



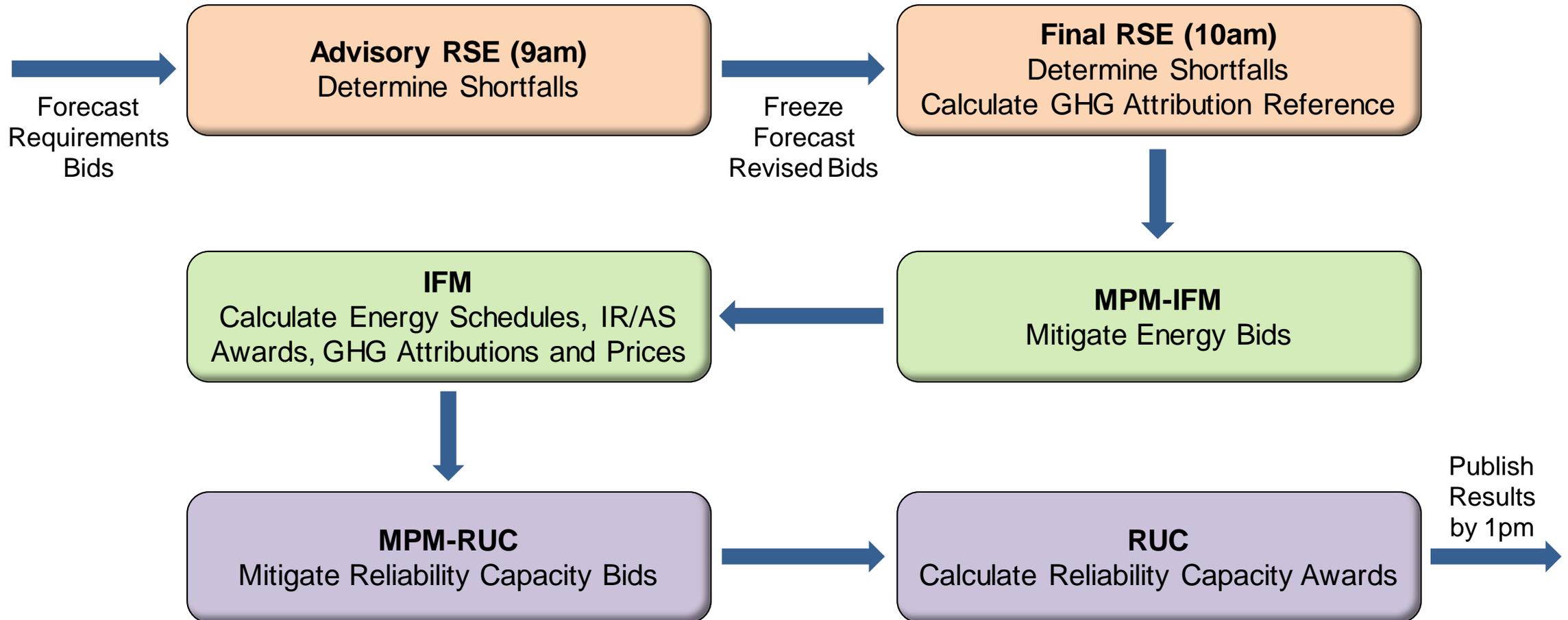
# High Level EDAM Design

CAISO EDAM Team

EDAM Working Group 1:  
Supply Commitment and Resource Sufficiency Evaluation

February 28, 2022

# EDAM Pass Sequence



# Resource Sufficiency Evaluation

- Uses the submitted resource energy/AS/IR bids (no RC bids)
  - ◆ Calculates for each EDAM BAA an hourly resource schedule profile over the Trading Day that meets demand forecast, and ancillary services and uncertainty requirements, as adjusted by bucket-1 transfers
  - ◆ Subject to all resource constraints
    - Inter-temporal unit commitment constraints
    - Operating limits and energy/AS/IR bid limits
    - Ramp rate capability limits
    - VER forecast, for VER
    - Daily energy limits, for hydro resources
    - State of charge limits, for storage resources
- Identify hourly shortfalls in meeting upward/downward requirements

# Integrated Forward Market

- Uses mitigated resource energy bids and submitted AS/IR bids
  - ◆ Calculates hourly resource energy schedules, ancillary services and imbalance reserve awards, transfers, GHG attributions, and prices
  - ◆ Balances physical and virtual supply with virtual demand and load schedules
  - ◆ Subject to all network and resource constraints
    - Transmission constraints (base and IRU/IRD deployment scenarios and contingencies) and scheduling limits (ISLs, ITCs, and transfers)
    - Inter-temporal unit commitment constraints
    - Operating limits and energy/AS/IR bid limits
    - Ramp rate capability limits
    - VER forecast, for VER
    - Daily energy limits, for hydro resources
    - State of charge limits, for storage resources

# Market Power Mitigation for Integrated Forward Market

- Trial IFM pass using submitted resource energy bids and AS/IR bids
  - ◆ Local Market Power Mitigation
    - Perform DCPA (RSI-3) to determine uncompetitive binding transmission constraints
    - Calculate resource marginal congestion component contributions from uncompetitive binding transmission constraints (using shift factors)
    - Identify recourses with a net positive uncompetitive marginal congestion component
    - Mitigate the energy bids for these resources above the competitive LMP
  - ◆ BAA Market Power Mitigation
    - Group BAAs in descending order of their power balance constraint shadow price
    - Calculate RSI-3 to determine uncompetitive conditions in serving the scheduled load in the BAA group
    - Mitigate physical energy bids for pivotal suppliers above the competitive energy price

# Residual Unit Commitment

- Physical energy schedules, imbalance reserve and ancillary services awards, and GHG attributions are fixed at IFM solution
- Virtual and load schedules are ignored
- Uses mitigated reliability capacity bids
  - ◆ Calculates hourly reliability capacity awards, transfers, and prices
  - ◆ Balances energy schedules and reliability capacity with demand forecast
  - ◆ Subject to all network and resource constraints
    - Transmission constraints (base and IRU/IRD deployment scenarios and contingencies) and scheduling limits (ISLs, ITCs, and transfers)
    - Inter-temporal unit commitment constraints
      - No shut-down to resources with energy schedules, but additional start-ups and MSG transitions
    - Operating limits and energy/AS/IR bid limits, ramp rate capability limits, etc.

# Market Power Mitigation for Residual Unit Commitment

- Trial RUC pass using submitted reliability capacity bids
  - ◆ Local Market Power Mitigation
    - Perform DCPA (RSI-3) to determine uncompetitive binding transmission constraints
    - Calculate resource marginal congestion component contributions from uncompetitive binding transmission constraints (using shift factors)
    - Identify recourses with a net positive uncompetitive marginal congestion component
    - Mitigate the reliability capacity bids for these resources above the competitive RCLMP
  - ◆ BAA Market Power Mitigation
    - Group BAAs in descending order of their RUC power balance constraint shadow price
    - Calculate RSI-3 to determine uncompetitive conditions in serving the demand forecast in the BAA group
    - Mitigate reliability capacity bids for pivotal suppliers above the competitive RC price

# Why RUC?

- Load schedules may clear in IFM below or above demand forecast
  - ◆ Reliability capacity awards make up for the difference
- Virtual supply and demand schedules are liquidated in WEIM
  - ◆ Reliability capacity awards substitute for net virtual supply that clears IFM
- RUC has a longer time horizon (48-72 hours)
  - ◆ RUC can commit extra-long-start resources
- RUC can schedule reliability capacity transfers
  - ◆ Unused transfer capacity from IFM or counter flow on IFM energy transfers
    - To counter energy transfers scheduled in IFM due to virtual schedules, and load schedules that are different from the demand forecast

# Residual Unit Commitment and Resource Sufficiency Evaluation

- If a BAA passes the EDAM RSE
  - ◆ Does it need RUC?
    - Yes, to procure reliability capacity for WEIM if not scheduled in IFM
      - Reliability capacity awards have a must offer obligation in WEIM
  - ◆ Can it fail RUC (RUC power balance constraint violation)?
    - Yes, if there are insufficient reliability capacity bids and transfer capacity
  - ◆ Can it lean on other BAAs in RUC?
    - Yes, through reliability capacity transfers
    - Can EDAM RSE test for that?
      - No, because the reliability capacity requirement is known only after IFM
    - How can this be prevented?
      - Make all capacity bid in IFM available to RUC with reliability capacity bids
      - Best outcome to pass the WEIM RSE