



Day-ahead market enhancement discussion

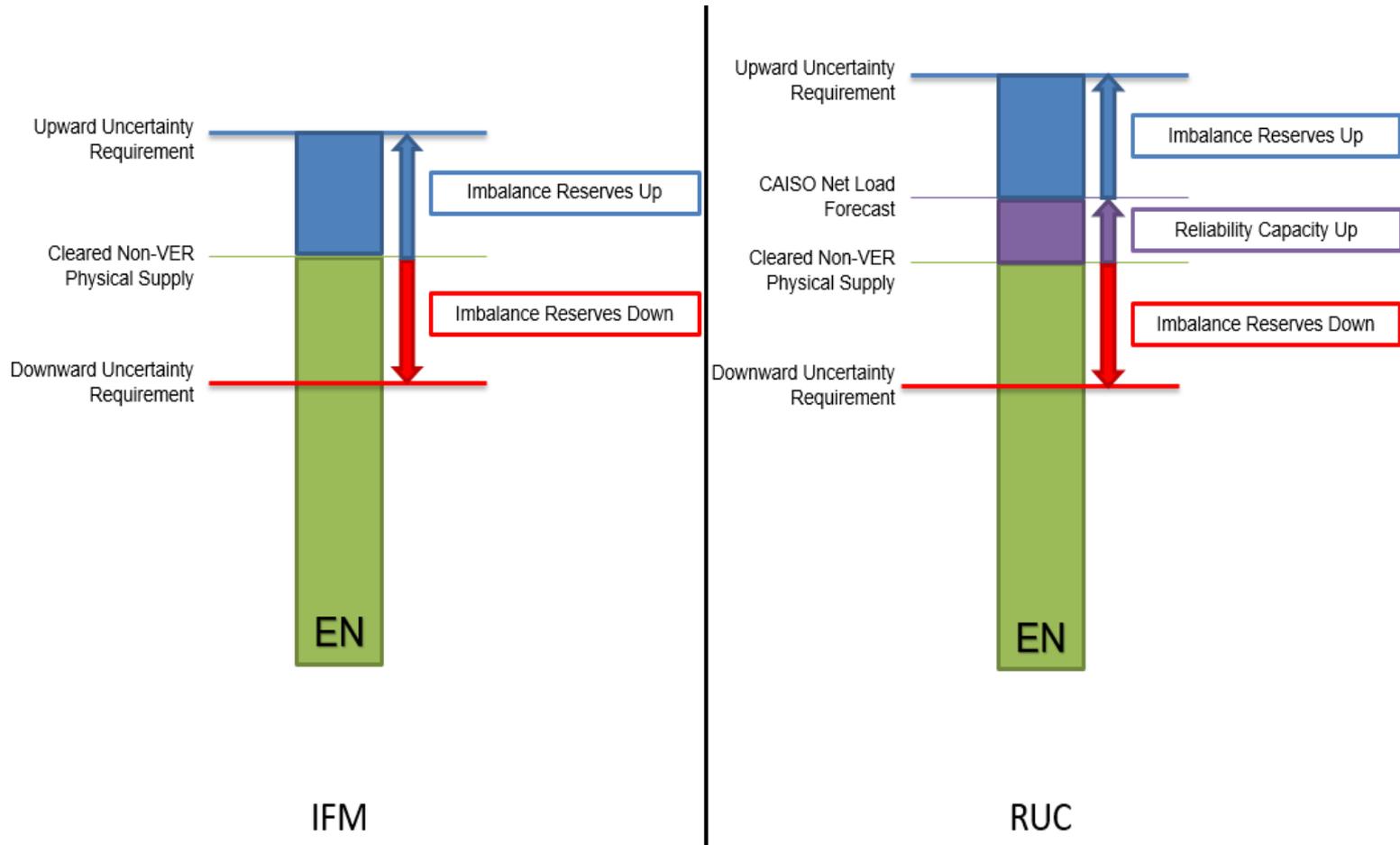
Don Tretheway
Principal, Market Design Policy

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New approach is needed to address operations need to bias residual unit commitment (RUC) process

- Add imbalance reserve up and down to IFM to provide intra-hour ramp and cover uncertainty
 - Addresses need to bias RUC load forecast
- Return RUC to its original purpose and enhance
 - Procure reliability capacity up and down. Does not shut down resources.
 - Establish export/import energy schedule to be tagged for checkout and establish real-time priority
 - Establish binding MSG configuration based upon RUC schedule

Sequential approach to commit additional resources if physical supply clears IFM less than ISO net load forecast



Summary of new design elements

- Sequential IFM and RUC
- **Deviation settlement for imbalance reserves (ramp)**
- Imbalance reserve deployment scenarios added to CRR model
- VERs can select to be CAISO forecasted (eligible for IRU/RCU) or SC forecasted (not eligible for IRU/RCU)
- **Clarify that only exports linked to internal non-RA capacity will have high priority in real time. Addresses imbalance reserve demand curve allowing exports to clear.**
- Transition period when RA resources will bid zero for imbalance reserves and reliability capacity and have a real-time must offer obligation even if not awarded

Summary of modified design elements

- Address high cost energy receiving IRU or RCU through a SIBR rule that makes the resource ineligible to be awarded if a bid submitted above a price established prior to bids submitted
- Market power mitigation to higher of historical spin or competitive capacity price. Energy, imbalance reserve and reliability capacity will all be mitigated if congestion in MPM run.
- Imbalance reserve cost allocation: tier 1 to deviations that require dispatch of other resource, tier 2 to metered load
- Reliability capacity cost allocation: tier 1 to load and SC-forecasted VER deviations and SC net virtual position, tier 2 to metered load
- Unavailable imbalance reserves/reliability capacity charged the higher of the day-ahead price, FMM FRP or RTD FRP price

Settlement of ramp deviations between IFM, FMM and RTD

- Ramp is composed of ...
 1. *Forecasted movement* is the change in energy schedules between intervals in same market run
 2. *Uncertainty awards* are additional ramp capability held back to meet changes in net load between market runs
- Marginal value of ramp is the same for both types
- Complications in designing a deviation settlement
 - Forecasted movement compensation can occur through energy price (IFM) or a side payment (FMM & RTD)
 - Side payment if moving up is paid FRU and charged FRD
 - Uncertainty granularity difference between 15-min imbalance reserves and 5-min flexible ramping products
 - Ramp for uncertainty awards comes from unloaded capability and energy schedule changes in opposite direction

Ramp deviation settlement is broken down into forecasted movement and uncertainty awards

	Ramp Settlement
IFM Forecasted Movement	No side payment, paid energy price
IFM Imbalance Reserve Award	Pay award
FMM Forecasted Movement	Settle deviation from IFM 5-minute forecasted movement
FMM FRP Uncertainty Award	Settle deviation from embedded 5-minute ramp within IR award
RTD Forecasted Movement	Settle deviation from FMM 5-minute forecasted movement
RTD FRP Uncertainty Award	Settle deviation from FMM
No-Pay 15-Minute Resource	If bid range does not support IR award charged higher IR or FRP
No-Pay 5-Minute Resource	If bid range does not support IR award, charged higher IR or FRP for quantity above embedded 5-minute ramp



Observations of proposed settlement

- No deviation settlement for reliability capacity because there is no energy settlement in RUC. No pay rules apply if bid range doesn't support awards.
- Quantity of embedded 5-minute ramp in imbalance reserve awards depends if ramp is from energy schedule changes or holding back ramp capability
- Imbalance reserve no pay rules apply to awards above the resource's embedded 5-minute ramp
- Both 15-minute and 5-minute resources are settled for forecasted movement deviations in FMM and RTD
- Only 5-minute dispatchable resources are subject to deviation settlement for uncertainty awards because 15-minute resources have no embedded 5-minute ramp
- Ramp deviation settlement only occurs if a resource reaches its P_{max}/P_{min} at a different time than the prior market

Seeking comparable scheduling priorities of exports as the rest of WECC

- High priority exports are supported by contracted internal non-RA supply prior to the day-ahead market. Receive same priority as ISO load in all markets.
- Low priority exports can clear the IFM, but energy that can be self-scheduled and tagged prior to real-time is the RUC schedule
- Low priority RUC schedules will have lower self-schedule scheduling priority than ISO load in real-time
- Low priority RUC schedules have higher priority than new real-time export self-schedules
- In EDAM straw proposal, proposed EDAM transfers of energy, imbalance reserves, reliability capacity, & AS equivalent priority to high priority exports and native load

Interaction between imbalance reserve demand curve and export scheduling priority

- Demand curve is currently capped at \$247
- Export bids above this level could clear by reducing the amount of imbalance reserve requirement met
- Imbalance reserve awards are held fixed in RUC. Unable to commit additional supply to backfill.
- If uncertainty materializes in real-time, low priority exports can be curtailed because of lower scheduling priority than ISO load
- ISO plans to notify market participants if imbalance reserve demand curve has reduced procurement