Session 7:
Market Power Issues

RTO West Market Monitoring Workshop

Portland, Oregon

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RTO West Market Monitoring Workshop

Session 1: Market Monitoring: Why

Session 2: Who Will Monitor; the RTO's Role

Session 3: Organization and Governance of Monitoring

Session 4: Monitoring Tasks and Process

Session 5: Authority to Address Problems

Session 6: Access to, Disclosure of Sensitive Information

➔ **Session 7: Market Power Issues**

Scope and Focus of Session 7

- Define market power, discuss how it is analyzed in competitive wholesale electricity markets
- Approval of market-based rates for participants in RTO West's markets: what market power analyses are needed, how identified market power can be addressed up-front
- Analysis of restructured wholesale electricity markets: approaches used by market monitors
  - Principles for determining when a market monitor should act to mitigate market power
  - Approaches to market power mitigation

What Is Market Power?

Market power is the ability of a supplier (or group of suppliers acting in concert) to profitably raise market prices above competitive levels.

- It must be *profitable;* otherwise suppliers won't do it. It will be profitable only if the increased profit on a supplier's remaining output is greater than the lost profit due to reduced sales.
- The opportunity must be s*ustainable* or recur with some regularity to raise a public policy concern. If other suppliers can expand output and drive prices back down to competitive levels, the attempt to exercise market power will be thwarted.

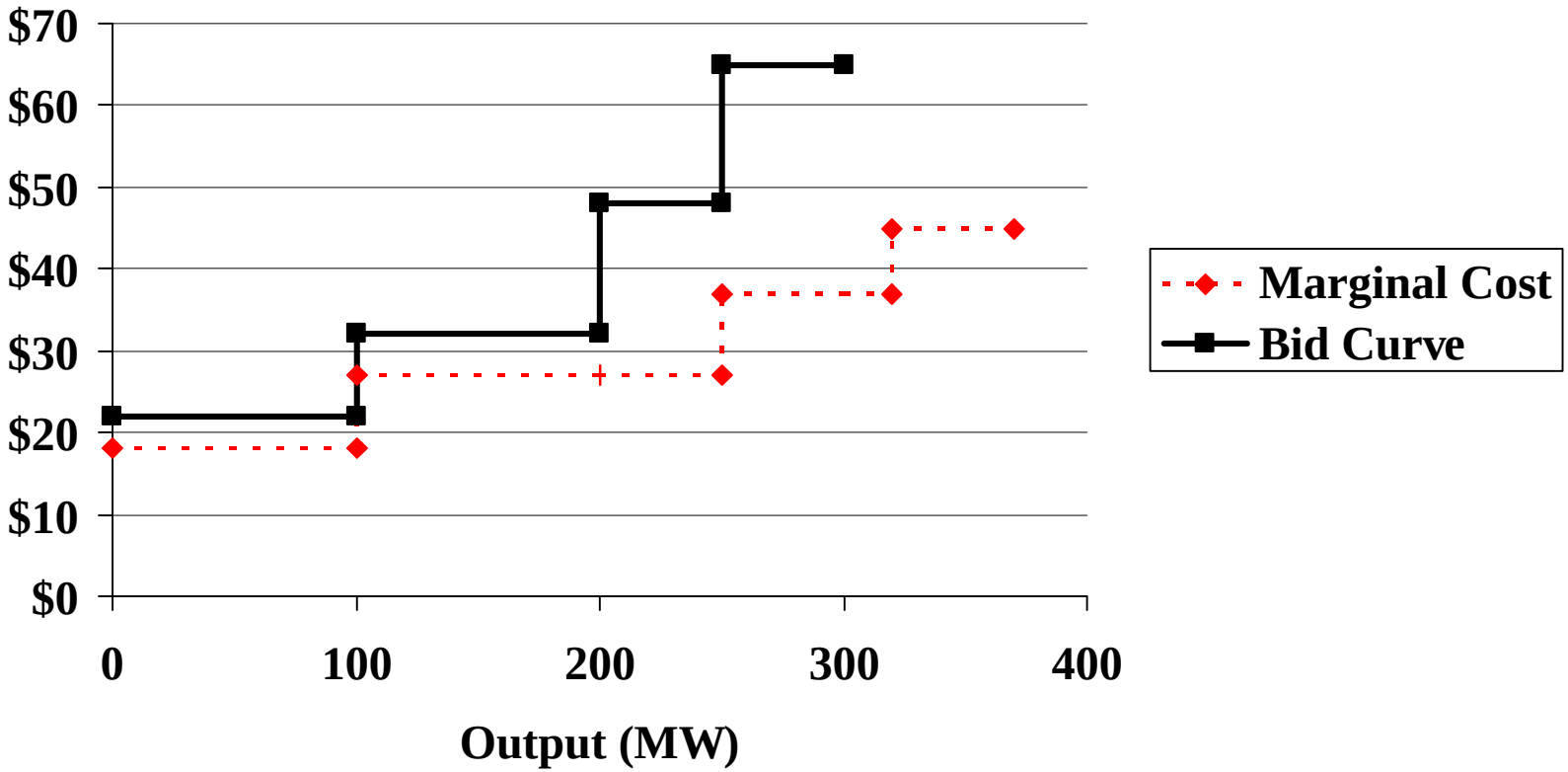
Types of Market Power

- "Horizontal market power" (defined on previous slide)
- "Vertical market power" is really horizontal market power exercised "vertically" (to benefit affiliates in upstream or downstream industry segments). For example, horizontal market power in transmission used to favor affiliated competitive generation.
- "Locational market power" is horizontal market power that exists during times when transmission constraints shrink the geographic scope of competition. At such times, the output of one or a few generators may be needed to meet local loads or for voltage support or reactive power.

How Market Power Is Exercised

- *Physical withholding* of available capacity, so other, more expensive output must be used, raising the market price
- *Economic withholding* of available capacity by bidding it at prices above costs, to withhold it or set a high market price
- *Uneconomic production* from available capacity, by selling it into one market as a means of withholding it from another. Or, to cause and benefit from transmission congestion.

How Market Power Is Exercised: Withholding or Bidding Up Capacity



Gaming, Market Design Flaws, and Market Power

- *Gaming* is taking advantage of market design weaknesses. It may involve many other types of conduct, and opportunities for gaming may be available to participants that lack market power.
- Market design weaknesses can create "artificial" market power that would not exist in a corrected market design. Where design flaws have been implicated, FERC and ISOs have consistently focused on the design flaws, not the resulting conduct.

How Is Market Power Evaluated?

- *Ex ante analyses:* What is the Potential For Market Power? Used to analyze hypothetical market conditions.
  - Evaluate the potential market power of an applicant for market-based rates
  - Evaluate the potential impact on competition of a merger or asset sale
- *Ex post analyses:* Do Market Prices and Supplier Bidding Strategies Reflect Exercise of Market Power? Used to analyze actual, "going" markets

Approaches Used In Ex Ante And Ex Post Market Power Analyses

- Ex ante analyses often rely on structural measures or market simulation
  - Market shares: is one supplier dominant?
  - Concentration ratios: is the industry concentrated?
  - Simulation: can supplier(s) withhold or bid up output profitably?
- Ex post analyses examine market results for evidence
  - Bids, prices compared to short-run marginal costs: are suppliers withholding or marking up their bids?
  - Relate other actions to market results: Is transmission being manipulated to increase prices or foreclose competition?

Ex Ante Analyses of Market Power: Traditional Approaches (DOJ, FERC)

- Identify "relevant markets"
  - Product dimension, geographic dimension
  - Include all products considered good substitutes by buyers
- Evaluate competitive conditions in each relevant market
  - Identify all competing suppliers
  - Apply concentration measures, screens
- Check for any barriers to entry
- Simulation of markets and bidding strategies is also increasingly used to analyze competitive conditions.

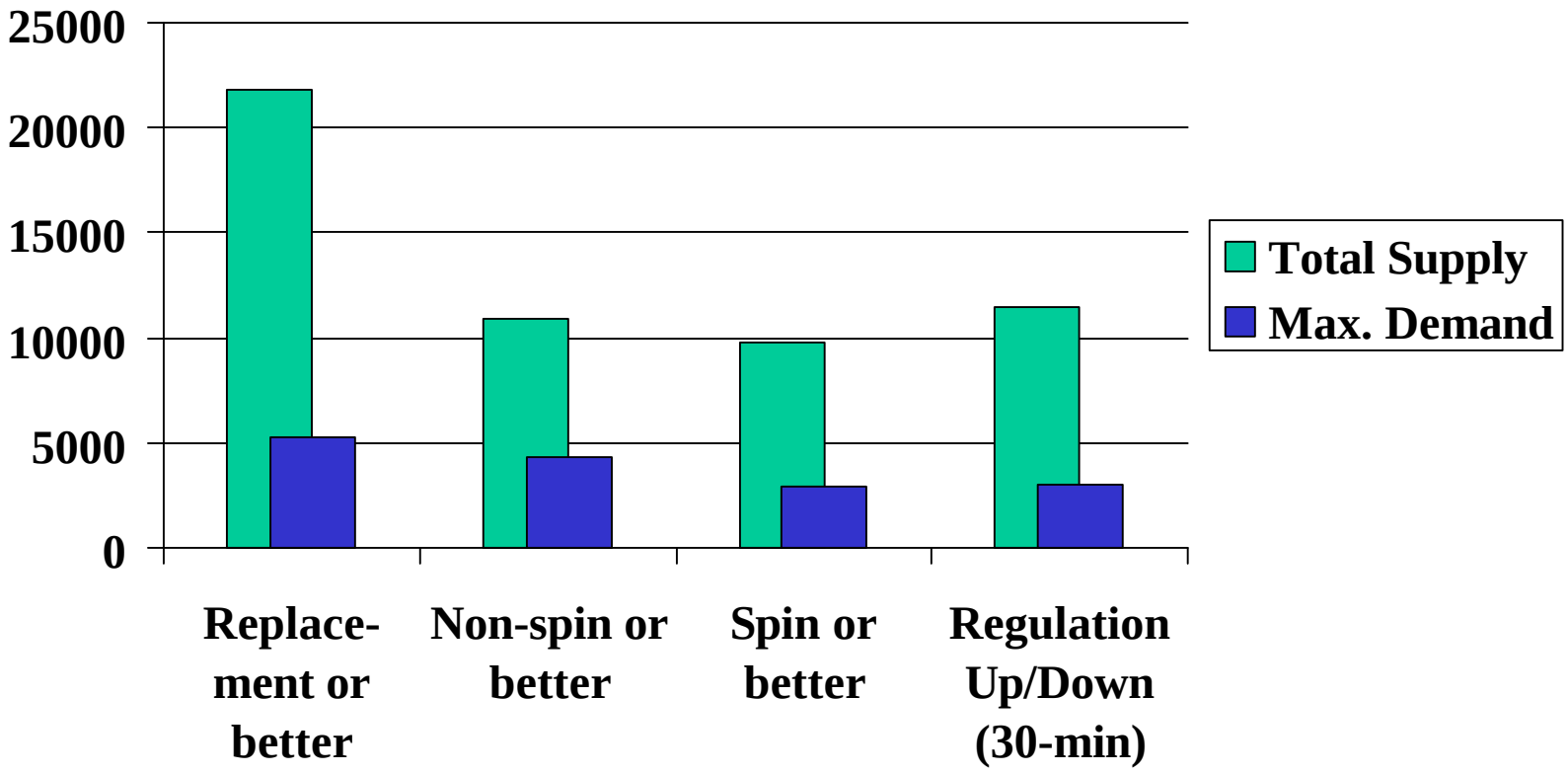
Analysis of Energy and A/S Markets Is Complex Because the Markets Are Highly Interrelated

- Regulation and reserves provide similar services (the ability to respond to contingencies over varying time frames); therefore they are substitutes in consumption
  - Various combinations of the defined A/S can provide the necessary responsiveness to maintain balance and reliability; "rational buyer" procurement rules
- The same generating capacity and interruptible loads can provide energy and all or many A/S, so these products are also substitutes in production.
- The total demand for energy and A/S must be met simultaneously by available capacity

FERC's Screens For Market-Based Rates

- To authorize market-based rates, FERC requires a showing that a seller lacks market power or that any market power is adequately mitigated.
- Energy, capacity: market based rates are generally approved if a seller's market share does not exceed 20% (not a bright line test, and higher shares have been approved)
- Ancillary services: Because total available capacity to provide ancillary services may exceed the market requirement by a large ratio, higher market shares have been approved (NY: 51%)

California ISO-Controlled Grid A/S Supply and Demand (MW)



Competitive Conditions in Ancillary Services Markets Contrasted to Energy/Capacity Markets

	Energy, Capacity	**Ancillary Services**
Concen-tration:	Reflects # utilities, divestiture, strength of grid, etc.	A/S often more concentrated, as not all plants provide them
Ratio of capacity to peak dmd:	Result of past planning to meet reserve margin target; typically 110-130%	A/S capability not planned to just meet demand; ratio of capacity to A/S demand often 150%-400%
Cost of entry:	Entry cost is generally cost of new capacity; loads may also provide capacity.	Entry cost can be lower. AGC can be added for ~$100K; plants can be modified to reduce min loads; loads can offer A/S, etc.
Market Power Screens:	FERC uses 20-25% market share and 1800 HHI.	Common high ratio of supply to demand allows higher shares. FERC has approved 50% share.

Market-Based Rates and Locational Market Power

- Locational market power circumstances are identified in market-based rates filings, and specific mitigation measures are proposed if not already in place in ISO rules.
- Structural approaches generally can't help (lumpy assets in smallish load pockets)
- PJM, NY, NE: bid cap approaches are used
- CA: Reliability must-run contracts were imposed; a bid cap approach may be implemented with the congestion reforms

Design Goals for Local Market Power Mitigation

- Observe all reliability constraints
- Protect consumers from material exercise of market power
- Use market mechanisms and get prices right to the extent feasible (gives hope of efficient entry to alleviate problem)
- Don’t distort bidding in competitive hours, or in adjacent, competitive areas
- Apply least restrictive, effective mitigation, ideally limited to presence of local market power

Participants in RTO West's Bid-Based Markets Must Prepare Market Power Analyses

- To be authorized to sell into RTO West's imbalance, congestion, and ancillary services markets and receive market-based rates, participants will have to file market power analyses.
- If competitive problems are identified in the market power analyses, mitigation will have to be proposed.
- The California experience shows that markets can be seriously distorted if some sellers have market-based rates while others operate under cost-based rates for some products.

Market Power Mitigation For Market-Based Rates: Experience Elsewhere

- California: Market power studies concluded that utilities may possess market power. Mitigation measures included divestiture, reliability must-run contracts for local market power, market monitoring. The stranded cost recovery mechanism and obligation to buy and sell through PX were recognized as also mitigating utility incentive to exercise market power.
- Ontario: A market power mitigation agreement was negotiated between Ontario Power Generation and the province involving a limit on average price earned, a time schedule to reduce control of capacity (divest, lease, etc).

Alternatives For Addressing Competitive Problems

- There are many approaches to mitigating potential horizontal market power to allow approval of market-based rates. Approaches are designed to reduce the *ability* and/or *incentive* to exercise market power.
  - Structural approaches: Divestiture, long-term leasing, or contracting away capacity (transfer of bidding control over a facility to another entity)
  - Financial contracts ("contracts for differences"); purely financial, reduce incentive without reducing control
  - Contractual agreement with RTO (e.g., reliability must-run)
  - Bid caps and requirement to bid available capacity

A/S Markets Can Be Expected To Become Increasingly Competitive Over Time

- Market rules will improve, markets will be more efficient
- Participants will likely have additional ways to buy A/S (self-supply, multiple trading forums)
- Demand for A/S will decline as RTOs learn to maintain reliability with less of them and market becomes more price-responsive
- Loads will increasingly be able to provide ancillaries (NZ experience)
- Supply will also expand; most new plants have AGC

Market Power Issues For Approval of Market-Based Rates: Discussion

Analysis of Market Power in Restructured Wholesale Electricity Markets

Potential Problems in Restructured Wholesale Markets, and Approaches To Their Mitigation

- Potential for discriminatory treatment by transmission owner or control area operator: Transfer of control to RTO
- Local market power due to transmission constraints: Bid caps and obligation to bid; or contracts
- Market power during peak demand hours when nearly all capacity must be used: High price caps (PJM: $1,000)
- Market power in reactive power, voltage support, etc.: Market-based rates not requested.
- Other market power problems in energy or A/S markets: ISO authority under market monitoring plan (varies).

Monitoring Plans Typically Define What The Monitor Is Watching For In Vague Terms

Quotes taken from market monitoring plans:

- conduct that substantially distorts *competitive outcomes*
- conduct substantially inconsistent with *competitive conduct*
- attempts to *restrain competition*
- actual or potential *abuse of market power*
- taking *unfair advantage* of the rules
- *anomalous market behavior* that may be detrimental to the efficient and *workably competitive* operation of the markets

Traditional FERC and DOJ Approaches to Market Power Analysis Provide Little Guidance

- The old needs: section 203 and 205 filings; structural analyses of hypothetical future market circumstances; market shares, HHIs
- The new needs: analysis of going competitive markets
  - Review complex multi-market pricing, bidding patterns
  - Identify causes, problems and solutions
- Are DOJ merger guidelines applicable?
  - Focus is on impact on competition of changes in the market
  - The 5% threshold is for market definition; it is not a threshold for acceptable market power

What Constitutes an "Abuse of Market Power" in the Electric Power Industry?

- Meaning of "abuse of market power" in antitrust:
  - attempt to restrict or harm competition (illegal)
  - withholding or setting high prices is <u>not</u> illegal or an abuse of market power (and attracts rather than harms competition)
- NYISO uses the term to refer to withholding that exceeds a specific threshold and has a material impact on a market price *in a single hour*
- The more relevant question is: when does exercise of market power warrant action to mitigate it? [What would it take for FERC to threaten to revoke market-based rates?]

Summary Of Data And Indices Used By Market Monitors

Market results and performance

- market-clearing prices and quantities; various comparisons
- transmission congestion and its causes
- market supply curves; prices compared to least cost dispatch
- analysis of market structure

Participant behavior

- bidding strategies: price, quantity, other bid components
- unit and company supply curves, bid mark-up; comparisons
- bid changes, deviations in actual generation
- outages

[Replace slide with list of data and indices]

Where the Rubber Hits the Road: Screens or Criteria Leading to Action

"Screens" are quantitative tests that are increasingly used for making important determinations under ISO tariffs and market monitoring plans

Screen = a measure or index

plus a trigger or threshold value of the index

Advantages of using screens:

- Objective test, agreed/approved in advance
- Reduces uncertainty and RTO discretion

In Defining Screens, Monitors Lack FERC Guidance, Useful Precedents, Stakeholder Consensus

- There is very little relevant guidance from FERC practices and precedents as to the right principles and thresholds (NYISO was a first).
- Analogous practices in other industries are also of limited application (electricity is different)
  - Securities monitoring? Natural gas industry? Others?
- There is a wide range of stakeholder views on principles, thresholds (SRMC? LRMC?)

Examples of Screens Linked to Specific Authority Under ISO Tariffs or MM Plans

- Market power conduct and materiality screens and thresholds leading to mitigation authority (NYISO)
- "Workable competition" screens determining need for price caps, or creation of new pricing zones (CAISO)
- Market structure and bid price screens leading to bid caps under circumstances of transmission constraints (ISO-NE)
- Screens and thresholds to determine need for review of prices (NYISO - recently proposed by Member Systems)
- Market structure and conduct screens to determine need for local market power mitigation (CAISO - under discussion)

Example of Market Power Screens in Operation: The NYISO's Market Power Thresholds

- FERC has recently approved specific market power thresholds leading to authority to impose pre-approved, prospective mitigation. This is unprecedented.
- Conduct (physical or economic withholding) must exceed a threshold, and its impact on price must exceed a materiality threshold. Mitigation is imposed if participant fails to explain conduct to NYISO's satisfaction.
  - Economic withholding: default bid (based on average of past bids) may be imposed for up to 6 months.
  - Physical withholding: penalty equal to quantity withheld times market price may be imposed.

FERC-Approved NYISO Market Power Thresholds

Physical Withholding:	Withhold 10% or 100 MW of unit's capability. Withhold 5% or 200 MW of bidding entity's capability.
Economic Withholding:	Energy bid exceeds "reference level" (average of past bids over 90 days) by 300% or $100/MWH. Spinning reserve bid exceeds "reference level" by 300% or $50/MWH.
Material Impact:	The conduct results in a 200% or $100/MWH increase in any market price (impact determined using NYISO models).

The NYISO Screens Do Not Accurately Distinguish Conduct That Should Raise Concerns

Bid Price Increase	Does the economic withholding exceed the threshold? NYISO Screen:
Energy bid $130 compared to reference level bid of $35 (90-day average)	**"NO"**
Spinning reserve bid $2.10 compared to reference level bid of $0.50 (90-day average)	**"YES"** (300% threshold)

The NYISO Material Impact Screen Ignores Quantity and Duration of Impact

Price Impact of Conduct	Is the impact material? NYISO Screen:
Increase in energy price from $50 to $140, all hours for 30 days, load averages 10,000 MW.	**"NO"** (impact = $648 million, 180% increase in monthly bill)
Increase in spinning reserve price from $1.00 to $3.10 in 1 hour, requirement 500 MW (5% of 10,000 MW).	**"YES"** (200% threshold) (impact = $1050, less than .001% increase in monthly bill)

The NYISO Screens and Mitigation Have A Discriminatory Impact on Smaller Participants

	Smaller supplier (200 MW):	Larger supplier (2,000 MW):
Quantity withheld:	100 MW; price increases $30-> $50	
Exceeds threshold?	**"YES"** (> 5%)	**"NO"**
Withhold penalty	$5,000 (100 MW x $50)	
Profit from w/holding, if no penalty (MC=$20)	$1,000	$37,000
Profit from w/holding, if penalty imposed	**$4,000 loss**	**$32,000 profit**

Market Power Numeric Thresholds: A Feasible Goal?

There are many factors to consider before concluding that any conduct warrants mitigation:

- Was the conduct a deliberate attempt to increase price? Other explanations for bidding strategy?
- Was the impact material? Is it likely to be in the future?
- Are prices above long-run entry prices? If not, is a higher tolerance for market power appropriate?
- What mitigation alternatives are available? What would be the impact of imposing each?
  - Default bids can lead to inefficient operation
  - An unprofitable plant, if mitigated, might shut down
  - etc.

What Constitutes a "Material" Impact?

- Materiality thresholds are appropriate
  - Changes to rules impose costs, create uncertainty, raise fairness issues, and can lead to new, unforeseen problems.
  - Mitigation measures can have negative impacts, both on the participant and on the market generally.
- Impacts on efficiency or cost to consumers (transfers of wealth) can be of concern
  - Price impact, duration/frequency, quantity matter
  - Dollars, not percents, hurt
  - A single hour event is unlikely to be material

Indices, Screens and Mitigation: Summary of Observations and Conclusions

- Market monitors are struggling to develop new techniques for analyzing market performance and participant conduct in the new electric energy and ancillary services markets.
- There is a lack of clarity on some fundamental issues
  - What are the bounds of acceptable conduct?
  - Is SRMC or LRMC the proper focus?
  - What constitutes a material impact?
- No consensus among stakeholders; little guidance (and much flexibility) from FERC

Market Power Issues in Restructured Electricity Markets: Discussion