DAME Design Issues: Imbalance Reserve

March 7, 2023

Agenda

- Imbalance Reserve as a Capacity Product
- Congestion (via capacity)
- Interactions with Virtual Bidding
  - Feasibility consideration
- Imbalance Reserve – the RUC process
- Ideas for moving forward

Imbalance Reserve (IR) as a Capacity Product

- CAISO plans to procure IRU and IRD based on 97.5% and 2.5% "deployment scenarios" accordingly
- As a result, it will be rare (< 2.5% of the time) that the products would deliver the full energy for which they are tested in the deployment scenarios
    - Moreover, since energy bids are not considered for IR, it is even more unlikely energy will be delivered from the capacity providing IR (that is there may be lower energy bids available)
    - However, in the "deployment scenarios" the full amount of capacity is modeled as if it is providing energy (i.e., 1 MW of IRU capacity is modeled as a 1MW energy injection) and tested for feasibility
- Because IR will typically be providing capacity (more than energy) this calls into question any congestion/price impact IR will have on the rest of the IFM (particularly energy)
- Note that Ancillary Services – also primarily capacity product –are not modeled as providing energy and thus don't create similar "buying capacity but modeling it as energy" issues

Congestion via Capacity

- "Congestion" resulting from IR has the potential to impact the dispatch and prices for all other products
  - And congestion will lead to a more costly dispatch
- However, since actual deployment will be rare (< 2.5% with other units also providing), this "congestion" will be the exception (if it ever happens), but the market will "pay the price" of the congestion at all times it binds in the "deployment scenarios"
- Is this appropriate?
  - What is the cost of "ensuring feasibility" when there may be multitudes of other feasible dispatches that both costs less in actual deployment, and that don't create costs when deployment isn't needed?
  - How will this impact the "simultaneous feasibility" test used to issue CRRs? It was not assumed and will likely make CRRs infeasible/underfunded and create uplift to CAISO load.
  - Do all these added costs even result in feasible IR? (next slides)

Interactions with Virtual Bidding

- As noted, the "deployment scenarios" used to procure IR and to determine congestion are not expected to happen (only expected less than 2.5% of the time)
- But flows/congestion will be modeled as if it happens 100% of the time
- **This should be expected to create systematic "phantom congestion" in the Day-ahead market**
- If the congestion is predictably wrong in the Day-ahead market, we should expect Virtual Bidders to enter the market to create counterflows and arbitrage away the difference
- SCE understands the "deployment scenarios" include the impact of Virtual Bids – and because of the systematic congestion, its is possible/likely the Virtual counterflows will make true deployment of IR infeasible (when the Virtual counterflows don't materialize in real-time)
    - Bottom line: If you want to be certain of IR feasibility, you have to perform procurement based on expected physical flows (not Virtual flows)

Imbalance Reserve – the RUC process

- Imbalance Reserve is a successor product to the current RUC product
  - RUC currently acquires capacity to 1) replace net Virtual supply, 2) clear based on CAISO load forecast, 3) procure additional capacity for uncertainty
  - IR simply moves #3 from the RUC process to the IFM (with some added bells and whistles)
- Like IR, RUC is also primarily a capacity product
- While RUC is procured nodally and models "energy flows", it is done **outside** of the IFM. As a result, it:
  - Doesn't impact congestion in the IFM
  - It models "flows" based on physical results by removing Virtuals, better ensuring feasibility
  - Doesn't create a (direct) arbitrage opportunity like IR because it is performed sequential to the IFM
- There is a strong argument to secure these "capacity-based" products outside of the IFM, rather than "pretending" they are "energy-based" products and including them in the energy/congestion IFM

Ideas for Moving Forward

- The CAISO proposal inappropriately increases costs, distorts the CRR process, and provides a false guarantee of IR "feasibility" - changes are warranted
- Alternative 1: Procure IR in the RUC process, rather than the IFM
  - The RUC process could procure and price two types of products – 1) traditional RUC, as well as 2) a second IR product as currently specified
  - Can be done nodally, and can be based on all physical flows and CAISO forecasts
  - Removes feasibility concerns create by Virtual bids since Virtuals are removed from the RUC process
  - Reduces/eliminates "phantom congestion", prevents price distortions/inflation on other products as the result of phantom congestion, and CRR distortions since IR "flows" are modeled sequentially to the IFM
- Improvement 1: If IR stays in the IFM, reduce the IR "flows" modeled in the "dispatch scenarios"
  - Instead of creating 1MW flow for every 1MW IR procure, only model a fraction of the flow
  - For example, only model .5MW of flow for every 1MW of capacity procured
    - This is more in line with expected dispatch, rather than maximum dispatch
    - Will better address the arbitrage problems with Virtual Bids in the CAISO's current formulation
  - Suggest this be a "tunable parameter" X ranging from 0 – 1
  - This may require scaling the "dispatch scenario" by X also to maintain power balance