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- Authority from Federal Energy Regulatory Commission (FERC) to implement an effective local market power mitigation (LMPM) mechanism is major motivation for CAISO market redesign
- California currently has the least stringent local market power mitigation mechanism of all markets currently operating in US
- Effective LMPM mechanism key component of a successful market design
  - PJM Local Market Power Mitigation (LMPM) mechanism is most stringent of those currently in place in US
    - Major reason for "superior performance" of PJM market
- LMPM mechanism must be integrated into energy and ancillary services market design
  - Significant risk of "unintended adverse consequences" from choosing LMPM without regard to how it best fits with market design

- In several recent decisions, FERC ordered changes to Residual Unit Commitment (RUC) process that substantially enhances ability of suppliers to raise RUC prices
  - Eliminates must-offer obligation on suppliers
  - Requires market-clearing prices for RUC capacity, not pay as-bid prices
  - Requires that suppliers keep RUC payment if dispatched for energy
- MSC believes that rather than run a separate RUC process, reliability constraints should be built into day-ahead market
  - Day-ahead market should be a reliability market not a financial market
  - Day-ahead market should yield best estimate of real-time system conditions as of day-ahead time horizon
- ISO's proposed day-ahead market design is a financial market
  - Allows major load-serving entities to submit "incredible" price-responsive demand bids
  - RUC process is then used to impose reliability constraints given schedules resulting from running day-ahead financial market

- MSC advocates integrating RUC constraints into day-ahead energy and ancillary services markets
  - Many reliability problems require more than hour-ahead time horizon to solve them in a least-cost manner
  - Rather than allow encourage "incredible" price responsive demand bids, deal with local market power of suppliers in day-ahead energy and ancillary services process through an effective LMPM mechanism
- ISO should procure ancillary services and energy in locations and quantities that it needs to operate system reliably in day-ahead market
  - If ISO operators need more ancillary services than Western Electricity Coordinating Council (WECC) minimums, they should purchase these amounts rather than use must-offer waiver denial process
    - Must-offer waiver denial process causes some suppliers to be paid for reserves, others are only paid minimum load commitment costs (MLCC)
    - By purchasing ancillary services and energy in day-ahead market in manner that reflects its locational needs, ISO can eliminate need for a RUC process

- Simultaneous integration of energy and ancillary services procurement process with LMPM mechanism to ensure consumers are not subject to unacceptable levels of local market power
  - Should yield lower overall energy costs to consumers and most reliable network than financial day-ahead energy and ancillary services markets followed by RUC market that procures to meet ISO's reliability constraints
- Major lesson from June 2000 to June 2001 is that day-ahead market should be a reliability market, not a financial market
  - Day-ahead, hour-ahead and real-time market should incorporate the ISO's best estimate of all relevant real-time operating constraints
  - Suppliers and load-serving entities (LSEs) have all time horizons longer than day-ahead horizon for financial transactions
- If day-ahead, hour-ahead, and real-time markets reflect all relevant operating constraints then there is a less need for virtual bidding
- No need to invest in software and other administrative costs to develop and operate RUC market

# **Automatic Mitigation Procedures (AMP)**

- System-wide automatic mitigation procedure (AMP) not worth potential market inefficiencies they creates in California
  - California is import-dependent and AMP mechanism not well-suited to imports
    - All proposals to implement AMP for imports discourages imports when California needs them most, which could create severe reliability problems
  - AMP mechanism sanctions the exercise of significant amounts market power without mitigation
    - If it doesn't violate conduct or impact thresholds, supplier escapes mitigation
  - AMP mechanism with accepted-bid reference levels may reduce volatility of prices but raise average prices
    - Accepted low-priced bids can reduce reference level, which makes it costly for a supplier to bid low during "competitive conditions"
- Hand system-wide market power problem through forward market procurement process
  - California Public Utilities Commission (CPUC) procurement process that relies on a contract adequacy (rather than generation adequacy) approach to energy procurement limits incentives for suppliers to exercise system-wide market power in the short-term energy and ancillary services markets

### Contract Adequacy not Generation Adequacy

- Seller of 500 MWh **fixed-price** forward contract is net buyer of electricity until it purchases 500 MWh from spot market or produces 500 MWh from its own generation units
  - Seller of forward contract only earns spot price on production in excess of contract quantity
    - Reduces incentive for supplier to bid to raise spot market price
  - Knowledge that other suppliers have forward contract obligations implies more aggressive spot market bidding by all suppliers
    - Greater concern about being under-bid by competitors
  - Contract adequacy limits exposure of LSEs to spot prices
- Contract adequacy implies buying forward financial commitments that clear against spot prices at locations where LSE withdraws energy from the network
  - All market participants (suppliers and LSEs) have a strong incentive to find leastcost energy and ancillary services mix from short-term markets
- Strong empirical relationship between level and volatility of spot prices and amount of forward contracting
  - Australian experience of early 2001

### Local AMP

Local AMP falls prey to the same problems as system-wide AMP

- Local AMP has lower thresholds for conduct, \$10/MWh or 20 percent of default energy bid, but opportunities to exercise local market power are far more frequent
- Cost-based default bids is a step in positive direction, but allowing a 10 percent adder unnecessarily distorts dispatch and locational prices
  - If all other suppliers bidding their minimum variable cost and this supplier's bid has a 10 percent adder other units will be overused relative to mitigated unit
- MSC recommends that cost-based default bid should be computed based on information that supplier cannot impact through it own decisions
  - Natural gas price = Henry Hub natural gas price plus transportation charge
  - Variable O&M costs from similar units in and outside of California
- Computing default bid in this manner provides strong incentives for suppliers to reduce their variable costs
  - Removes incentives to increase costs similar to those provided by "soft price cap" during January to June 2001 time period
  - Any additional cost recovery for mitigated units should be provided through fixed payments that do not distort LMPs and therefore the dispatch of units throughout the control area

#### Contract Adequacy on Local Market Power

- Contract adequacy approach typically does not limit local market power of suppliers
  - The lack of effective competition to serve load at a given location in the network occurs at virtually all time horizons to delivery
  - Very difficult to predict in advance when and how much local market power a supplier will
    possess and for how long
    - Depends on level of local demand, configuration of transmission network, operating behavior of other suppliers, extent to which consumers respond to real-time wholesale prices
- Supplier located in downtown San Francisco can raise prices substantially at all virtually time horizons to delivery and still not trigger new entry of generation
  - Contestability of market for new generation capacity at system-wide level which implies that buying forward is an effective way to limit system-wide spot market power does not work
- Supplier located in a region served by a transmission line that is out for a sustained period of time can exercise a substantial amount of local market power before the line is repaired and sufficient competition at that location exists
- A prospective LMPM mechanism that pre-commits to mitigate the bids of a supplier under all conditions that it is deemed to possess substantial local market power is necessary to solve these problems
  - If the system conditions when a supplier is deemed to possess substantial local market power are clearly defined, then both suppliers and LSEs can estimate the opportunity cost of the supplier signing a forward contract (i.e., selling into the spot market)
  - Forward contractual arrangements between local generation and LSEs that do not reflect the expected exercise of local market power can then be signed with effective LMPM mechanism in place
  - Absent an effective LMPM mechanism all forward contracts an LSE might sign require consumers to "pay for local market power on the installment plan"

### **Designing a LMPM Mechanism**

- LMPM mechanism should apply to energy and ancillary services
  - Focus replicating competitive market outcomes when there is insufficient competition to rely on market mechanism
- Default bids should estimate a competitive bid
  - Separate revenue adequacy for unit from desire for efficient pricing and dispatch of generation units
  - Default bids higher than minimum variable cost of supply sanctions exercise of market power by unit owner
- LMPM mechanism should contain three components
  - Determining system conditions when a supplier possesses significant local market power
    - Don't require supplier to exercise significant market power to be mitigated as is the case with AMP
  - Determining how supplier is paid when it is mitigated
    - Can pay supplier more than LMP at unit's location, but don't distort LMPs and dispatch of generation to do it
  - How market prices are computed accounting for mitigation process

### **Design of LMPM Mechanism**

- A number possible approaches to determining when a supplier possesses substantial local market power
- Approach used in PJM requires making distinction between competitive and non-competitive network constraints to determine which units to mitigate
  - Two passes in dispatch process to determine LMPs
    - First pass determines which units are mitigated based on those taken to resolve noncompetitive constraints
    - Second pass determines LMPs with cost-based default energy bids for mitigated units
- All units with substantial local market power should be mitigated
  - Several ways to do accomplish this
    - Default energy bids based on cost estimates outside of unit owner's control
    - Unit owner required to be price-taker for needed quantity of energy
- Run market pricing mechanism with mitigated bids in place of actual bids to set LMPs
- Proposed LMPM mechanism uses RMR units and non-RMR units
  - Unclear why RMR contracts needed if all units subject to LMPM
  - Two types of units—Suppliers elect status on yearly basis
    - Cost-based units guaranteed full cost recovery with default bid at variable cost
    - Market-based units subject to LMPM mechanism but no make whole payment
  - Electing to be cost-based has risk that if ISO does not need unit for reliability reasons, it must be retired or auctioned off

### LMPM Mechanism

- LMPM mechanism should be integrated with overall market design
- Offering FERC list of options to choose from increases risk of "unintended adverse consequences"
- Without an stringent LMPM mechanism integrated into overall market design, California is unlikely to realize significant benefits from adoption of LMP market, even if seller's choice contract problem is solved
- Integration of reliability must-run unit designations process with LMPM mechanism has potential for significant savings to California consumers



# **Other MSC Activities**

- Preparing opinion on design of resource adequacy process in California market
  - Problems with capacity markets and capacity payments in other markets
  - Alternative mechanisms for ensuring California load is met at least cost to consumers
  - Mechanisms for fostering symmetric treatment of load and generation in California market