Southern Company Energy Auction
Auction Clearing Methodology
(Phase II—Third Party Sellers)

Overview

The current version of the Energy Auction (Phase I) provides for multiple Bidders, but Offers are submitted only by Southern Company. In general terms, the Energy Auction clearing methodology stacks Bids in descending Bid Price order, stacks Offers in ascending Offer Price order, and establishes the Auction Clearing Price as the simulated crossover of the two curves (the "Curve Crossover"). Bids that are ineligible for matching due to applicable credit limits or other constraining factors such as linked offers and full bid match requirements can be identified and excluded from further consideration. Those Bids and Offers falling to the left of this simulated Curve Crossover can then be matched, with subsequent physical transactions entered into by Southern Company and the matched Bidders at the Auction Clearing Price.

In Phase II, third-party Sellers also will be able to submit Offers. If every Seller had an enabling agreement with every Buyer, and if there were no credit or legal considerations that could prohibit a particular Seller from conducting business with a particular Buyer (*i.e.*, counterparty blocking), then the existing stacking and clearing methodology, as described above, could continue to be utilized without modification. However, every Seller may not have an enabling contract with every Buyer. Moreover, it is likely that the amount of available credit for each Buyer will differ from Seller to Seller, and some Sellers and Buyers may be legally prohibited from transacting with one another. If these matching constraints are not considered within the Auction clearing methodology, then the Auction could match Buyers with Sellers that subsequently will be unable to enter into a physical transaction.

Southern Company, working with its software provider (OATI), has developed the following methodology to recognize such matching constraints with the objective of maximizing, to the extent practicable, the number of Bids and Offers that can be matched for a given Auction. As described more fully below, the methodology basically entails:

- An initial screening of all Bids and Offers in an effort to reject those that cannot be matched. (Step I – Initialization Screens)
- The calculation of the Auction Clearing Price and the identification of potentially winning Bids and Offers. (Step II – Pass 1)
- The identification of additional Bids and Offers that would be eligible to transact at the Auction Clearing Price but which failed to fall to the left of the Curve Crossover. These additional Bids and Offers are considered in the clearing process **IF** a higher priority Bid or Offer is eliminated. (Step II – Pass 1)
- An initial evaluation of potentially winning Bids and Offers taking into consideration Seller established credit, contract restrictions, and full-match stipulations. (Step III – Pass 2 – Transaction Matching)
- A second evaluation of the remaining Bids and Offers that were not matched in the initial evaluation process. (Step IV – Pass 3 – Attempt to Resolve Counterparty Matching Infeasibilities)

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Step I. Initialization Screens

1) Credit Screen

    a) Bidder Screen
       i) For each Bid Block,
          (1) Bid Block Credit Exposure = Bid Block Quantity * Bid Block Price.
       ii) Obtain Offerors' Available Credit for that Bidder.
       iii) Credit Screen
          (1) If Credit Exposure for the entire bid is greater than each of the Offerors' Available Credit, then that Bid will be disqualified.

    b) Offeror Screen
       i) Compare Offeror Available Credit with each Bidder's Credit Exposure.
       ii) If no Bidder is identified that meets that Offeror's Available Credit requirements, then that Offeror will be disqualified.

2) Contract Restriction Screen

    a) If a Bidder is not authorized to purchase from any Offeror, then that Bid will be disqualified.

    b) If none of the Bidders has been designated by an Offeror as an entity to which the Offeror can be matched, then that Offeror will be disqualified.

Step II. Pass 1

1) Obtain Auction Clearing Price

    a) Develop Initial Bid Stack Priority
       i) Bid Blocks will be ordered in Bid Price descending order, with secondary order being timestamp. This process is sometimes referred to as developing a demand curve.

    b) Develop Initial Offer Stack Priority
       i) Offer Blocks will be ordered in Offer Price ascending order, with secondary order being timestamp. This process is sometimes referred to as developing a supply curve.

    c) Identify Curve Crossover
       i) Defined as the point where the Bid Price of next Bid Block (as determined by the Initial Bid Stack Priority) is greater than the Offer price of the next Offer Block (as determined by the Initial Offer Stack Priority).

    d) Determine Auction Clearing Price
       i) Defined as the greater of the Offer Price of the last Offer Block prior to the Curve Crossover and the Bid Price of the Bid Block that established the Curve Crossover

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Step II. Pass 1 (cont'd)

2) Determine Set of Potentially Winning Bids/Offers

   a) The list of potentially winning Bid Blocks will comprise all Bid Blocks whose Bid Price is greater than or equal to the Auction Clearing Price. This may include some Bid Blocks whose Initial Bid Stack Priority is lower than that at the Curve Crossover.

   b) The list of potentially winning Offer Blocks will comprise all Offer Blocks whose Offer Price is less than or equal to the Auction Clearing Price. This may include some Offer Blocks whose Initial Offer Stack Priority is lower than that at the Curve Crossover.

   c) All other Bid and Offer Blocks will be marked as "Not Cleared" and excluded from further processing.
   i) *Note: In situations where an Offer Block has a dependent link that is not included in the list of potentially winning Blocks, the dependent Block not included in the potentially winning list is marked as "Not Cleared".*

   d) Calculate the credit exposure of the Bid Blocks associated with each entity represented in the list of potentially winning Bid Blocks against its credit with each entity represented in the list of potentially winning Offer Blocks.
   i) If the Credit Exposure exceeds the Available Credit that Bidder has with the Offeror, those Bid Blocks will be prevented from being matched with that Offeror as part of Step III.
   ii) Otherwise, those Bid Blocks will be available to be matched with that Offeror as part of Step III.

Step III. Pass 2 – Transaction Matching

1) Identify "Tentative" Matches

   a) Select the next Bid Block (*i.e.*, the Bid Block with the next highest Initial Bid Stack Priority).

   b) If there are no more available Bid Blocks, skip to Step IV.

   c) Select the next highest Offer Block(s) from the Offer Stack to find the quantity of Offer Blocks equal to the Bid Block. This may be one Offer Block, a portion of one Offer Block, or multiple Offer Blocks, depending upon the size of the requested Bid Block.
   i) If the full amount of the Bid Block is available in the Offer Stack to satisfy the Bid Block, then skip to Step III-2.
   ii) If there is an insufficient amount of Offer quantity in the Offer Stack to satisfy the entire Bid Block:
   (1) And the Bid Block is marked as "full match"
      (a) Proceed to Step III-4.
   (2) And the Bid Block is **not** marked as "full match"

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        (a) Reduce the Offer Block to the amount of available Bid Block quantity and proceed to Step III-2

2) <u>Validate Matches</u>

    a) If any of the Bidders that have been tentatively matched with the Offeror (identified in Step III-1) is unable to be matched with any of the Offer Blocks because of either counterparty blocking or credit violations (identified in Step II-2d):
        i) Initially, credit/counterparty blocking is resolved in favor of the Offer, so for the first instance of an Offer Block and Bid Block being constrained, place the associated Bid Block with such Bidder on the Temporary Infeasible List ("TIL")
        ii) If it is the second instance of an Offer Block being constrained, place the associated Offer Block on the TIL, then
        iii) Return to Step III-1b to find an amount of replacement Bid Block(s) from the remaining Bid Stack to fulfill the Offer Block.

        (1) Revalidate per Step III-2.

    b) If the last Offer Block considered is designated as a "full match" and was only partially matched in Step III-1c above, then proceed to Step III-3.

    c) Designate the Offer Block and Bid Block(s) as having a final match (*i.e.*, a status of "Cleared"):
        i) Decrement the Available Credit that each of the matched Bidders have with the Offeror by the calculated Bid Block Credit Exposure,
        ii) Decrement matched MWs from the Bid and Offer Blocks as appropriate, and
        iii) Return to Step III-1 for the next Offer Block.

3) <u>Full-Match Processing</u>

    a) Identify the reference "centric" for continued matching:
        i) If a Bid Block is the full-match, then a Bid-centric mode will be utilized
            (1) "counterstack" = Offer Stack.
        ii) If an Offer Block is the full-match, then an Offer-centric mode will be utilized
            (1) "counterstack" = Bid Stack.
    b) Select the next highest Block from the counterstack to meet the full-match requirement:
        i) If there are insufficient Blocks available in the counterstack to meet the MW requirement of the full-match, proceed to Step III-4.
        ii) If the Blocks selected from the counterstack are designated with a full-match requirement, return to Step III-3 (*i.e.*, switch from Offer-centric to Bid-centric or vice versa to perform a full-match evaluation on the counterstack Block),
        iii) If the MW from the counterstack do not contain a full-match requirement:
            (1) Mark the matches as "tentative".
            (2) Perform Step III-2 on this "tentative" match.
            (3) If the match is constrained (given Offeror constraints):
               (a) Place the affected counterstack MWs on the TIL.

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(b) Return to Step III-3b.

c) Mark all tentative matches as final (*i.e.*, a status of "Cleared"):

i)   Decrement credit as appropriate.

ii) Decrement matched MW from the Bid Blocks and Offer Blocks.

iii) Return to Step III-1 for the next Offer Block.

4) If the full-match cannot be satisfied:

a) Restore all "tentative" matches to their original state.

b) Place the offending "full-match" Block in the TIL.

c) Return to prior place in the evaluation and continue processing from previous spot.

Step IV. Pass 3 – Attempt to Resolve Counterparty Matching Infeasibilities

At this step, several possible combinations remain for un-matched Bid and Offer Blocks:

- Bid Blocks that were placed on the TIL,
- Offer Blocks that were placed on the TIL,
- Bid Blocks that were remaining after the Offer Stack was exhausted, and/or
- Offer Blocks that were remaining after the Bid Stack was exhausted.

1) The remaining Offer Blocks will assume their original Offer Stack Priority order relative to each other.

2) The remaining Bid Blocks will assume their original Bid Stack Priority order relative to each other.

3) A simplified form of Step III will be followed to determine if additional matches can be established.

a) Each Bid Block and Offer Block in the TIL ("Reference Blocks") will be individually evaluated against the available Blocks in the counterstack in their original Bid or Offer Stack Priority order ("Service Blocks").

i)   Reference Blocks will alternate between the next Bid Block in the TIL and the next Offer Block in the TIL; Service Blocks will be all the Blocks in the counterstack with respect to the Reference Block.

ii) Any Service Block that has a credit, counterparty blocking, or full-match constraint with the Reference Block is skipped and the next Service Block is considered.

iii) Service Blocks that are skipped or underutilized are not discarded but remain on the stack for evaluation with the next available Reference Block in the TIL.

b) Bid and Offer Blocks that are successfully matched will be marked as "Cleared".

4) Any Bid and Offer Blocks remaining after all Blocks have been evaluated will be marked as "Not Cleared".