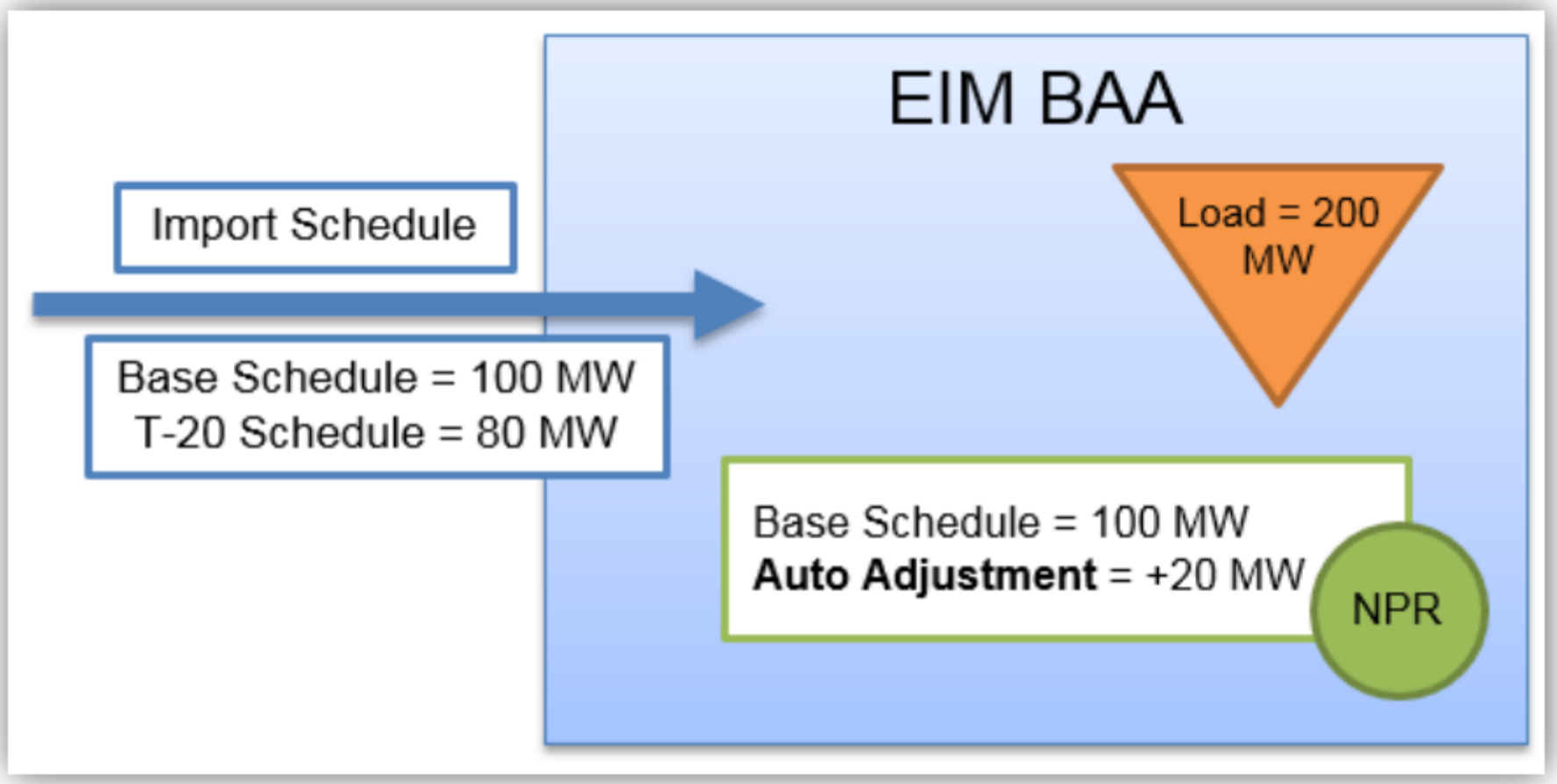
Manual Dispatch



New – Automated Adjustment



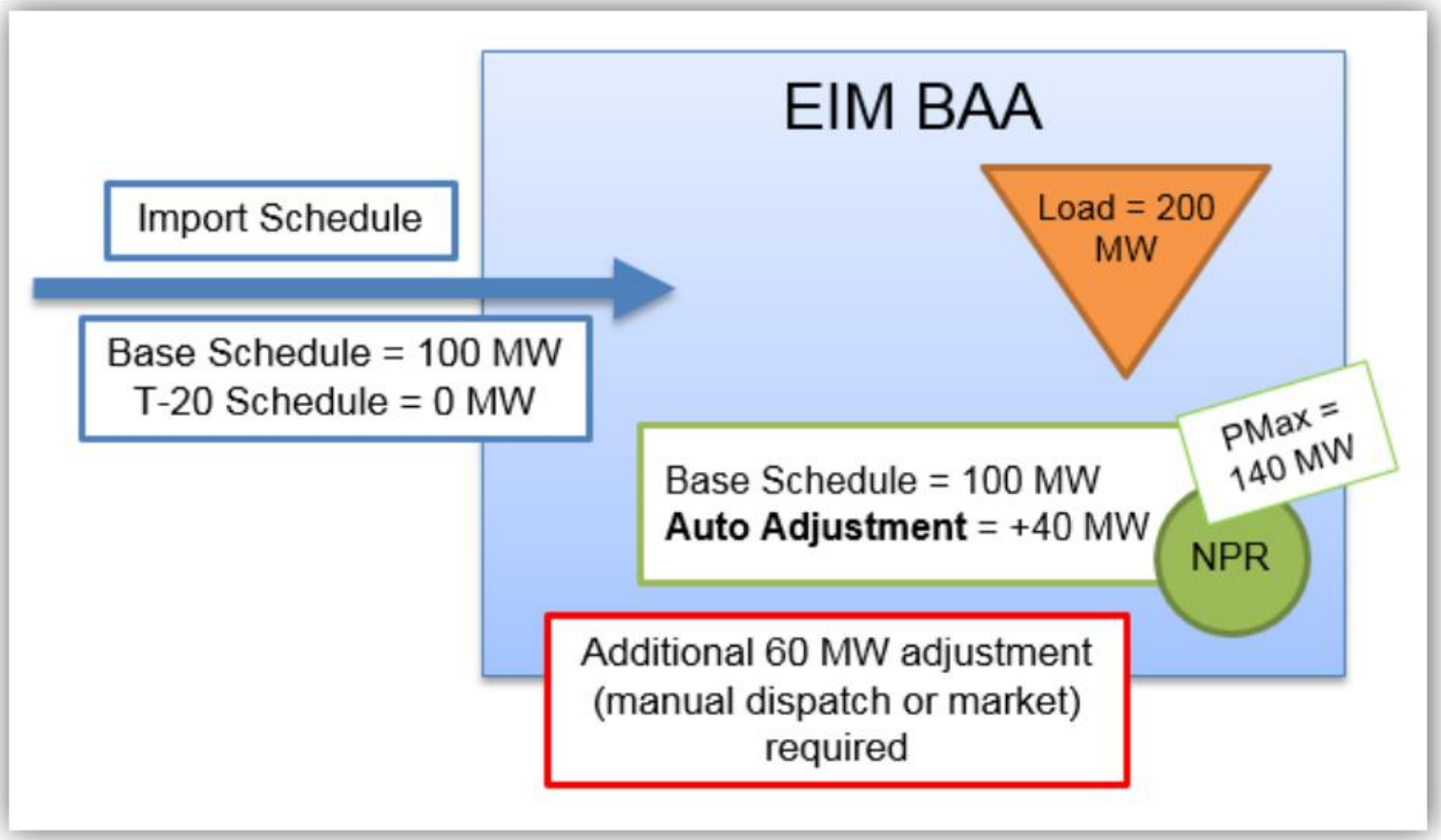
Auto-Match



Automated Schedule Changes after T-40

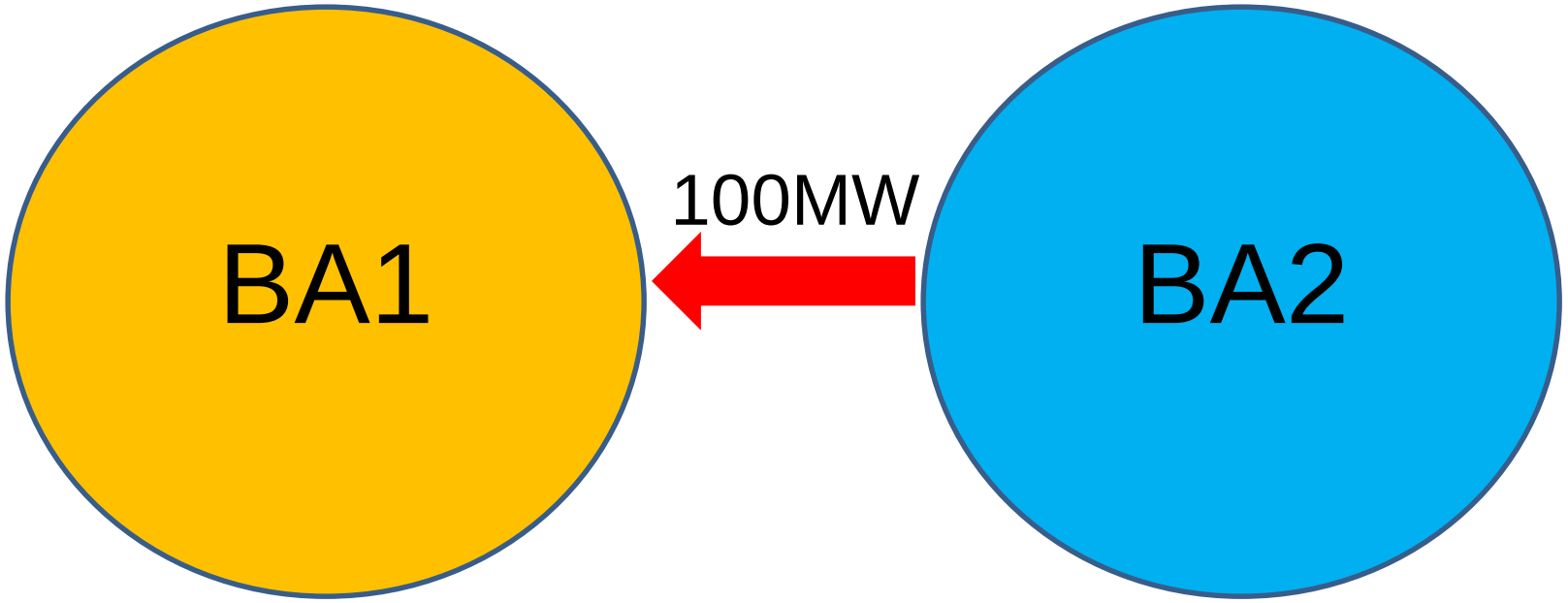
- Allows the ISO to automatically adjust an EIM Non-Participating Resource (NPR) schedule in an EIM BAA to match an import or export schedule change after T-40.
- We now support multiple NPRs for auto-matching different sets of intertie schedule changes.
- If limitations on the NPR do not allow for the entire schedule change to be balanced, a manual dispatch or a market resolution will need to solve the imbalance.
- If the market solves for the imbalance, the resources moved as a result of the imbalance are still required to be in the resource sufficiency test.

If the NPR can't Balance the Schedule Change



Auto-mirroring for ISO import/export schedules at ISO scheduling points

Example of traditional interchange:

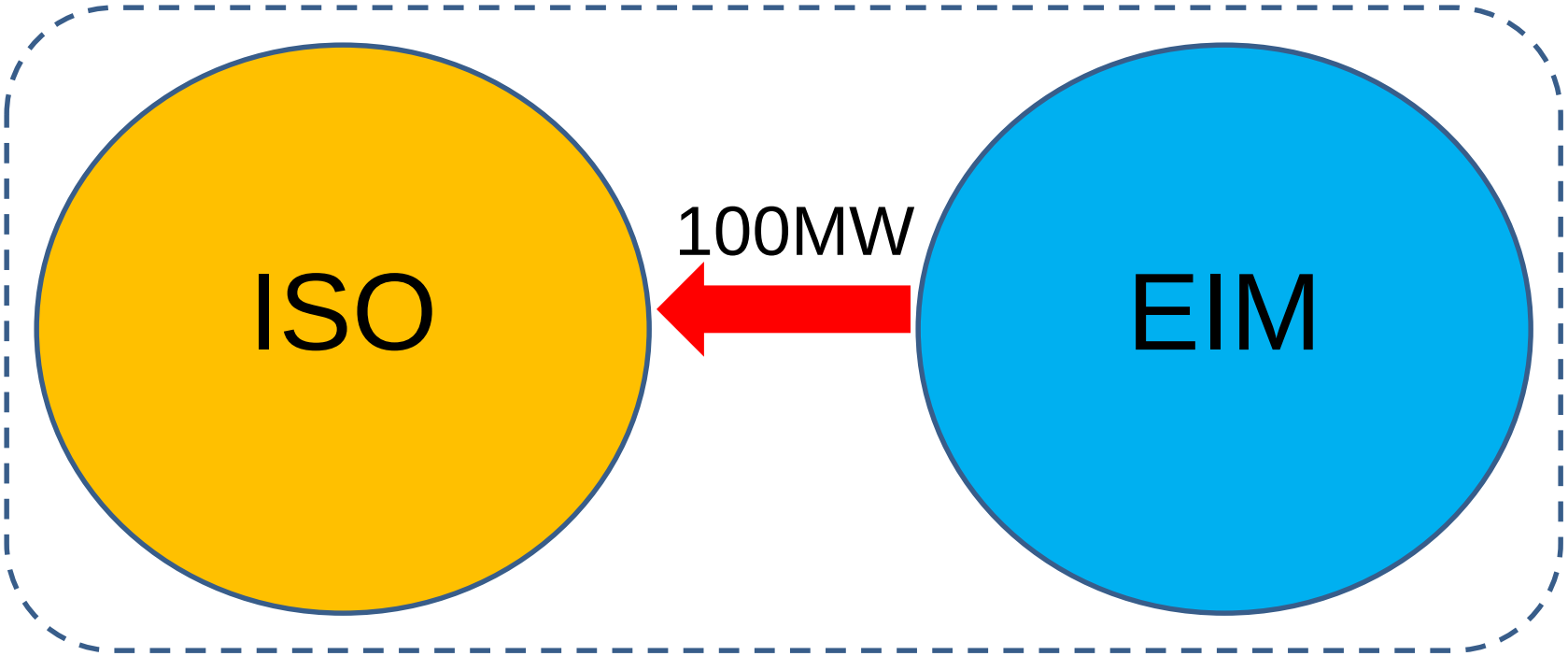


BA1 shows import of -100MW

BA2 shows export of 100MW

Auto-mirroring for ISO import/export schedules at ISO scheduling points

Example of market footprint interchange:



Market shows import of -100MW and export of 100MW = 0 MW

Auto-mirroring for ISO import/export schedules at ISO scheduling points

However, CAISO market models net all transactions on a tie within the market footprint:

ISO	-100 MW	
Net	-100 MW	

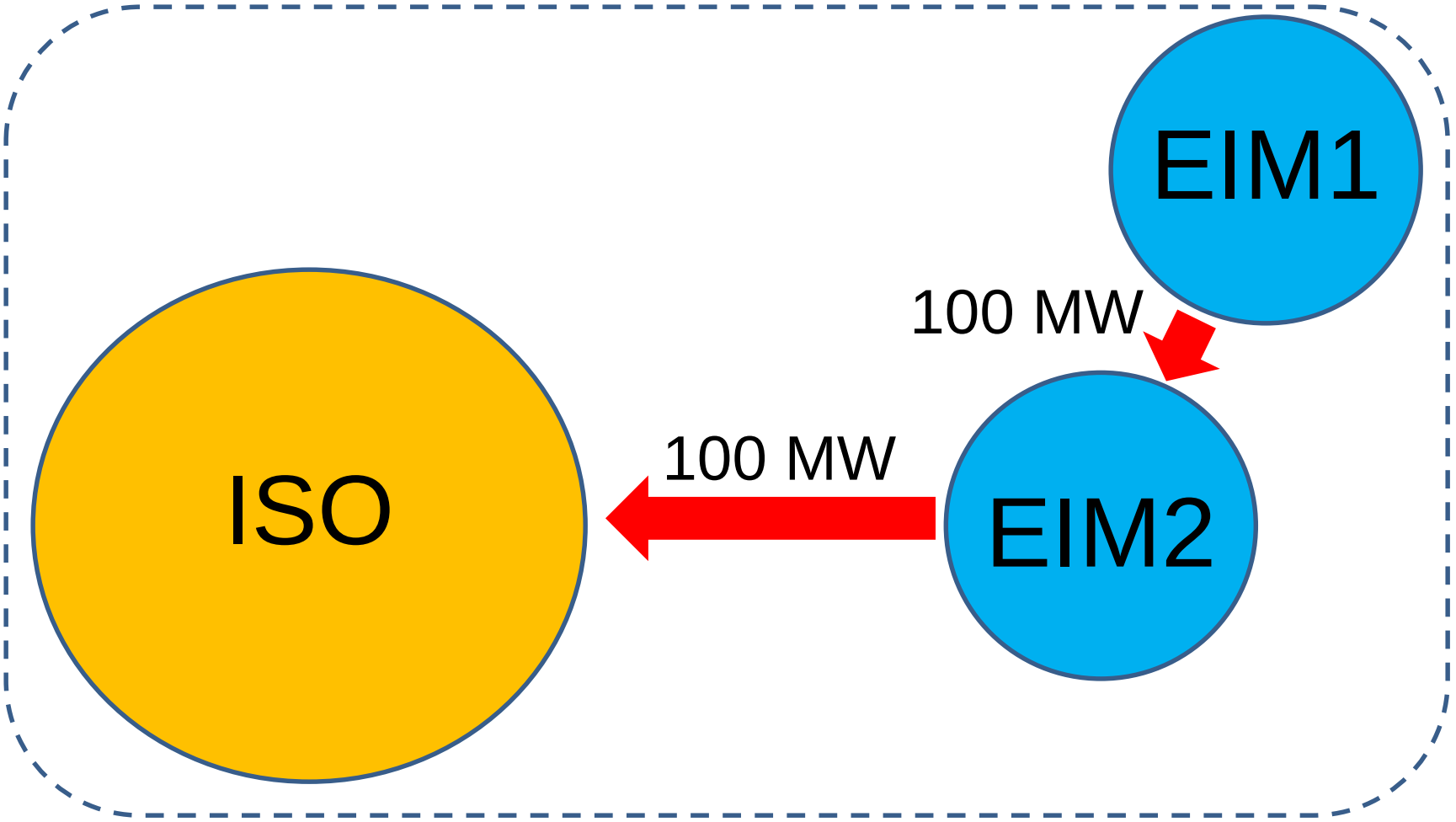
ISO	100 MW	
EIM	-100 MW	
Net	0 MW	

The mirror schedule allows the CAISO market to see the correct interchange value on the tie within the market footprint.

Auto-mirroring for ISO import/export schedules at ISO scheduling points

- Mirror system resources are used to mirror import and export schedules between the ISO and an EIM entity at ISO intertie scheduling points. This allows the market to solve for both the California ISO and adjacent EIM BAAs simultaneously.
- EIM entities are responsible for mirroring these schedules by submitting base schedules for their designated mirror system resources.
- EIM entities must adjust the mirror schedules for changes made to base schedules after T-40.

Last EIM Entity in the Chain Mirrors the Schedule



EIM2 mirrors the schedule

Auto-mirroring for ISO import/export schedules at ISO scheduling points

- This functionality can be combined with the auto-matching described earlier.
- An automated mirror system resource can be auto-matched to the NPR used for that purpose if the automated mirror is mirroring self-schedules only.

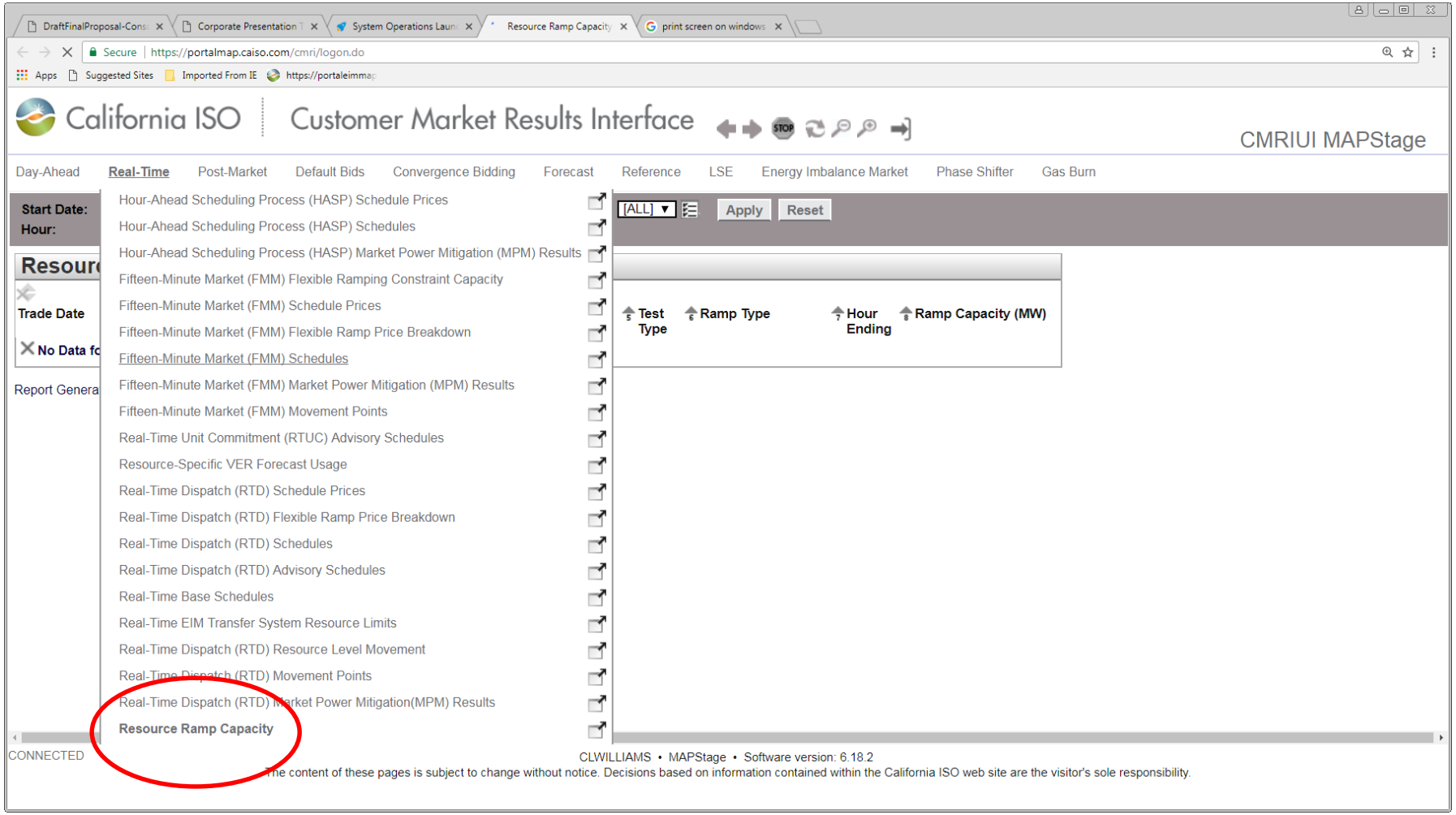
Auto-mirroring for ISO import/export schedules at ISO scheduling points

- The automated mirror system resource must only be mirroring ISO import/export self-schedules.

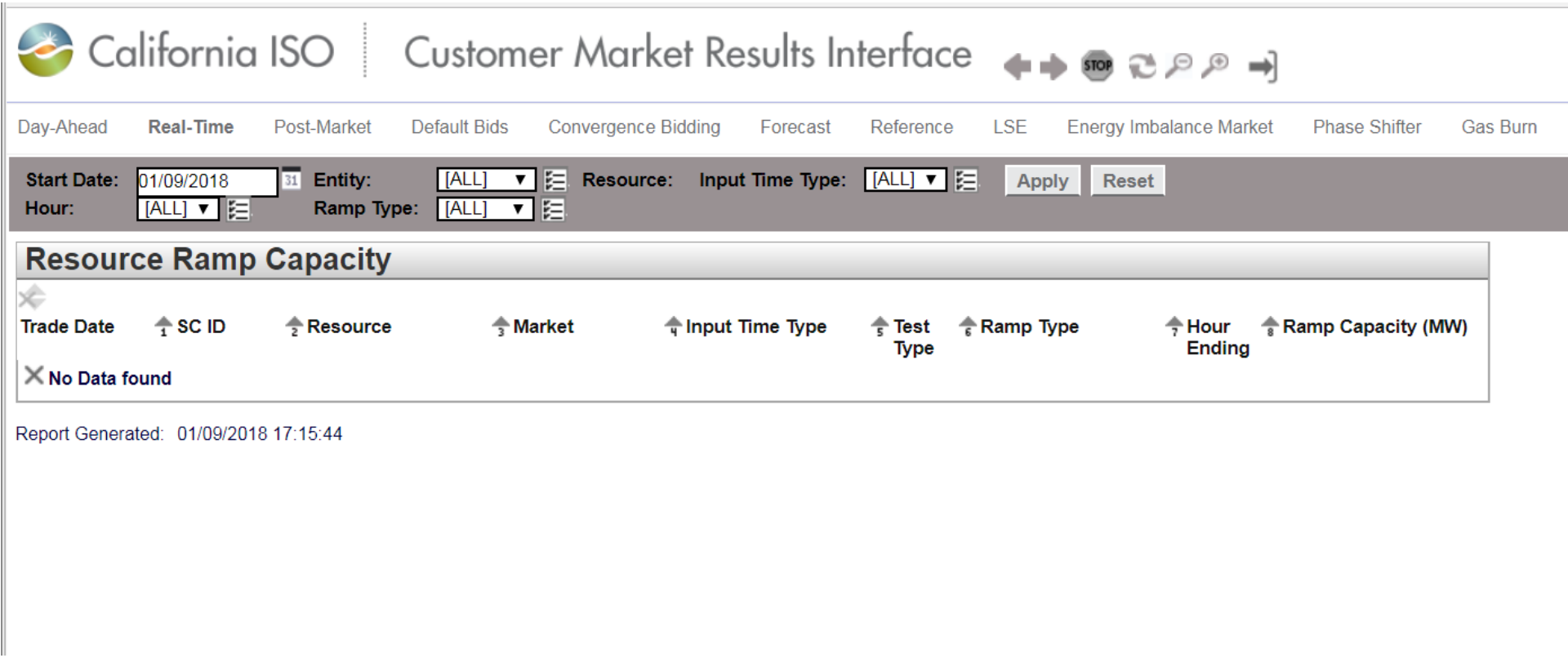
This is because the market will most likely accept a self-schedule change. An economic bid schedule change is not guaranteed to be accepted, therefore, only self-schedules can be used for auto-mirroring since they will clear in the market.

The self-schedule restriction is not so much technical as it is policy. The auto-match functionality is designed to facilitate bi-lateral contracts that are outside the market. Hence, it may not be used if bids are implicitly included.

Viewing Resource Ramp Capability in CMRI for SCs



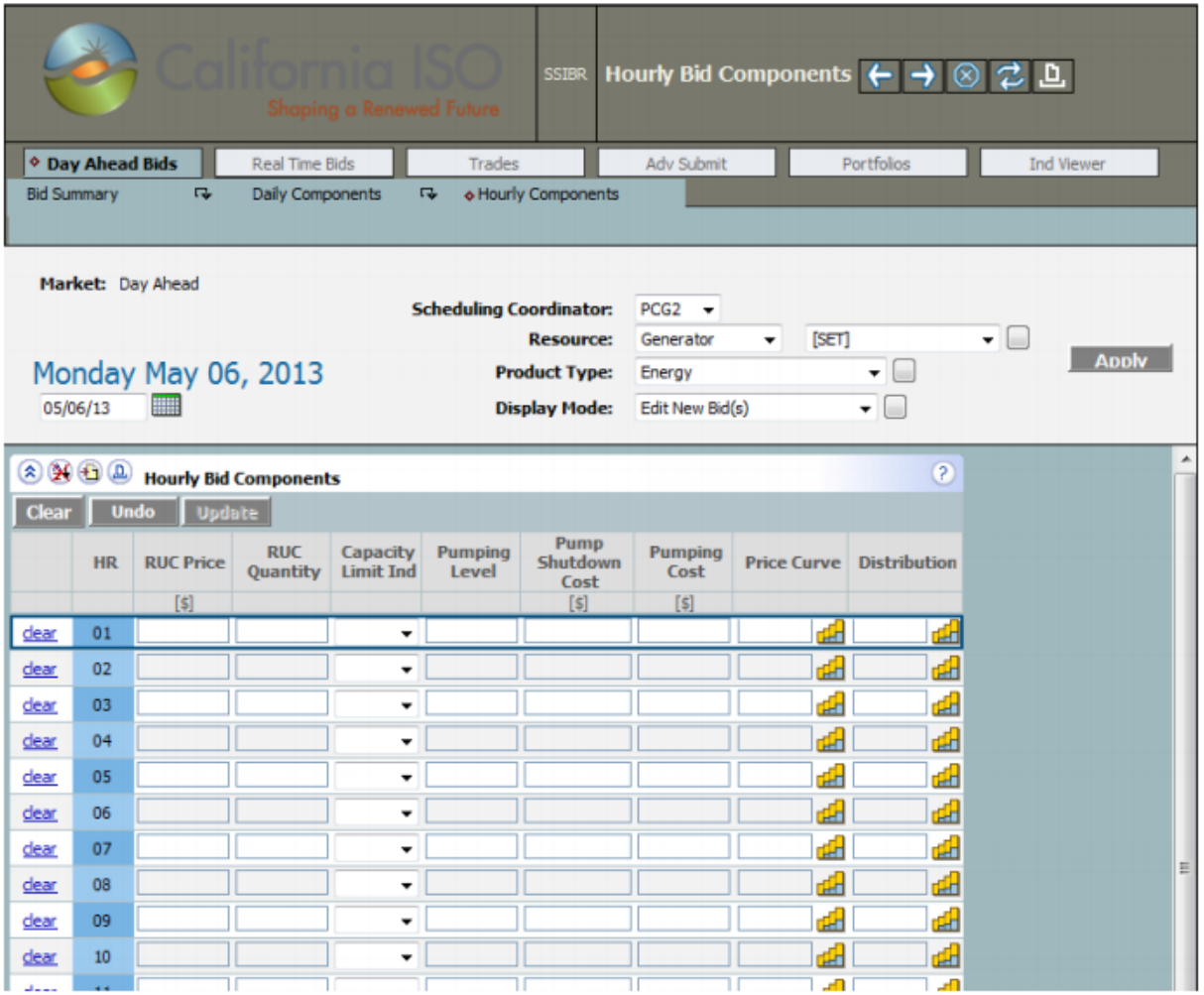
Viewing Resource Ramp Capability in CMRI for SCs



Submission of Base Schedule Distribution Factors (GDFs) for aggregate EIMNPR

- If base Generation Distribution Factors (GDFs) are submitted via SIBR for Participating Resources (BSAP for NPRs), the market will distribute the base schedule and any imbalances of aggregate EIM non-participating resources using the submitted base GDFs.
- If submitted GDFs are not available, the market will use the registered default base GDFs for the resource in the Master File. We always re-normalize for outages.
- The base GDFs will be used to calculate the aggregate LMP for the aggregate EIM NPR.

SIBR Submission of GDFs



Generic Non-Generator Resource (NGR) Modeling

- The ISO has developed non-generator resource (NGR) modeling functionality to allow a resource to reduce output without having a forward energy schedule.

- A full description of the NGR enhancements can be found in Section 6.2 of the Energy Storage Distributed Energy Resources (ESDER) Phase 2 Draft Final Proposal:

  http://www.caiso.com/Documents/DraftFinalProposalEnergyStorage_DistributedEnergyResourcesPhase2.pdf

Generic Non-Generator Resource (NGR) Modeling

Currently, if a GR aggregate is operating at 0 MW, the dispatch cannot decrease to a negative output even if the aggregate has storage capabilities.

With this enhancement, the aggregated resource can have a base schedule equal to zero and still be able to receive a dispatch instruction to reduce output.

- This new functionality will be available to all Scheduling Coordinators and enables the modeling of individual or aggregated EIM participating and EIM non-participating resources.

Generic Non-Generator Resource (NGR) Modeling

- Resources utilizing this function will have a continuous operating range from negative to positive injection, and none of the costs normally associated with resource management including start-up cost, start up time, minimum up time, minimum down time, or forbidden operating regions.
- The modeling functionality will not enforce a state of charge constraint that is used by storage resources in the ISO's market today.

Generic Non-Generator Resource (NGR) Modeling

- These NGR resources will be subject to local market power mitigation (LMPM) and can use any of the methods under the ISO's tariff to establish a default energy bid.
- The energy bid of a resource modeled via the Generic NGR model will be subject to mitigation above the competitive LMP at its location.

Generic Non-Generator Resource (NGR) Modeling

In addition to aggregated and individual resources, the NGR modeling functionality will be available for use on interties to support regulation down.

For example, an intertie resource without a forward energy schedule will be able to provide regulation down to the ISO.

Questions