CALIFORNIA ISO

California Independent
System Operator

Competitive Path Assessment

Market Surveillance Committee Meeting

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Prepared By

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Problem Statement

- Transmission path constraints in the network model used under MRTU are categorized in two groups, namely Competitive and Non-competitive Paths. The distinction is central to local market power mitigation (Pre-IFM Passes 1 and 2)
- A methodology is sought to determine competitive and non-competitive paths on a periodic basis
  - Short of a study, existing inter-zonal paths are deemed competitive and intra-zonal paths non-competitive
  - Study to update (or confirm the list) planned to be completed by Fall 2006.

Requested MSC Action

- MSC Opinion is requested on:
  - Relative merits and shortfalls of options (below) for competitive path assessment
  - MSC's recommendation for a competitive path assessment methodology suitable for CAISO
- Methodologies considered for competitive path assessment (described next):
  - PJM methodology
  - MISO methodology
  - CAISO methodology based on Residual Supply Index (RSI)

PJM Approach

- PJM uses the "Delivered Price Test" for competitive path assessment, involving a combination of three tests for each candidate interface:
  - Market share threshold test of 20%
  - Market concentration test (Herfindahl-Hirschman Index, HHI)
  - Pivotal supplier test (no three jointly pivotal suppliers)
- Need not necessarily pass all 3 test to be declared competitive
  - Passing the threshold and HHI tests is not enough
  - If fails "no 3-jointly pivotal suppliers" test, would consider "no 2 or 1 pivotal supplier" in combination with below threshold market share and HHI.
- PJM conducted and filed competitive path assessment in October 2004
  - Since the start of the PJM market, all PJM internal transmission interfaces except 3 were deemed uncompetitive and their congestion relief subject to "offer capping".
  - The October competitive path assessment considered 11 interfaces as potential candidates to be exempted from offer capping (including the 3 mentioned above)
  - The study resulted in one new competitive interface and confirmed the previous 3.

MISO Approach

- A Narrow Constrained Area (NCA) is designated by the MISO using a two-part test.
  - The transmission flowgate or flowgates that serve a common electrical area are expected to experience Binding Transmission Constraints for at least 500 unique hours during a given year.
  - There must be at least one supplier whose generation resources are pivotal in relieving congestion on one or more of these flowgates.
    - A supplier is pivotal when the supplier can cause or sustain a binding constraint even when its rivals' generating resources are fully redispatched to relieve the congestion
    - MISO treated each participant as a potential pivotal supplier and test whether the participant is pivotal on each of the flowgates being studied
- 121 candidate flowgates were analyzed.

CAISO RSI Approach

- Apply an RSI test on "effective" resources that can relieve congestion on a particular transmission path.
- If there are three or more suppliers that own effective resources and the RSI is determined to be greater than 1.2 for more than 95% of the time, the transmission path will be designated as "competitive".
- Issues that need to be addressed:
  - Quantifying the amount of "effective supply" available for providing congestion relief. This includes the choice of the proper sinks for determination of Generation Shift Factors
  - System conditions to incorporate into forward-looking assessment (load levels, hydro availability, congestion on one path affecting unit effectiveness in relieving congestion on another path).
  - Separate assessment of DA and RT?

Determination of Generator Shift Factors

- Pivotal analysis for competitive path assessment generally requires the determination and use of Generation Shift Factors
  - Generator shift factors are needed for this analysis only. They are not needed for operating and settling the LMP market.
  - A unit's "effectiveness" in relieving congestion on a particular path will depend on the designation of the energy sink.
  - The sink can be selected at any node or collection of nodes in the network.
  - The designation of the sink can impact the results of the analysis
  - Options
    - MISO-like Approach: Use all other generators as the sink.
    - PJM-like Approach: Use all load nodes as the sink (distributed load sink)
    - Designate the sink on a case by case basis depending on the transmission path being analyzed.

Issues to be Resolved

- Methodology for determining generator shift factors.
- Methodology for determining candidate paths to assess.
- Methodology for assessing competitiveness
  - CAISO RSI Approach
  - MISO Pivotal Analysis Approach
  - PJM Three-Part Test Approach (Market share, HHI, and RSI)
- Set of market conditions examined
  - Seasonal (e.g., monthly peak & off-peak)
  - Load scenarios
  - Hydro scenarios
- Treatment of imports (any analysis of potential pivotal importers?)
- Treatment of forward contracts
- Should the entities considered in pivotal analysis be the SCs or Generation Owners (if different)
- Is pivotal analysis a quantity measure (e.g., if the local supplier is not indispensable, but can raise its price many folds and still be more effective) or should it include consideration of effective costs?

Supplement – Feasibility Index Method

- Model all transmission constraints (except possibly those that are definitely known to be competitive) as soft constraints with high violation penalty
- Remove all resources of a supplier (i) and compute the following Feasibility Index for each path (j)

  $$FI(i,j) = (\text{Path j Limit} - \text{Path j Flow}) / (\text{Path j Limit})$$

- If $FI(i,j) < 0$, supplier i is deemed to be pivotal for congestion relief on path j
- If $FI(i,k) \geq 0$ for all suppliers i, then:
  - Path k is competitive with respect to "a single pivotal supplier" test
  - Choose the suppliers corresponding to the lowest FI for path k to carry out "jointly pivotal supplier" test to confirm or reject competitiveness of this path