ENERGY LAW JOURNAL

Volume 23, No. 2 2002

COMPETITION IN WHOLESALE ELECTRIC POWER MARKETS

Peter Fox-Penner[*]
Gary Taylor
Romkaew Broehm
James Bohn

I. INTRODUCTION AND SUMMARY

For almost seventy years, the Federal Power Act (FPA) has required the Federal Energy Regulatory Commission (FERC or Commission) and its predecessor to allow wholesale or bulk power sales only at rates that are "just and reasonable" (J&R).[1] Until just under ten years ago, virtually all sales were made at traditional cost-of-service rates or via cost-based formulas. Since then, the Commission has allowed sellers to sell at "market-based rates" (MBRs) on the condition that sellers could demonstrate that they did not have any market power. In brief, the Commission requires that sellers demonstrate that they do not "dominate" (have undue market power) in generation, do not dominate transmission, and cannot impose barriers to entry.[2]

On November 20, 2001, the FERC issued two orders that together constitute a dramatic new approach to MBRs. The first order concerned a new enforcement process under section 206 of the FPA.[3] In that order, the Commission began the process of conditioning MBR authority and making market rate sales subject to retroactive refunds. The Commission also ordered that all MBR tariffs be revised to include a prohibition against anticompetitive behavior and the exercise of market power.[4] The Commission stated that its definition of impermissible market power consisted of two kinds of withholding, physical and economic:

---

* Dr. Bohn is an Associate and Dr. Broehm a Senior Associate with *The Brattle Group*. Dr. Fox-Penner is a Principal and the Chairman of *The Brattle Group*. Mr. Taylor is a Principal of *The Brattle Group*. We also thank Earle O'Donnell, Carl Coscia, Metin Celebi, Bill Dudley, Mac Norton, Ed Comer, Philip Hanser, Tim McClive, Marius Schwartz, Tim Brennan, Diana Moss and Jerry Pfeffer for their input. All errors and views are the authors' alone and do not necessarily represent the views of *The Brattle Group* or its clients.

1. 16 U.S.C. § 824(d) (Supp. II 2002).

2. *See generally Louisville Gas & Elec. Co.*, 62 F.E.R.C. ¶ 61,016 (1993); *Entergy Servs., Inc.*, 58 F.E.R.C. ¶ 61,234 (1992); *Entergy Servs., Inc.*, 60 F.E.R.C. ¶ 61,168 (1992).

3. *Investigation of Terms and Conditions of Public Utility Market-Based Rate Authorizations*, 97 F.E.R.C. ¶ 61,220 (2001) [hereinafter *Investigation*].

4. *Id.* at 61,977.

> Anticompetitive behavior or exercises of market power include behavior that raises the market price through physical or economic withholding of supplies. Such behavior may involve an individual supplier withholding supplies, or a group of suppliers jointly colluding to do so. Physical withholding occurs when a supplier fails to offer its output to the market during periods when the market price exceeds the supplier's full incremental costs .... Economic withholding occurs when a supplier offers output to the market at a price that is above both its full incremental costs and the market price (and thus, the output is not sold) .... Withholding supplies can also occur when a seller is able to erect barriers to entry that limit or prevent others from offering supplies to the market or that raise the costs of other suppliers.[5]

In the second order, the Commission discarded the test previously used to pre-approve sellers to offer market-based rates, the so-called "hub-and-spoke" test.[6] For sales within Independent System Operators (ISOs) or Regional Transmission Organizations (RTOs) with Commission approved market monitoring and mitigation procedures, the Commission *eliminated* any preapproval test for MBRs.[7] The Commission, however, requires a Supply Margin Assessment (SMA) analysis within an ISO or RTO without approved market monitoring and mitigation.[8] In those regions, the Commission chose instead to rely entirely on monitoring and *ex-post* enforcement using ISO/RTO Market Monitoring Units (MMUs) within these organizations and their complaint procedures, which are generally *ex-post*.[9] In other regions of the U.S., the Commission adopted the SMA test. In addition, the Commission held that sellers who did not pass the test would automatically be denied market rate authority in the relevant market and would instead be required to sell all surplus power under a traditional cost-based approach known as "split-the-savings" rates.[10] The Commission also ordered changes in interconnection and transmission evaluation procedures.[11]

The past and proposed MBR processes are illustrated schematically in Figure 1. The new approach is two enforcement frameworks layered atop one another. The first layer is the SMA framework, with its radically different treatments in ISO and non-ISO markets. The second layer, common to all sellers, is the Commission's new test for illegal behavior and expanded authority to order retroactive remedies.

---

5. *Investigation, supra* note 3, at 61,976.

6. *Order on Triennial Market Power Updates and Announcing New, Interim Generation Market Power Screen and Mitigation Policy*, 97 F.E.R.C. ¶ 61,219 (2001) [hereinafter SMA Order].

7. The Order says that it will no longer examine any "sales *into* an ISO or RTO." SMA Order, *supra* note 6, at 61,970 (emphasis added). By its own reasoning, there is no reason why the Commission should have distinguished between sales into or *within* an ISO or RTO. Presumably, this is what the Commission meant.

8. *LG&E Capital Trimble County, LLC*, 98 F.E.R.C. ¶ 61,261 (March 13, 2002).

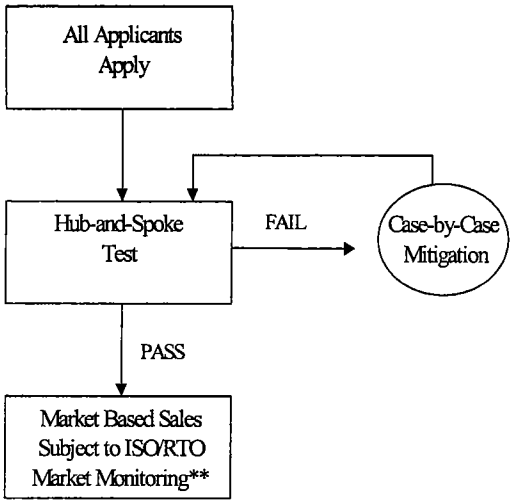
9. SMA Order, *supra* note 6, at 61,970.

10. In a split-the-savings rate, the price paid equals the average of the buyers' and sellers' incremental costs.

11. SMA Order, *supra* note 6, at 61,973. These changes will not be discussed further.

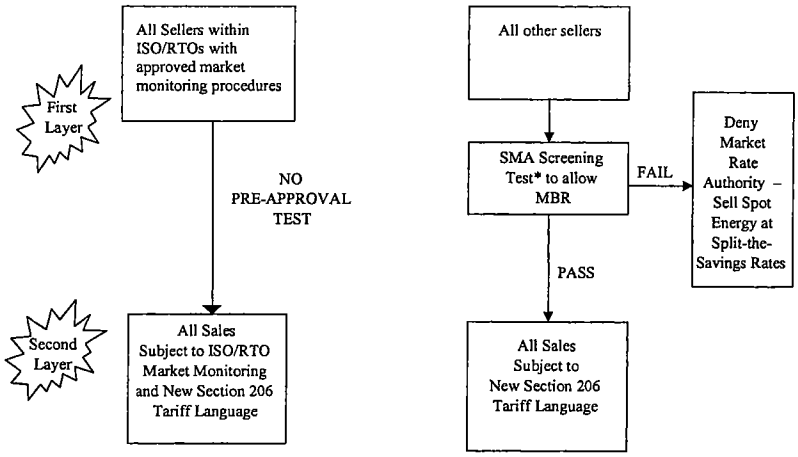
Figure 1 - The Commission's Approach to Market Based Rate Approval*

A. Hub-and-Spoke Approach



* Jurisdictional sellers only
** If seller sells in ISO/RTO

B. SMA/206 Order Approach



* Separate test for Market Rate Authority in each control area

A. Summary of Conclusions and Recommendations

Our analysis examines the relationship between several key dimensions of any market power enforcement approach: (1) whether the process tries to find and remove illegal market power in advance (*ex-ante*) or by examining and punishing retrospectively (*ex-post*); and (2) the closely related question of whether what is disallowed is a description of market performance or a description of particular illegal behaviors.

These dimensions determine the appropriate form of many specific aspects of the enforcement process. For example, *ex-ante* approaches are inherently at odds with policing specific behaviors, because it is nearly impossible to punish someone for behavior they have not yet committed. Thus, *ex-ante* approaches are consistent only with performance-based measures.

Our analysis argues that pre-testing and pre-approvals are superior to *ex-post* enforcement if an *ex-ante* approach can be fashioned that meets the design objectives of an efficient enforcement process. Rather than searching in this direction, the Commission moved towards defining illegal behaviors and looking for them after the fact. This creates more uncertainty for both consumers and sellers, all of whom must await the outcome of complex litigation to determine whether the exercise of a particular episode of conduct was illegal. This uncertainty will discourage investment and ultimately raise prices relative to an efficient *ex-ante* process.

The Commission's approach is not, however, simply a move towards *ex-post* behavioral enforcement. Instead, the Commission has a new pre-approval test for sellers outside ISOs and RTOs, combined with market monitoring inside RTOs and the new section 206 conditions.

While we strongly applaud the search for a better pre-approval test than the hub-and-spoke, we find that the new pre-approval test is unsuited to its task, creating little or no improvement in the *prevention* of market power. In contrast, the new standard for *ex-post* review is a net so large it is destined to snare much more than it should catch, leaving market participants exposed to risks they can scarcely calibrate, much less avoid.

The first enforcement layer of the interim proposal (left and right side of Figure 1B) is internally inconsistent. In particular, outside ISO/RTOs the Commission's interim policy may lead either to an extreme of too little investment in peaking capacity or too little control of market power in spite of the seemingly strict nature of the test. Within ISO/RTO markets, the mere existence of market monitors, with no formal delegated powers and no due process, is not a guarantee of consistent and effective enforcement policies.

The second layer of the proposal, the section 206 provision, is also flawed. The new standard of review is an overly rigid behavioral standard that seems nearly impossible to administer properly. It will prevent good and necessary, as well as bad, behavior.

On the basis of our analysis, we recommend that the Commission: (1) revise the section 206 standard so as not to prohibit any sale at or above measured incremental cost; (2) create a safe harbor rebuttable presumption of legality for markups above marginal costs on the order of at least ten percent; (3) substantially revise the SMA test for market power, or replace it with a parallel

evaluation of the market and the applying seller(s) (Sellers); (4) perform additional case-by-case analysis and only then require customized mitigation in markets where the revised screening test(s) fails; and (5) delegate authority more carefully to the MMUs, along with the promulgation of revised market power standards and process guidance, if they are to be relied on as extensively as the Commission apparently intends.

At first glance, this process may appear to be a more complex and burdensome set of hurdles for Sellers than today's MBR approval process. Upon closer scrutiny, however, the differences are not as large as they first seem, and the process would improve the degree of consistency.

Above all, the new process is designed to reduce the need for *ex-post* enforcement and refund proceedings while maintaining protection against rates that are not the product of workable competition. In addition, the intent is not to frighten off pro-competitive behavior or adequate investment in generation. Achieving these objectives is not costless and the expense in this case is greater investment in pre-approvals. Ideally, several ounces of prevention are worth a pound of cure.

At a minimum, the Commission should take several steps to guard against exacerbating the very problems it is trying to solve. First, retroactive refund authority for any sale violating the withholding tests should be replaced by a much more carefully described behavioral prohibition, as well as a safe harbor standard. Second, applicants and other parties should be allowed to present refinements on the SMA test that better account for the actual capacity economically relevant to wholesale market power, actual transmission availability, alternative geographic market definitions, and the incentives and ability to exercise market power. Finally, the requirements to post incremental and decremental costs and transact at split-the-savings rates *should not be automatic* for all sellers who do not pass the SMA screen. Instead, mitigation should be designed on a case-specific basis. *Mandatory* posting of a dominant suppliers' costs could facilitate rather than reduce market power in some cases.

Without these improvements, the Commission risks an interim policy that may actually increase volatility and market power in some cases and discourage new investment and pro-competitive activity in others. In extreme cases, the mitigation will be confiscatory. More commonly, the new policy will produce highly variable outcomes, adding to the already rampant uncertainty overshadowing the electric industry in the U.S. today.

B. Remainder of the Paper

The following discussion first examines the proposed section 206 language and then proceeds to address the remainder of these arguments in greater detail. Section II reviews principles for designing a market power enforcement process, and section III discusses choices of enforcement standards that the Commission could adopt to ensure workable competition in electric power markets. Market performance and behavior standards are compared, including their implications on enforcement and remedies given the nature of the FERC' s mandate to control market power. Section IV describes the special features of electricity markets and their implication for market power and enforcement.

Section V examines the Commission's proposed behavioral prohibitions, including section 206's language and its implications on the enforcement process. Section VI discusses optimal strictness in the use of a pre-screening test for impermissible market power. Section VII provides general observations about the Commission's SMA test and the justification for differences in the treatment of ISO/RTO and non-ISO/RTO markets, while sections VIII and IX study the Commission's SMA test and its mitigation in detail, respectively. Proposed amendments to the SMA test and its mitigation that meet the Commission's obligations more effectively are proposed in these sections.

Section X offers a critique on the role of ISO/RTO market monitoring units. A summary, and concluding observations, are provided in section XI.

II. DESIGN PRINCIPLES FOR MARKET POWER ENFORCEMENT PROCESSES

A. Optimal Enforcement Processes

The Commission's challenge in devising a new market oversight process can be viewed as a matter of balancing the benefits and costs of different enforcement approaches.[12] There are several divergent approaches to the enforcement process. Some forms of undesirable market conduct are controlled by pre-approval requirements or licensure. For example, we do not allow physicians to practice medicine without strict pre-approvals. This pre-approval rule is intended to reduce (not eliminate) medical errors. Conversely, many other illegal acts are prevented and punished using an approach that applies a range of penalties that violators will face if they are caught and convicted after the fact.

There are many ways to combine before-the-fact (*ex-ante*) and after-the-fact (*ex-post*) actions to create a law enforcement process. The variety of approaches has prompted economic and legal scholars to develop principles that suggest how enforcement process elements can be combined to create a system that yields the greatest overall social benefit. In general, society seeks law enforcement schemes that: (1) catch all *actual* violators; (2) do not catch non-violators; (3) do not deter neutral or desirable behavior in order to avoid violations; (4) require proof that violators did violate "innocent until proven guilty"; (5) impose penalties on violators intended to meet a complex set of objectives, including deterring violations in the first place, redressing harms, and other considerations; and (6) are not overly costly or burdensome to implement. In any one process, all of these considerations come into play. Some with more prominence than others.

Several of these items call for the articulation of clear standards. We all understand that it is impossible to write rules that perfectly pre-specify prohibitions, and that one critical role for the Commission and the courts is to evaluate the legality of specific acts against the language of statutory prohibitions. However, it is also the case that the clearer a rule can be, the fewer the accidental violations. This serves several of the objectives above. If a rule is

12. The economic interpretation of these objectives is discussed *infra*, particularly in Section III.

unambiguous, it is more likely that an alleged violation was an actual violation (#1), was not a non-violation (#2), didn't cause anyone to forego other allowed activities (#3), and was probably less costly to catch violators (#6) – all without impairing the other considerations.

The first and second items are on this list because any enforcement process will be imperfect. If there are systematic biases in the enforcement process, it either will err on the side of allowing some violators to go free or on the side of catching and punishing some non-violators. In a sense, the Constitution's requirement that all persons be considered innocent of a crime until proven guilty can be seen as a broad preference for the primacy of the third principle (do not punish non-violators), as distinct from a legal system in which a government can punish citizens without having to show that they committed an actual crime.

Real-world law enforcement processes have many stages. Real processes start with a determination of whether the available evidence suggests that a violation has taken place and the identification of potential violators, devoting investigative resources to those identified, bringing those investigated through a hearing or trial process, and determining remedies after conviction. While ultimate innocence must be presumed until a judge or jury declares otherwise, at each stage of the process enforcement officials must decide whether to pursue further action. It is these decisions, processes, and tests used to make them, that force the main tradeoff between allowing the *likely* innocent to stand trial or the *likely* guilty to go free. This tradeoff is precisely what makes the design of the stages of an enforcement process so difficult — especially in the case of workable competition in electric power markets.

B. Ex-ante vs. Ex-post Process

These tradeoffs also formed the choice between *ex-ante* and *ex-post* processes. In general, *ex-ante* processes are used to enforce rules when either of two conditions obtain: (1) *ex-ante* requirements are able to reduce the incidence of violations without incurring large costs or large losses in the ability to do non-prohibited behavior; or (2) the harm that occurs is very hard to remedy or reverse.

These rules are neither hard-and-fast, nor necessarily sufficient, but they are useful guides. For example, we license physicians because we think it will greatly reduce the incidence of harmful medical treatments and provide for good medical care. Licensure is also relatively inexpensive to administer and improper medical care can easily cause irreversible harm. On all counts, most would view this pre-approval approach as best.

At the same time, our enforcement for the crime of murder is entirely *ex-post* even though the harm is most certainly irreversible. In this case, we simply cannot reduce incidence of the crime by pre-approval processes.

Regardless of whether we choose an *ex-post* or *ex-ante* approach, the goals of any enforcement process (points 1-6 above) remain the same. Similarly, the design of the internal stages of the process also seeks to achieve these objectives. This is the challenge of effective law enforcement in the presence of uncertainty.

C. *Liability vs. Fault-Based Standards*

Enforcement processes also differ on whether, when a certain outcome occurs, the assignment of responsibility is based on a standard of either "strict liability" or "fault-based."[13] Under a strict liability standard, liability for losses is assigned to a particular party regardless of whether that party took (or could have taken) reasonable measures to prevent the outcome. The question as to whether the FPA requires a strict liability or a fault-based standard depends on a legal interpretation of the Act. In the second section following, we discuss whether the FPA appears to require one particular form of standard.

D. *Concluding Questions*

The FERC's mandate, examined in more detail below, is to ensure J&R prices. The discussion in this section demonstrates that the FERC's enforcement of this legislated objective should adhere to the broad public policy goals that apply to all law enforcement processes: a minimum of unpunished violators, a minimum of mistaken convictions, fair and efficient remedies, low enforcement costs, and other goals. The remainder of this paper steps through a preliminary analysis of whether the proposed new SMA and section 206 enforcement processes best serve these objectives.

III. PERFORMANCE VERSUS BEHAVIORAL STANDARDS IN ELECTRIC POWER MARKETS: DEFINITION AND IMPLEMENTATION

In the context of market power enforcement, the nature of the liability standard translates into enforcement processes that are based on either behavior or outcomes. A system of strict liability is akin to a requirement that sellers provide refunds in the event that rates are no longer J&R, *regardless of whether specific actions of a seller or sellers caused rates to become so.* In contrast, a system of "fault-based" liability is similar to an enforcement process whereby remedies are imposed only when parties have been shown to violate certain standards of behavior. In the context of the Commission's section 206 Order, remedies would only be imposed when suppliers were shown to have violated the Commission's standards of behavior. In addition to referring to market power standards as strict liability versus fault-based, we also call them market-performance based and behavioral, respectively.

A. *Articulating Economic Performance and Behavioral Standards*

Performance and behavior are two very different approaches to articulating a standard for J&R prices, assuming that competition and not costs are allowed to be the main factor determining prices.[14] The market-performance approach asks whether the total functioning of the process by which prices are arrived at meets a standard of being workably competitive. As noted above, this

13. A. Mitchell Polinsky & Steven Shavell, *The Economic Theory of Public Enforcement of Law*, 38 J. OF ECON. LITERATURE 45 (2000).

14. *See generally* PHILLIP AREEDA & LOUIS KAPLOW, ANTITRUST ANALYSIS 36-8 (5th ed. 1997) [hereinafter AREEDA & KAPLOW].

corresponds to a strict liability concept.

Performance standards are implemented using economic assessments that examine whether actual market performance has the attributes, or yields the outcomes, associated with competition. These attributes include: (1) many sellers, vying to sell to many buyers, none of whom dominates the market [attributes]; (2) price increases when demand increases relative to supply, and vice versa [outcomes]; (3) competition and innovation between sellers to produce better products at lower cost [outcomes]; and (4) a market-clearing price at or near the marginal opportunity cost of the highest-cost seller needed to serve willing customers [outcomes].[15]

These attributes and outcomes can each be measured more or less directly, and accurately, depending on the availability of data. They can often be measured with numerical indicia or calculations. A common measure of the first attribute is the Herfindahl Hirschman Index (HHI), which measures the market shares of all sellers or potential sellers; a common measure of the latter is the Lerner Index or Price-Cost margin. There are many additional analyses and metrics that provide useful information as well.[16]

The Commission's electric utility merger approval process largely employs a performance standard approach. The screening test the Commission uses, set forth in Order 642, examines market concentration before and after the proposed merger.[17] The HHI concentration measure used is generally agreed to be an indicator of the likely competitiveness of a well-defined market. If a merger impairs the competitiveness of the market, as measured by projected change in the HHI, the merger is not permitted unless additional analysis shows that the harm is not as large as the change in the HHI suggests, or unless the potential harm is mitigated in advance.[18]

The main alternative to a performance-based standard is a behavioral approach. Here, the Commission prohibits certain activities if they are more likely to harm competition than not. This is the Commission's proposed direction in the new 206 process, where the prohibited activities are economic and physical withholding as described above.

With behavioral standards, there is no inherent need to use an econometric to establish liability or measure the market. The need arises rather soon thereafter, however, when one tries to measure the size of the damages. A behavioral standard is implemented simply by articulating the form of behavior that is illegal.

Sometimes the definition itself requires an economic calculation. For

---

15. This and all other metrics must be assessed carefully, as discussed *infra* Section IV.

16. *See also* W. KIP VISCUSI ET. AL., ECONOMICS OF REGULATION AND ANTITRUST 145 (2nd ed., MIT Press, 1995).

17. Order No. 642, *Revised Filing Requirement Under Part 33 of the Commission's Regulations*, F.E.R.C. STATS. & REGS ¶ 31,111 (2000), 65 Fed. Reg. 70,984 (2000) (codified at 18 C.F.R. pt. 33) [hereinafter Order No. 642].

18. It is important to recognize that this performance measure is merely a test used to progress between stages of the enforcement process, not to determine innocence or guilt of an individual market participant. It does not constitute a finding of guilt, nor does it trigger any required mitigation. Nevertheless, it is a forward looking market performance measure.

example, the illegal economic behavior of "dumping" is defined as selling a product in a foreign nation at a price below the seller's incremental cost.[19] However, in many cases behavioral standards require calculations that apply to a single seller, not to the rest of the market.

B. Performance Versus Behavioral Standard: Implications for Enforcement

The choice of a performance versus a behavioral standard has substantial implications for the structure of the enforcement process. Enforcing a performance standard requires the Commission to choose methods of measuring market performance and decide what levels of the metric are a violation. This need not be formulaic, nor rely on a single measuring cup. However, according to the first principle of optimal enforcement, the more specific the Commission can be in advance, the better. Needless to say, the main focus in this approach is not on individual sellers' behavior.

Behavioral standards raise very different process issues. First, it is not easy either to define particular forms of illegal economic behavior. Second, it can be difficult to prove that specific actors engaged in the behavior. At a minimum, the accused must be accorded due process. Finally, it is often necessary for the Commission and/or the courts to distinguish between situations in which the same actual economic behavior is anti-competitive and others in which it is pro-competitive.

The Commission's use of a behavioral standard is similar to the prohibition on "contracts . . . in restraint of trade" in sections 1 and 2 of the Sherman Act.[20] A century of antitrust jurisprudence has demonstrated the difficulty of establishing clear *ex-ante* standards for allowed competitive practices. Certain practices, such as bid-rigging, have been declared illegal *per se*. However, the majority of investigations and disputed practices today are subject to a "rule of reason" that evaluates each alleged anticompetitive act using a case-specific analysis.[21] Judge Bork makes this point clearly:

> We come now to a crucial point. To carry out its mission, antitrust must classify varieties of profit-maximizing behavior with respect to their probable impacts upon consumer welfare. Obviously, only three relationships are possible, and these correspond to three quite different ways of making money. A business firm may seek to increase its profits by achieving new efficiency (beneficial), by gaining monopoly power and restricting output (detrimental), or by some device not related to either productive or allocative efficiency, such as taking a bookkeeping advantage of some wrinkle in the tax laws (neutral).
>
> The task of antitrust is to identify and prohibit those forms of behavior whose net effect is output restricting and hence detrimental. It should, of course, leave untouched behavior that is beneficial or neutral. The available resources of price theory dictate the manner in which this task must be accomplished. The best-developed branch of price theory is the theory of the ways in which firms may

19. RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW 335 (5th ed., Aspen Law & Business, 1998) [hereinafter POSNER].

20. 15 U.S.C. §§ 1-7 (2000 & Supp. II 2002). These sections prohibit, respectively, cooperative illegal activities such as conspiracy or collusion and attempts to monopolize markets.

21. AREEDA & KAPLOW, *supra* note 14, at 974-6; ROBERT H. BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF 90, (1st ed., Free Press 1978).

> profit by interfering with allocative efficiency. Though we know something of the subject there is no comparably clear, reliable, and general theory of the ways in which they may create productive efficiency. It follows, therefore, that antitrust analysis, if it is to be successful, must proceed primarily by elimination. We must appraise any questioned practice—say, a merger or a requirements contract—in order to determine whether it contains any likelihood of creating output restrictions[,]. . . however, we must assume that its purpose and therefore its effect are either the creation of efficiency or some neutral goal. In that case the practice should be held lawful.[22]

Although the antitrust statutes are inherently behavioral, the enforcing agencies are well aware of the difficulties of distinguishing pro-competitive and anticompetitive acts.[23] Partly for this reason, these agencies prefer structural remedies that do not rely either on behavioral changes or agencies policing such changes.[24]

The difficulties of distinguishing harmful economic behavior from neutral or pro-competitive behavior are as difficult, or more difficult, in bulk power markets than they are in other competition law enforcement contexts. Some of these reasons have to do with the unique history, technology, and importance of electric power and the nature of market power when it arises in electric power markets. Other reasons are related to the specific operation of utility systems and the requirements thereon over the course of a day, season, and year. We turn to these difficulties in the following section.

C. Disciplining Dysfunctional Markets

Electric utility markets are designed by stakeholders and experts and approved by regulators. In every part of the world, market designs have been complicated, initially flawed, and frequently revised. Even now, many stakeholders do not agree on the best design for an electricity market.

If a flaw in market design or condition, outside the control of any one seller, enables the seller to exercise market power, the traditional antitrust view of this market power exercise would be that it is not clearly prohibited, and perhaps entirely legal. After all, firms should use their skills to understand how a market works and how firms can increase their profitability through legal means. If regulators approve a market, firms can be expected to search the market for profit-increasing opportunities.

The Commission may intend to prohibit market-based sales where it determines a market has design flaws that prevent workable competition. However, holding individual sellers responsible for participating in markets that are dysfunctional requires extreme caution. Creating a framework in which

---

22. ROBERT H. BORK, THE ANTITRUST PARADOX: A POLICY AT WAR WITH ITSELF 122, (2nd ed., Free Press, 1993) [hereinafter BORK].

23. *Id.* at 90; Robin C. Landis & R.S. Rolfe, *Market Conduct under Section 2: When is it Anticompetitive?, in* ANTITRUST AND REGULATION: ESSAYS IN MEMORY OF JOHN J. MCGOWAN (Franklin Fisher ed., MIT Press 1985).

24. These statements are echoed in the comments of the Staff of the Bureau of Economics and Office of General Counsel of the FTC concerning the new Section 206 enforcement process. *See also* Comment of the Staff of the Bureau of Economics and the Office of the General Counsel of the FTC, No. EL01-118-000, (Jan. 7, 2002) [hereinafter FTC].

market participants are later found to have unintentionally violated the FERC behavioral rules is a terrible approach to market power *prevention*. The goal should be the opposite, *i.e.* to create laws and enforcement procedures that guide market participants towards the avoidance of rule-breaking through intentional behavior and the detection of intentional rule-breaking when it occurs.

There is no question this view now motivates the Commission's Standard Market Design (SMD) effort. However, whether one views the market power enforcement framework as an integral part of SMD or a standalone requirement, the normal concept of market design, by itself, cannot prevent the need for explicit market power enforcement processes.

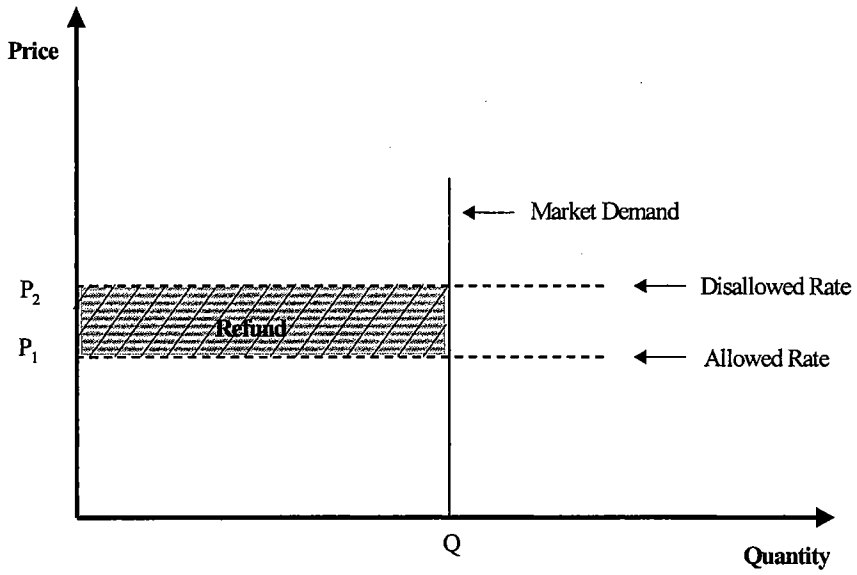
D. Behavioral Versus Market Performance Standards: The Implications for Refunds and Other Remedies

An interesting relationship exists between three of the dimensions of the enforcement process: (1) the strict liability versus the fault-based standard; (2) the performance-based versus the behavioral approach to prohibitions; and (3) the practicality of applying certain remedies. The relationship between these dimensions of market power enforcement has long been recognized, but the specific implications for electric power markets should be considered as the Commission formulates its enforcement approach.

One remedy available to the Commission under the FPA is a refund of unjust and unreasonable rates.[25] The practical calculation of refunds in a traditional rate-regulated setting is illustrated in a purely hypothetical example shown in Figure 3-1. In this Figure, a utility serves a known group of customers (the market, in this instance). The total demand in this market, which does not vary significantly with price, is quantity Q. The utility initially charges P_2. The Commission finds P_2 is unjust and unreasonable and the proper rate is P_1. The calculation of a refund in this instance is straightforward: it is $(P_2-P_1) \times Q$ for each period.

25. 16 U.S.C. §§ 824(d)-(e) (Supp. II 2002).

Figure 3-1
Calculation Of A Refund
Under Regulated Rates



As the Commission and its stakeholders have learned through the California and Western refund proceedings,[26] the analogous problem in a market in which market-based pricing was allowed is much more complex. In highly simplified fashion, this situation is illustrated in Figure 3-2.

In this example, assume the market is well defined and has a single market-clearing price for each period, shown as the square dots in Figure 3-2A. Five time periods are depicted, each with a higher level of demand and a higher price. Note that without collecting more data, no one agent (including the FERC) will know much more than the single market clearing price and the total quantity sold in that period (since centralized markets typically report total sales in near-real time). For simplicity, suppose the FERC has the information to go beyond reported prices to look at the apparent supply curve that the sellers were using, which was assumed unchanged in all periods. We form the supply curve by showing a line through the prices.

Suppose the FERC decides, in this market, that one particular seller was unquestionably guilty of a specific anticompetitive act in all periods. The particular isolated bad actor's actual supply curve is shown as the bold portion of the supply curve in Figure 3-2B. It has reached no conclusion about the other

26. *Puget Sound Energy, Inc. v. Sellers of Energy*, 96 F.E.R.C. ¶ 63,044 (2001); *San Diego Gas & Elec. Co. v. Sellers of Energy*, 96 F.E.R.C. ¶ 61,120 (2001).

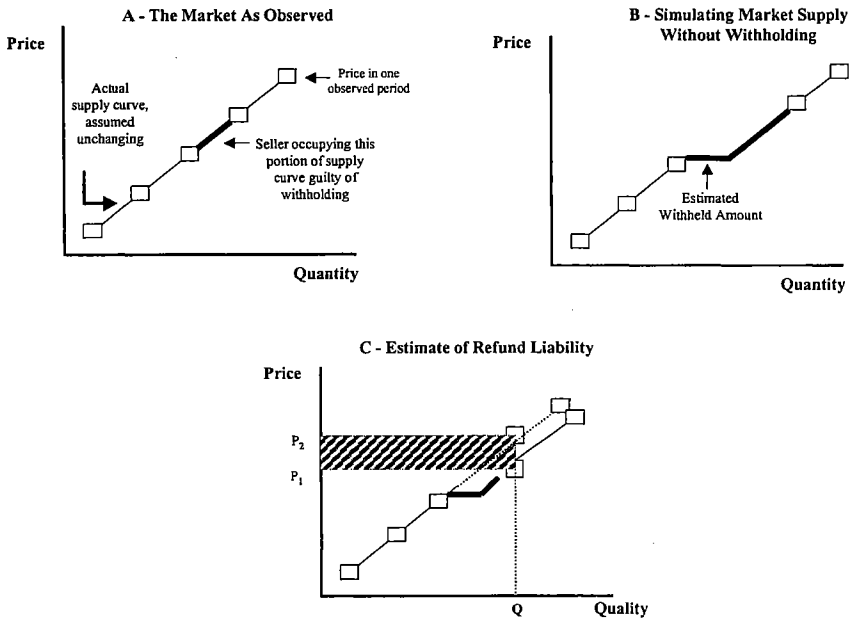
sellers. The immediate objective is to offer a refund equal to the harm done by the anticompetitive act.

Even a situation as simple as that illustrated in Figure 3-2B shows the difficulty of this calculation. The Commission must determine how much power was withheld and then construct a *pro forma* supply curve, applying estimated supply curve that would have existed absent the withholding. To do this, the Commission must make a number of critical assumptions concerning the behavior of the other participants, both with and without the withholding. Would other suppliers have offered more or less if the withholding hadn't occurred? What about buyers? In short, the Commission must determine whether the withholding was unilateral, whether other sellers tacitly or intentionally cooperated (or undid) the actions of the withholder, and how the buyers would have reacted. Moreover, if this market were linked to other geographic areas and to other substitute products (*e.g.* day-ahead versus real-time energy), these factors must be considered.

Another complication is added by the assumption that this power market uses a centralized market-clearing auction that results in a single transaction price for all buyers and sellers. Suppose only one seller is found guilty of withholding. Due to the seller raising the market-clearing price for all buyers, all buyers are entitled to refunds, including buyers who did not buy from the errant seller. Thus, even when one chooses a behavioral-based, specific seller basis for market power enforcement, centralized power markets may not be able to employ specific-buyer remedies or refunds.[27]

27. The question as to whether price increases in the centralized market influence longer-term (perhaps bilateral) trading adds an additional complication. This issue is explored *infra* Section IX.

Figure 3-2
Calculation Of A Refund For Specific Seller Withholding



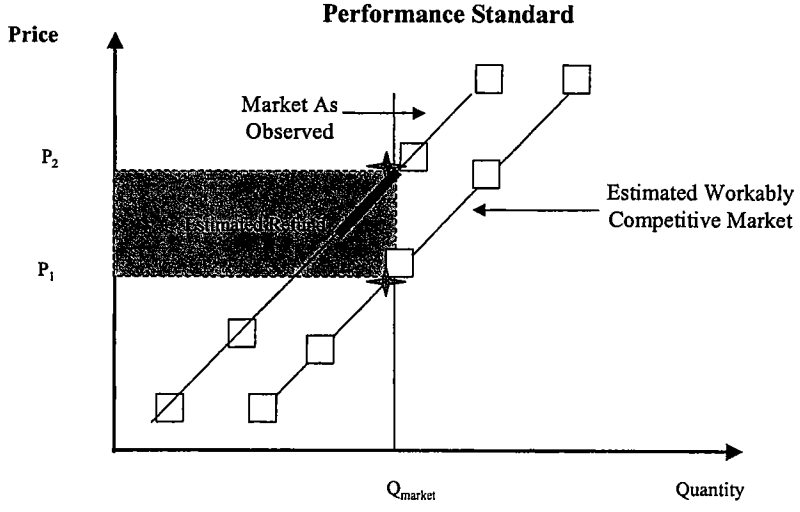
All this requires what economists call a market simulation calculation with the possibility of a variety of strategic competitor and buyer responses. Such simulations are feasible, but they are complex and often controversial. Once complete, a refund liability can be computed by estimating the price difference caused by the withholding, (P_2 less P_1) times the amount purchased (Q). This is the cross-hatched area appearing in Figure 3-2C. The formula is the same as in the regulated rate example; the determination of P_1 is the controversial factor.

If the Commission employs a performance approach, the refund estimation is much different. In this case, illustrated in Figure 3-3, the task is to estimate what the market supply curve would have looked like if the market were workably competitive. In this approach, the Commission develops the supply curve for a workably competitive market from suppliers' cost of production. Departures from that supply curve are attributed to the exercise of market power. There is no need to determine what individual sellers did or how the actions of buyers would have changed. The linkages to other markets remain important, but in general, the computation is less difficult because we know the approximate attributes of workably competitive markets, namely, that all sellers sell at their marginal opportunity costs. In other words, if the total market demand, the observed supply conditions, and the marginal costs of all sellers are known, a supply curve can be built (as in Figure 3-2) to determine an approximately workable competitive price.

Obviously, in the California refund proceedings,[28] this performance-based approach to remedies is precisely the course chosen by the Commission. It has not found any specific seller guilty of impermissible acts, but it has determined the market was not workably competitive.[29] The Commission fashioned a simple version of building up the supply curve of a workably competitive market, as just described. The "P_1" it uses as the basis of a refund is equivalent to the point marked with a star on Figure 3-3, namely the marginal cost of the last generating unit needed to meet market demand.

This example is not intended to suggest the estimation of the prices resulting from an unobserved workably competitive market using data from a non-workably competitive market is very easy.[30] It is not. It is, however, easier than establishing the impact of particular forms of sellers' behavior, observing only the results of the alleged behavior on the market. Moreover, it is directed at meeting the fundamental test the Commission relies on for the grant of market-based rates. The fact that performance-based remedies are somewhat more easily computed is, in itself, not a reason to depart from behavioral standards. However, the complexity, uncertainty, and cost of implementing the market-performance enforcement approach bears on several elements within an optimal enforcement scheme.

Figure 3-3
Estimating Refunds Under A Performance Standard



28. *San Diego Gas & Elec. Co. v. Sellers of Energy*, 93 F.E.R.C. ¶ 61,121 (2000).

29. *Id.* at 61,350.

30. In addition, it is not our intent to take a position on whether the specific method the Commission has adopted in the California refund proceeding is reasonable and appropriate.

E. The Commission's Mandate: A Strict Liability Standard?

Electric power has a unique legal status in American society. Most producers of goods and services are subject to the antitrust laws and many industry-specific restrictions. Almost alone, wholesale electricity transactions remain subject to a federal law that requires the Commission's approval that the rates and terms and conditions of power sales are J&R.[31]

Conceptually, this requirement was easily met by setting regulated rates equal to each seller's average costs. Prices equal to average costs do not meet the test of maximum economic efficiency, but they generally allowed for a plentiful supply of power, stable and declining real prices (in the presence of scale economies), and adequate investment incentives to amply provide a capital-intensive sector of the economy. However, with the advent of unregulated bulk power prices, the cost-based standard of J&R is lost. In its place, the Commission has held that prices produced by workably competitive markets are inherently J&R.[32]

The implications of this finding are enormous. First, it asserts there are no pure fairness or distributive justice requirements for J&R prices, beyond those that are produced by true workable competition. In other words, effective competition will produce prices that are just as well as reasonable, even if the prices are different from those most buyers paid under traditional FERC regulation.[33] The vital corollary to this finding is the Commission must determine whether a deregulated sale of power is occurring under workable competition. In other words, in order to allow MBR authority, the Commission is responsible for a process that evaluates the effectiveness of power market competition and either suspends MBR sales or otherwise restores J&R prices when competition fails.

One of the most important questions is whether the FPA mandates this decision process as a strict or fault-based liability standard.[34] This is a question of legal interpretation and thus not a subject on which economic expertise controls. We *assume* herein the standard is indeed strict, *i.e.,* the FERC need not determine who is "at fault" in order to insist on J&R prices. Whether the Commission chooses to use blanket regulations, seller-specific rules, competition, or any other approach, the resulting prices are supposed to be reasonable. Neither is it apparent that it matters to the FPA why a price became unreasonable, *i.e.,* who was to blame, but again this is a matter of law, not economics.

As a final note, our *assumption* that the FPA allows (or requires) a strict

---

31. Utilities remain subject to antitrust enforcement. *See also* Otter Tail Power Co. v. United States, 410 U.S. 366 (1973). However, their liability under the statutes must be meshed with their status as franchised monopolies (or nearly so) established under state law.

32. *See generally San Diego Gas & Elec. Co. v. Sellers of Energy*, 95 F.E.R.C. ¶ 61,418 (2001).

33. For example, it is virtually guaranteed that unregulated electricity prices will change the effective structure of prices from flat annual rates to time-of-use prices. Moreover, large customers will pay a unit price less than small customers, relative to regulated rate structures. *See also* PETER S. FOX-PENNER, ELECTRIC UTILITY RESTRUCTURING: A GUIDE TO THE COMPETITIVE ERA 291-320 (1998).

34. *See also supra* Section II; POSNER, *supra* note 19, § 6.5.

liability standard for workable competition creates an important distinction between the Commission's enforcement of the FPA and the enforcement of the main antitrust statutes. The antitrust laws are inherently constructed around behavioral acts (*e.g.*, attempted monopolization) and not market performance. Causality must be established between the violator and victim.[35] This is consistent with the fundamentally different view of price regulation and antitrust enforcement in the economy. Regulation is an inherently *ex-ante* approach to controlling market power, namely the express power to set prices on an ongoing basis. The antitrust laws were designed to apply to markets that were acceptably competitive, absent the prohibited behavior. If such behavior was prevented, the likelihood that these markets would return to a competitive state was believed high enough that it was sufficient to bar specific acts and leave it at that.[36] In contrast, the Commission is laboring under a regulatory statute founded on the premise that regulation is required, because markets, left alone, will not work "well enough."

If the Commission can, and does choose a behavioral standard, the implied conclusion is similar to Senator Sherman and his colleagues; electric markets are likely to be competitive enough, absent prohibited behavior, to meet the test of J&R.[37] If the Commission is comfortable reaching this finding, a matter it has yet to clarify, a behavioral standard becomes a possibility, though still not a requirement. Otherwise, this finding alone suggests that a performance-based approach appears more consistent with the Commission's objective.[38]

F. Concluding Discussion

There are two approaches to choosing a competition standard, market performance-based and behavioral. Market performance standards use measures of market attributes or outcomes, lend themselves to *ex-ante* or *ex-post* processes, and correspond to a strict liability standard. Behavioral standards examine specific seller acts, which largely imply *ex-post* enforcement, and correspond to a fault-based standard.

The process/timing implications of behavior versus performance metrics are significant. Behavioral standards imply large *ex-post* enforcement processes. This goes hand-in-hand with a determination of whether the alleged behavior not only occurred, but was actually anticompetitive. The latter often is a matter of economic debate. It also suggests remedies must be inherently retroactive.

Performance metrics can be assessed in advance (as occurs for mergers) or

---

35. AREEDA & KAPLOW, *supra* note 14, at 85.

36. One legal historian wrote of the Congress that enacted the Sherman Act: "Congress believed in competition. . . . As a general rule, business operated best when left alone. The government's natural role in the system of free private enterprise was that of a patrolman policing the highways of commerce." AREEDA & KAPLOW, *supra* note 14, at 46 (quoting HANS BIRGER THORELLI, THE FEDERAL ANTITRUST POLICY: ORIGINATION OF AN AMERICAN TRADITION (Johns Hopkins Press 1954)).

37. When combined with the SMA Order, which continues to require pre-screening of sellers outside ISO/RTOs, the implied finding actually applies to ISO/RTO markets. The basis for a differential conclusion regarding the overall health of competition between these two types of markets is discussed *infra* Section X (where we conclude the basis for such a differential conclusion is, at best, weak).

38. *See generally supra* Section III.C. *Disciplining Dysfunctional Markets.*

in real-time, and mitigation can be arranged in advance, rather than after-the-fact. However, this requires articulating a performance metric that is reasonably clear, applicable to a wide variety of situations, and meets the enforcement goals set forth at the beginning of this section.

A close relationship exists between the choice of liability standard (*i.e.*, behavioral-based versus performance-based standards) and the analytical burdens placed on the FERC. In order to estimate refund levels, behavioral standards require simulations of the market with altered behavior. Performance standards are generally less burdensome analytically, lend themselves to pre-approval processes, and fit nicely into a mandate to achieve workable competition or its equivalent.

The Commission has used a mixed approach in the California refund proceedings and in other recent enforcement actions. On the one hand, the Commission repeatedly describes its standards as impermissible seller-specific behavior, as in the new section 206 provisions. However, the Commission has yet to find any specific California parties guilty of such behavior, and instead, has concluded that the market was broken. Thus, the Commission flipped from a behavioral standard to a performance basis, both administered *ex-post*. Furthermore, the refund approach was performance-based, applying to all buyers regardless from whom they bought.

The mandate under the FPA suggests, and we assume, a strict liability standard. This implies the Commission has an ongoing obligation to ensure workable competition, regardless of whether the Commission can establish whether any specific parties are at fault. In short, the Commission must fix or control dysfunctional markets regardless of whether it knows how or why the market is producing non-J&R prices.

The nature of the mandate also suggests that a performance metric is more appropriate, since these metrics tend to be based on market outcomes rather than on the actions and the results of specific market participants. This contrasts starkly with the approach embodied in antitrust law.

IV. SOME ECONOMIC FEATURES OF ELECTRICITY MARKETS AND THEIR IMPLICATIONS FOR MARKET POWER AND ENFORCEMENT

Electricity is an unusual commodity. It is non-storable, non-directable on the grid, and the present infrastructure has been engineered with little ability to alter power use based on cost or price signals. These features make electricity prices volatile when electricity is traded freely. Nevertheless, electricity is essential for the safety and functionality of our homes, communities, government, and economy. The smallest interruptions may have enormous public and private costs. Finally, there remain substantial economies of scope and scale in supply and significant network effects, such that market conditions and, indeed, definition of the market itself may change hourly.

The structure and governance of the industry is also unique. About 28% of the industry is owned by non-profit entities; investor-owned companies own the

remainder.[39] The latter were traditionally vertically integrated and largely granted monopoly franchises in exchange for rate regulation. The old structure is now in various stages of transition to vertical de-integration (actual or effective), continued regulation of transmission and distribution, and generation competition. From a policymaking and enforcement standpoint, it is important that about a quarter of the industry is not subject to the FERC's jurisdiction and therefore not directly subject to any enforcement approach. Another important detail is a large fraction of the investor-owned industry remains regulated by the states.

The power markets in existence today are unique for several reasons. First, power is a necessity purchased universally, including low-income families and small businesses, so that even small price increases have large social impacts. Unfortunately, the U.S. economy, as well as every individual household's monthly budget, is anchored in average electricity prices that are far below the marginal value of power to most users. Because competition drives price to marginal value, it exerts an upward pressure that is highly dislocational, with impacts falling disproportionately on low-income families and firms with narrow profit margins or high power use.

Second, demand is presently inelastic, meaning buyers cannot substitute or reduce demand when prices rise. This has several implications: (1) anticompetitive behavior is likely to be more rewarding than in the average market where price increases sometimes lead to drastic sales reductions;[40] (2) price increases trigger large wealth transfers from buyers to sellers, often much larger than is necessary to induce more capital into the market; and (3) markets do not equilibrate normally, as occurs when higher prices reduce demand, thus acting to lower prices. Examination of these issues are detailed below. Third, markets for non-storable commodities are inherently very volatile. In power markets, this is further exacerbated by the fact that supply and demand conditions change substantially over the course of a day. Fourth, electricity sales occur within a complex set of market and reliability rules. These rules create a complex information environment and many possibilities for intentional or unintentional strategic behavior. Fifth, electric investments are very long-lived, and individual producer decisions are often indivisible over long periods. Conversely, electric sales can happen within intervals of five minutes or less, and market power episodes can last as little as one hour and still cause significant economic dislocation. Sixth, there are significant economies of

39. Ownership percentage is based on generator nameplate capacity. ENERGY INFORMATION ADMINISTRATION, INVENTORY OF ELECTRIC UTILITY POWER PLANTS IN THE UNITED STATES 1999, TABLE E3: Existing Capacity at U.S. Electric Utilities by Class of Ownerships, Census Division, and State, *at* http://www. eia.doe.gov/cneaf/electricity/ipp/ipp99.pdf (last visited Oct. 16, 2002).

40. For example, Posner notes:

> Another is a high elasticity of demand at the current market price, coupled with an absence of good substitutes for product (i.e., comparable in both cost and value), suggesting that the high elasticity is the result of monopoly pricing. This is a good example of the difference between economic conditions that *facilitate* cartelization and economic conditions that *evidence* it. If demand is inelastic at the competitive price, this makes cartelization attractive because an increase in price will not cause a proportional decrease in quantity demanded.

POSNER, *supra* note 19, at 313 n.37.

vertical integration and horizontal scale. Among other factors, this suggests extensive de-concentration will raise costs and prices. Thus, structural solutions to market power may be prohibitively costly. Finally, electric power has environmental externalities and long-term substitutes with different energy policy and environmental attributes. These important policy requirements influence the design and the performance of power markets in the short and long term.

A. The Implications of Inelastic Power Demand

It is often noted that the demand for power does not respond much to higher short-term prices, especially in the bulk power markets. The extent to which this is true is changing rapidly as the Commission, many state regulators, other policymakers, and many parts of the industry push forward to make demand more price-responsive.

The Commission has taken several actions to promote price responsiveness in markets. First, the Commission has approved load response programs of many ISOs and is well aware of the fact that its standard market design must maximize price-responsive demand.[41] The Commission has engaged the states on this topic as well,[42] and has taken additional specific steps in the West. On March 14, 2001, the Commission authorized wholesale and retail customers in the Western power markets to resell their load reductions at wholesale, market-based rates.[43] The Commission later adopted the mitigation plan for the California market that requires load serving entities to submit their demand-side bids and establish demand response mechanisms in which they will identify the price at which load will be curtailed.[44]

In addition, a number of states are adopting or expanding time-of-use or real-time pricing programs and installing real-time metering far more widely than before. Over 320,000 customers in Washington State have real-time meters and price signals,[45] and the state of Pennsylvania is installing real time meters very widely.[46] Many other utilities and states are taking steps to assess or implement time-based metering; the essential precursor to price-responsive demand.

---

41. "With respect to generation market power, market forces such as supply and demand responses are the most potent and lasting means of mitigating market power, so solutions that increase the potential number of suppliers or increase price-responsive demand must be promoted." *Working Paper on Standardized Transmission Service and Wholesale Electric Market Design* 21 (March 2002) *available at* http: //www.ferc.gov/Electric/RTO/Mrkt-Strct-comments/e-1finalSMD.pdf.

42. FERC, *Making Markets Work, Strategic Plan 2002-2007,* Washington, D.C. (September 25, 2001) *available at* http://www.ferc.gov/about/mission/sp-09-18-02.pdf.

43. *Removing Obstacles to Increased Electric Generation and Natural Gas Supply in the Western United States*, 94 F.E.R.C. ¶ 61,272 (2001).

44. *San Diego Gas & Elec. Co. v. Sellers of Energy*, 95 F.E.R.C. ¶ 61,115 (2001); *San Diego Gas & Elec. Co. v. Sellers of Energy*, 95 F.E.R.C. ¶ 61,418 (2001).

45. Washington Utilities and Transportation Commission v. Puget Sound Energy, Inc., No. UE-011570 (Nov. 26, 2001) (Testimony of Penny J. Gullekson, Exh. PJG-1T) *available at* http://www.wutc.wa.gov/rms2.nsf.

46. Press Release, PPL Electric Utilities Installing Automated Electric Meters (Feb. 4, 2002) *available at* http://www1.pplweb.com/newsapp/news_releases.articleview?p_artid=2025.

The medium-term and long-term implications of these efforts will be significant. At the moment, however, price responsiveness in bulk power markets is low or inelastic. This means the quantity of power demanded in any one hour of the day in the wholesale markets does not diminish much as price increases. For almost all other commodities, the demand for the product goes down as price goes up, as shown in the traditional picture of a "demand curve" (Figure 4-1a). The downward slope of the curve implies that higher prices mean less quantity demanded by buyers, with little or no time lag between higher prices and lower sales.

In contrast, inelastic demand curves (Figure 4-1b) are depicted as vertical lines. Regardless of how high or low the price, buyers will buy the same quantity. Short-term electricity markets are thought to work this way because the grid requires an exact balancing of demand and supply at every second, and the amount of power demanded at any moment is the sum of all the residential, commercial, and industrial equipment that is then operating. At present, almost none of this equipment is turned on or off based on price alone. In such an instance, scarcity premiums no longer serve as a valid signal for the value that users place on additional output. Rather, prices reflect in part the effect of the distortions in the supply curve from the detachment of the prices paid by the ultimate users from prices in wholesale markets.

Figure 4-1a
Ordinary Demand Curve

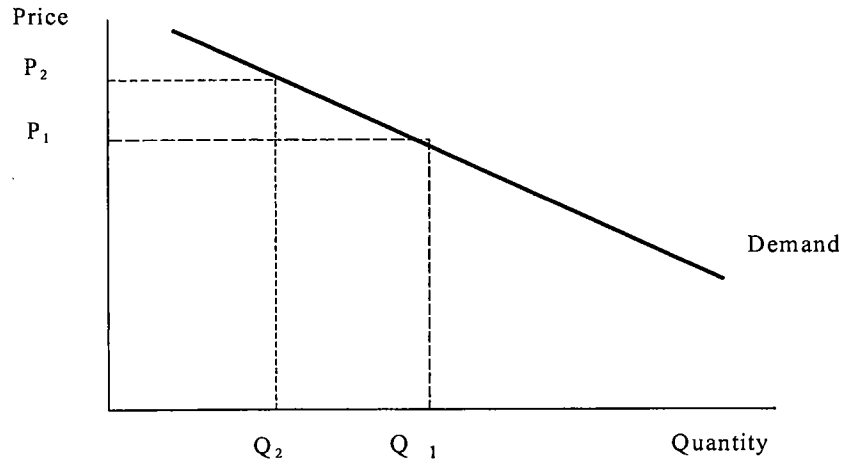
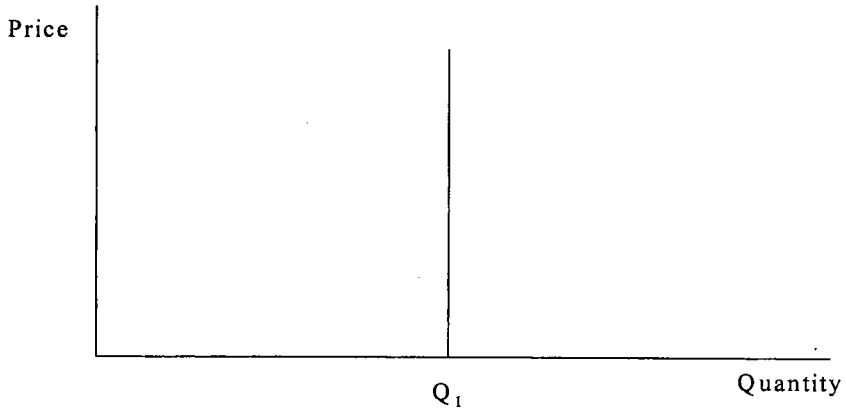


Figure 4-1b
Inelastic Demand Curve



There are two important implications of inelastic demand for power: First, the sensitivity of price to capacity withholding; second, the scarcity rent is not disciplined by demand. Where demand is inelastic, price increases are very sensitive to sellers' withholding output. To see this, consider the impacts of supplier withholding in markets that have ordinary, price-responsive demand (Figure 4-2a). In this figure, the pre-withholding supply is the marginal costs of all firms in the relevant market in ascending order. Demand is shown in the customary downward sloping fashion and the pre-withholding market price and quantity are P_1 and Q_1, respectively.

Figure 4-2a also shows this market when one or more suppliers successfully withhold output and raise price. The supply curve shifts up due to the withholding and the new market clears at a higher price P_2, but at a lower quantity than before (Q_2). Withholding has caused higher prices, but lower sales. Because sales have gone down, the withholding action may or may not be profitable for the firm or firms doing the withholding. To see this, note that all sellers were earning revenues equal to P_1xQ_1 before withholding. After withholding, sales revenues are P_2xQ_2. Sellers have gained the revenues in the crosshatched rectangle from higher prices caused by withholding, but they have lost the revenue in the shaded rectangle.

To complete the profitability assessment, we need to know which sellers were withholding, whether their costs went up or down because of withholding, and how many sellers were involved. But even without knowing this, the fact that total revenues earned by sellers does not increase uniformly means that not all sellers will benefit from the withholding. This discourages collusion, as the revenue reductions must be apportioned among sellers.[47] Depending on market

47. Press reports on the OPEC cartel often report on the cartel's agreement to reduce output. These agreements apportion the reduction in output (sales) in exchange for an increase in market price enjoyed

conditions, it often discourages unilateral withholding behavior as well.

Figure 4-2b shows the impacts of supplier withholding where demand is inelastic (vertical). This figure shows the same original pre-withholding supply curve and the same post-withholding supply curve shifted up. The geometry of a vertical demand curve is such that *all* sellers benefit from one or more sellers withholding. No seller loses any quantity sold prior to withholding; they simply raise their price. Sellers gain the additional revenue in the crosshatched area, but lose nothing.

Figure 4-2a
Profitability of Withholding-Market with Elastic Demand

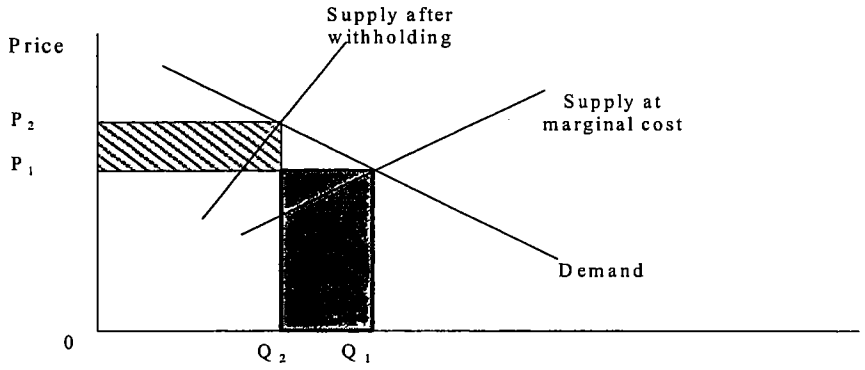
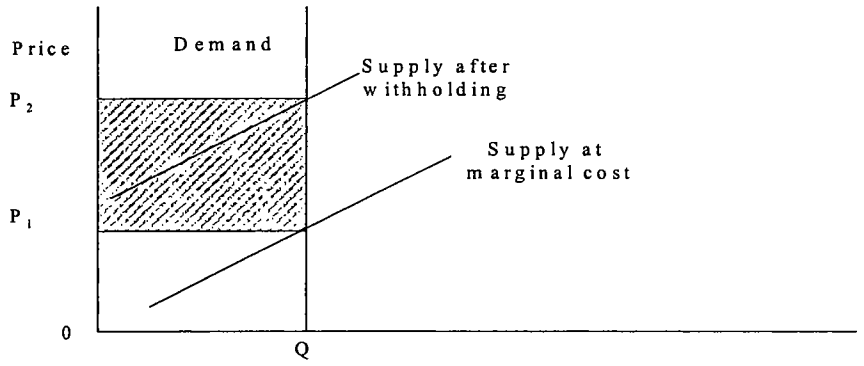


Figure 4-2b
Profitability of Withholding Market with Inelastic Demand



The difference between this situation and one in which demand is elastic is important. The essence of competition is sellers competing to capture customers served by other sellers: "If you raise prices to your customers," any competitor

by all sellers. As oil demand is somewhat elastic, the actual situation is much as depicted in Figure 4-2a.

would say, "I will offer them lower prices and steal them from you." In inelastic markets, this doesn't work. Buyers don't cut back their purchases as price goes up, so a seller has much more confidence that customers will not defect to competitors when they raise their price. It is easier to reap the benefits of higher prices and profits charged to the same customers. In other words, with inelastic demand there is far more incentive for sellers to collude, tacitly collude, or simply sit back and go along for the ride when one or more sellers withhold.

B. Scarcity Rents are not Disciplined by Demand

For buyers, the implications are reversed. All buyers pay higher prices, and price increases are very sensitive to the amount of withholding. It is also difficult or impossible to apportion the higher prices to customers who have a higher willingness or ability to pay higher prices. This suggests some of the reasons why increases in bulk power spot prices have triggered such high levels of concern.

Perhaps the most important function of price signals is their ability to alert the marketplace that more supply is needed, or more demand reductions are required. When demand grows relative to supply, prices rise. Buyers see that they should reduce less essential purchases (those that are simply no longer "worth it" at the higher price) and sellers see that they might make money on new supply investments.

Competition ordinarily causes higher prices to lead to a natural process of searching for and finding a new equilibrium of demand and supply. The cycle begins with an imbalance between supply and demand, with demand growing relative to supply such that prices rise above their original level (Figure 4-3a). Prices rise, first to P_2, and sellers see that there is more money to be made by competing for the new demand. Sellers respond to the higher prices by expanding supply and marketing efforts. Ordinarily, the expanded supply efforts will bring prices back down, though not necessarily to where they were before the demand increase. In the figure, prices end up at P_3, higher than the original P_1, but not necessarily at P_2.

The genius of the market mechanism is that the market itself finds the new equilibrium. An essential part of this new equilibrium is that each and every buyer is able to decide whether they want to continue to buy after a price increase or decline to buy. The slope of the demand curve means that buyers have alternative choices – to substitute other products or other vendors, or simply to "do without" – so that as prices rise, buyers can cut back. If buyers can make these choices, then the market clears efficiently when the willingness of buyers to pay for new supply just equals the cost of new supplies from sellers. The scarcity premium helps signal the need for new investment. However, as the cost of new supply increases, eventually sellers run out of customers willing to pay for it.

When demand is inelastic (Figure 4-3b), scarcity premiums no longer serve as a valid signal for the value that users place on additional output. In the electric industry, most retail customers do not see price signals and also have almost no ability to respond to prices. As a result, unlike the case in Figure 4-3a, the equilibrium level of capacity will not be at the point where the costs of the

marginal unit equals the true willingness of the marginal buyer to pay. Instead, the lack of demand responsiveness will result in distortions of production and consumption decisions. Since no one is cutting back on their demand, how are suppliers able to determine how much more to build? And if they build more, they simply lower every seller's price, including their own. As noted above, they maintain sales as prices go up.

In other words, with inelastic demand a scarcity-induced price increase does not create a practical mechanism for the market to decide how much more capacity to build. Price increases *do* signal that more capacity is needed, but they don't give a guide as to how much more is needed. As a result, there is an immediate argument over whether the size of the price increase is too large or too small to signal the correct amount of investment. More importantly, there is no natural market process that will bring supply and demand into balance.

This description is, of course, highly simplified. Moreover, hourly demand and supply in the spot market are heavily influenced by unpredictable conditions such as the temperature, water conditions, plant outages, fuel costs, and other factors. Thus, a sudden but fleeting imbalance of supply and demand "scarcity signal" is an uncertain basis upon which to make a long-lasting new supply investment.

One benefit of generation competition is that it gives incentives to private sellers to learn how to interpret scarcity signals and make decisions as to where and when to add new supply. The control of spot prices in the power markets attenuates the scarcity signals and makes new investment decisions even more difficult and uncertain.

Figure 4-3a
Scarcity Rents
Market with Elastic Demand

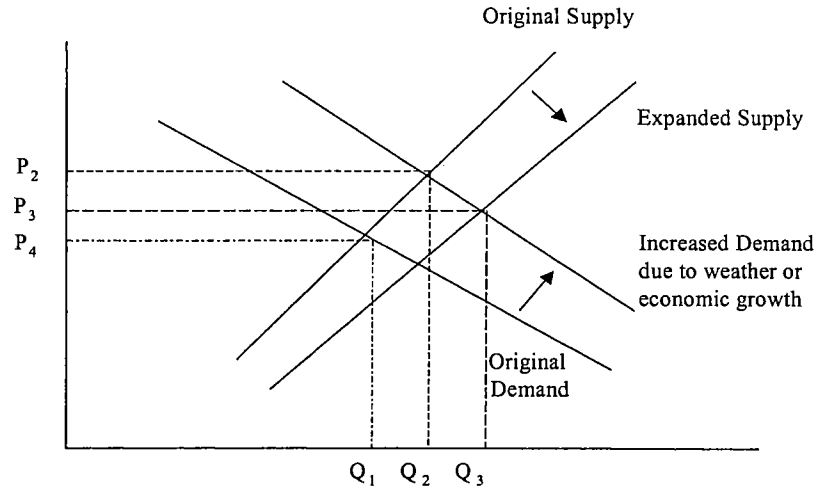
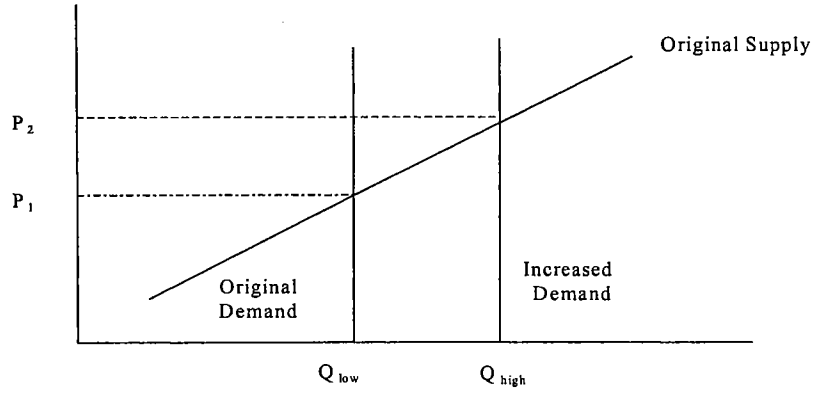


Figure 4-3b
Scarcity Rents
Market with Inelastic Demand



C. Spot Price Signals, Long-Term Purchases, and Supply Investments

Several additional important features complicate the difficult dynamics of power markets with inelastic demands. The markets we are talking about, so far, are all hourly or daily spot markets. In these markets, power demand tends to be inelastic.

There are also longer-term power markets, with transactions that take place over months, quarters, and years. The products traded in these markets are partial substitutes for the power needed in spot markets. The degree to which they substitute depends on industry structure, state regulation, and the risk preferences of buyers. Generally, most power suppliers prefer to purchase (or own) some long-term supply resources, some intermediate-term resources (0.5 to 2 years in duration), and some short-term supplies. The exact proportions depend on many factors.

The Commission has repeatedly held that if it controls market power in the spot markets, it will inherently control market power exercised (or that could be exercised) in the longer-term product markets.[48] The Commission recognized in

48. SMA Order, *supra* note 6.

Applying mitigation to spot market transactions will also result in mitigation of generation market power in longer term (forward) markets by creating a kind of competitive "standard offer" service for customers. If sellers attempt to charge excessive, non-competitive prices in forward markets, customers can avoid them by waiting to purchase in the real-time market. This puts market pressure on sellers to offer competitive prices in the forward markets. And when sellers offer competitive forward prices, many buyers will prefer to purchase in the forward markets in order to gain price certainty.

Id. at 61,972.

the mid-1990's that it should not be possible to exercise market power for a period longer than it takes to build a new power plant, because any buyer who felt the victim of generation market power would seek to build its own power plant, or contract with a third party to do the same.[49] The maximum period over which market power could be exercised, according to this reasoning, would be a planning and construction period, typically three to four years.

The nature of the substitution relationship between spot and longer-term markets is extremely complex. On the one hand, the products are not perfect substitutes. It is prohibitively risky and expensive to rely completely on either spot or long-term power. On the margin, many sellers can substitute, but some cannot. For example, many state-regulated utilities cannot increase their long-term purchases or supply investment without regulatory pre-approval. In addition, surplus purchases on the medium-term and long-term markets become additional future spot supplies, as future demand is uncertain, and supply and demand must match exactly in every time period.

To the extent these products are substitutes, the ability to substitute long-term contracts for short-term purchases introduces effective price elasticity. When prices increase in the spot market, typically in a volatile fashion, buyers are encouraged to substitute long-term purchases, which usually have much less volatile prices. In effect, this is ultimately what California did when the California Department of Water Resources (CDWR) began to sign long-term supply contracts following the Western spot price increases of Summer 2000.[50]

As noted above, if the spot price of power is over controlled in the name of market power prevention, new suppliers will have no incentives to increase supply. There will be no scarcity signal whatsoever and no hope of inducing new supply. At the same time, buyers will have little incentive to purchase long-term substitutes, since the price of spot power is controlled at a low level. In fact, if spot prices are kept near marginal costs, and the unit costs of long-term purchases or self-build options are approximately the fully allocated average cost, spot purchases may look like the cheaper option. Of course, this is ultimately a self-defeating course, as new supply will not be built under these terms, thus further contributing to high prices in the future when demand catches up to supply. It also encourages poor portfolio planning, *i.e.,* over reliance on spot markets – one major source of the Western power crisis of 2000.

However, there are also limits on the effectiveness of relying on high spot prices to induce the appropriate amount of buyer product substitution. Aside from the fact that some buyers cannot substitute easily, or at all, the time delay in (a) obtaining the ability to substitute purchase durations and (b) bringing new supply on line and non-storability, means that price increases might be sustainable for much longer than one hour or one day – perhaps as long as several years. It is during these periods – periods when new supplies are given incentives, planned, and constructed – that the debate rages over whether the scarcity premium in power prices is too high or too low to induce the right

49. *Kansas City Power and Light Co.*, 67 F.E.R.C. ¶ 61,183 (1994).

50. Long-term contracts theoretically cannot immediately alleviate short-term market power if the latter is caused by an existing supply deficiency.

amount of new supply.

The result of all these considerations is that the control of market power in spot markets is a many-edged sword. Over-control attenuates the signals new suppliers need to invest and buyers need to make wise purchases. It is also not a complete substitute for controlling market power in longer-term markets because: (1) there is incomplete product substitutability between long-term and short-term products; and (2) stronger control in spot markets discourages reliance on longer-term markets, which in turn increases the vulnerability of short-term markets to market power.

More work is needed on this question, including consultation with state resource planners and unregulated suppliers. However, one avenue for consideration is clear. If the Commission is concerned about market power during the period between daily markets and new supply gestation, it should address this directly, not via control of the spot market. By addressing the intermediate and long-term markets directly, it will not encourage buyers to rely more on spot markets than they should.[51]

D. The Special Features of Electricity Markets: Implications for the Choice of Competitive Standard.

These considerations begin to suggest the challenges for either a performance or a behavioral standard. If market power problems in spot markets are transitory yet severe, this implies that market performance deteriorates quickly and then is restored to health, perhaps just as quickly. Indeed, some observers of power markets believe this description is appropriate.[52] From the standpoint of performance measures, the performance metric shifts over time and performance measures must be nimble enough to assess conditions during different time periods. In addition, during these brief episodes, it is necessary to distinguish between legitimate scarcity signals and undue market power. It is also necessary to balance protection against short-term market power with protection of buyers in forward markets so as not to distort appropriate purchase duration portfolios.

All this places very large demands on market power evaluators. As an example, unless one is collecting all the data one needs to assess performance frequently, how can one assess deterioration? Moreover, this need to collect data flies in the face of a competitors' understandable desire to be free of governmental data collection efforts, especially concerning their costs and other sensitive information. Additionally, as discussed below, near-real-time data that is made public can itself facilitate competitive harm.

The uniqueness of electricity also creates special problems for behavioral standards. As we discuss in greater detail in section V, there are pro-efficient reasons why withholding (as the Commission defines it) could occur. A decision

---

51. This consideration should include a careful assessment of the influence of environmental and energy policies on short-term and long-term markets.

52. David B. Patton, *Detecting and Mitigating Market Power in Competitive Electric Markets, American Antitrust Institute Workshop on Market Monitoring* (2001), [hereinafter Patton].*at* http://www.antitrustinstitute.org /recent2/166.cfm.

to withhold generation in one hour today may be efficient if it is genuinely likely that such withholding reduces the ability to sell it at a point in the future where it is more valuable and therefore more profitable. In addition, a number of electricity sellers remain subject to state utility regulation, contracts, or RTO market rules. These specific rules induce or direct the utility to operate the system in certain ways. For example, it may be necessary to meet state reliability requirements even if it is not more profitable to do so. Other sellers are entirely exempt from FERC authority, so their behavior cannot be policed or changed by the FERC, at least directly.

In short, the unique features of power markets render the detection and punishment of market power an extraordinary challenge. Power is purchased in a set of product markets with durations from minutes to years. Over-control in the spot market harms new supply and distorts purchase behavior. However, the low elasticity of demand renders the spot market (and other markets within new supply gestation periods) vulnerable to market power and lacking any natural ability to moderate or defeat it.

The Commission has correctly recognized these unique challenges and the importance of introducing price-responsiveness in demand as soon as possible. Until this occurs, however, the challenge remains considerable.

V. THE PROPOSED BEHAVIORAL PROHIBITIONS

A. Market Power and the Primary Conditioning Language

In the section 206 Order, the Commission proposed a bright-line standard of illegal behavior. The language begins with a new general provision. "As a condition of obtaining and retaining market-based rate authority, the seller is prohibited from engaging in anticompetitive behavior or the exercise of market power."[53]

As an initial matter, this choice of language is unusual because it appears to prohibit *any* exercise of market power. Market power, or the ability to influence price, is one of the primary motivating forces for competition, innovation, cost reductions, and quality improvements. Long ago, antitrust jurisprudence recognized that the antitrust statutes should not prohibit the mere acquisition of market power if it occurred through the legal pursuit of better products or service. In other words, it is necessary to distinguish market power acquired through illegal means, and towards illegal ends from that acquired through superior performance.[54]

The use of unconditioned language could indicate the Commission's opinion that there are no instances in which the acquisition or use of market power in electric power markets is permissible. In effect, the language says that *any* ability to charge a price higher than one's rivals is *per se* illegal. Professor Borenstein argues that, although this standard is strict, it may be appropriate.

> Some analysts of the electricity industry have raised the concern that price-taking

53. *Investigation, supra* note 3, at 61,976.

54. BORK, *supra* note 22, at 72.

> behavior on the part of every firm is simply too strict of a standard to be used as a benchmark. They argue that it is unrealistic to think that no market power will exist, since there is market power present in most markets. Though market power exists in many markets, there are also many markets in which virtually no market power exits: most agricultural and natural resource markets, for instance. These industries are notable for producing virtually homogenous products and selling them over a large geographical area, characteristics that bear an important similarity to the electricity industry.[55]

The next section shows that there are many acts that could be viewed as withholding or the exercise of market power, but which are not welfare reducing. For example, suppose one power generator excels at maintaining power plant availability. Buyers should be willing to pay a premium for this more reliable power. Technically, this is the exercise of market power, but it is market power in a highly salutary form. The Commission should therefore reject this absolute standard, lest it discourage too much pro-competitive behavior along with the anticompetitive behavior it must stop. While electricity is very much a special commodity in our economy, it remains true that any introduction of competition among suppliers must allow them to reap some of the benefits of better reputation and performance legally obtained.

It is doubtful that the Commission intended to discourage the legal pursuit of better performance and customer service. Whatever the reason for using the simple phrase "market power," such language suggests a perfect rather than workable competition standard.

B. Proposed Illegal Withholding Behavior

The Commission's definition of anticompetitive behavior centers on two prohibited activities: physical withholding and economic withholding. The former consists of not offering sales when physically able to do so; the latter, offering sales at a price intended to be so far above the market that no willing buyers will purchase. The exact language is:

> Anticompetitive behavior or exercises of market power include behavior that raises the market price through physical or economic withholding of supplies. Such behavior may involve an individual supplier withholding supplies, or a group of suppliers jointly colluding to do so. Physical withholding occurs when a supplier fails to offer its output to the market during periods when the market price exceeds the supplier's full incremental costs. For example, physical withholding would occur when a generator declares a forced outage when its unit is not, in fact, experiencing mechanical problems, and when the market price is above the unit's full incremental costs. Economic withholding occurs when a supplier offers output to the market at a price that is above both its full incremental costs and the market price (and thus, the output is not sold). For example, we would expect that, during periods of high demand and high market prices, all generation capacity whose full incremental costs do not exceed the market price would be either producing energy or supplying operating reserves. Failing to do so would be an example of economic withholding. Withholding supplies can also occur when a seller is able to erect barriers to entry that limit or prevent others from offering supplies to the market or

55. Severin Borenstein, *Understanding Competitive Pricing and Market Power in Wholesale Electric Markets* 3-4 (1999), [hereinafter Borenstein] *available at* http://repositories.cdlib.org/iber/cpc/CPC99-008.

> that raise the costs of other suppliers. Examples would include denying, delaying or requiring unreasonable terms, conditions, or rates for natural gas service to a potential electric competitor in bulk power markets.[56]

This proposed language can trace its lineage to sound theoretical concepts. In perfectly competitive markets, with correctly defined marginal costs, no seller fails to sell when market price is above its true marginal cost.[57] Theoretical propriety notwithstanding, the Commission's language is so strong that it does not meet several of the six optimal enforcement objectives described in section II. Under this language, any instance in which a generator has unsold capacity whose apparent incremental cost is at or below the apparent market price is withholding, and therefore subject to refund. Such language does not allow for many situations in which one of the conditions in the Commission's definition is not met, yet no anticompetitive behavior is intended or occurring. In contravention of good enforcement policy, the standard will tend to catch non-violators, discourage efficient behavior, and incur large enforcement costs.[58]

Indeed, even in Professor Borenstein's perfect world, we may observe prices higher than marginal costs.

> If the industry marginal cost (*i.e.*, supply) function, which is the aggregation of all firms' supply functions, exhibits distinct steps – as is often thought to be the case in the electricity industry – then a competitive market equilibrium may be reached at which the price exceeds the marginal cost of even the last unit of output produced, but is still less than the marginal cost of producing one more unit of output. . . . Similarly, if all units of production are in use, then the intersection of supply and demand can occur at a price above marginal production cost of any unit. . . . Thus, *in the absence of market power by any seller in the market, price may still exceed the marginal production costs of all facilities producing output in the market at that time.*[59]

If a price-cost margin is the telltale sign the Commission would use under its standard to find withholding behavior, it will need tools and information able to distinguish benign from impermissible instances where price exceeds marginal cost.

There are many reasons why behavior that would be classified as withholding under the Commission's standard might occur in today's electric power markets without an intent (or sometimes even the ability) to exercise market power. More accurately, there are many reasons why either actual or *perceived* behavior may not be anticompetitive, including the following.[60]

Price definition and dispersion. Centralized electricity markets clear at a single price at any one time. Even in these markets, economically efficient prices are strongly locational in nature, and locational differences are not always

---

56. *Investigation*, *supra* note 3.

57. Borenstein, *supra* note 55, at 2-3.

58. Many of these points are also made in the comments of the Federal Trade Commission in this proceeding. FTC, *supra* note 24.

59. Borenstein, *supra* note 55, at 3.

60. Many of these general points were made in response to the Commission's inquiry into market power in the California markets. STAFF REPORT TO THE FEDERAL ENERGY REGULATORY COMMISSION ON WESTERN MARKETS AND THE CAUSES OF THE SUMMER 2000 PRICE ABNORMALITIES, PART 1, 5-16 (2000), *available at* http://www.ferc.fed.us/electric/wem-2000.htm.

without controversy. In markets without fully operational locational pricing and standardized spot market products, which will probably describe the majority of U.S. power markets for at least some years to come, there are neither standard market prices nor products. The Commission will have to determine, in each case, the appropriate market price applicable to the quality and attributes of the product offered. The Commission may press forward with a standard market design, but this is unlikely to resolve this issue in the near term, and perhaps the long term as well.

Opportunity costs not equal to measured incremental costs. Perhaps the most difficult aspect of this language is the fact that the marginal costs of sellers must reflect not only their true-recorded marginal costs, but also their opportunity costs over longer time periods. If production today does not affect production tomorrow there is no difference between opportunity cost and today's marginal cost. However, all generators have some cumulative output limitations, whether due to maintenance cycles, limited fuel inventories, emissions limits, or other factors.

As an example, it is economically efficient and not anti-competitive for the owner of a hydroelectric facility with a fixed water supply to withhold production today if she legitimately foresees higher prices tomorrow, even if today's price is greater than marginal cost. But the need to judge whether behavior is intentional withholding or a legitimate search for higher profits confronts such thorny questions as; was the forecast of future market prices legitimate,[61] or did the seller face a legitimate constraint not of its own making?

To answer the latter question the investigator needs to rule out legitimate reasons for not selling output from a particular unit at a particular time. Some of the possibilities that must be ruled out include the following questions.

Did transmission limits prevent a sale? There are two circumstances in which limitations on transmission may result in physical withholding and/or higher prices. First, in many electric networks, utilities with transmission assets must have an ability to maintain reliability in their electric systems. This requires a particular generation unit, or combination of units, to withhold their output in order to provide reactive power and voltage supports, creating an unintentional withholding of their outputs. Second, transmission congestion may unintentionally cause a price disparity between control areas with and without transmission constraints. A more expensive unit located inside the transmission-constrained area is dispatched instead of a low-cost unit located outside due to limitations on transmission capacity serving those areas.

Did a potential seller forgo production because of the inability to locate a buyer? Wholesale power trading in non-ISO markets is dominated by bilateral contracts that are privately negotiated or facilitated by a broker. No power

61. With respect to this aspect of the proposed standard, one FTC economist recently commented that "Basing penalties on the 'accuracy' of a firm's projections of unknown circumstances may present substantial investigatory challenges, especially within abbreviated deadlines for discovery." John C. Hilke, *Market Monitoring Is the Glass Half Full or Half Empty?* 3-4 (2001), [hereinafter Hilke] *at* http://www.antitrustinstitute. org/recent2/166.cfm. Dr. Hilke's comment "does not purport to reflect the views of the Federal Trade Commission or any individual Commissioner." *Id.* at 1 n.1.

exchanges settle trades at a uniform clearing price. Traders solicit deals and exploit arbitrage opportunities via telephone or other simple trading arrangements. Thus, there is no guarantee that trades can be matched between buyers and sellers, *i.e.*, buyers and sellers cannot find a trading partner. In this case, a seller's inability to locate a buyer should not be interpreted as withholding output.

Was capacity unsold to meet fluctuations in retail load obligations or protect against outage risks? Many utilities are obligated to serve their native load, and many are subject to reliability council reserve requirements. Thus, they must hold capacity for unexpected events, either random outages of their power plants or bad weather that may cause the demand for electricity to rise (such as the Midwest price spike in 1998). Although the Commission recognizes this fact as it defines uncommitted capacity equal to "generation in excess of each hourly projected peak load and minimum required operating reserves,"[62] some sellers with risk aversion may want to maintain higher reserves than the minimum necessary or required levels.

Did unit commitment considerations cause a unit to remain off-line? Due to their operating limits, some generators will not be economically dispatched on an hourly or daily basis. Thermal generating units have some operating limits, particularly on how quickly they can start up and shut down. They also require minimum levels at which they can generate. Unit costs are dependent upon operating levels. Thermal heat unit rates tend to be much higher at low operating levels causing high unit costs at these levels. Consequently, their dispatches are determined at least one week ahead, since this is their cycling timeframe.[63] Such units will commit only if the payment for generating electricity is sufficient to compensate for all of start-up and shut-down costs. In practice, utilities often run a chronological study incorporating heat rate curves and unit commitment logic to determine if this type of unit is appropriate for dispatch.

Was a unit off-line because of planned maintenance outages? Generators usually schedule their generation maintenance and planned outages during hours in which they anticipate uneconomic operation. This type of unit non-operation is needed to help maintain the reliability of electric operations.

Was a sale not consummated because of the credit risks associated with a particular buyer or seller? When utilities enter into bilateral contracts, they may become subject to the risks that a counter party will default on its obligations. Thus, it is common for utilities to restrict sales to firms that have approved credit ratings. If agreement regarding credit provisions cannot be reached, sellers may prefer not to sell rather than to risk unacceptable financial exposure.

The Commission undoubtedly wants its actions to punish market power violators to withstand judicial scrutiny. If so, it will probably be necessary for it to consider these and other possible reasons why apparent withholding either was not invidious withholding or did not cause harmful impacts. This has a number of enforcement process implications.

---

62. SMA Order, *supra* note 6, at 61,971.

63. The cycling timeframe is the minimum period over which it is physically or economically feasible to turn a unit on and off.

First, the Commission would have to gather considerable amounts and types of information to properly analyze the situation. It is significant that the Commission has identified almost no parties engaging in prohibited behavior in Western power markets over the 2000-2001 period in spite of extensive research on the part of the California ISO (CAISO) and other experts, and extensive discovery and assembly of an enormous hearing record in its refund proceedings.[64]

In a similar vein, there will be considerable enforcement resources required for sorting illegal from legal conduct in this approach. As noted in the previous section, refund remedies or damage estimates require an analysis that estimates counterfactual price changes resulting from a single actor's prohibited behavior. This behavior may be complex, changing over time and hard to correlate directly with quantities or prices.

As an example, suppose we determine that Seller A intentionally withheld output by using a computer algorithm for unit commitment that used inflated values for start-up costs. The only way to determine how much more output the Seller would have sold, and at what price, is to rerun the commitment software with external conditions as the Seller encountered them. Even then, commitment software will tell only how much more the plant could have been available. It does not guarantee that the plant would have been dispatched in all instances.

Finally, this approach shares an infirmity with the SMA mitigation related to its potential for under compensating generator fixed costs. Many observers note that deregulated generators are not guaranteed recovery of their fixed costs. However, when generators do not cover their fixed costs they will not dedicate capacity to the market, reducing investment in generation. Moreover, the Commission's regulatory approach must not constitute highly opportunistic or retroactive ratemaking, both of which have been found unlawful.[65] All these issues are examined in more detail in Section VII in connection with the similar marginal-cost-based mandatory mitigation in the SMA Order.

In short, the Commission's unconditional prohibition of market power and withholding is overly strict and difficult to administer. The unconditional language it proposes for prohibited conduct will require costly and intrusive efforts to distinguish between harmful and benign behavior. Even then, litigated results are destined to be controversial, and many utilities will forsake efficient behavior to avoid prosecution.

C. Suggested Alternatives to the New 206 Conditions

The weight of all these considerations suggests that, to the maximum extent possible, the Commission's section 206 approach should be to evaluate markets using performance measures in advance, *i.e.*, through a continued pre-approval process. The process should focus on the strength of competition in the market, rather than specific sellers, and should employ one or more performance-based standards that are as broadly applicable and clear as possible.

---

64. *San Diego Gas & Elec. Co. v. Sellers of Energy*, 95 F.E.R.C. ¶ 61,418 (2001); *San Diego Gas & Elec. Co. v. Sellers of Energy*, 97 F.E.R.C. ¶ 61,293 (2001).

65. LEONARD SAUL GOODMAN, THE PROCESS OF RATEMAKING 165-67 (1998).

With respect to impairing pro-competitive behavior, a pre-approval approach is likely to be at least as good as *ex-post* behavioral review. A Commission determination that a particular market is, in prospect, likely to be workably competitive should give market participants at least slightly more confidence to engage in aggressive, pro-competitive strategies. This, in turn, should boost investor confidence in the generation sector as well, helping to ensure adequate capital at reasonable cost.

In addition, the Commission should consider promulgating a standard for markups above marginal cost that bears the rebuttable presumption that they are consistent with workable competition, and just and reasonable as a result.

The Commission has already created a number of explicit or implicit market power safe harbors in a variety of contexts. The merger evaluation process promulgated in Order 642 indirectly creates a presumption that price increases of 5% or less arising from a merger are just and reasonable.[66] Of course, this is the same *informal* standard used by the antitrust agencies for similar merger enforcement purposes, though they state clearly that this is not a formal rule. Several ISO/RTO market monitors also use a 5% rule for a *de minimis* markup in various contexts.[67]

Recently, market monitors at the CAISO performed a study of reserve margin requirements at the request of the California Legislature.[68] The ISO was asked to estimate the physical reserve margin needed to ensure workable competition. The ISO reported its findings by first noting that "at this time there is no established standard for a workably competitive market by any federal or state regulatory agencies."[69] The CAISO chose a 10% maximum allowed markup over recorded marginal costs as its threshold for the purpose of this study.[70] The ISO estimated that required reserves of 14% to 19% would be needed in its market to ensure that market forces kept markups at or below 10%.[71]

Assuming the ISO's computations are correct, its results suggest that a 10% *de minimis* markup is probably a more reasonable benchmark for electric power markets. Had the ISO chosen 5%, it would have undoubtedly found that significantly higher reserve margins would be needed to achieve the standard. We know the formally-regulated utility industry usually provided reasonably priced regulated service at about the same reserve margins as the ISO found with the 10% standard, and that well-functioning competition should use generation capital more intensively, not less. While we know that power markets are far

66. 18 C.F.R. § 33.3 (2002).

67. For example, ISO New England's Market Rule 17 employs a screening price 5% above a "reference price" as a basis for setting allowed markups for out-of-merit bids. New England Power Pool FERC Electric Rate Schedule No. 6, Sec. 17, App. B (2000) *available at* http://www.iso-ne.com /mrp/ MRP-17_Market_Surveillance/.

68. Anjali Sheffrin, *Preliminary Study of Reserve Margin Requirements Necessary to Promote Workable Competition* 1 (Nov. 19, 2001), [hereinafter *Preliminary Study*] *available at* http://www.caiso.com/docs/2001/11/20/200111201556082796.pdf.

69. *Id.* at 4.

70. *Preliminary Study*, *supra* note 68, at 4.

71. *Id.* at 6.

from any equilibrium state, especially in California, but also elsewhere, the CAISO study is a more appropriate piece of evidence than a number chosen purely by tradition from non-utility markets. The fact that the standard emerges from a market formerly in distress makes it more appropriate, not less.

There are many pros and cons of using a relatively more or less strict definition of workable competition for safe harbor purposes. A stricter approach provides greater assurance of consumer protection, especially if the standard is simply a screen that triggers further scrutiny.

A less strict approach achieves two goals of the enforcement process by reducing the required enforcement resources and by not deterring as much favorable behavior. It also allows markets to equilibrate over the long run, avoiding structural imbalances such as those which occurred in California (though it is not necessarily sufficient to guarantee adequacy). The ability to earn excess rents on one's generation investment is the traditional signal markets use to induce more investment, and vice-versa. If workable competition standards press against this equilibration function, regulators will have to manage investment through other markets and policies, such as the ICAP markets.

Thus, there is a general but important connection between the strictness of safe harbors, and the need to continue to oversee and perhaps manage generation adequacy. If the Commission is too strict in its regulation of market power, it will need to continue its oversight of generation investment. So will other important stakeholders such as the state public service commissions and the non-jurisdictional sector. Less strict standards will allow generation capital to adjust more freely, requiring less long-term oversight. This highlights an interesting conundrum not found in traditional antitrust markets: tougher [behavioral] antitrust standards in electric power may ultimately beget a more strongly managed quasi-competitive industry.

VI. DELEGATION, SCREENING, AND OTHER PROCEDURAL ASPECTS OF THE SMA PROCESS

A. Optimal Strictness in the Enforcement Process

For discussion purposes, the notion of an economic standard for workable competition can be viewed as distinct from the process by which the standard is applied. If we put aside the issues in articulating a standard, two closely related and important aspects of the enforcement process remain. The first of these aspects is the "strictness" of the process; the second is whether the process is a pre-approval (*ex-ante*) process, post-transaction review (*ex-post*), or both.

No process for determining whether a sale occurs under workable competition will be perfect. Any *systematic* evaluation of competition tends to err towards making either one of two possible mistakes. The process can either err on the side of preventing competitive sales even when they *should have* been allowed, given perfect information, or the process can tend to allow unregulated sales when the market was not actually workably competitive. For simplicity, we refer to these alternative regimes as "more strict" and "less strict,"

respectively.

Should the Commission adopt a process that is more strict or less strict? The fundamental considerations that govern the benefits and costs of more or less strict market power tests are the same as for all other goods. Simply put, the aggregate net public benefits of a more strict control policy should be weighed against the net benefits of a less strict regime.[72]

A less strict approach will allow easier access to market-based rates. To the extent that true workable competition provides overall benefits, more of these benefits will be realized. However, by definition, this approach will allow some episodes of market power to "slip through" the permission stage. This will lead to more frequent, and probably more severe, after-the-fact investigations and remedies if the process allows them.[73]

A "more strict" approach is nearly the opposite. The net benefits of competition will not be as widely shared because fewer sellers will, by definition, pass the test for deregulated sales (or they will face greater mitigation, which also has costs). In addition, there is a danger of a perverse cycle: over-strict enforcement chills merchant investment, reducing new supply and exacerbating shortages. Practically speaking, this may lead to more traditionally regulated supply, thus transitioning the market from market-based sales back to regulation.

If the process uses pre-approvals, there should be fewer episodes of illegal market behavior observed and therefore fewer *ex-post* investigations and mitigations. If the process is entirely *ex-post*, sellers may be scared to violate a strict test, deterring pro-competitive as well as anti-competitive behavior, and there will also likely be many *ex-post* inquiries and remedies.

One approach of enforcement is to single out individual sellers. This makes the legal burden of proof more manageable and narrows the range of structural and behavioral solutions to those involving only the alleged violator. By comparison, applying a market-wide approach to granting MBR requires, for a market that does not pass muster with no changes, the Commission to decide from among a huge range of remedies that do not affect the participants equally. For a market not meeting the test, should the Commission deconcentrate only the largest seller? All sellers? The largest several sellers? Place units within submarkets under "must-run" contracts?

While a shift to market-wide approvals is an enormous procedural departure, the Commission has slowly and informally moved in this direction for some time. It has granted market rate authority on a multiple seller basis in California, New England, and PJM as part of establishing the balancing markets created by these ISOs.[74]

---

72. *See generally infra* Section VII. The Commission recently released a staff discussion paper that appears to incorporate this reasoning. FERC, MARKET-BASED RATE OPTIONS PAPER, (Sept. 26, 2001), [hereinafter OPTIONS PAPER] *at* http://www.ferc.fed.us/calendar/commissionmeetings/discussion_papers/9-26-01/Public.pdf.

73. In addition, the antitrust authorities are free to pursue export investigations under their enabling statutes.

74. *See also New England Power Pool*, 85 F.E.R.C. ¶ 61,379 (1998); *Central Hudson Gas & Elec. Corp.*, 86 F.E.R.C. ¶ 61,062 (1999).

Market-wide approvals for MBR highlight the general problem the Commission faced in the Western U.S. market episodes of 2000 and 2001. When a market having market-wide MBR approval no longer meets the test of J&R rates, the Commission must decide whether to single out particular sellers who are responsible, or to restore the market generally to J&R rates without prosecuting individual sellers. The Commission recognized this distinction in the September 26, 2001 Commission meeting. Commissioner Massey sought clarification about whether the blanket tariff amendment to all MBR tariffs gave buyers or the Commission authority to request refunds when illegal market behavior cannot be demonstrated, but it is clear that the market is no longer workably competitive. The Commissioner was assured that this was the intent of the tariff amendment.[75]

The fact that the Commission has apparently clarified that rates found to be unjust and unreasonable are now subject to refund relieves it of the need to establish whether a particular seller intended to act impermissibly. However, since at the same time the Commission established a right of refund during dysfunctional periods, the question remains as to which seller or sellers are liable for such refunds if none have been found specifically to violate behavioral restrictions. As noted in a centralized market, all buyers pay the price for one errant seller. The problem is further exacerbated by incomplete jurisdiction over all sellers.

This does not suggest that market-wide approvals are economically disadvantageous. To the contrary, economic theory supports the notion that it is a market that is either competitive or not, not a seller. It further highlights the widely held belief that pro-competitive government market controls should focus on the strength of competition, not the fate of individual sellers.

B. The Role and Design of Market Power Screening Tests

Many enforcement processes employ at some point a test or a screen for non-workable competition. Screening tests, subsequent analysis, and mitigation measures go hand in hand. The efficacy and strictness of the process is set by the *practical ability* of market participants to use and combine these and all other elements effectively.

There is an important interaction between the construction of the enforcement process and the legal standards of proof applicable to its use. For instance, the American system of criminal justice presumes innocence until guilt is proven. The severity of the standard of proof usually varies with the severity of the crime and its remedy or punishment. In administrative proceedings, however, the preponderance-of-evidence standard is often applied, and the burden of proof is sometimes placed on the respondent.

Any approach the Commission chooses must in its totality meet the standards of proof applicable to the FPA and other applicable statutes. But there is an analogous consideration that applies *within* the Commission's process, *i.e.* before it reaches the point of final legal action. In other words, if a test

75. Transcript of the September 26, 2001 Commission Meeting, 113-14 *at* http://www.ferc.gov/calendar/commissionmeetings/transcripts/9-26-01.pdf.

determines guilt, it must contain a low probability of "false positives." If a test merely determines the likely innocent from the possibly guilty, it can take a more balanced approach. It is critical that the Commission distinguish between tests that are designed to isolate clearly innocent parties from tests and processes designed to isolate impermissible actions.

The American justice system is filled with many examples of both types of tests. The IRS uses many screening tools to separate taxpayers who are unlikely to have violated the law from those who may have. The latter are not automatically penalized for failing the screen, but rather are called in for an audit process that more carefully examines alleged guilt or innocence.[76]

The most prominent use of a screening test in market power control process is the review of mergers and acquisitions by the U.S. Department of Justice and the Federal Trade Commission. These agencies have published guidelines "DOJ/FTC Guidelines," or simply "the Guidelines" that contain a screening test and much discussion of what might occur if the screening tests fail.[77]

The screening test in the Guidelines is intended to have the following attributes: (1) it is a single framework applicable to a wide variety of transactions; (2) it is intended to be less complex than a full-scale investigation of market power; and (3) it is intended to identify cases that clearly need additional analysis from cases that the agencies are unlikely to examine further or disapprove.

Importantly, the DOJ Guidelines are not applied automatically or rigidly, nor are transactors subject to automatic mitigation if they fail the test. Thus, the sole purpose of the test is to separate out the "likely non-harmful" transactions from all others. The test is designed to fulfill this role reliably over repeated applications. Ideally, the DOJ/FTC screen identifies all mergers that are definitely not harmful and allows these mergers to pass the screen. All other tested transactions fail. To be conservative in this manner, the test is designed to fail many mergers that, upon further scrutiny, are found not to be harmful. It is precisely for this reason that no mitigation is automatically triggered when a merger fails the screens – instead, the situation is analyzed more closely.

One would not expect to use a similar screening test in an enforcement regime in which mitigation (*i.e.* amelioration of the harm) is automatic. Indeed, where amelioration is mandatory and automatic, screening tests are the opposite of the DOJ/FTC approach, *i.e.,* they are designed to carefully distinguish the guilty from the innocent. One prominent example of this screening/enforcement approach is the American criminal justice system. In this system, a very severe screen (innocent until proven guilty) is employed, but punishment is mandatory if a violation is proven.

This discussion is not meant to suggest that conservative screening tests are inherently wrong. The point is that the stringency of the test and the result of

76. *Publication 556, Examination of Returns, Appeal Rights, and Claims for Refund* 1-2 (IRS July 2002). The booklet notes, "[i]f your return is selected for examination, it does not suggest that you made an error or are dishonest." Instead, the criteria used is that "there is a high potential for an examination of your return to result in change to your income tax liability." *Id.*

77. *See also* 1992 Horizontal Merger Guidelines, 57 Red. Reg. 41,552 (1992) [hereinafter 1992 Guidelines].

failing the test must be calibrated jointly.[78] Screens that identify clear non-violators are different than screens that target clear violators, and the process that follows failing the screen will be different in the two examples.

The type of screening test employed fits naturally onto the securities versus antitrust spectrum of enforcement processes. At the antitrust end of the spectrum, the role of the screening test is to isolate transactions of no interest from all others that merit further scrutiny. Remedies follow a more extensive case-specific review process. At the securities end of the spectrum, the test may be designed to target violators specifically. Of course, alleged violators must always have due process rights, but this does not change the fact that the nature of the test is to demonstrate their guilt under an appropriate legal standard.

C. Other Process Attributes

Many other attributes of the market oversight process differ as one travels along the process spectrum between the two polar cases. A few of the key attributes and their relationship to the process spectrum are noted below.

Public information disclosure. Presumably an *ex-ante* approval process can be implemented with less *public* information disclosure, because the Commission satisfies itself in advance that workable competition will exist. This is analogous to the extensive information review the Justice Department conducts as part of the merger pre-approval process, all of which is kept confidential. In contrast, after-the-fact enforcement likely requires extensive public data, because market participants' complaints are an element of the enforcement process itself, and all parties need access to data in order to evaluate the possibility of anticompetitive outcomes.[79]

Need for a bright-line standard. Because it uses a pre-approval process, the antitrust approach inherently relies more on a FERC-articulated standard for allowing MBRs. In after-the-fact proceedings, the FERC must rely more on a rule of reason.

Range and Effectiveness of Remedies. Obviously, the range and severity of penalties greatly affects the strictness and efficacy of any control process. First,

78. More generally, the FERC's challenge is described as one of "optimal deterrence." This branch of the economics literature is based on the observation that there are a variety of costs associated with economic rules. These include the costs of allowing violations to occur, the costs of preventing non-violators from taking pro-efficient actions mistakenly, and the costs of the enforcement mechanism itself. Ideally, an enforcement scheme is economically optimal when the aggregate additional costs of undetected, uncorrected violations equal the aggregate additional cost of added enforcement and the losses from mistakenly barred pro-efficient activities. *See generally*, POSNER, *supra* note 19, at § 7.2. Indeed, the Commission may have used analogous reasoning to conclude that the possibility of adverse behavior by the set of sellers likely to fail the SMA was high enough that these sellers should be targeted and automatically mitigated with a relatively small expenditure of enforcement resources. The body of this comment suggests that, even if this was the Commission's overall reasoning, the SMA test and mitigation scheme have correctable defects significant enough to warrant substantial revisions that will be achieve the same goal.

79. One of the unsolved dilemmas of electric power markets is the optimal degree of information collection and dissemination. In this sense, information is a two-edged sword. Buyers and regulators need more information to evaluate markets, but greater information can facilitate active or tacit collusion. The latter possibility is discussed in more detail below.

the expected cost of incurring a penalty (*i.e.,* the probability of getting caught and convicted times the cost if convicted) is the main economic deterrent against violations. The notion of strictness may be seen as attempting to keep the probability of catching violators high, but if the penalties are weak, strictness is of little value in deterrence.

Degree of Standardized Market Design and Delegation to Market Monitors. A standard market design helps both approaches in different ways. In a standardized market, an *ex-ante* test for competition can be used with greater confidence. At the same time, a standard market will allow the FERC to give better (more consistent) guidance as to impermissible conduct. Among other things, this can allow delegated market monitors to use a more common set of rules.

These process attributes must be consistent within an overall approach for that approach to be effective and efficient. The essential point to note is that any process the Commission employs has to consider these and other associated attributes in order to be complete, coherent, and effective.

D. Conclusion

This section has shown that there is a complex, important relationship between the strictness in applying a standard for judging competition, the legal standard of proof, and the overall process used to allow market-based sales. The effectiveness or "strictness" of the process in serving its statutory functions can be judged only by looking at the practical function of the totality of the process, including the effectiveness of the mitigation employed.

One key attribute of these alternatives is the use of a screening test for impermissible market power. It is critical to distinguish between screening tests that merely identify candidates for further study or possible prosecution versus tests designed to demonstrate specific impermissible acts. Either can be used, but they play very different roles in the oversight process.

Finally, we noted that the process approach chosen is logically related to many other process attributes. These attributes include the allowed range of remedies, public information disclosure policies, the nature of the screening tests employed, and the degree of delegation to RTOs.

The next three sections examine the Commission's proposed new SMA approach to allowing MBR. Regrettably, this approach falls short of constituting a consistent and effective approach to certifying workable competition. Later sections examine amendments and alternatives to the SMA test that meet the Commission's obligations more effectively.

VII. THE COMMISSION'S SMA ORDER FRAMEWORK – GENERAL OBSERVATIONS

A. The Dual-Track Structure of the Process

The Commission's proposed SMA framework – the top layer of Figure 1B—is a mixture of approaches and process elements. Sellers within ISOs/RTOs with approved procedures are placed entirely within an *ex-post*

enforcement framework partially delegated to market monitors and enforced by complaint proceedings. Beyond this change, which is a dramatic *process* departure from the pre-approval approach (however weak it was), there is no discussion of information disclosure, allowed remedies, or other process attributes.

The new approval process for sellers outside of RTOs/ISOs with approved procedures is very different. Pre-approval is maintained, but an entirely new test is used. This new test is used to trigger a highly specific and new form of mitigation, implying that it is not a screening test like the DOJ Guidelines, but rather a test for innocence or guilt.

As the next several sections demonstrate, each half of the new framework is flawed and internally inconsistent. Before examining the two halves of Figure 1B individually, it should be noted that the basis for creating a dual process with such vastly different approaches is open to question.[80]

The ISO/RTO approach suggests that the Commission has concluded that the public interest is best served by allowing RTO market monitors to examine markets under their Commission-approved procedures, and either mitigate problems at the RTO or bring them to the Commission for resolution. In the presence of the requirement for workably competitive markets, this suggests the Commission has concluded that these markets almost always work well, and that problems that crop up are not so large as to warrant pre-approval. Yet at the same time, the new section 206 language enhances the Commission's authority to intervene when needed. Both aspects of the approach suggest a Commission conclusion that the MMUs and the Commission can remedy problems effectively after they arise, and further suggest a belief that such problems will be small, and/or infrequent, and/or easily remedied.[81]

---

80. There are some elements common to the two halves of the new framework. In particular, the Commission also adopted new tariff language applying to all sellers that prohibits sellers from "engaging in anticompetitive behavior or the exercise of market power" and changes the refund effective date to make all market-based sales subject to refund. *Investigation, supra* note 3, at 61,976. For the purposes of the present discussion, these changes can be viewed as enhancing the Commission's latitude to bring *ex-post* enforcement actions and impose an expanded remedy, namely refunds. They increase "strictness," but because they are applied after the fact, they create uncertainty as to their efficacy and costs for both buyers and sellers.

81. OPTIONS PAPER, *supra* note 72.

> The existing ISOs operate bid-based markets with Commission-approved monitoring and mitigation mechanisms that avoid many of the problems of cost-of-service regulation. Cost of service regulation should not be imposed on the sellers in these markets because it would disrupt these benefits. However, markets outside the existing ISOs lack these bid-based markets and alternative mitigation measures, so using one of the structural screens to determine whether to continue cost of service regulation for sellers in non-ISO markets is necessary for the short term. Bid based ISO markets establish separate market-clearing prices in each hour that reflect changing supply and demand conditions, encourage suppliers to minimize their costs, and rations supplies efficiently. The mitigation mechanisms used by ISOs can force sellers with market power to act in a more competitive manner without disrupting the efficiency benefits of the markets. The details of the mechanisms differ among the ISOs. However, all of them include capping individual supplier bids when identified conditions indicate the potential for market power. For example, bid caps may be imposed during reserve shortages, when transmission constraints create the potential for market power in load pockets, or when

The difference in approach in the non-RTO markets suggests that the Commission has reached nearly the opposite conclusion in these markets. Here, the half-approach would be appropriate if the Commission found that market power exercise by at least some sellers was more frequent and more harmful than it was in RTOs, that a test could be devised that would catch violators with high probability but not snare the innocent, and that an automatic new remedy was appropriate and effective.

The evidence that warrants continued pre-approval only in non-RTO markets is mixed. There is no evidence I know of that *horizontal* market power exercise by generation sellers (which is what MBR processes control) has been more common or more severe in non-RTO markets.[82] In some respects, the evidence probably goes the other way. First, most non-RTO markets are in parts of the U.S. where most sales overall are still regulated, and much wholesale supply occurs under bilateral contracts or integrated supply relationships. Many of these sales are still regulated, and many buyers are subject to cost-based regulation and considerable pressure to keep costs and rates down. In short, outside the RTOs most markets still rely strongly on vertically integrated utility structures and less on spot market trading.

Conversely, most ISO/RTO regions have eliminated retail rate regulation and the majority of the wholesale market trades occur at market rates. These regions have generally been the ones that have seen the more frequent price spike episodes and market rule changes. It hardly bears repeating that the CAISO markets were "ground zero" for the Western power crisis of 2000-2001. Less visibly, the Commission has investigated numerous market power complaints in ISO-New England, the NYISO, and PJM. The Department of Justice is reportedly investigating one ISO's markets as of this writing.[83]

There are two possible differences between non-ISO/RTO and ISO/RTO markets that enable the large difference in approach. First, it could be said that only in RTO/ISO markets has the Commission been presented with a market structure that enables it to give blanket approval to all sellers in the market. If it cannot reach such a determination in non-ISO/RTO markets, it simply cannot use the same process. Second, only in the latter does the Commission have available to it market monitors that leverage its resources.

In section IX, we argue that the Commission should use these considerations not to forsake its own market-wide scrutiny with ISO/RTOs, but rather to extend it to all markets in a consistent manner. This conclusion is

---

individuals submit bids substantially in excess of their previously accepted in-merit bids. In most instances when the seller's bid is capped, the seller receives the applicable market-clearing price, which may be higher than the bid. Thus, sellers have incentives to minimize their costs, and market-clearing prices avoid the need for administrative rules to allocate supplies among customers.

Id. at 5-6.

82. Conversely, vertical market power complaints (after involving access to transmission) are clearly more frequent outside ISOs/RTOs.

83. *John Hanger Sees Big Meaning in Justice Probe*, RESTRUCTURING TODAY (Dec. 21, 2001). The Commission has also investigated market problems outside ISOs, such as the Midwestern Price Spikes of 1998.

based in part on interim findings below that the pre-approval test applied to non-ISO/RTO markets is too narrow to diagnose the market and therefore does not fulfill the Commission's mandate.

It could also be that the Commission has reached a conclusion that *vertical* market power exercise, namely using one's control over transmission to benefit one's own generation, is more prevalent in non-RTO regions than RTO regions. The Commission may further reason that severe limits on MBRs for dominant sellers in non-RTO regions will cause them to join or form RTOs, thus eliminating vertical market power. Under this theory, the Commission's approach is warranted if it effectively reduces vertical market power that is costly, does not increase horizontal market power (in either RTO or non-RTO markets), and does not impose excessive costs on participants. A complete evaluation of this theory is beyond the scope of this paper. However, the following analysis casts doubt on the latter elements of this argument.

VIII. PIVOTAL SUPPLIERS AND THE SMA TEST

A. Introduction

The SMA test is based on the concept of a pivotal supplier. In a market with a fixed supply and inelastic demand, when nearly all available supplier capacity is already dedicated to buyer use and not all demand is satisfied, the remaining suppliers may become pivotal. This is particularly a problem in non-storable goods markets, since supply must exceed demand at all times – buyers cannot draw upon self-storage (inventories) to serve their needs.

The basic approach of the test, to check to ensure that no supplier becomes pivotal and therefore has market power, is entirely appropriate in electric power markets. However, like any market power analysis, the appropriate concepts must be properly applied. In this section we examine the Commission's proposed pivotal supplier test, which is the SMA test. While we find many shortcomings with the way it has been applied, we do not mean to reject the concept of checking for pivotal supplier market power.

The basic construction of the SMA test is straightforward. The test is based on the applicant's total installed capacity and the capacity of all other potential energy sellers. The test is done for each control area in which a seller owns capacity, and the results apply only to sales within that control area.

The capacity of the applicant is defined as the sum of total capacity owned or controlled through contracts. The capacity of the market is the sum of installed capacity in the control area and a minimum of either the total transfer capacity (TTC) from all adjacent markets or the total uncommitted capacity of potential sellers located in neighboring control areas.[84]

The SMA compares the amount of capacity controlled by the applicant to the difference between total supply (including the applicant's) and peak demand in the market. The difference between total supply and peak demand is referred to as the "supply margin." In order to pass the SMA and obtain market-based

84. SMA Order, *supra* note 6, at 61,971-2.

rates, the applicant's capacity must not exceed the supply margin.

$$\text{SMA Ratio}_j = \frac{\text{Applicant's Total Capacity}}{\text{Suppy Margin}_j} \leq 1$$

$$\text{where : } = \text{Supply Margin} = \text{Min}\left[\text{TTC}_j, \text{Uncommitted Capacity Outside}_j\right]$$

$$+ \text{Total Capacity Inside}_j - \text{Peak Load}_j$$

$$j = \text{control area}$$

The test is designed to identify sellers who have undue market power. For the test to fulfill its role, it should ideally (a) find all sellers in a market who have market power, but (b) find no sellers who do not have market power. In other words, the test should catch very few non-violators by mistake. The test should leave little room for "reasonable doubt" as to whether a violation has occurred. This section shows that the SMA does not seem to have been designed for this purpose. Moreover, the test has so many flaws that it is unlikely to yield *consistent* results – a harmful outcome under any circumstances and a particularly unwelcome result in today's power marketplace.

For a variety of reasons, the SMA test is unlikely to fulfill its role reliably. Some of the test's shortcomings will cause "failures" where there is little or no ability or incentive to exercise generation market power.

The use of an applicant's total capacity (either owned or controlled through contracts) does not provide a true picture of either the incentive or the ability of an applicant to exercise market power. First, many utilities may fail the SMA test in their own territories (control areas) because their systems must meet ongoing native load responsibilities. Since horizontal market power can be exercised only by withdrawing output, the capacity dedicated to retail service cannot be withdrawn without likely state regulator scrutiny (and often penalties). Capacity that cannot be withdrawn is not a potential source of market power and should not be counted as such in a test, especially if mitigation is mandatory.[85]

Another restriction on the ability to withhold not recognized by the test concerns the inability to reduce output from non-cycling capacity (such as nuclear power). This generation is too inflexible to permit intentional withholding, at least in the spot market.[86]

85. In merger enforcement, the Commission has recognized this by creating the product, Available Economic Capacity. *See also* Order No. 642, *supra* note 17, at 71,016. In addition, the DOJ/FTC Guidelines recognize that capacity committed to a sale and that cannot be diverted based on a price increase are not a part of the relevant market. *See also* 1992 Guidelines, *supra* note 77, at 41,557.

86. In a similar vein, any test or calculation used by the Commission for market power analysis should reflect unit deratings or required reserve capacity. We acknowledge that intentional unit deratings may be a means of intentional withdrawal of capacity from the market.

Finally, although the SMA test identifies whether an applicant is pivotal in a market, it does not test whether an applicant has an economic incentive to exercise market power. Many utilities are net buyers, notably at times of system peak. Even without being a net buyer, the applicant may lose revenues by withholding power as the power withheld is replaced by imports or power from other suppliers.

These shortcomings of the SMA all tend to cause the test to "catch" suppliers who do not have either the economic incentive or the ability to exercise market power, and therefore are not good candidates for automatic mitigation. In contrast, other aspects of the SMA calculation are likely to fail to catch sellers with potential market power.

The SMA test examines only the annual peak hour. In contrast, the demand for, and supply of electricity varies over time, depending upon weather, customer usages, plant maintenance and outages, and environmental permits. An applicant's capacity may not be pivotal during high-load periods or seasons, but may be pivotal during low-load periods or seasons. In addition, transmission availability in many markets changes substantially across the seasons, and is sometimes least available during shoulder periods.[87] If market power episodes were limited to summer peak hours, restricting the test to the summer peak would be a wise use of enforcement resources. At least in some markets, however, price spikes (which are not the same thing as illegal market power, but are one indicator) have not been limited to summer peak periods.

The SMA test adopts an implicit geographic market equal to North American Electric Reliability Council (NERC) control areas.[88] While this is an essential starting point, many electricity market power problems involve localized spots within control areas, or so-called load pockets.[89] There is no provision in the SMA test to account for sub-control area markets.[90]

The Commission's authority does not extend to all sellers. In some regions non-jurisdictional generators alone could fail the SMA test. Jurisdictional sellers (who had all passed the test) could piggyback on the larger exempt seller's exercise of market power which arguably could lead to unjust and unreasonable prices.

Similarly, the SMA does not test for the possibility of collusive or tacitly collusive behavior. This might occur in a market in which several large sellers

87. In addition, an Applicant's incentives may shift between periods as its net long or short position (native load plus required reserves less actually available total resources) changes. In the past, the Commission, through the settlement process, allowed utilities with transmission constraints to sell at market-based rates during unconstrained periods. *See generally Florida Power Corp.*, 79 F.E.R.C. ¶ 61,385 (1997); *Public Serv. Co. of N.M.*, 83 F.E.R.C. ¶ 61,061 (1998).

88. SMA Order, *supra* note 6, at 61,970. "[W]e will first consider the control area market where the applicant is located." *Id.*

89. Order No. 592, *Inquiry Concerning the Commission's Merger Policy Under the Federal Power Act: Policy Statement*, F.E.R.C. STATS. & REGS. ¶ 31,044 (1996), 61 Fed. Reg. 68,595 (1996) (codified at 18 C.F.R. pt. 2).

90. This may be contrasted to the practices of most ISO or RTO market monitors, who frequently check for the existence and significance of load pockets. Issues in the delegation of market power control duties to the MMUs are discussed in Section X below.

comprised most of the market, but each just passed the SMA test.

A final set of SMA test considerations center on the inclusion of sellers outside the control area. The Commission has long recognized that outside sellers whose capacity can be economically marketed within a given control area, and for which transmission capacity is available, should be counted as sellers within that control area.[91] For the purpose of assessing the market power impacts of mergers, the Commission generally (and correctly) recognizes that the transmission capacity available to sellers outside the control area is the transmission capacity outside sellers already control on a long-term basis into a control area plus the transmission capacity available to the total short-term outside market, or ATC.[92]

In contrast, the SMA test directs applicants within a control area to use the lesser of outside sellers' "uncommitted capacity" or the *total* transfer capability (TTC) of the transmission system into the control area. TTC is much larger than ATC because it reflects the total ability of the transmission system to transfer power over an interface, including all transfers that are long-term and/or dedicated to customers on a firm basis.[93] Without added study, it is impossible to determine how much of this capacity sellers outside the control area could actually use to defeat attempted market power exercise within the control area. The overstatement is amplified by the fact that TTC measurements usually are non-simultaneous, *i.e.* do not account for an inability to send power into a control area across several interfaces at once.[94] The saving grace with respect to this issue is that the Commission allows interveners to "present arguments" as to why TTC measures are inappropriate.[95]

In a footnote, the Commission recognized that TTC is merely "a point of reference to establish the maximum amount of uncommitted supply."[96] However, a final factor, allocation of transmission import capability, adds complexity to this issue. When both the applicant and other suppliers own significant capacity outside the control area, the total available uncommitted transmission capacity must be allocated between the applicant and its outside rivals. The SMA Order gives no guidance on how this should be done, presumably giving some latitude to applicants and interveners.

As a whole, the defects of the SMA test suggest that it will neither consistently identify sellers not needing control, nor identify sellers that do need it – failing the remedy trigger function the Commission set out for it. When

91. Order No. 642, *supra* note 17, at 71,014.

92. Similarly, the Applicant may control rights to large portions of the TTC, rendering the capacity unavailable to outside sellers but part of Applicants' own resources.

93. In a refined examination of this situation, it is necessary to scrutinize carefully all transmission rights holdings for their impact on the potential exercise of market power.

94. In contrast, the Commission's transmission measurements for the purpose of market power assessment in mergers explicitly require that transmission limits be simultaneous. *See also* Order No. 642, *supra* note 17, at 70,996. The impact of this overstatement is reduced when the "lesser of" condition makes uncommitted external capacity the binding constraint, but we do not know how often this will occur in practice.

95. SMA Order, *supra* note 6, at 61,968.

96. *Id.*

combined with the mitigation scheme, its effects are not predictable enough to give confidence that it meets the characteristics of an enforcement process.

IX. SMA MITIGATION AND ITS EFFECTS

Under the SMA Order, sellers who fail the SMA test in a market outside ISOs/RTOs are required to make spot market sales with that market at "split-the-savings" rates, or rates midway between the incremental costs of the seller and the decremental cost of the buyer.[97] As the Commission notes, this approach splits the gains from trade between buyers and sellers, provided they have well-defined incremental and decremental costs.[98]

Like the SMA test, the impacts of this mandatory mitigation approach are uncertain. It is possible that the mitigation will work so well at constraining prices in the control area that sellers will not earn a reasonable return on their investment, especially on peaking plants. It is also possible that the extreme opposite will occur, *i.e.* that this form of mitigation will facilitate collusive behavior on the part of all other sellers in the market and enable others to exercise market power even if the dominant seller is price-limited. While we cannot be sure whether either of these extreme outcomes will occur, the uncertainties suggest against the automatic nature of the mitigation mechanism.

Concerns over the mitigation approach may be grouped into six general areas: cost recovery by the dominant seller, cost recovery and investment incentives for entrants, possible collusion facilitation via the posting of marginal costs, incentives and penalties associated with the "must-trade" provisions, administrative issues, and impacts on the forward markets.

A. Cost Recovery by the Dominant Seller

Although economic theory suggests that prices should equal marginal costs, the true marginal costs of power include not only the marginal operating cost, the incremental cost of producing the next unit of energy, but also marginal reliability cost—the change in the value of system reliability caused by producing one more unit of electricity. The latter component is also known as a *scarcity premium* or a capacity payment. In the short run, this payment sends a signal to buyers to adjust their consumption and allows certain generating units to recover their variable and fixed costs, and remain viable in the market.

If pivotal suppliers' incremental costs offer a result in split-savings prices very near their incremental costs, these suppliers may earn insufficient revenue to cover their total costs. In a competitive market, this would reduce the value of the generation capacity and possibly cause that support to withdraw from the market. Wholesale suppliers who wanted a greater guarantee of cost recovery

97. Applicants and their affiliates must post their projected day-ahead hourly incremental costs of energy offered for spot market sales in its control area and in control areas surrounded by the applicant's control area. The lowest incremental cost will be matched with the highest decremental energy bid among all purchase requests. The Commission also requires the applicant to simultaneously post hourly decremental cost data to ensure that the incremental costs of the applicant are not inflated. SMA Order, *supra* note 6, at 61,969-70.

98. *Id.* at 61,971-2.

would have to apply to the Commission for full cost-based rates, essentially becoming rate regulated or re-regulated.[99]

Split savings rates require that the buyer estimate the costs it would have incurred had it not made the purchase from the actual seller. Where the buyer owns a large portfolio of resources, and some are available, this is straightforward. However, where buyers have no added resources of their own whose costs are well-specified, it is not clear what they will use as decremental cost. Suppose, for example, in a widespread shortage the only power available to buyers is $500/MWh from the market. If the local dominant supplier has incremental capacity available at $100/MWh, does the FERC intend the transaction price to be $300/MWh, documented by broker quotes? It is likely that many, if not all, pivotal suppliers identified by the SMA test will be large utilities with traditional state retail regulation. In this case, most generation will be in rate base, meaning (in most cases) that the capital costs of all generators are recovered through retail rates, and the net sales revenues from wholesale sales are returned to retail customers in some manner. In this case, the required mitigation will not deny utilities the opportunity to earn a reasonable return on their investment, but it will require that state regulators understand that wholesale sales margins by their main utility will be constrained, and that wholesale buyers are seldom paying for the capacity portion of the power they are using. So long as these conditions are met, sellers subject to mitigation will not be deprived of a reasonable opportunity to earn a return on their investment. However, there will undoubtedly be exceptions to these stylized circumstances. In these circumstances, the Commission should act in an expedited manner to review the concerns of sellers for whom the mitigation scheme removes the opportunity to recover a reasonable return on their investment.[100]

Aside from requiring a timely review of sellers' cost recovery claims, the Commission's policy will probably make it more difficult over time for integrated, regulated utilities to add to their generation portfolio. Utilities will probably insist on obtaining state regulatory investment pre-approval for new plants or cost recovery approval from the FERC for new generating plants, especially plants at the top of their dispatch orders. While the Commission and other parties probably view this pressure to deconcentrate the control area as a positive dynamic outcome, the discouragement of internal additions should not be so large that it effectively removes the option of integrated or intra-system generation additions.

B. Investment Incentives for New Sellers

The investment incentives for new entrants differ from those of the dominant seller, who is constrained to sell at split-savings rates. In many instances, these suppliers will be much smaller than the dominant seller, and many will be unregulated merchant generation firms. These firms have no

99. This may include units built by the locally dominant utility or its affiliates that are not in the state retail rate base.

100. One logical alternative would be to allow such sellers to sell at rates up to, but not exceeding, their full average embedded costs.

obligation to serve or add capacity and will be strongly influenced by the perceived ability to earn risk-adjusted returns on their investment.

Depending on market conditions, non-dominant sellers within the control area will be constrained to sell at prices near those of the dominant firm – thus resembling a competitive market overall – or they will be able to price above these levels. In this section, I discuss the former situation.

If non-dominant sellers are constrained to prices near those of the dominant supplier's incremental costs, these suppliers will probably not perceive an upside potential large enough to warrant investment in speculative capacity. This is the same argument (and outcome) the Commission has faced since June 2001 in Western U.S. markets, where many sellers argue that a mitigation scheme, much like that in the SMA Order, has caused many firms to cancel plans to build merchant (or even regulated) peaking plants. In an order dated December 15, 2000, the Commission imposed a "soft" cap of $150/MWh for California ISO and PX transactions and made bids above this level subject to refunds.[101] A later Commission ruling modified the scheme, adopting in place of the fixed cap a "reference price" based upon production costs of the least efficient generation that operated on the margin during Stage 3 emergencies.[102] Refund exposure was also limited to periods of Stage 3 alerts. Immediately upon the FERC's announcement of the mitigation plan, several developers that had sought and even obtained accelerated approval for peaking units in California withdrew or delayed them, citing the mitigation plan and the uncertainty it created as the reason for their action.[103]

The uncertainty caused by the current handling of MBR authority is arguably even greater than that resulting from the California mitigation approach. In the MBR scheme, the exposure to potential refunds is extended over a very long period. Standards for prohibited behavior are quite vague, and the Commission seems to be contemplating, at least, mitigation where dysfunctional markets raise prices even without any anticompetitive or collusive behavior on the part of generators. Beyond this, the automatic nature of the mitigation trigger will likely induce strategic investment behavior. Sellers below the SMA threshold will be very careful not to add capacity so as to exceed the threshold, even if their capacity additions would reduce concentration in the market and yield scale economies. If the supply margin drops too low relative to demand, even smaller sellers will not want to increase their investment.

101. *San Diego Gas & Elec. Co.*, 93 F.E.R.C. ¶ 61,294, 61,996-7 (2000). The cap and potential refunds became effective January 1, 2001.

102. *Id.* at 61,981-2. The reference price, calculated for each month, was based upon five elements: 1) Heat rates from inefficient CTs, 2) California natural gas prices, 3) Average NO_x allowance costs, 4) Average NO_x emission rates, and 5) Reported variable O&M costs.

103. *See generally, Calpine Pulls Offer of Peakers; Enron Gets Cold Feet,* CALIFORNIA ENERGY MARKETS, No. 592, 1 (2000). In all, over 2,000 MWh of peaking generation was withdrawn from the California Energy Commission's "fast track" approval process in 2000-2001 following proposal of the mitigation plan. Cal. Energy Comm'n., *Power Plant Projects Withdrawn by Applicants* (Sep. 28, 2002), *available at* http://www.energy.ca.gov/sitingcases/withdrawn.html. As a more recent example, see also *Citing Low Prices, PPL Bails Out of 2,100 MWh,* ELECTRICITY DAILY (Jan. 9, 2002).

Appendix A contains a simple example illustrating these points.[104]

C. *Facilitating Collusion via Posted Prices*

In many markets additional price transparency improves competition. In other markets – electricity, unfortunately, among them—the posting of important suppliers' costs or bids can facilitate collusion. This concern has led the Commission to repeatedly deny attempts to post real-time bid information in the bid-based markets it has approved.[105]

Pivotal suppliers' incremental and decremental costs may facilitate explicit or tacit collusion among the non-mitigated sellers in the market. Needless to say, this will lead to higher prices and the exercise of market power by all sellers other than the dominant firm, which will continue to price and sell at split-savings rates. Outside ISO/RTOs, where this scheme is required, some sellers may not be under the FERC's jurisdiction, which may further complicate investigation of adverse market conditions.

Concerns over the facilitation of collusion via posted information are well-established in economics literature.[106] The particular attributes of electricity spot markets, in which many trades are repeated daily and there are few large participants, makes them especially vulnerable to information misuse. As Professors Peter Cramton and Robert Wilson wrote in their 1998 review of ISO-New England's bidding rules:

> The difficulty with a fully transparent process, which prove critical in electricity markets, is that information is sometimes a two-edged sword. It can be used to facilitate explicit or implicit collusion, as well as promote efficiency. Information about the bidder identity associated with each bid is especially vulnerable to implicit collusive use.[107]

---

104. The negative impact of the SMA test on investment incentives is likely to occur to existing sellers, even smaller-sized sellers, rather than new entrants. *See generally* Appendix, *infra*.

105. *San Diego Gas & Elec. Co.*, 95 F.E.R.C. ¶ 61,1115, 61,364 (2001).

> The amount particular competitors bid is generally considered confidential business information. Disclosure of such information may lead to a reduction in competition because it will allow competitors to learn what their competitors are bidding and could lead to price collusion or coordination .... [T]he Commission must recognize the need to keep bid information confidential in order to promote competition. In addition, section 205 of the FPA refers to the posting of rates and charges, not bids, and the actual charges for power are contemporaneously disclosed.

Id.

106. Posting of cost information increases expected profit and welfare, but expected consumer surplus falls. The shared information simply yields the Cournot or Bertrand Equilibrium. *See also* George J. Stigler, *A Theory of Oligopoly*, 72 J. OF POLITICAL ECON. 44, (1964); Carl Shapiro, *Exchange of Cost Information in Oligology*, 53 REV. OF ECON. STUDIES 433 (1986); Peter Cramton & Jesse A. Schwartz, *Collusive Bidding: Lessons from the FCC Spectrum Auctions*, 17 J. OF REGULATORY ECON. 229 (2000); Edward J. Green & Robert H. Porter, *Noncooperative Collusion Under Imperfect Price Information*, 52 ECONOMETRICA 87 (1984); Steven C. Salop, *Practices that (Credibly) Facilitate Oligopoly Co-Ordination*, NEW DEVELOPMENT IN THE ANALYSIS OF MARKET STRUCTURE, (Joseph J. Stiglitz & G. Frank Mathewson eds., The MIT Press 1986), JEAN TIROLE, THE THEORY OF INDUSTRIAL ORGANIZATION (The MIT Press 1988).

107. Peter Cramton & Robert Wilson, *A Review of ISO New England's Proposed Market Rules* 22 (1998), *available at* http://www.cramton.umd.edu/papers1995-1999/98mdi-iso-ne-markets-review.pdf.

The Commission has consistently acknowledged that the disclosure of bids and bidder cost information is sensitive, and has generally not mandated contemporaneous public release of such information.[108]

Under these circumstances, requiring the largest supplier in the market to post incremental and decremental costs every day for a wide variety of load levels creates an information climate that could assist the remaining suppliers in the market in efforts to raise prices, pivotal supplier sales at split-savings rates notwithstanding. The information climate may include several supplier's costs if several fail the SMA in the market, if they are state or federally regulated, or if the implementation of the must-buy and split-the-savings formula makes incremental costs widely known.

The Commission's mitigation design should aim to suppress gaming and promote effective competition. At a minimum, the risk of misuse of pivotal supplier information will require that the Commission scrutinize markets with SMA mitigation quite carefully. Oversight to prevent unacceptable behavior of this sort is likely to be difficult, a point discussed below. More preferable alternatives are summarized in section XI below.

D. Incentives and Penalties in the Must-Trade Scheme

Utilities with traditional native load obligations under state regulation who "fail" the SMA test are subjected to a "must-trade" arrangement that presents a number of potential risks and conflicts. As noted above, such utilities must (1) post all available capacity on a day-ahead basis; (2) post incremental and decremental costs for each next-day hour; (3) sell to all requestors having decremental costs higher than posted incremental prices; and (4) buy from all sellers having incremental costs lower than posted decremental costs.

It should first be noted that measured incremental or decremental costs are not necessarily the economically correct measure of a perfectly competitive trading price. Under many conditions the opportunity cost of sales today are higher or lower than measured marginal costs. This is especially true if generating units face annual or seasonal production constraints, as is common for hydroelectric plants and emissions-limited fossil fuel plants.

Second, the positive incentive to engage in trades under the must-trade scheme is the margin between the offeror's decremental cost and the dominant seller's incremental cost, or vice-versa. There is no way to know how large these will be, but we can get an idea by comparing reported power market spot indices to reported system marginal costs "lambdas" on FERC Form 714.

In general, reported lambdas have not been reliable indicators of system marginal costs. Utility form 714 filings often contain abnormalities and missing data. For instance, a study of the Southeastern U.S. found that reported market prices and lambdas were similar for most of the year, but diverged substantially – as one would expect – in the summer season.[109] In addition to the uncertain

108. *See also NSTAR Serv. Co. v. New England Power Pool*, 92 F.E.R.C. ¶ 61,065, 61,194 (2000); *San Diego Gas and Elec. Co. v. Sellers of Energy*, 93 F.E.R.C. ¶ 61,294, 62,007 (2000); *San Diego Gas and Electric Co. v. Sellers of Energy*, 95 F.E.R.C. ¶ 61,115, 61,368-9 (2001).

109. *See generally*, Prepared Direct Testimony of Peter Fox-Penner on Behalf of CP&L Holdings,

and probably understated upside, utilities with native load obligations face significant risks if their trading under the must-offer scheme impairs their ability to offer reliable, least-cost service to their customers. For example, if a utility purchased spot energy from a reportedly less expensive source, that source failed to deliver day-ahead, and the utility were forced to buy real-time emergency power at a premium, there is no vehicle for recouping the added costs other than through increases in retail revenues.

E. Administering SMA Mitigation

The preceding discussion of the must-trade scheme highlights several aspects of the must-offer scheme that are likely to make the scheme difficult to administer.

First, the Commission will have to ensure that reported incremental costs strike the proper balance between verifiability and true economic opportunity costs. As discussed above, this is a question as difficult as the establishment of a standard of workable competition itself. Second, many traders in the market will not have easily-defined incremental or decremental costs. The incremental or decremental costs of traders who do not run systems according to economic dispatch principles, or do not have systems at all, can be determined only by examining the various trading arrangements made by that seller or buyer, which can be complex.

Beyond these issues, there are questions of prioritization and rationing. If a utility receives two identical offers to purchase, must it time-stamp them and make them in order of receipt? If the utility runs out of power at the requested incremental cost, does the second in line get the next higher price, bumping everyone up in the purchase queue? What happens when a buyer or seller defaults?

More generally, the Commission's mitigation scheme nearly turns each SMA-failing utility into the hub of a *de-facto* power pool. Well-run power pools have admirable efficiency characteristics, but they are enormous undertakings, requiring their own tariffs, rules, and large administrative staffs. We doubt the Commission wants to establish tight power pools in all non-RTO regions of the U.S., but if it does, this should be done as a formal undertaking, not something grafted on to the operations of the region's dominant seller.

F. Effects of the SMA on the Forward Market

The Commission mandates that sellers who fail the SMA screen sell into the spot market at split-savings rates, but does not extend the requirement to longer-term or forward sales.[110] This divided mandate raises the possibility that

Inc. and Florida Progress Corp, No. EC00-55-000, Exhibit CF-400 at 55 (FERC Docketed Feb. 3, 2000) (showing that 10 of 26 control areas in the analysis did not have filed lambdas, and that several of the lambdas filed were not usable).

110. For the purposes of SMA mitigation, the spot market should be defined as transactions that will require delivery within 24 hours, and the forward market should be defined as transactions that require delivery of a specified quantity of a commodity or asset at a specified price at a date more than 24 hours into the future. *See also* SMA Order, *supra* note 6, at 61,971-2.

buyers will rely too much on the real-time market, a situation reminiscent of the California markets during their most dysfunctional periods in 2000 and 2001.

The Commission's Order will indeed shift some sales that might otherwise be made in forward markets to the spot markets. The degree of the shift, however, is not clear because the impact of the SMA mitigation scheme on the spot market is uncertain. To the extent that the mitigation successfully reduces *average* spot market prices, but does not change their volatility, the balance between spot and forward purchases may not change much. However, if the mitigation reduces volatility from today's levels, the incentives to contract forward will diminish and purchases will shift to the spot market.

A seller failing the SMA will have an incentive to minimize the availability of spot energy if it can sell forward or long-term energy to other parties at uncapped prices. Thus, the supply of spot energy may diminish, perhaps increasing average spot prices or volatility — depending on who purchases the energy that the dominant seller has sold off, and whether it is resold into the spot market.

Forward market transactions are usually entered into as a means for eliminating risk. Buyers and sellers can lock in a price today with certainty and eliminate the risk associated with spot market purchases in the future. In a perfect forward market, today's forward price is equal to today's expected spot price. However, by most accounts, forward power markets are not perfect.[111] Oftentimes, clauses in forward contracts that force buyers and sellers to be able to "make or take" energy restrict speculators from entering the market. In this case, there is no means for buyers and sellers of forward contracts to shed risk to parties out of the industry, and the volume of energy purchased must equal the volume of energy sold.

Under these circumstances, the forward price will exceed the expected spot price if there is greater pressure on the part of buyers to buy forward, and the forward price will fall below the expected spot if there is greater pressure on the part of sellers to sell forward. The effect on the forward market price and volume will be determined by how buyers and sellers react to the changes in the spot price brought about by the SMA mitigation. There are a number of possible scenarios that could play out with multiple outcomes.

Examples of these scenarios would include a possible reduction in both forward market price and volume if sellers, trying to avoid the split-the-savings pricing, offer a large number of forward (short) contracts and buyers, while facing lower expected prices in the forward market, offer fewer contracts to purchase energy (long contracts). In this case, both the substitution effect and forward market pressure are working in the same direction to lower both the price and volume of forward contracts. Conversely, if buyers observe that the mitigation measures have produced an environment in which collusion can occur through price signals from the dominant seller, and the expected spot price increases or the likelihood of price spikes increases, then buyers will have incentives to offer more long contracts while sellers will have incentives to offer

111. *See generally,* Direct Testimony of S. Craig Pirrong on Behalf of San Diego Gas and Elec. Co, California Pub. Utils. Comm'n, No. 00-10-008 (Oct. 2, 2000).

fewer shorts. In this case, both the substitution effect and the forward market pressure are working in the same direction to increase both the price and volume of forward contracts.

X. THE ROLE OF ISO/RTO MARKET MONITORS

The second half of the Commission's new framework applies to all sellers selling within ISO/RTO areas. Sellers within these organizations are not subject to the SMA test or the potential mitigation. Instead, the Commission has made these sellers subject to the market monitoring units (MMUs) of the local ISO/RTO.[112]

This represents an enormous departure from the prior MBR regime. Under this half of the new framework, pre-approval is ended. All monitoring of workable competition and all remedies will be imposed retroactively following the processes applicable to the MMUs and the FERC.[113]

The new approach places enormous reliance on the MMUs. At a minimum, the Commission believes that MMUs will be able to diagnose market problems rapidly and refer them to the Commission for action.

A. MMUs in Order 2000

Market monitors are extremely new units within new organizations. Following a full-scale comment process, the requirements for market monitors were most recently set by the Commission in Order 2000.[114] The Commission asked for comments on a variety of aspects of MMUs, including their authority to impose remedies and their information policies. However, the Commission did not inquire into many economic issues, such as the proper articulation of a workable competition standard.

Virtually every aspect of MMUs, about which comments were solicited, produced widely disparate points of view. Commenters could not even agree on whether MMUs should exist, much less whether they fit within RTOs, ISOs, or transcos; what their authority should be; whether they should have access to proprietary information; whether they should monitor all markets or only markets their RTO operates; or due process issues, and so on.

Because of the great divergence in views, the Commission's Order 2000 requirements for MMUs were extremely general. The Commission said:

> . . .[I]n light of the different forms of RTOs that could be developed by market participants and the varying types of markets an RTO may be operating within its region, different market monitoring plans are likely to be appropriate for different

112. In some cases, an internal monitoring unit is replaced or enhanced by an "Independent Market Monitor" (IMM), typically an outside consulting expert. The acronym MMU will be used throughout to refer to the market monitor in place, regardless of whether it is an MMU, an IMM, or both.

113. Retroactive is used here in the sense that there is no longer any *ex-ante* approval process required by the Commission prior to market-based sales. Some RTOs apply remedies that are non-retroactive in the sense that, when a problem is identified, they require that all sales from that time forward be subject to some remedy, such as a price or bid cap. This might be termed a prospective remedy, but it is not the same as a blanket requirement for pre-approval.

114. Order No. 2000, *Regional Transmission Organizations,* F.E.R.C. STATS. & REGS. ¶ 31,089 (2000), 65 Fed. Reg. 809 (2000) (codified at 18 C.F.R. pt. 35) [hereinafter Order No. 2000].

> RTOs. Consequently, after careful consideration of the comments, the Commission will require that RTO proposals contain a market monitoring plan that identifies what the RTO participants believe are the appropriate monitoring activities the RTO, or an independent monitor, if appropriate, will perform. We believe that such approach will provide those proposing an RTO sufficient flexibility to design a monitoring plan that fits the corporate form of the RTO as well as the types of markets that RTO will operate or administer. We have revised the regulatory text for the RTO market monitoring function to reflect our decision to allow this flexible approach.
>
> Although we decline at this time to prescribe a particular market monitoring plan or the specific elements of such a plan, the RTO must propose a monitoring plan that contains certain standards. The monitoring plan must be designed to ensure that there is objective information about the markets that the RTO operates or administers and a vehicle to propose appropriate action regarding any opportunities for efficiency improvement, market design flaws, or market power identified by that information. The monitoring plan also must evaluate the behavior of the market participants, including transmission owners, if any, in the region to determine whether their behavior adversely affects the ability of the RTO to provide reliable, efficient and nondiscriminatory transmission service. Because not all market operations in a region may be operated or administered by the RTO (*e.g.*, there may be markets operated by unaffiliated power exchanges), the monitoring plan must periodically assess whether behavior in other markets in the RTO's region affect RTO operations and, conversely, how RTO operations affect the efficiency of markets operated by others.
>
> . . .The monitoring plan should indicate whether the RTO will only identify problems and/or abuses or whether it also will propose solutions to such problems. We note that sanctions and penalties may be appropriate for certain actions such as noncompliance with RTO rules. However, the monitoring plan should clearly identify any proposed sanctions or penalties and the specific conduct to which they would be applied, provide the rationale to support any sanctions, penalties or remedies (financial or otherwise) and explain how they would be implemented.[115]

In terms of either the economic standards of workable competition or the process to judge it, these requirements are nearly content-free. The Commission's approach has been to allow MMUs great flexibility to design their plans, which may be appropriate. However, this flexibility makes it even more important that the Commission apply reason and commonsense guidance as to what sort of competition is workable and what behaviors are not.

In addition, although the Commission declined to rule on several controversial aspects of MMUs, it certainly recognizes that they cannot use arbitrarily constructed standards and processes. To maintain consistency and effectiveness under the new scheme, additional decisions and requirements concerning MMUs are needed.

It is beyond the scope of this article to analyze each of the MMU processes at the level of detail that this paper examines the entire new Commission framework. However, several factors applying to most or all of the MMUs raise questions that the Commission should address forcefully if it intends to rely heavily on MMUs as part of its enforcement regime. These factors are the MMUs authority, procedural transparency and information policies,

115. *Id.* at 31,155-6.

independence and resources, and, most importantly, the commonality of standards.

B. MMU Authority

The Commission has not articulated a clear generic grant of authority, or bounds on the authority, of MMUs. No topic in the Order 2000 comment process drew more heated debate. The spectrum of opinion ran from those who favored little or no monitoring of only the markets operated by RTOs, to those who favored giving MMUs full authority to investigate and remedy all forms of market power abuses.[116]

The Commission's formal view continues to suggest that MMUs are merely monitors who investigate preliminarily and then hand matters over to the FERC for enforcement. In testimony before Congress on August 2, 2001, senior FERC officials said:

> Performance of market monitoring by RTOs is not intended to supplant Commission authority. Rather it will provide the Commission with an additional means of detecting market power abuses, market design flaws and opportunities for improvements in market efficiency. Further, because market monitoring plans are required to be filed with and approved by the Commission, we will retain the ability to shape the market monitoring activities that will be performed by the RTO to ensure that they complement the Commission's ultimate responsibility to ensure just and reasonable rates in wholesale electricity markets. Moreover, as we have noted in our orders addressing various RTO applications, analysis and reports from an RTO's market monitoring unit are to be submitted to the Commission at the same time as they are submitted to the RTO. This will ensure that the analysis and reports are not subject to "pre-approval" by the RTO prior to Commission review.[117]

Although this implies that MMUs have no authority to apply remedies, the Commission has approved schemes that allow for automatic remedies triggered by the MMU itself (New York, New England). In other cases (such as California and the Alliance as proposed), the MMUs can only refer matters to the FERC, which then must reach its own conclusion regarding enforcement. The PJM market monitoring plan states that "the MMU does not have enforcement powers," but allows the unit to issue letters to market participants demanding that they cease practices deemed violations of PJM rules by the MMU.[118]

The division of opinion has not abated since Order 2000 was issued. Last spring, PJM responded to a specific Commission request to examine the extent of remedy authority it felt that it needed. It responded:

> The result of that evaluation is that there is good reason to provide the MMU the

116. Order No. 2000, *supra* note 114, at 31,146-57.

117. Summary of Testimony of Kevin P. Madden, General Counsel, & Shelton Cannon, Deputy Director, Office of Markets and Tariffs and Rates, Federal Energy Regulatory Commission, Before the Subcommittee on Energy Policy, Natural Resources and Regulatory Affairs of the Committee on Government Reform, US House of Representatives, (August 2, 2001), *available at* http://www.ferc.gov /news/congressionaltestimony/km-sc8-2.pdf

118. PJM INTERCONNECTION, LLC., MARKET MONITORING UNIT, *Report to the F.E.R.C.– Enforcement Remedies* 2 (2001) *available* at http://www.pjm.com/documents/FERC/2001docs/april/ 20010402 _mmu_enforcement_report.pdf.

> ability to compel responses to data requests within specified timeframes. The result of that evaluation is also that the MMU does not now require an expansion of the enforcement authority of the MMU. However, it is possible that the MMU will face situations that are not reasonably resolvable by the necessarily somewhat lengthy process of proposing rules changes or filing requests for action directly with FERC. It is thus possible that, in the future, the MMU will request that FERC grant broader enforcement authority to the MMU than is currently encompassed in the Market Monitoring Plan.[119]

Conversely, in the October 19, 2001 Commission Workshop on RTOs, the CAISO's MMU head called for explicit locally delegated authority as well as special status within FERC enforcement dockets.[120] These differences prompted one recent observer at an antitrust agency to view "the chain of referrals from investigations to law enforcement" as "ambiguous."[121]

Whether and how much MMUs can impose remedies has enormous implications for the scope, timeliness, and potential effectiveness of market power controls. At present, the ability of MMU's to impose remedies does not seem to be common across RTO/ISOs, much less between these regions and the rest of the U.S.

C. The Competition Standard/Screening Test/ Remedy Relationship

As their name implies, the MMUs are primarily intended to observe market behavior and report abnormalities that might require Commission action.[122] In the design terms used in this paper, the MMUs are essentially ongoing screening tests for the Commission. If they merely refer matters to the Commission for investigation, they can be "separate the innocent" type of tests, referring only the possibly guilty to the Commission. If they can impose remedies, then the MMUs should use radically different tests, namely tests designed to find only those who are very likely to have violated the rules.

The New York and New England ISOs illustrate this issue nicely. In these ISO-operated markets, the prices earned by bidders may be adjusted from the market-clearing price in the energy markets if their bids fail a screening test.[123] In New York, the changes are prospective only; in New England they can be retrospective as well. We now understand that a test/remedy process like this that automatically (or semi-automatically) triggers mitigation should (a) have a high likelihood of catching only the guilty, sparing the innocent; and (b) should impose effective and efficient remedies. Focusing on the New York ISO, the screening test for economic withholding has been summarized as: (1) a bid raised over $100/MWh from prior comparable-period bids; and (2) which causes

---

119. *Id.* at 7

120. Anjali Sheffrin, Comment Before F.E.R.C., *In re* Reg'l Transmission Org. Elec. Mkt. Design and Structure, (Oct. 19, 2001), No. RM01-12-000, at 24 *available at* http://www. ferc.gov/electric/rto/workshops/rto_week_transcripts/rm01-12-10-19.pdf.

121. Hilke, *supra* note 61.

122. They also have an important responsibility to analyze and fix the design of the market itself, *i.e.* to suggest changes to market rules that are believed to be impeding efficient competition.

123. New England Power Pool, FERC Electric Rate Schedule No. 6, Sec. 17 (2000) *available at* http://www.iso-ne.com/mrp/MRP-17_Market_Surveillance/.

prices in the market to rise significantly.

If this screen is pierced, the bidder's prices are capped *prospectively* at a "reference price" that is unit-specific. The ISO's remedy for physical withholding (*i.e.* failing to bid when bidding would have been economic) is the imposition of a penalty. Importantly, "[t]he penalty is intended to serve as a deterrent, rather than a means to recoup market power costs."[124]

It is well beyond the scope of this paper to analyze this screening/mitigation process fully. However, it is immediately apparent that the New York screening test is nothing like the SMA test, which is also of the "catch guilty/auto-remedy" type, and dedicated to the same purpose. For reasons explained in section IV, it is likely that the New York scheme is far closer to an appropriate test. It is also the case that by accepting this procedure the Commission has articulated a *de facto* definition of workable competition which applies only to New York.

This is not meant to be a criticism – to the contrary, such an articulation is needed. However, when its standard is combined with the penalties, the Commission is essentially choosing a degree of strictness and effectiveness applicable to this RTO only.[125]

There is nothing inherently wrong with a two-stage process for ensuring J&R rates, provided it is not too cumbersome for sellers or buyers and it meets the enforcement objectives above. The point is rather that the Commission should seek to articulate common standards and features as much as possible. The differences between MMU processes and their standards implicit in their monitoring protocols seem significant.[126]

It is worth noting that the remedies most MMUs employ are entirely behavioral, even more so than the FERC itself. Regardless of whether a market problem would be better served by a structural fix, reliance on MMUs will tend to steer the process even more towards purely behavioral solutions. In these instances, MMUs will repeatedly alter prices and impose ongoing behavioral conditions on some sellers. The reality of these markets is that they will be managed competition, not price-deregulated.

D. Information Availability and Process Transparency

Considerable attention has been focused on the ability of MMUs and other market participants to gain access to market information in order to ensure that competition has been working well. The MMU protocols specify that market participants must give a range of requested information to the MMU as a condition of using the market, and the range is often significant. However, other market participants can gain access to information only by initiating proceedings

124. *See also* Patton, *supra* note 52, at slide 16.

125. For example, this RTO mitigates only prospectively, and does not attempt to award refunds for overcharges to bidders. The scheme here may be summarized as: *At the RTO level, we'll automatically mitigate prospectively if you exceed our standard. However, if you buyers want your money back, or you believe that prices were not J&R, even if bids rose by less than $100/MWh, appeal to the FERC.*

126. Indeed, the Commission itself has recently recognized that the remedies it has permitted in at least one ISO (NYISO) are in need of harmonization within that organization. The ISO was directed to file "a comprehensive mitigation proposal" by March 1, 2002. *New York Indep. Sys. Operator Inc.*, 97 F.E.R.C. ¶ 61,242 (2001).

at the FERC and then using the FERC's discovery rules – a long, cumbersome process.

If the MMUs are not remedy enforcers, but merely render prosecutorial advice to the FERC, their deliberations may be withheld from the public. This is analogous to the discretion we accord prosecutors, including the antitrust agencies. The latter have extensive power to compel information production, but the information is strictly confidential and not available to other market participants.

It has been suggested that there may be no legal basis for withholding MMU deliberations from the public. As practitioners, we cannot comment on the legal requirements for disclosure, however is our experience on behalf of parties is that it can be next to impossible, as a practical matter, to monitor MMU deliberations. But this is not the point. Rather, our point is that our legal system seems to recognize a difference between a prosecutorial and a regulatory function, with different degress of openness to the public.

If the MMUs are granted remedial authority, as it appears some have, and if the practical reality is that this remediation is the only redress buyers or injured competitors will ever see, then the MMU process should become much more transparent. All affected parties should have the right to participate, and all parties should have access to the information they need.[127]

E. Location, Independence and Resources

To a non-lawyer, MMUs seem to be quite similar to delegated self-regulatory enforcement agencies such as those in the securities industry. As such, the processes they employ raise all the issues discussed in sections 1 through 4 of this paper. They must have standards for workable competition, an *ex-ante* or *ex-post* process with some degree of strictness, an allowed range of effective remedies, consistent information policies, and so on. Again, it would seem that the MMUs that can impose remedies of any kind must accord due process to both sellers and buyers, which implies a degree of transparency to their processes. As noted above, all these dimensions must fit together in a way that yields effective enforcement.

The Commission has correctly required that MMUs be independent of their host organizations, and of all market participants. At present, the primary means of assuring this independence seems to be an examination of organizational charts and the simple willingness to listen to the MMUs' opinions regardless of whether RTO or ISO management have approved them. Indeed, the Commission requires that MMU opinions be sent to it concurrently with their transmittal to the host organization.

This is necessary and proper, but it may not be sufficient if the MMUs are to become true self-regulatory organizations. The SEC places extensive requirements on the self-regulatory organizations (SROs) it relies upon, including auditing the practices of each SRO periodically to ensure that the SRO has adequate resources and procedures.

127. Order No. 2000, *supra* note 114, at 31,147-50.

F. Improvements to the Market Monitoring Function

Regardless of what else the Commission does, it should clarify the role and authority of the market monitors. As discussed above, if they are the practical source of most remedies – a controversial topic – a number of important implications for information disclosure and due process follow. If they merely monitor-and-refer, they still deserve expedited access to the Commission. The Commission must also stand ready to oversee the quality and timeliness of MMU resources.

As discussed above, market monitoring need not be conducted only in ISO or RTO markets. Until these organizations are formed everywhere, the Commission itself is the *de facto* MMU for the real markets that exist today. If a practical means can be formed to fund an independent external group performing FERC-approved functions, the Commission can greatly leverage its resources.

The Commission should also articulate a common standard for workable competition. Until markets have a more consistent design – a goal that will take many years, at a minimum – the standard will have to be applicable to a variety of market designs, yet consistent enough to yield reasonably equal treatment for buyers and sellers in different markets. It will also help prevent gaming at the border between markets with different *de facto* standards, as will probably occur under the Commission's new proposed framework. This may sound daunting, but in reality the Commission has already endorsed several *de facto* standards, and they are not overwhelmingly different as they stand.

G. Conclusion

The Commission's abandonment of MBR pre-approval and its reliance on MMUs for *ex-post* market monitoring places an extraordinary responsibility on these units. While there are certainly many advantages to leveraging the resources and expertise of the MMUs, the Commission should clarify common standards, practices, and procedures to the greatest extent possible. Even if the MMUs act only to correct market rules and refer possible violations to the Commissions, their actions are explicitly or implicitly based on the practical administration of a workable competition standard.

The authority of the MMU to administer remedies is particularly important, as it greatly affects the range of remedies and the overall efficiency of the enforcement approach. It also has information disclosure and due process implications.

When clarifying MMU responsibilities and standards, the Commission is likely to make the MMUs into a *de-facto* self-regulatory organization. If so, it must oversee the independence and quality of these units and stand ready as an appellate body.

XI. SUMMARY AND CONCLUSION

The Commission is confronted with a challenge of extraordinary complexity. On the one hand, it has a statutory requirement to ensure that workable competition exists at all times in all bulk power markets. Yet the nature of power markets often causes the exercise of market power to be

transitory, making performance measurements difficult. Conduct-based measures face equally severe limitations, and structural solutions may not be possible or desirable for other reasons. To meet this challenge, the Commission has proposed replacing an aging pre-approval process with three new process elements: (1) a new pre-approval test outside ISO/RTOs; (2) new pre-approval test inside RTOs; and (3) new language seeking to bar anticompetitive conduct and make refunds retroactive.

All three of these elements must be judged together for their ability to fulfill the Commissions responsibility under the FPA. However, in the presence of uncertainty and other real-world constraints, the Commission's burdens cannot be met with a simple yes or no answer. The new process elements must be judged against a more pragmatic, refined, and probabilistic standard. First, will this process catch offenders with a high likelihood, but not catch non-offenders? Second, will the process deter pro-competitive behavior in an effort to deter anticompetitive acts?

This analysis has shown that the Commission's new process meets these criteria very poorly. While the notion of checking for pivotal supplier market power is sound, the SMA test as ordered is an unreliable indicator of the potential for market power exercise. It is also applied only to a subset of sellers and focuses only on one form of prohibited conduct. Most importantly, the automatic mitigation triggered by an SMA test failure is counterproductive and burdensome on everyone, including the FERC. In short, without improvement the SMA test and mitigation is not much better than the hub-and-spoke test it is replacing, and possibly worse.

If the Commission insists on keeping the SMA test as its screening tool, it should amend the test to remove the limitations described in section VIII above. As a brief review, the Commission should: (1) screen the peak period in all four seasons and preferably shoulder periods as well; (2) explicitly account for each sellers' ability to withdraw capacity from the wholesale or retail market, and treat only this capacity as subject to withdrawal; (3) define geographic product markets more carefully by allowing the use of transmission capacity measures other than TTC, such as available flowgate capacity and allowing sub-control-area markets; and (4) end automatic mitigation, replacing it with case-by-case review.

These amendments would realign the test towards identifying potentially harmful candidate sellers much more accurately than the present SMA test design allows.

With respect to exclusive reliance on MMUs within RTOs, the analysis has shown that these units have different implicit and explicit grants of authority and use different processes and standards for isolating and mitigating undue market power. The Commission should clarify and make consistent the role of MMUs if it intends to rely on them. It should also oversee their independence and adherence to required processes and standards if it intends to make them an integral part of the enforcement process.

More generally, the Commission's new proposal reflects a retroactive process paradigm that is less preferable than a more pre-emptive, pro-active approach. Provided the resource costs are manageable, it is far preferable to

analyze markets before they are unleashed to try and ensure that they work well for most customers most of the time. The greater the degree of up-front assurance of workable competition and unchanged market rules, the greater the confidence of buyers, sellers, and investors, and the less the Commission will engage in costly and contentious investigations and remedy proceedings. Parallel thinking has led the antitrust enforcement agencies to pre-screen and pre-approve mergers since 1976.

By revising its SMA test, removing the automatic mitigation, clarifying associated MMU standards and processes, and revising its section 206 language, the Commission can ensure that its new process represents an improvement over the hub-and-spoke test. The Commissions' shift towards retroactivity is regrettable, and should be replaced by an effective pre-approval alternative, if one can be found.

The Commission has correctly found that its past approach to analyzing the competitive effects of market-based sales should be updated. Replacing the present test with a poorly designed framework would be regrettable if alternatives that better advance the Commission's objectives—and the public interest—are achievable.

APPENDIX

EXAMPLES OF THE SMA IMPACT ON INVESTMENT INCENTIVES

The effects of the SMA on investment incentives are complex and can retard investment in many markets where it is most needed. This problem is illustrated in the simplified market example that follows. It demonstrates that the SMA would discourage investments that would reduce concentration in the market and provide the generation needed to boost the supply margin back to more comfortable levels.

In the hypothetical market there are eight suppliers, A through H. A dominates with a share of 62.5%. Generators B and C are major players each with shares of 12.5%. As shown in the "Before" panel of Case 1, the market totals 4,000 MW with a load of 3,700 MW and a supply margin (or operating reserves) of 300 MW, or 8%. Under these assumptions, the HHI for the market is 4,259 and generators A, B and C fail the SMA test.

The "After" panel in Case 1 shows that generators B and C can not invest, because unless others also expand they will continue to fail the SMA test. Even more perverse is the fact that if either invests while the other does not, their competitor may be freed from mitigation. Thus, even though investment by either would reduce HHI (over 300 points in this example) and increase the supply margin, there is a significant deterrent to either one expanding.

If B and C both invest, then both may pass, or both may fail, depending upon the size of the expansions and how similar they are. Cases 2 through 4 demonstrate the problem. If both expand, but only a little, both will continue to fail as in Case 2. If they expand significantly, but one to a greater degree than the other, the aggressive investor may remain mitigated as in Case 3. In Case 4, where both make similarly significant investments, both may pass. The obvious

way for B and C to avoid the risk illustrated here is to coordinate.

The challenge faced by generators B and C discussed above becomes much more complex when demand growth is added to the picture. As shown in Case 5, the similar expansions that allowed them to escape mitigation in Case 4 prove insufficient to avoid SMA test failure with modest load growth, here assumed at 3%. This failure occurs despite the fact that the investors have provided additional generation needed by the market.

Growth also creates problems for generator D, which passed the SMA test in Case 1. Case 6 demonstrates that the tightening market would reduce the supply margin and push D over the line to failure. Case 7 reveals that D cannot solve this threat by investing unilaterally; expansion only works if others (says F) also invest as seen in Case 8. Case 9 shows that if D expands unwisely, this can free its competitors from mitigation without improving its own situation.

With the uncertainties in real markets regarding load growth and competitor behavior, the SMA could promote collusion and deter investment, particularly among significant players in the marketplace. Only the smaller generators would be able to invest without significant risk as markets tightened and supplies became short, even though expansion by larger generators might be more economic and would reduce market concentration. This may be the intent of the SMA test, but the result of these disincentives to invest among generators with significant positions could be substantial increases in price levels and volatility and reductions in reliability.

GENERATOR INVESTMENT INCENTIVES: Case 1

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	58.8%	3460	F
B	500	12.5%	156	F		750	17.6%	311	F
C	500	12.5%	156	F		500	11.8%	138	P
D	200	5.0%	25	P		200	4.7%	22	P
F	100	2.5%	6	P		100	2.4%	6	P
G	100	2.5%	6	P		100	2.4%	6	P
H	50	1.3%	2	P		50	1.2%	1	P
I	50	1.3%	2	P		50	1.2%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4250		3946	
Load	3700				0%	3700			
SM	300					550			
RM	8%					15%			

GENERATOR INVESTMENT INCENTIVES: Case 2

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	59.5%	3543	F
B	500	12.5%	156	F		600	14.3%	204	F
C	500	12.5%	156	F		600	14.3%	204	F
D	200	5.0%	25	P		200	4.8%	23	P
F	100	2.5%	6	P		100	2.4%	6	P
G	100	2.5%	6	P		100	2.4%	6	P
H	50	1.3%	2	P		50	1.2%	1	P
I	50	1.3%	2	P		50	1.2%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4200		3988	
Load	3700				0%	3700			
SM	300					500			
RM	8%					14%			

GENERATOR INVESTMENT INCENTIVES: Case 3

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	57.5%	3303	F
B	500	12.5%	156	F		750	17.2%	297	F
C	500	12.5%	156	F		600	13.8%	190	P
D	200	5.0%	25	P		200	4.6%	21	P
F	100	2.5%	6	P		100	2.3%	5	P
G	100	2.5%	6	P		100	2.3%	5	P
H	50	1.3%	2	P		50	1.1%	1	P
I	50	1.3%	2	P		50	1.1%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4350		3825	
Load	3700				0%	3700			
SM	300					650			
RM	8%					18%			

GENERATOR INVESTMENT INCENTIVES: Case 4

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	55.6%	3086	F
B	500	12.5%	156	F		750	16.7%	278	P
C	500	12.5%	156	F		750	16.7%	278	P
D	200	5.0%	25	P		200	4.4%	20	P
F	100	2.5%	6	P		100	2.2%	5	P
G	100	2.5%	6	P		100	2.2%	5	P
H	50	1.3%	2	P		50	1.1%	1	P
I	50	1.3%	2	P		50	1.1%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4500		3674	
Load	3700				0%	3700			
SM	300					800			
RM	8%					22%			

GENERATOR INVESTMENT INCENTIVES: Case 5

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	55.6%	3086	F
B	500	12.5%	156	F		750	16.7%	278	F
C	500	12.5%	156	F		750	16.7%	278	F
D	200	5.0%	25	P		200	4.4%	20	P
F	100	2.5%	6	P		100	2.2%	5	P
G	100	2.5%	6	P		100	2.2%	5	P
H	50	1.3%	2	P		50	1.1%	1	P
I	50	1.3%	2	P		50	1.1%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4500		3674	
Load	3700				3%	3811			
SM	300					689			
RM	8%					18%			

GENERATOR INVESTMENT INCENTIVES: Case 6

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	62.5%	3906	F
B	500	12.5%	156	F		500	12.5%	156	F
C	500	12.5%	156	F		500	12.5%	156	F
D	200	5.0%	25	P		200	5.0%	25	F
F	100	2.5%	6	P		100	2.5%	6	P
G	100	2.5%	6	P		100	2.5%	6	P
H	50	1.3%	2	P		50	1.3%	2	P
I	50	1.3%	2	P		50	1.3%	2	P
I					Load Growth Rate				
Total/HHI	4000		4259			4000		4259	
Load	3700				3%	3811			
SM	300					189			
RM	8%					5%			

GENERATOR INVESTMENT INCENTIVES: Case 7

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	59.5%	3543	F
B	500	12.5%	156	F		500	11.9%	142	F
C	500	12.5%	156	F		500	11.9%	142	F
D	200	5.0%	25	P		400	9.5%	91	F
F	100	2.5%	6	P		100	2.4%	6	P
G	100	2.5%	6	P		100	2.4%	6	P
H	50	1.3%	2	P		50	1.2%	1	P
I	50	1.3%	2	P		50	1.2%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4200		3931	
Load	3700				3%	3811			
SM	300					389			
RM	8%					10%			

GENERATOR INVESTMENT INCENTIVES: Case 8

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	58.1%	3380	F
B	500	12.5%	156	F		500	11.6%	135	F
C	500	12.5%	156	F		500	11.6%	135	F
D	200	5.0%	25	P		400	9.3%	87	P
F	100	2.5%	6	P		200	4.7%	22	P
G	100	2.5%	6	P		100	2.3%	5	P
H	50	1.3%	2	P		50	1.2%	1	P
I	50	1.3%	2	P		50	1.2%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4300		3767	
Load	3700				3%	3811			
SM	300					489			
RM	8%					13%			

GENERATOR INVESTMENT INCENTIVES: Case 9

	BEFORE					AFTER			
Generator	Generation	Share	Share 2	Pass/Fail		Generation	Share	Share 2	Pass/Fail
A	2500	62.5%	3906	F		2500	57.5%	3303	F
B	500	12.5%	156	F		500	11.5%	132	P
C	500	12.5%	156	F		500	11.5%	132	P
D	200	5.0%	25	P		550	12.6%	160	F
F	100	2.5%	6	P		100	2.3%	5	P
G	100	2.5%	6	P		100	2.3%	5	P
H	50	1.3%	2	P		50	1.1%	1	P
I	50	1.3%	2	P		50	1.1%	1	P
I					Load Growth Rate				
Total/HHI	4000		4259			4350		3740	
Load	3700				3%	3811			
SM	300					589			
RM	8%					14%			