Day-Ahead Market Enhancements Discussion

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Key Objectives of DAME Phase 2

- Increased efficiency
  - Co-optimizing all market commodities
- Increased reliability
  - Commit/schedule resources to meet demand forecast and uncertainty
- Maintain existing financial market tools
  - Virtual and load bids for taking financial positions
  - Congestion Revenue Rights for hedging congestion
- Reasonable performance

Previous Proposal: Combine IFM and RUC into a Single Optimization Problem

- Co-optimize financial and reliability targets for best overall outcome
- Developed mathematical formulation and Excel prototype, and worked out settlement examples
- Failed!
  - Strong coupling between the financial and physical markets undermined existing financial instruments
  - Different prices for physical, virtual, and load schedules with potentially significant market uplifts

Current Proposal: Keep Financial (IFM) and Reliability (RUC) Markets Separate

- Alternative 1 (conservative)
  - Keep current DAM application sequence
    - MPM/IFM – RUC
    - Add FRU/FRD procurement in IFM
    - Additional unit commitment and fixed AS/FRU/FRD in RUC
- Alternative 2 (aggressive)
  - Change current DAM application sequence
    - MPM/RUC – MPM/IFM
    - Co-optimize Energy/AS/FRU/FRD in RUC
    - Fixed unit commitment and AS/FRU/FRD in IFM

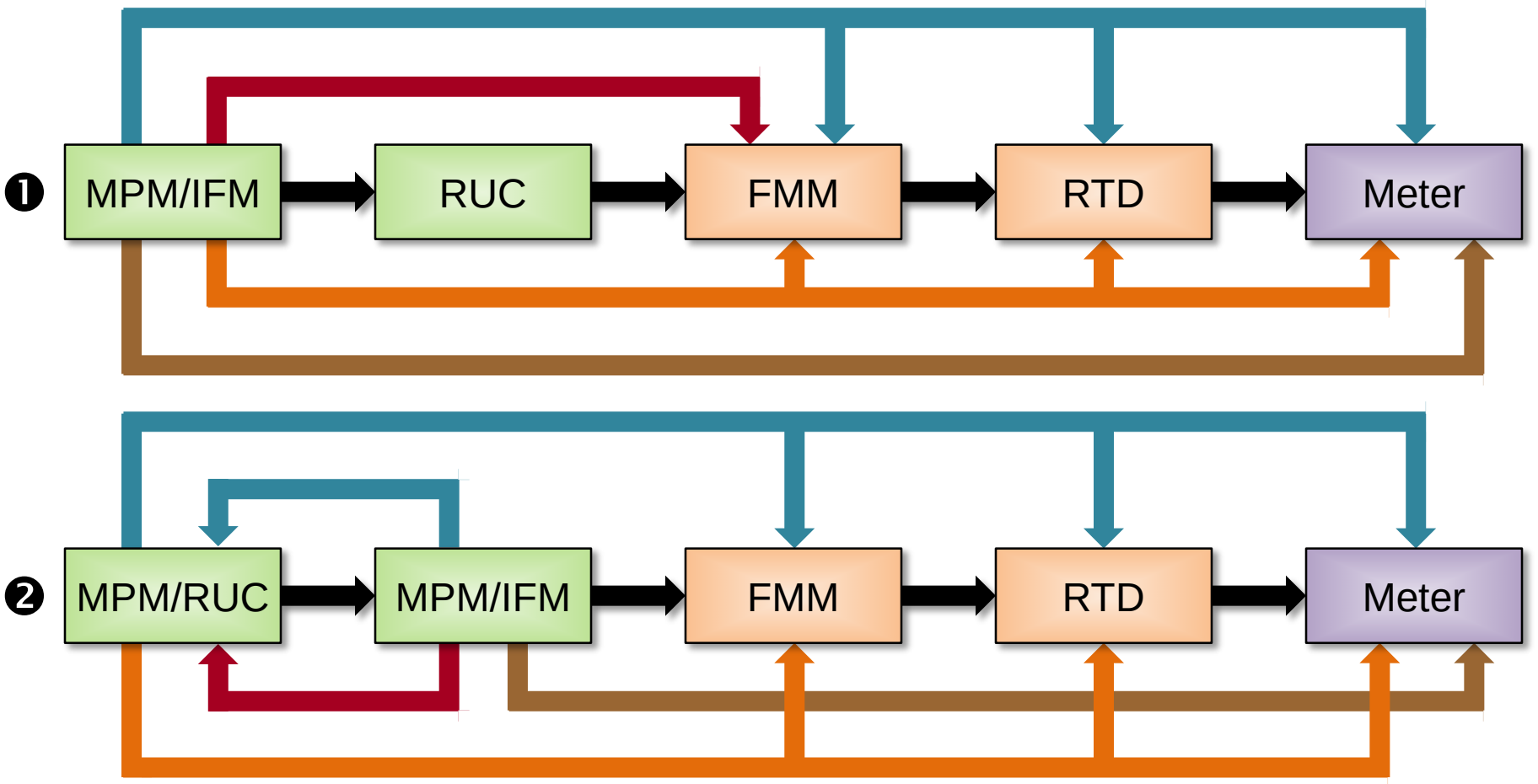
Alternative 1 Details

- Co-optimize Energy/AS/FRU/FRD in IFM
  - Full unit commitment
  - Clear physical supply with virtual and load bids
- Minimal change in RUC
  - Additional unit commitment (no de-commitment)
  - Use availability bids (non-zero for RA Resources, after EDAM) to procure RUC Capacity to meet demand forecast
  - Fixed AS/FRU/FRD awards from IFM
- No changes to deviation settlement except for FRU/FRD/Corrective Capacity (CC)

Alternative 2 Details

- Reliability Unit Commitment (RUC)
  - Full unit commitment
  - Co-optimize Reliability Energy/AS/FRU/FRD to meet demand forecast
  - Use energy bids, no need for RUC availability bids
- Independent Forward Market (IFM)
  - Forward Energy physical/virtual/load schedules
  - Fixed unit commitment and AS/FRU/FRD from RUC
- Settle Forward Energy in IFM, deviation in RUC

Alternative Comparison: Settlement Paths



Alternative 1 Pros

- Lower regulatory risk (closer to status quo)
- Easier implementation (small changes)
- Virtual schedules are liquidated in FMM providing hedge for demand/VER forecast errors and outages from DAM to RTM

Alternative 1 Cons

- Inefficient unit commitment
  - Influenced by virtual/load bids
  - Additional unit commitment in RUC with no de-commitment
- Inefficient RUC Capacity
  - Energy bids are ignored
  - FMM deviations even without change in conditions/bids
- AS/FRU/FRD awards consistent with ramp capability at IFM schedules, not load forecast

Alternative 2 Pros

- Efficient unit commitment
  - Single shot, not influenced from virtual/load bids
- Efficient RUC Energy/AS/FRU/FRD schedules
  - No FMM deviations without change in conditions/bids
- AS/FRU/FRD awards consistent with ramp capability at RUC schedules meeting demand
- RUC prices reflect real-time conditions
- Simplified Bid Cost Recovery (one cost allocation)
- Overall lower performance requirements for DAM

Alternative 2 Cons

- Virtual schedules are liquidated in RUC providing hedge for demand/VER forecast in RUC, not FMM
  - FRU/FRD awards can hedge for that uncertainty
  - RUC prices would be closer to FMM prices
- VER deviation in RUC introduces a cost for ISO's VER forecast error in DAM
  - ISO can use SC's VER forecast, if historically more accurate

Analysis to evaluate if market or ISO day-ahead forecast more accurate

- Day-Ahead Forecast
  - Cleared bid-in demand – VER cleared + net virtual demand
  - ISO load forecast – ISO VER forecast
- Compare to FMM
  - ISO FMM load forecast – ISO FMM VER forecast
- Evaluation of Accuracy
  - On average
  - Peak days
  - Challenging days