



California ISO

Day-Ahead Market Enhancements

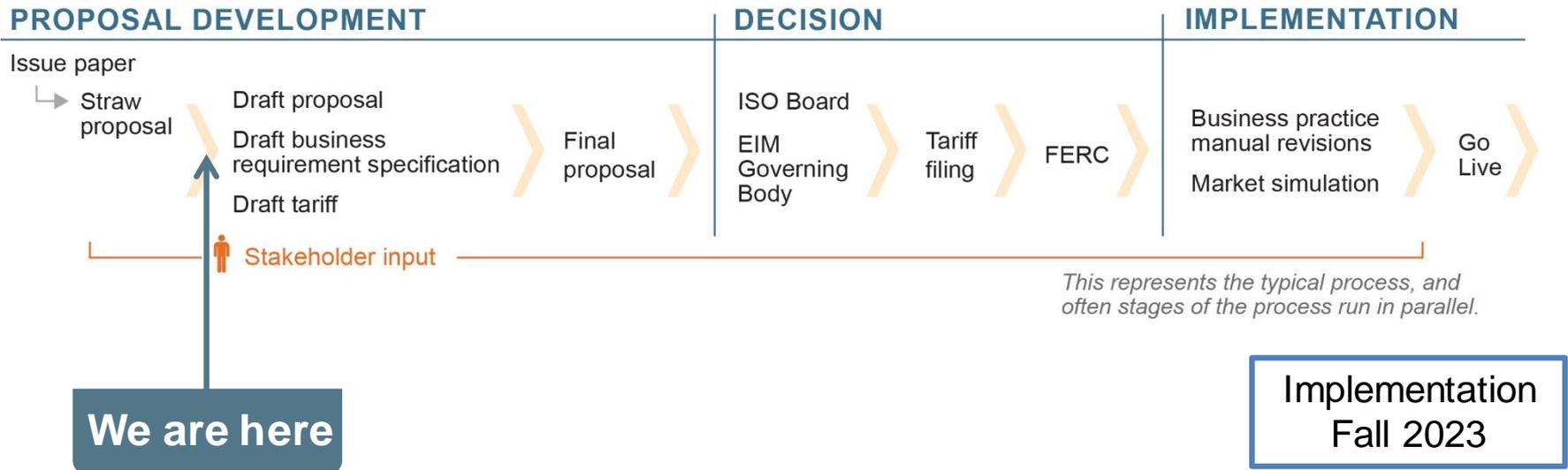
Stakeholder Workshop

January 24, 2022

Agenda

Time:	Task:	Presenter:
9:00–9:10am	Welcome/introductions	Kristina Osborne
9:10–10:30am	Need for Day-Ahead Market Enhancements Imbalance Reserves and Reliability Capacity Benefits of Imbalance Reserves and Role in EDAM	James Friedrich
10:30–11:50am	Day-Ahead Market Enhancement Analysis	Guillermo Bautista Alderete
11:50am–12:00pm	Next Steps	Kristina Osborne

CAISO development process for DAME



DAME policy development schedule

Item	Date
Post Third Revised Straw Proposal	April 6, 2022
Stakeholder Conference Call	April 13, 2022
Stakeholder Comments Due	May 11, 2022
Stakeholder Workshop	May 25, 2022
Stakeholder Comments Due	June 8, 2022
Post Draft Final Proposal	June 30, 2022
Stakeholder Conference Call	July 8, 2022
Stakeholder Comments Due	July 22, 2022
ISO Board of Governors Decision	September 1, 2022

**Dates are tentative and subject to change*

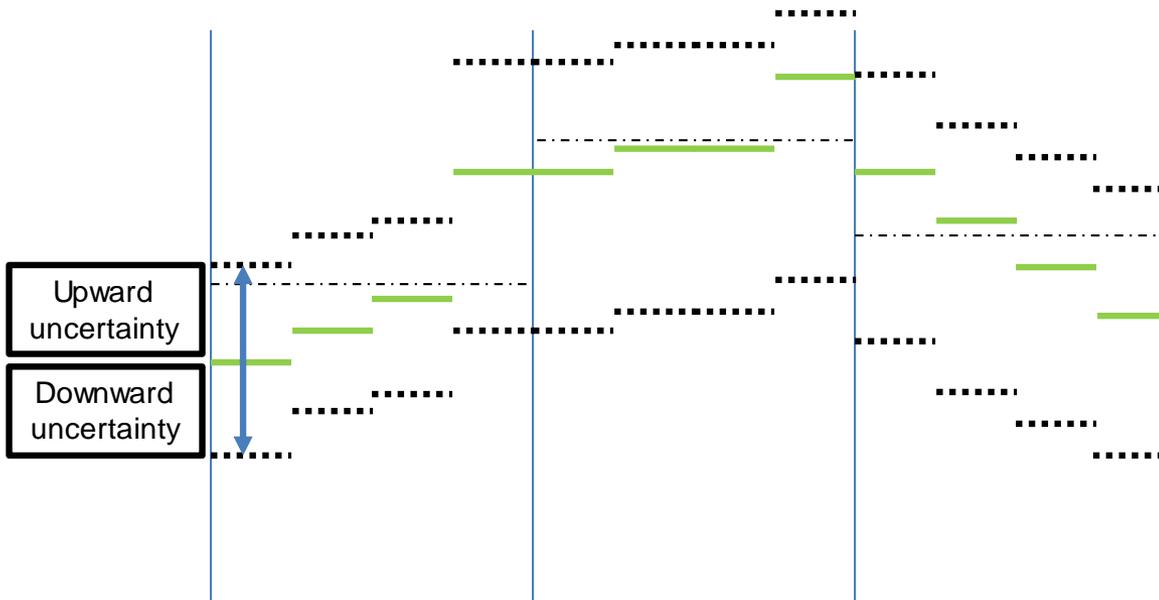
Overview

- Need for day-ahead market enhancements
- Description of imbalance reserves and reliability capacity
- Imbalance reserve benefits and relationship to EDAM

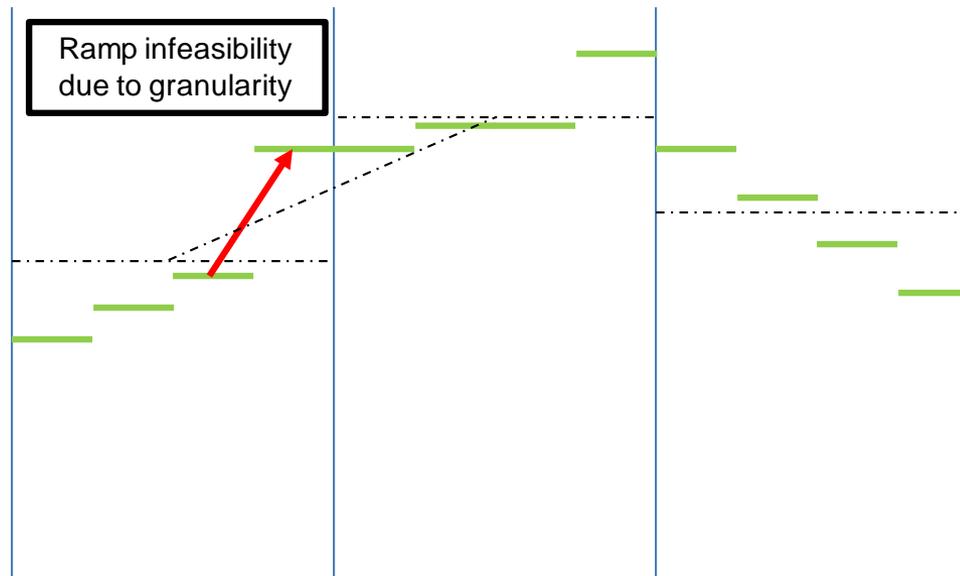
Day-Ahead Market Enhancements (DAME) initiative is addressing challenges of the transforming grid (1 of 3)

- Day-ahead net load uncertainty continues to grow
 - Increasing grid-connected renewables
 - Increasing behind-the-meter distributed energy resources
 - Increasing extreme weather conditions (wildfire, drought, extreme heat)
- Real-time market dispatches are increasingly steeper and more variable
 - Real-time energy ramping needs may exceed that accounted for in hourly day-ahead market schedules

NET LOAD UNCERTAINTY – The need for dispatchable generation to meet changes in the net load forecast (deviations due to load and renewables)



RAMPING NEEDS - Steep differences between 15-minute intervals (granularity differences) may result in 15-minute ramp infeasibility due to mid-point to mid-point hourly scheduling



Day-Ahead Market Enhancements (DAME) initiative is addressing challenges of the transforming grid (2 of 3)

- CAISO currently accounts for net load uncertainty and real-time ramping needs through upward adjustments to the load forecast used by the day-ahead market's residual unit commitment process (i.e., RUC Net Short)
- CAISO day-ahead operators use RUC net short to cover variety of risks between day-ahead and real-time
 - Load uncertainty (addressed by imbalance reserves)
 - Replacement of contingency reserves that are dispatched for energy
 - “One-off” contingencies (e.g., wildfire risk, gas system risk)

Day-Ahead Market Enhancements (DAME) initiative is addressing challenges of the transforming grid (3 of 3)

- DAME is developing two enhancements:
 - Imbalance reserve product
 - Enhancing the residual unit commitment process to also schedule downward capacity

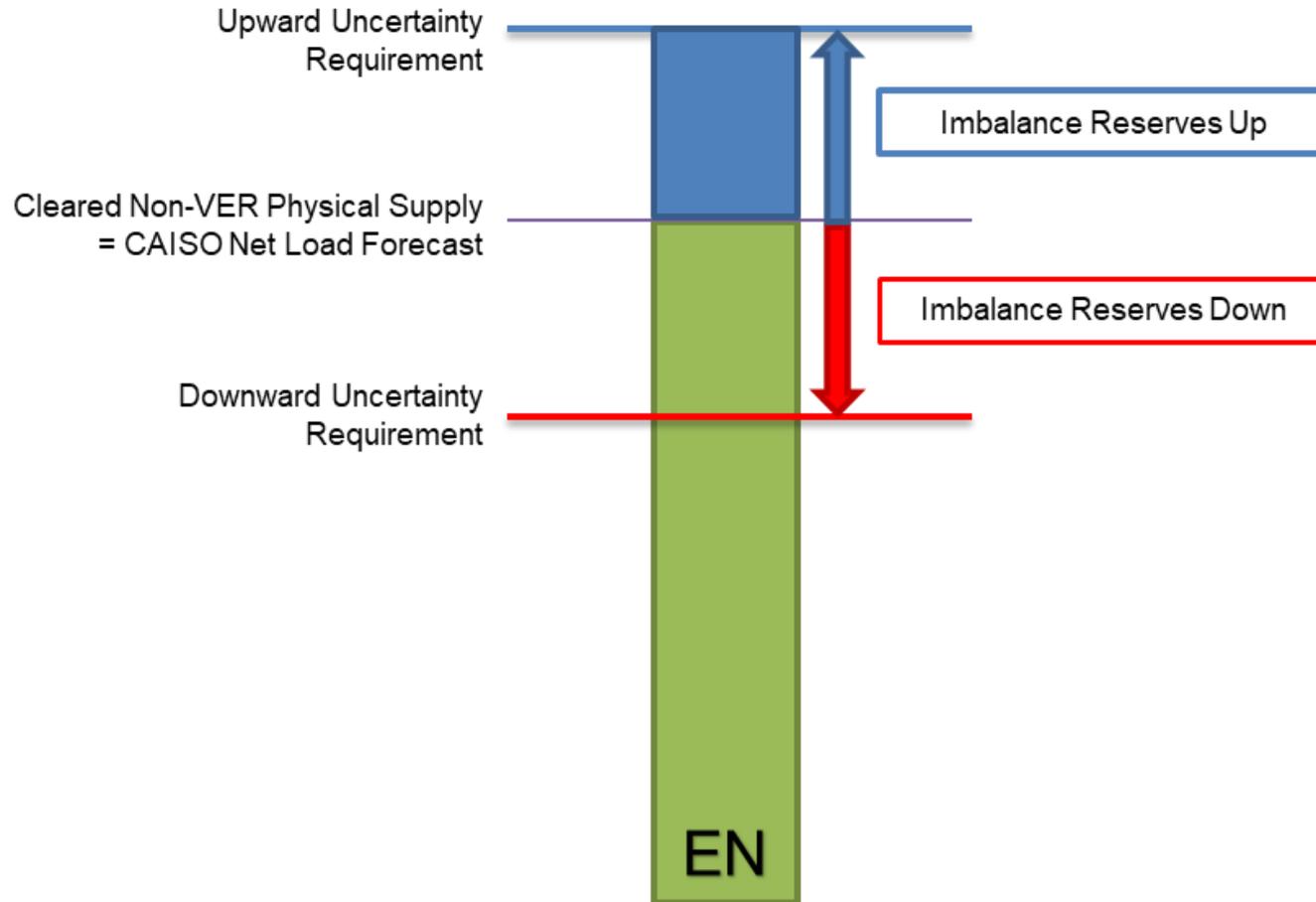
Imbalance reserves would be co-optimized with energy and ancillary services in the integrated forward market

- Upward and downward imbalance reserves with separate bids
- Imbalance reserve awards obligate resource to provide economic energy bids and be available to the real-time market
- Awards based on resource's fifteen-minute ramping capability
 - Must be able to start in fifteen-minutes if day-ahead market does not schedule resource on-line
- Nodally modeled and priced respecting transmission constraints
 - Ensures deliverability
 - Prices based on imbalance reserve bids and opportunity costs
- Procurement requirement base on quantile regression methodology
 - Accounts for historical differences as well as actual load and VER forecasts

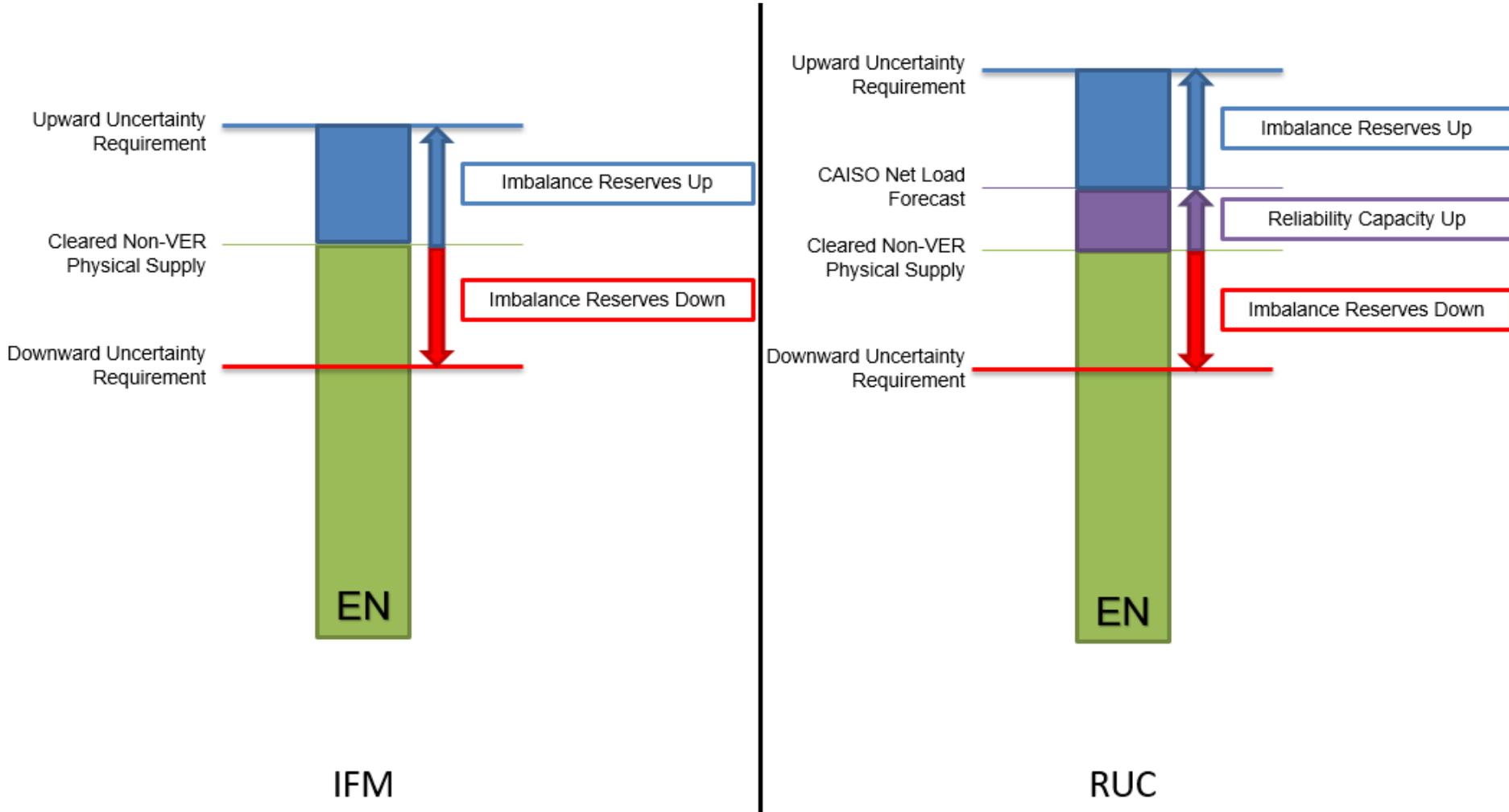
Residual unit commitment (RUC) process is still needed because non-VER physical supply may clear differently when bid-in load, virtual bids, and VER offers are considered

- Drivers of reliability capacity up
 - Bid-in load clears less than CAISO forecast
 - Virtual supply clears market
 - Cleared VERs greater than CAISO forecast
- Drivers of reliability capacity down
 - Bid-in load clears greater than CAISO forecast
 - Virtual demand clears market
 - Cleared VERs less than CAISO forecast

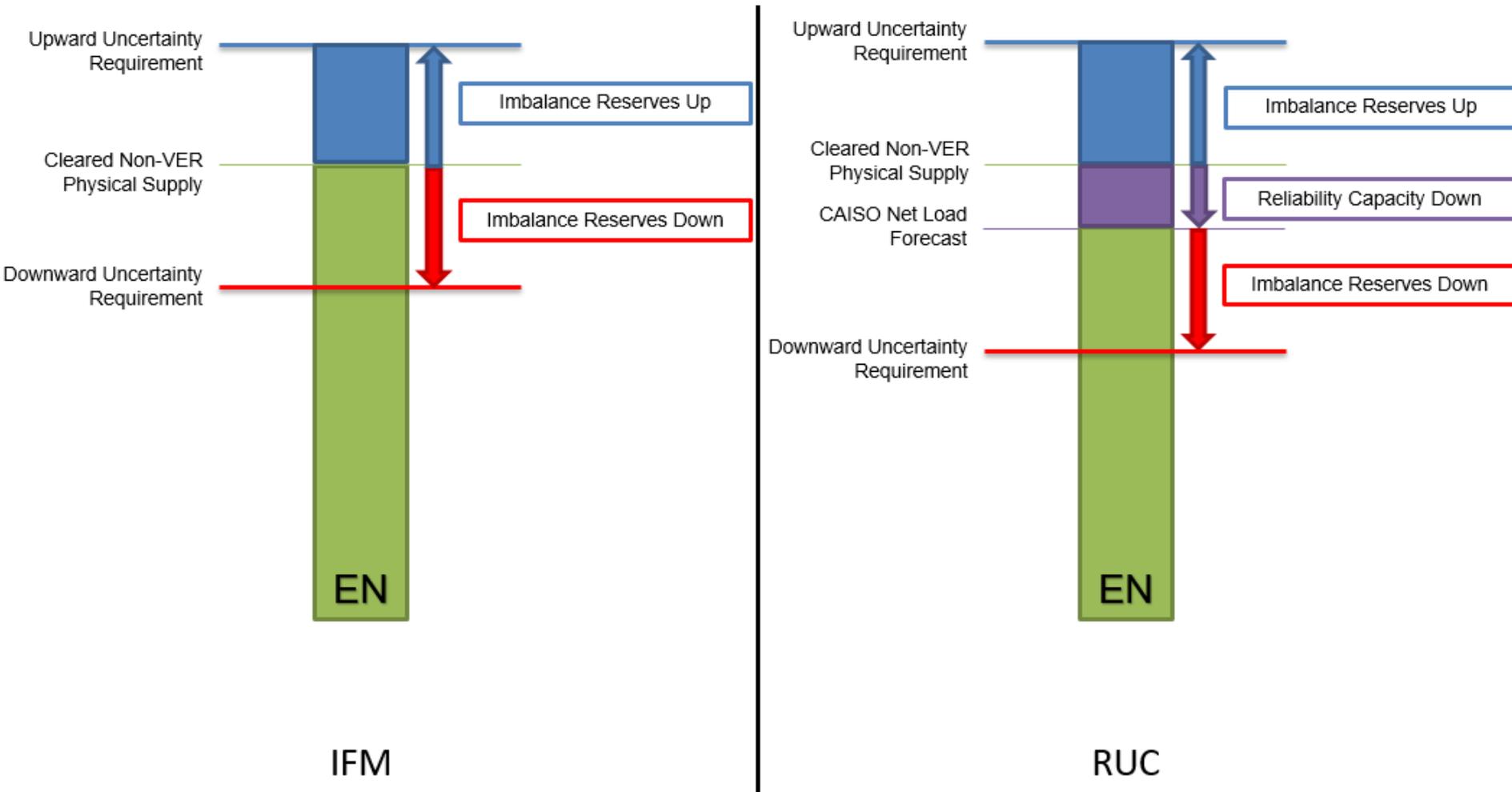
Day-ahead market products when net load forecast is equal to non-VER physical supply



Day-ahead market products when net load forecast is greater than non-VER physical supply



Day-ahead market products when net load forecast is less than non-VER physical supply



Imbalance reserves provide benefits over out-of-market actions to account for net load uncertainty and ramping needs (1 of 2)

- Improves allocation of system ramping capability
 - Optimizes fleets ramping capability between hourly day-ahead schedules and 15-minute ramping capability
- Better ensures IFM export schedules are feasible by reducing RUC load adjustments
- Responds more flexibly than RUC supply to real-time changes and ramp insufficiencies
- Returns RUC to its intended purpose
 - RUC is not intended nor designed to provide ramping capability

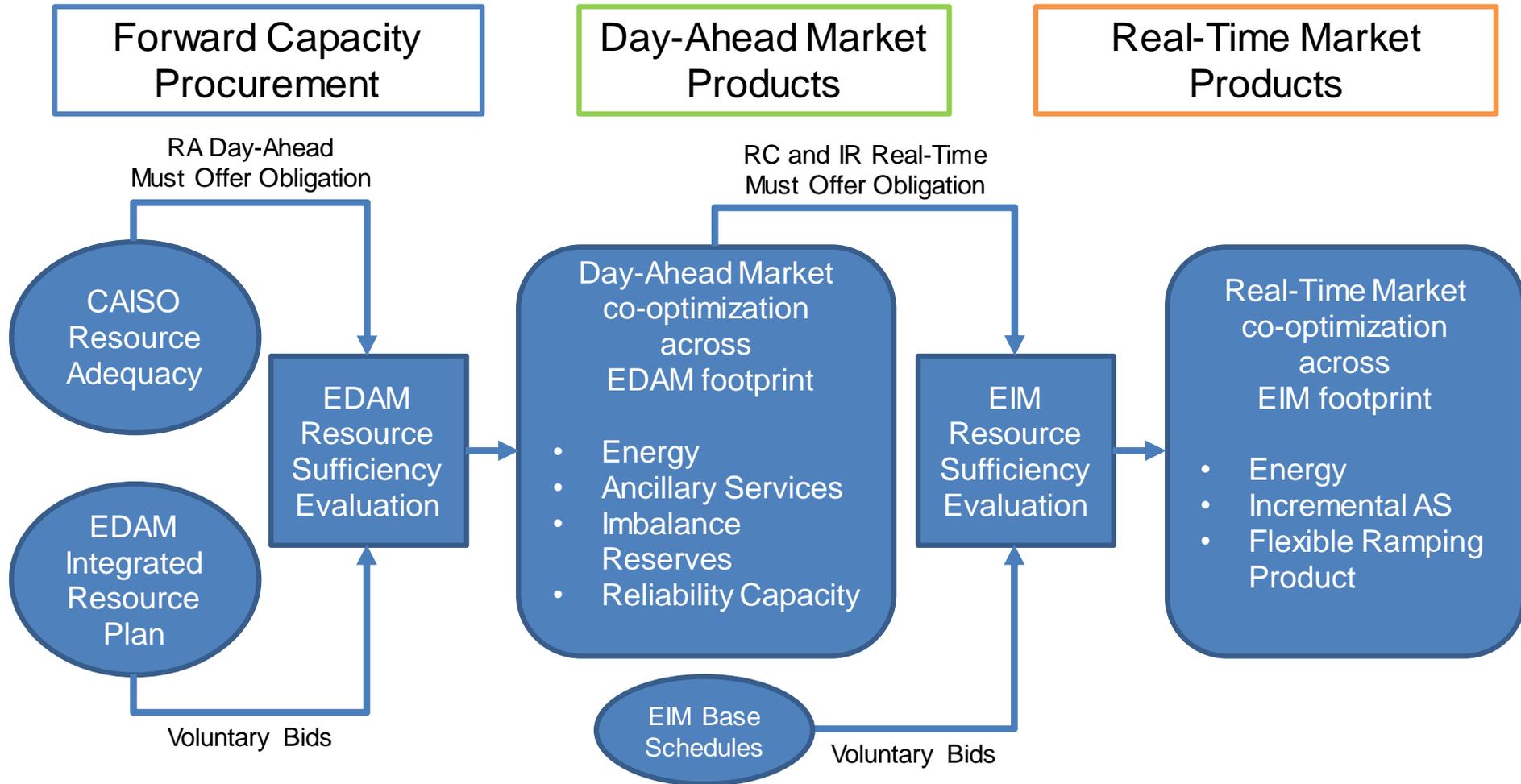
Imbalance reserves provide benefits over out-of-market actions to account for net load uncertainty and ramping needs (2 of 2)

- A biddable product would allow the market to optimize costs to be available in real-time and improve unit commitment decisions
 - Costs to procure and schedule natural gas
 - Costs associated with setting-up a hydro system
 - Cost associated with making demand response available
 - (For imports) opportunity costs and transmission costs
- Market prices reveal value of flexible capacity and result in more appropriate compensation to flexible resources
- Encourages more 15-minute import schedules

Imbalance reserves have an important role in EDAM

- Optimizes scheduling of reserve capacity across the EDAM footprint to meet net load uncertainty and real-time ramping needs
- Optimizes EDAM transfers
 - IFM can consider needed reserves to efficiently schedule transfer quantities
- Improves reliability of EDAM transfers
 - Establishes a consistent treatment of uncertainty in each BAA's resource sufficiency evaluation requirements
 - Comes with a must-offer obligation
- Enables trading of capacity to meet resource sufficiency evaluation's uncertainty component

Overview of RA, DAME, EDAM and EIM relationship with CAISO market runs



Next Steps

- Please submit written comments on the workshop materials and discussion by end of day Feb. 7, 2022 using the comments template on the initiative webpage: <https://stakeholdercenter.caiso.com/StakeholderInitiatives/Day-ahead-market-enhancements>
- Targeting to publish the third revised straw proposal in early April 2022.