SCED Mitigation Issues

IMM/ERCOT

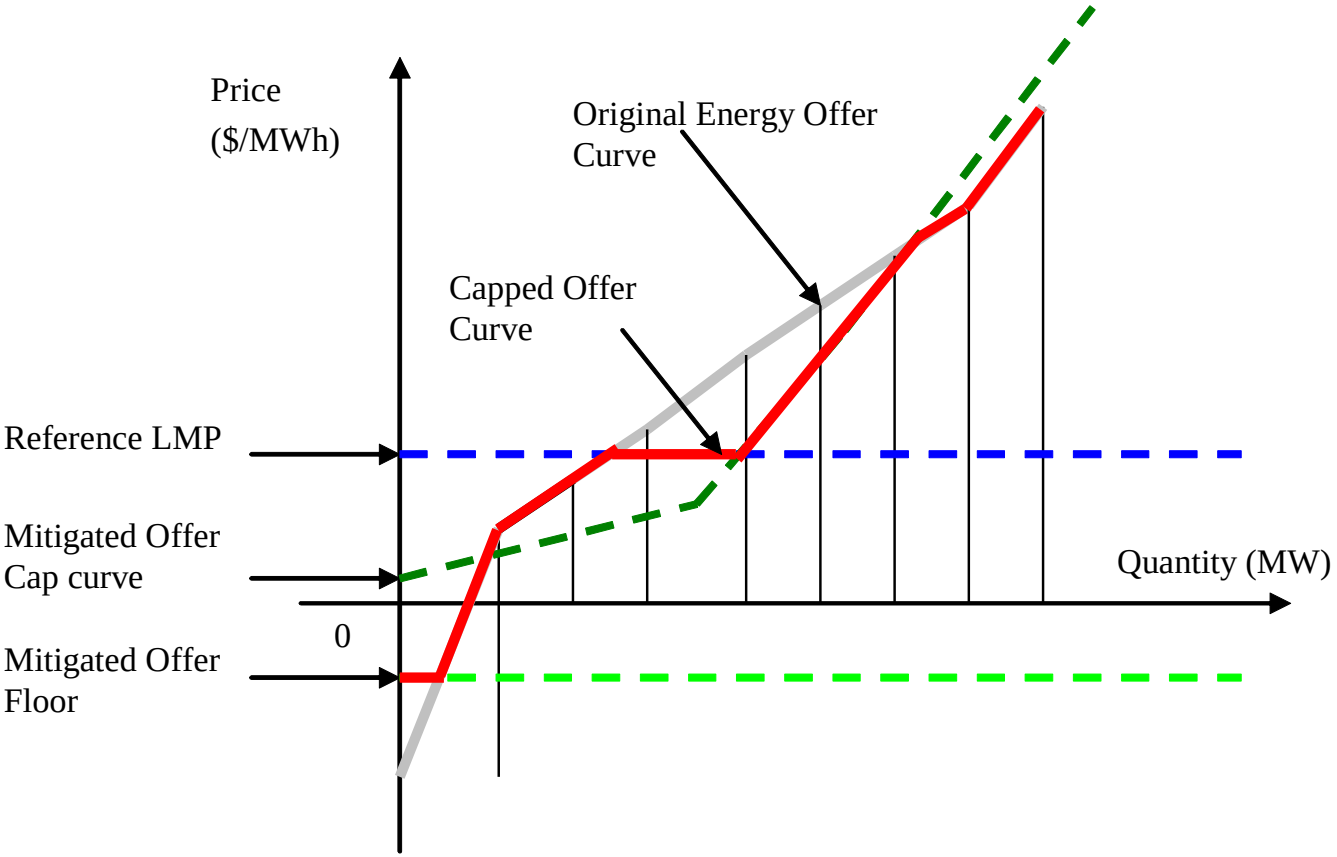
Current SCED 2-Step Process

- **STEP1** - Resolves competitive constraints using submitted energy offer curves to produce Reference LMPs

- **Prior to STEP2** – Irrespective of presence of non-competitive constraints, mitigate ALL online resources
  - Offer curve capped at Max(Ref LMP, Mitigated Offer Cap)
  - Offer curve bounded at Min(Ref LMP, Mitigated Offer Floor)

- **STEP2** – Resolves both competitive & non-competitive constraints using mitigated (capped/bounded) energy offer curve to produce Base Points and LMPs

Offer Mitigation

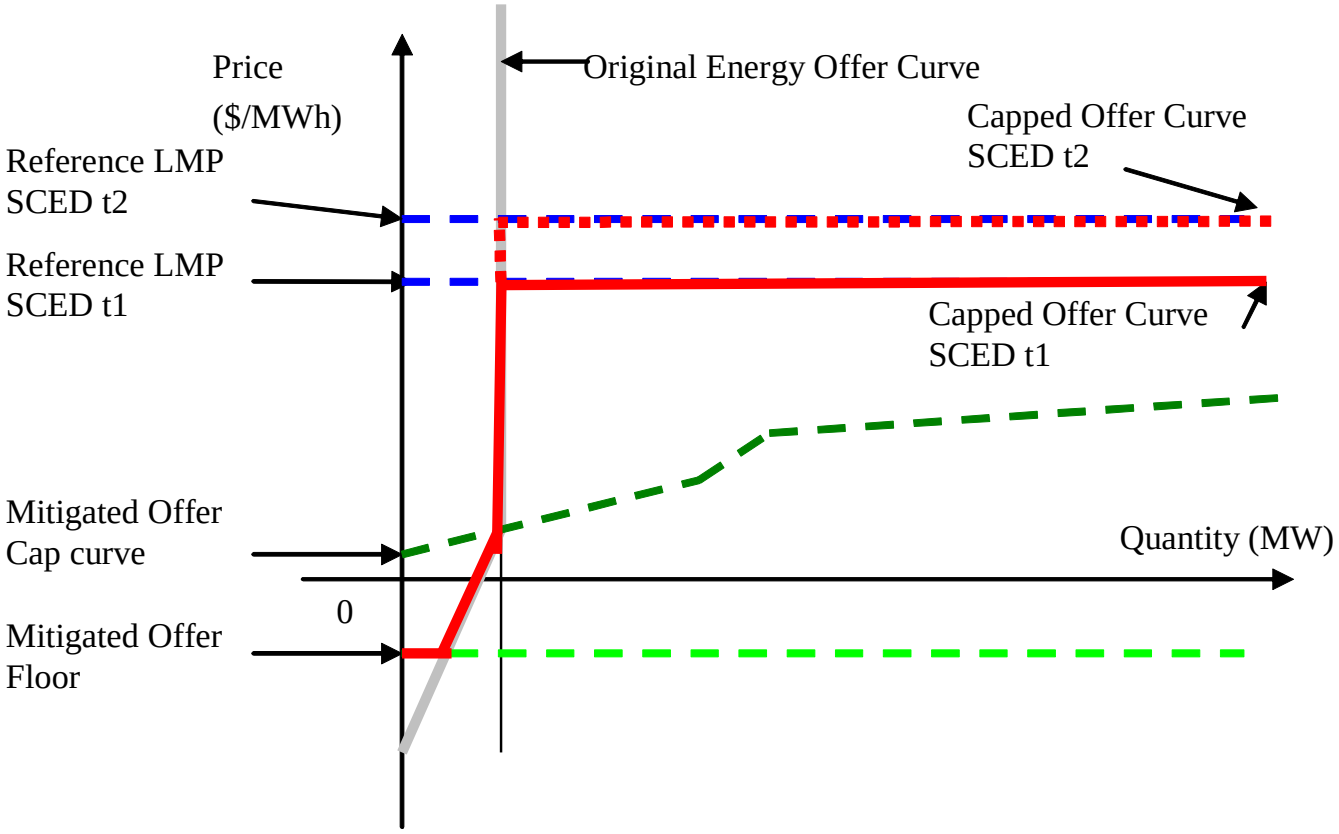


Over Mitigation Issue

Price for capacity being set by mitigated offer

- Mitigation is currently applied to ALL online resources irrespective of their impact to any active non-competitive constraint
- Resources that were economical and hence moved up in STEP1 could be moved down in STEP2 if they have positive Shift Factor to a non-competitive constraint. Resources having no impact on the non-competitive constraints could then be moved up based on their mitigated prices to meet power balance requirement in STEP2.
- Offer floors for NSPIN/RUC/RMR, QSGR offers and offers submitted based on Voluntary Mitigation Plan (VMP) could be uneconomical in STEP1 but could become economical in STEP2 and hence get dispatched at mitigated price
- **Potential Fix:** Only mitigate Resource that have significant impact to the active non-competitive constraint

Offer Mitigation



Over Mitigation Issue

Base Point Oscillation

- Marginal Resources could be moved around based on changes in system condition like drop in wind, unit tripping etc
- Offer floors for NSPIN/RUC/RMR, QSGR offers, offers submitted based on VMP increases the number of marginal Resources and hence more Resources are moved around
- When Reference LMP is higher than typical Mitigated offer cap, Resources with high submitted offers get mitigated at Reference LMP. Under tight system condition Reference LMP could change significantly between consecutive SCED runs causing the offers of these resources to move between economical and uneconomical with respect to other offer resulting in Base Point oscillation
- **Potential Fix :** Base Point oscillation could be minimized by reducing the set of Resources that are subject to mitigation

Tie Breaking Issue

QSGRs brought online when not needed by system

- "Tie breaking" logic – Even with no constraints, SCED prorates the energy awarded at Ref LMP in STEP1 to all online resources in STEP2 that have a mitigated price equal to Ref LMP
- When Ref LMP > typical mitigated offer cap, mitigation often results in lots of Resource offers at the same price (Ref LMP) in STEP2.
- All QSGRs operating with ON status (Protocol 3.8.3) may receive small, non-zero Base Points requiring them to come online at LSL when they are not really needed by system which in turn causes price depression
- **Potential Fix :** Eliminate multiple offers at same price
  - Cap EOC at max(MOC, Ref LMP + MOC* K1) instead of max(MOC, Ref LMP) where K1 is significantly small, e.g. 0.001
  - Issue: Multiple QSGRs in the same location with the same MOC can still see tie-breaking impact if their MOCs are same.

Proposed Solution

- Run CCT on activate constraint every 5 min to identify which constraints to be considered as competitive and which Resource to be mitigated
- Identify DMEs with negative-side-ECI greater than a threshold for an active non-competitive constraints as the DMEs to be mitigated (Threshold could be based on % of calculated ECI)
- For those DMEs, mitigate only those Resources with an impact contribution percentage for that DME greater than a threshold. (i.e. negative SF resources with (SF*HSL)/Sum(SF*HSL) > threshold)
- Mitigate based on Min[offer, Max(Ref LMP +K1*MOC, MOC)]
- Apply offer floor to all resources to address predatory pricing
- To prevent mitigation from switching between being applied and not being applied,
  - once a Resource is identified for mitigation, it will be mitigated for the rest of the operating hour
  - Any constraint deemed non-competitive during the operating hour will not be re-evaluated and will be considered non-competitive until the top of the next operating hour

Mitigation in other ISOs

	ERCOT	CAISO	ISO-NE	MISO
Day Ahead Energy	No	Yes	Yes	Yes
Hour Ahead Energy	N/A	Yes	N/A	N/A
Real Time Energy	Yes	Yes	Yes	Yes
RUC	No	No	Yes	No
Offer Caps	Yes	Yes	Yes	Yes
Physical Withholding Check/Prevention	No	Yes	Yes	Yes