

HARVARD UNIVERSITY

JOHN F. KENNEDY SCHOOL OF GOVERNMENT

Harvard Electricity Policy
Group



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THE HARVARD ELECTRICITY POLICY GROUP Twelfth Plenary Session

La Quinta Resort
Palm Desert, California
January 9-10, 1997

Rapporteur's Report

Session I. ISO Governance: Declaring and Honoring Independence

The subject of ISO governance has been a matter of both great concern and rapid development in discussions around the country. Although the visions for the role and functions of the ISO differ greatly in the various models under development, there is a common theme from outside the vertically integrated utilities that true independence is a necessary requirement. Regulators see independence as a source of simplification of governance and oversight problems. However, some in the industry have raised concerns about an all-encompassing independence as being inconsistent with the continuing demands of reliability or the realistic responsibilities that would remain with the established players. For example, if the unbundled wire companies of the future are the regulated heirs of the vertically integrated utilities, will they really escape ultimate responsibility for the reliability of the system? If not, should they have a special standing in establishing the standards and rules for the ISO?

Speaker One:

The topic of our discussion, ISO independence, calls to mind a comment Congressman Markey said about the information superhighway: "I believe in

it, I believe we should have a lot more of it, I just don't know what the heck it really is." Independence for system operators can best be achieved by recognizing that the ultimate goal is to provide benefits to consumers first, even above market participants, and that market

power will not be voluntarily relinquished in a competitive setting.

In 1776 Adam Smith observed that since market participants have incentives to work together to increase prices, they will rarely do otherwise. However, the year 1776 also marked the beginning of America's difficult transition from declaring independence to securing it. Similarly, the electric industry, having proclaimed a new order, now faces the challenge of sustaining that vision by creating constitutions for governing competitive markets. As in government, the electric industry must reach consensus among many different entities and factions. Similarly, checks and balances are necessary to insure the success of the new constitutions. It is of paramount importance that the constitutions be prepared from the outset to resolve difficulties, as robust and effective competition demands a single comprehensive overhaul of the system rather than piecemeal reform.

From 1994-95, the UK's National Power and Powergen had market shares of about 33% and 25% respectively. Furthermore, the two plants owned 90% of those plants which determined pool prices. These large players, therefore, command a much greater influence over market prices than their market shares indicate. This factor has made competition in peaking or intermediate power units more difficult to realize. It has also been suggested that strategic bidding by large players can cause market prices to rise.

Indeed, recent studies of the UK document the emergence of this practice. Although strategic bidding is regulated in theory, practical oversight of the various means of extracting profits from consumers is all but impossible. Unlike the rest of the world, the UK is currently dealing with incumbent generators

who want to keep ownership of transmission and system operation. Apart from forcing total divestment, the UK must either grant generators independence, allow partial divestiture by establishing a strong ISO with effective rules for transmission and system operation, or introduce well-informed regulators with sufficient jurisdiction and effective enforcement powers. Since independence without sufficient accountability cannot be allowed, the ISO's aims -must be clearly defined, and the ISO must be provide the means to accomplish these aims. While independence of the ISO is crucial, of equal importance is the scope of the ISO's authority which must be sufficient to attain the system's goals.

To ensure reliability, maintain nondiscrimination among generators, and control market power, efficient use of generation and transmission assets must be employed primarily for the benefit of the consumer. System reliability is compatible with the independence of the system operator only if the ISO is carefully constructed and regulated. Some combination of FERC and regional mechanisms will be responsible for monitoring the system operators in such a way that review is not excessively centralized at the federal level. The ISO should work with all market participants to understand their constraints and their operating conditions. The ISO will need sufficient authority to act, not just with respect to short-term system balancing, but with respect to adopting pool-wide rules and system planning.

Recent negotiations concerning the NEPOOL ISO proposal to FERC regulators were quite positive. NEPOOL's original proposal for an ISO restricted the ISO's role to the operation of the system and some limited input in planning, but the proposal was amended

dramatically before the final filing with FERC. In the filed proposal, both parties acknowledged that the ISO must have authority over its budget and the authority to plan for and operate the system in accordance with system rules. The original draft envisioned the ISO as a non-partisan player in dispute resolution, its duties confined to supplying necessary information to NEPOOL. The filed proposal gives the ISO judicial powers suitable to a truly independent and effective system operator.

Similarly, the original draft stated that ISO shall conduct system assessment and planning at the direction of NEPOOL, the filed proposal gave the ISO the authority to independently conduct system assessment, and propose or adopt such new system rules or procedures as it deems necessary. Under this proposal, the ISO could initiate system planning or market assessment and adopt new rules and procedures to implement its findings. The previous proposals required assessment findings to be reported to NEPOOL. While the previous draft essentially maintained NEPOOL's hegemony, the December proposal strikes a more conciliatory balance. It states that NEPOOL and the ISO have joint responsibility to develop rules but that if the ISO wants to adopt a rule which NEPOOL opposes, the ISO board of directors shall have the authority to adopt that rule unless FERC approves NEPOOL's appeal. Originally NEPOOL was to control the ISO's budget completely, but ultimately some checks and balances were introduced which allowed the ISO a measure of fiscal autonomy while preserving NEPOOL supervision of ISO expenditures. The funding of ISO expenses would be raised by an uplift charge, paid on a non-discriminatory basis by all participants in the pool. Equipped with an independent funding source, the ISO would not be

economically beholden to NEPOOL. Despite the various reforms aimed at securing the ISO's independence, the ISO may nonetheless be removed by a vote of the NEPOOL management committee.

Speaker Two:

ISO's are the latest challenge to the "old guard," specifically, the traditional transmission utilities. These utilities are in a desperate struggle for survival, and are remarkably tenacious. However, it seems likely that . their responsibilities will be transferred to another institution in the near future. The situation recalls similar circumstances under inheritance law and the law of perpetuity. Under this principle, an individual can establish a trust to pass on to an inheritor, but the individual cannot decide, for time immemorial, how the trust should be governed. The heirs inherit the trust and the existing rules of the trust, but eventually acquire the right to handle the assets as they see fit. Who will inherit the transmission assets in the new competitive world--the unbundled wired companies or the ISOs? The current NEPOOL proposal envisions the ISO as implementing reliability and transmission policies, while NEPOOL oversees regional transmission policy. The ISO will serve more as an implementer than an originator. It is granted some powers which offset NEPOOL's, but ultimately NEPOOL is the

primary administrative engine. FERC intervenes solely as a dispute resolution mechanism.

In the NEPOOL proposal the ISO is an independent entity, but one whose primary duty is to implement the rules established in the NEPOOL committees. Any reform of NEPOOL will have to come from within, from its own voting membership. Members are

allotted votes in proportion to their participation in terms of sales transactions, wholesale and retail markets, serving load, and power generation. To the extent that a particular NEPOOL member is involved in all sectors of the market, in other words, a vertically integrated utility company, it will have significant influence and voting shares at NEPOOL. Although no individual member can have more than a 20% share in NEPOOL, companies with a combination of vertical integration and size can wield significant control over regional transmission policy. This current NEPOOL proposal attempts to circumvent the rule of perpetuity. NEPOOL members not only want to establish the trust which shapes the initial disposition of the transmission assets, but also to control these assets indefinitely. As currently reconstituted, NEPOOL fails to meet the standards of a properly independent ISO.

Continuing with the Constitution analogy, under the new utility agreement NEPOOL is acting as Congress, the ISO as President, an executive implementor, and FERC as the judicial branch. In the NEPOOL arrangement, however, the ISO board reclaims some legislative functions. Furthermore, NEPOOL's influence over legislative issues, garnered through market and voting shares, burdens FERC with the additional regulatory responsibility of precluding, rather than just adjudicating, industry concerns.

Private utilities with vertically integrated power production and delivery functions were traditionally considered public service corporations in a regulated market environment, and allowed to operate monopoly assets in trust for their rate payers. Assuming that companies will want to remain vertically integrated, maintaining both regulated and competitive functions, the state

must see that the monopoly facilities are used in trust for the public. The most effective way of achieving these goals is through the creation of an independent ISO.

Greater independence is required when reliability functions intersect market functions. Therefore, FERC has assigned the ISOs the task of assuring power supply delivery in a non-discriminatory fashion. Transmission companies can still address issues which do not intersect market functions such as tree trimming and squirrel management, but network system reliability which intersects market functions belongs to the ISO.

Speaker Three

If independence of the ISO is defined as control by market participants in general, rather than a elected group, the ISO will not necessarily protect consumers. Consumers will lack representation in the very places where decisions that affect them are made, for market buyers and sellers will pursue their own interests. For the same reasons, ISOs are unlikely to reduce horizontal market power because of its reluctance to enforce bidding rules. Instead, an independent ISO should seek to reverse vertical market power and provide non-discriminatory access to the system.

A system in which one group decides how the industry is to be governed while another determines the jurisdiction of each governance structure will inevitably be riddled with contradictions and dissension. Considerations of unity and administrative coordination must be balanced with those of independence and accountability. If the decision-making process resides in a truly independent entity, its accountability will dissuade it from making rulings which have far-reaching effects.

To what extent should the ISO use market processes, and, assuming correct pricing, is it necessary for it to have complete independence? Well-functioning market processes and efficient prices can maximize an ISO's chance of being fair and nonpartisan, thereby lessening the need for autonomy. However, even an independent and non-discriminatory ISO cannot arbitrarily impose costs on the system. Even non-discriminatory decisions that impose random cost and benefit will discriminate against those players who lack diversified portfolios that protect against the vagaries of the market system. Therefore, even for non-discriminating decisions, it's important that ISOs use market processes as much as possible to guide its determinations.

Other countries have restructured their electricity systems with comprehensive legislation, but the U.S. is trying an incremental approach. In the absence of any central leadership, FERC and the states are left to seek an impossible middle ground between overhaul and the status quo. However, they are discovering that a gradual approach only serves to give protesting groups more time to catalogue their complaints.

Legislation must recognize that the market has altered traditional responsibilities and obligations. Until legislation reflects this development, transmission owners will continue to insist that since they are responsible for reliability in certain situations, they have the right to question ISO demands. Administrative processes within the ISO can be structured in such a way that certain classes or participants are awarded voting rights on different classes of decisions. Another method would separate certain types of decisions from the ISO altogether, and have these decisions made by a higher body and imposed on the ISO. The ISO can then be fully independent

without having to rule on decisions involving specific market participants.

In the UK, there's the National Grid Company, which serves as the system operator, and "the Pool." The Grid Company is a private company with incentive regulations and must answer to the NGC. The NGC writes the reliability rules within a set of a grid codes and standards imposed by legislation. These rules can be appealed to the parliament and the energy minister. The grid company alone determines the reliability standards and how to impose them. Their private board has a fiscal responsibility to its shareholders, under nominal regulatory authority. It also has incentive regulation to restrain the cost of maintaining reliability standards, but does not have any compunction to seek representation to justify its decisions. However, if things go astray, the grid company is held legally responsible and liable. The grid also operates the power exchange which is totally integrated with the dispatch function and the pricing, for the pool. The power chain is likewise integrated with the dispatch function. For example, in the New Zealand electricity market Transpower (TP) owns the grid, sets reliability standards and is responsible for reliability, without broad representation on its board and with little inclination to let market participants influence its decisions. The New Zealand Electricity Market (NZEM) is a broadly representative organization that operates the power exchange and acts as ISO--although TP can override NZEM dispatch decisions for reliability reasons and the treatment of non-NZEM members buying transmission service from TP is unclear.

Is the UK grid operator truly independent, since it establishes and implements all the rules? Its board doesn't represent all the market participants, but rather one that

operates under set rules and is responsible for the NGC. Only the energy minister can replace the CEO of the grid company. Since the government has never controlled the grid, they are understandably trying to sell it.

In Victoria there is VPX, the Victoria Power Exchange. It's truly independent, a club of market participants which does not own the grid, but is responsible for reliability as the acting power exchange. VPX has acquired insurance that will cover the cost of the liability and of reliability problems so that they can withstand being sued for the results of their operational decisions. These costs are predictably passed through to market participants. Therefore, all market participants are responsible, in a broad sense, for the outcome of reliability decisions. Chile has the Committee for the Economic Operation of the System (COEDS). It is a cartel of the generators, who operate the system as they see fit although they do not own the grid. They are responsible for reliability. It's essentially an arrangement where they generators pool their resources to meet their contract obligations.

While certain rules and procedures can be defined and debated over time, there are hands-on decisions which must be made quickly, without discussion or appeal. These judgements of the operator cannot practically be appealed or argued about, or even monitored effectively. The question of responsibility is further clouded by past legislation which the utilities interpret as removing their responsibility for reliability.

When the lights go out, where can customers turn? The ISO can take control, but if responsibilities are delegated to individual utilities, their ability to influence utilities' behavior will evaporate. It is likely that more complicated structures, with "constitutional"

checks and balances, is needed to resolve the situation.

General Discussion

It is ill-advised for one committee within the ISO to deal with economic matters and another committee to deal with reliability. The issues are linked closely enough to warrant a cohesive policy. A wiser approach would separate those decisions which, although subject to post facto regulation, must initially be made in a timely fashion, from those longer term decisions which can be monitored, debated, and appealed more leisurely. The ISO must react quickly to a changing market in a non-discriminatory fashion. Their decisions will surely involve economic and reliability trade-offs. Should a transmission line be expanded, or should a double or single contingency be used? However, certain matters can be considered gradually, and others which must be promptly expedited.

While currently the New England system operator requires twelve hours notice for new contracts, one hour would be the preferable standard. However, many argue that one hour is unfeasible and would threaten reliability. If the industry agrees that the length of notice is primarily a trading issue, then presumably ISO would want to control that ruling. As a reliability issue, the system is NEPOOL's to test and change if necessary, and appeals can be brought to FERC. It's very difficult to separate reliability from economic issues.

The western outages were blamed on unruly vegetation and BPA's reluctance to inform people of problems because they wanted to continue to push more power through the grid. An independent system operator, unmotivated

by fiscal gain, would have ordered the BPA to stop overloading the grid.

Based on the western grids' experience this summer, customers prefer reliability over lower prices, but industrial customers often choose the price break which accompanies interruptible rates. Some businesses are unable to cope with interruptions and remain competitive, other cannot. Reliability is properly defined, however, as insuring that individual customers do not experience failures in the power system.

The ISO needs to insure that the market is maximizing social welfare through efficient operation. A competitive market will create widespread benefits for all consumers, rather than undue benefits for a few. A union of reliability and economic benefits is possible—as people agree to leave the grid, fewer situations arise where there is not enough generation to meet demand, and the improved functions of the market increases both reliability and profits. In England the grid and its company, the NGC, act as a type of ISO in that they are responsible for reliability, grid investment decisions, and recently, the costs associated with grid constraints. The National Grid Company has been building new transmission lines by managing the operation of the existing lines so that they remain within the reliability rules.

There are two distinct aspects of reliability, adequacy of resources to serve the load, and security. While they are obviously linked, the security of the system should be the ISO's primary focus. However, in a competitive market, the parties don't want to relay that information to the ISO. Hence, the ISO can enhance the security aspect but should leave the adequacy rules to the market.

Operators and planners can, if properly motivated, make daily decisions to ensure reliability at low cost, but they're going to avoid the risk of dealing with reliability issues unless there are incentives in place, and without that balance uplift costs are going to rise. NGC's uplift got out of hand because of a lack of incentive. The NGC knew they'd only be in big trouble if the lights went out, so it channeled everything into reliable operations which raised the uplift costs. When the rules were amended to relieve NGC of a percentage of its uplift costs if they were able to keep it below an established target level, NGC was able to lower the uplift substantially.

Politicians and economists look at reliability in quite different ways, which has caused some conflict between some California laws and FERC. Politicians see Adam Smith model's as insufficient for reliability. If the lights go out because the ISO didn't do its job right, it cannot be explained away as a whim of the market.

What is the objective function of the ISO? What is its mission, and what structure will maximize its ability to reach it? Efficient trade, bulk power, and maximum output through the transmission network, are essential, but difficult to measure with separate ISO and power exchange operation.

If the ISO is granted total independence, transmission owners will be reluctant to cede their assets, and will try to maintain some control, particularly if they are to be held liable. The new ISO must claim liability as a prerequisite for total independence.

Focus on ISO structures persists because the industry contains so many unresolved issues. Because states are deregulating in such different ways, the industry is designing

institutions to oversee still poorly defined market and regulatory arrangements. Because many utilities own both generation and transmission, measures have been taken to separate control of generation from transmission, and to disengage ownership from control. The ISO structure deals with this vertical market power problem. Multiple ownership of transmission assets in the same area must also be addressed. However, is the separation to be enacted from the federal or state level? Who is in control? It is very difficult to design an institution which can tackle all these issues simultaneously.

The UK has the cleanest solution, which is to separate transmission entirely. Transmission can then be regulated through incentives and penalties. That scenario is unlikely to occur in the U. S. anytime soon. It is possible to envision a partially separated grid board which continues to be linked somewhat to the vertically integrated system.

More attention should be paid to the effectiveness of the new rules, and to accountability of those applying them than to the present focus on independence. The burden should be on those designing the rules to demonstrate a improved marketplace, not just to assume change will necessarily be positive.

Independence should help increase efficiency. An independent ISO is designed to create an environment in which competition can flourish and average cost pricing is eliminated. The ISO must not therefore limit its actions to generation but instead create tradable rights and as much competition as possible in the transmission grid as well. While vertical integration is crucial for the ISO, the ISO may also be the most appropriate place to analyze market power bidding rules and their

subsequent monitoring. If the ISO runs audit rules through its dispatch program, it may result in generators dispatching negative prices. Normally a cause for alarm, negative prices may actually be embraced by generators. The auction may not be the ideal solution, and the ISO needs to deliberate the problems of fixed costs, non-convex marginal cost functions before dismissing all other options.

New York's complicated bureaucracy results in decisions which are usually temporary and ineffective, and thus the industry is talking about getting involved in operation. Operation assets have been built up over time, and now have to be maintained, upgraded, or replaced. There will have to be incentive mechanisms for the system to achieve its objectives efficiently.

The meeting began with a quotation from Adam Smith, but an important sentence was omitted. After noting that businessmen are not part of a conspiracy to raise prices, he comments that meddling in the affairs of the market will do more harm than good. The ISOs, as essentially a vehicle to continue regulation, needs to consider whether the negative economic effects from efforts to maintain reliability is worth the sacrifice. Would consumers, were they given the choice, pay for a more reliable system? Although interventionist attempts to control market power or influence market behavior often backfire, governance institutions must continue to make rules which promote efficiency and consumer welfare for the market.

When regulation's effects cannot be measured in advance by a market test, checks and balances can lessen the potential for unwanted consequences. System operation looks like a natural monopoly in terms the scale and scope

of its economy, but it cannot be subjected to a market test. A governance structure that provides regulatory oversight must assess operation's performance in lieu of the market.

It is difficult to establish new rules in the face of an enormous amount of institutional knowledge and momentum in the market today. Furthermore, the ISO has never dealt with these issues, having implemented, rather than design, previous regulation. The transition to having an independent entity become more involved in the rule-making process has proved taxing.

Owners of assets can be involved in the disposition of those assets to a new heir. However, there must be a set date by which the integrated utility yields ownership and control to the new ISO. The utility may choose to divest, which create a truly independent ISO, and removes some of the complications of the governance structures based on the UK model. However, total divestment is unlikely in the near future, so it is advisable that the utilities deal with the complicated governance structure paradigm, particularly the independence of the ISO, and the role of the incumbents in the new system.

An ISO oversight board, accountable to the governance structure of the state, could oversee the operations of the ISO. It would contain three appointees from the governor's office, one appointee from the assembly, and one from the state senate. FERC resists this structure because it wants the ISOs to be regionally, rather than state-based. California thought that all the members of this oversight board ought to be California residents, and that the government needed some input into making sure the ISO keeps the lights on.

The key to competition is who controls the customer. **The ISO** should strive to create an atmosphere which allows buyers and sellers the freedom make their offers without ISO interference. One advantage of an ISO over grid owners is that it can accommodate multiple grid owners, where each grid owner leases its assets to the ISO. The independence of the ISO does not, by itself, create competition, since potential monopolies can still charge a market clearing price to remove competitors. Rather, the ability of sellers and buyers to deal with each other creates competition,--which an ISO-operated market lends them. An ISO insures that multiples sellers can have non-discriminatory access to customers.

Maximizing throughput of the transmission system is an acceptable goal, but it doesn't adequately define the objectives of the ISO. Several of these objectives are not mutually exclusive. Maximize throughput may cause the conductors to melt. How can these factors be weighed objectively? An incentive scheme which measures ISO's success in meeting certain objectives needs to be installed. Current ISO proposals are vague about ISO compensation.

In terms of the most efficient use of the wires and the system, the amount of electricity that can flow over given wires at any given time is highly variable and volatile. As long as utilities are affiliated with generation transmission, at least the perception of new market power will exist. If an independent person decides either the lease conditions or the amount of power that can flow, the market can decide the most efficient means of bringing suppliers and customers together.

At present, utilities have the power to decide whether to expand the transmission system or

continue to operate the existing system. In England, the national grid usually decides to expand the system, since their regulation offers incentives, such as earnings from an investment rate base, to install as many wires as possible.

There can never be a perfect grid. The tradeoff is, is a better grid desirable considering its attendant costs? The grid company combines those two things by subjecting these decisions to market analysis. The grid company must operate under a fixed revenue ceiling while paying all the costs associated with delivering electricity. In this way, there is no incentive to overbuild the grid, since if the extra gains turn out to be grit, the lost profits come out of the company's pockets. While now the grid has fixed revenue, for the first several years the grid company was responsible for improving the grid, but not for the uplift costs associated with a less than perfect grid. Victoria offers an alternative model, where the entity that owns the grid has no responsibility for dispatch, operations, or even liability other than maintaining its facilities to certain standards. These standards are created by the VPX, and the ISO decides how to operate and upgrade the system, and is liable for the reliability problems and the costs associated with an imperfect grid. The grid company contracts out its expansion projects, and then passes those costs back to system users. Essentially, VPX leases the grid assets from the grid owner, uses them as it sees fit, and decides when more assets are necessary.

The ISO must be given incentives to behave appropriately, either through objective rules of operation with an incentive structure, or through a constitutional model where it is assumed that the governing body and the ISO will pursue the same interests of the governing

body. The VPX in Victoria is compelled to purchase insurance and then has the impacts of both the insurance and the liability suits shouldered by the governing body. Ideally, the equity owners and residual claimants in the governing body would absorb those charges since they let the system deteriorate to the extent that they have to shoulder the cost through high insurance rates.

VPX collects all its Costs, including those of buying insurance, from system users through general uplift or assessment. Incentive, such as a revenue ceiling, could be implemented by which to pay insurance. In England, the NGC operates under a revenue ceiling high enough to cover both the operational costs of the grid and the expected value of any liability associated with outage. Insurance is inherently problematic, since its purchase reduces incentives to prevent its need.

The Victoria system has even more moral hazards. In addition to the standard insurance problems, premiums can be passed along. The UK system offers stronger incentives than the WPX system. If something goes wrong in England, the utilities must absorb the cost. Once this fact is diluted by insurance or some socialization procedure, accountability diminishes rapidly.

Studies have concluded that the current PBR plans fail to balance these incentives. The incentives are not generally transparent, and the incentive in one performance area often is much stronger than in another. Some argue in favor of incentivizing the ISO on congestion costs and reliability, others prefer throughput.

Session II: Designing a Competitive Retail Market

Unlike the future of wholesale power markets, which are well on their way to unbundling and full competition, the future of retail markets is uncertain. Some state regulators and other industry participants believe that retail competition should not be introduced until the effects of wholesale competition on the industry are known. The degree of possible unbundling of retail services is in dispute. However, in order for customers of all sizes to fully enjoy the benefits of wholesale competition, unbundled retail competition may be necessary. Retail market structures will affect how large or how small the benefits and risks customers will receive from competition. Regulators will have to strike the proper balance between consumer protection and pro-competitive interest. Which components of the retail market should be unbundled? Who owns the customer interface, post restructuring? What is the role of the distribution utility post unbundling? Should the distribution company continue to provide retail services, does it remain as a passive provider of these services only on a default-basis, or does it exit the market entirely?

Speaker Four

My study compares the efficiency properties of two hypothetical market structures and looks at the incentives for behavior that are embodied in the two. Efficiency is defined as maximize consumer satisfaction at minimum cost of production--not just minimized costs and therefore minimized prices--but whatever the consumers want, which may include a quality of service which requires higher costs and higher prices. Both hypothetical market structures are characterized by identical generation and ISO sectors, which assumes that generation has been divested. Where the two market structures differ is at the distribution end in terms of bundled versus unbundled distribution service. They also differ in terms of direct, as opposed to no access to the spot market. So the wholesale model is similar to the traditional regulated distribution company, offering bundled service under regulated cost-of-services rates.

Therefore, there's no direct access to the spot market by consumers, and no direct entry into a contract market between consumers and

On the other hand, the retail model offers unbundled service, unbundled power, and wire service. Competitive marketing companies sell power and related services to the consumers, who are able to deal in the spot market. There are two load serving entities, namely regulated distribution companies and unregulated competitive power marketing companies. These entities can be judged on several criteria: the contract market for pricing power, the incentives for product differentiation and innovation, investment and transmission capacity, and transactions costs.

Contract Market for Power Pricing

The contract market reaches efficiency when price equals marginal cost. Consumers are then paying what it costs to produce, and producers are offering consumers acceptable rates. Prices still vary seasonally, even hourly, so there will still be price risk which will encourage contracting by the load-serving entities and by generators interested in price certainty to cover their costs.

Contracting is designed to assuage the risk-averse. Risk-averse parties are often willing to pay more to stabilize the prices at the level of the contract market. Contract prices will differ from spot prices, but price will not necessarily differ from marginal costs because the purchased insurance actually adds to the marginal cost. An efficient contract market balances risk-bearing and risk-shifting in the market. It minimizes the cost of insurance and best represents the interests of consumers. However, the more initial differentiation among these terms and conditions, the higher the cost of transaction costs, which will ultimately limit the amount of variety available. The price of the contracts is likely to be driven down by the aggressive bargaining of generating companies and intense competition for customers. Regulated distribution companies will avoid this type of competitive pressure.

Minimizing the cost of insurance can be accomplished by shifting risk to the party most willing and able to accept it, and by offering more stable terms to the least risk-averse. The least risk-averse customers will require lower insurance payments, and marketers will exploit risk aversion tendencies in the market to offer a variety of contractual terms. Similarly, relatively fixed terms should be allocated to those with the least flexibility to respond to price variations. Those able to accept the varying risk receive lower costs. The retail market will reflect these efficiencies in the wider variety of terms that consumers can choose from.

Product Diversity and Innovation

The key to efficiency in product diversity and innovation is simply providing an array of services that consumers are willing to pay for. Diversity lies in power services and in demand

side management options. Power services can offer options that will lower power consumption during periods of high spot prices, and increase their profits and customer satisfaction in the process. Distribution companies are again less capable to differentiate power services than the marketing companies. They are also not as willing because of the lack of pressure of competition, and because of the regulator's control over their price behavior. Under-regulation they will not profit as much from selling substitutes for power, since currently profits are problematically linked to the volume of power sales. Traditional regulation lessens their motivation to reduce consumption during high price periods as well.

Investment in Transmission

While the first two criteria work more efficiently under the retail model, investments in transmission tend to favor the wholesale model. Transmission capacity needs private sector investment to achieve efficiency, specifically, capacity should be expanded until the marginal benefit from expansion exceeds the marginal cost. If benefits exceed cost, there is too little investment in transmission capacity. Congestion will result in some consumers paying more for power than others, and some producers will pay less for power than other producers. However, those who benefit from relieving the congestion will be expected to pay for it. Expansion benefits tend to accrue unevenly, and unless there is a central planner who requires everyone to pay according to the benefits they receive from expansion, marginal benefits will always exceed the costs of expansion, causing under investment. In both the wholesale and retail models a central planner who strives for a general dispersement of the benefits is

preferable, but it is less crucial in the wholesale model because their costs of transmission expansion are a smaller share of the cost of the overall transaction. Transmission expansion costs are relatively unimportant to the overall returns from transactions.

Transactions Costs

Transaction costs, which are basically the costs of arranging, negotiating, and enforcing contracts, also favor the wholesale model. These costs might be a barrier to competition in marketing power. Larger companies may have an advantage if costs rise faster with the number of transactions rather than with the size of transactions, average costs would fall with size.

Benefits are a combination of cost savings and price reductions caused by competition in generation. Retail customers are able to choose generation options, while regulated transmission distribution still contains hidden charges. However, not all benefits accrue from retail competition. True competition at the retail stage is a laudable goal, but its strongest influences would be in creating innovative technology, even more than lowering generation costs. Static efficiency does exist between retail and generation, which accounts for the difference in contract prices between the two. If either transaction costs or poorly structured serving entities provide a barrier to healthy retail competition, then competition should be limited to wholesale.

Speaker Five

The traditional business school approach looks at an industry as a chain that links research and development, product conceptualization, and production manufacturing, to product,

distribution, marketing, and customer service. Until recently, the electric utility industry was involved in all segments of the chain, from the co-funding and operation of in-house R&D, generation transmission, marketing of electric homes, and customer services such as pilot lights, and bill and credit options. This traditional model has been transformed to a competitive non-utility generation sector where the physical product, measured in kilowatt hours, financing building, operating generation, and the financial risk management activities associated with the commodity side of the business are being unbundled from the utility. All facets of the industry are becoming competitive and unregulated. The distribution function, the pipes and wires utility, remains a monopoly company which builds and maintains open access transmission distribution systems. The transmission distribution company has come to be defined as a non-discriminatory service provider. Unbundling distribution services from the utility will result in certain products and services being offered competitively by a multitude of retailers.

In retail competition there is a division between the open access pipes and wires companies, and the competitive retailing companies. Metering, meter reading, billing, collections, and credit are currently performed by the monopoly distribution company, yet need to be scrutinized very carefully to see whether they belong in the monopoly distribution company, or are competitive services that could be provided by retailers. Retailers would value direct customer relations such as metering, meter reading, and billing very highly. Competitive retailing in the electric industry must be created in a manner to ensure that the customer will not be annoyed by the process--transition should produce tangible benefits quickly.

Retailers are going to find it very attractive to garner some customer contact, and will be battling for access, but who, if anyone, owns this relationship? Metering, data management, billing, and credit functions are presently bundled in the local distribution company. This situation seems fundamentally at odds with allowing customers maximum choice among retailers, as does giving customer contact functions to the non-discriminatory service provider rather than to the market participants. The Utility Distribution Company ((JDC) remains a non-discriminatory tariffed default provider of many of these services because not all customers will select a retail provider. The utility distribution company still has a vital role in ensuring that standards for these functions are set and maintained. Retailers who assume new responsibilities to enhance their customer contact, must live up to the standards that customers are entitled to expect. The revenue cycle is but a small component of the total activities of the UDC, so restructuring this area of the distribution company would not be a radical step. The activities that are required to run the pipes and wires business remain bundled in the utility distribution company. Many of the activities within the revenue cycle, however, such as billing systems, customer contact vehicles, are sufficiently universal to be performed by others. While utilities should relinquish some of these functions, a utility affiliate could provide services to the market.

Speaker Six

Now that it is accepted that certain functions of the wholesale market will be unbundled, the process will soon extend into some of the retail functions. In its most theoretical form, the competitive retail market would have unlimited new entrance, complete service

unbundling, and different rules of interaction for every state. The vertically integrated utility is sort of a Rubik's cube with all the sides the same color. No matter how you turn the sides, the outcome is always the same! One company performs all aspects of the business. This type of thinking has become unsatisfactory to New England customers. Prices are too high, and the "cube" needs to be unbundled. Unbundling the generation square involves separating retail versus wholesale.

The stranded cost problems associated with a gradual progression from a regulated monopoly to a wholesale environment, with the attendant stranded costs, should be avoided as we unbundle distribution. However, the number of suppliers should not be limited, nor should their freedom. The general philosophy is to let everyone, including in New England public and quasi-public agencies, be able to sell. Every supplier must be governed by the same set of rules, which are absolutely critical to understanding how to read meters and send bills.

Unbundling competitive services is, administratively, quite complicated. It has never been done before, and will require hearings on every area to establish the proper jurisdictions. England, having just introduced retail wheeling without telemetering, has just launched the process, although a transitional

stage will precede it. Originally, the distribution company was to serve as the supplier of last resort. Yet if the distribution company agrees to read meters and perform bill collection, it will want more recognition than as a last resort supplier. Otherwise, there are more savings to be made in generation, which comprises seventy-five percent of customer's bills. Arguably, 50% of their bills are stranded, and thus subject to influence from competition. In distribution, the area

under discussion is only 2.5% of their total bill. Even saving 50% of those costs results in a meager 1% savings on their bill by introducing competition. Suppliers, however, will provide incentive for deregulation. Suppliers want to be able to send one bill, bundled together with credit cards, banking, or the home security system, to garner a higher price for the commodity. Retail sales is utterly dependent on being able to hold customers, and retailers cannot rebundle these services until they handle the basic services.

Speaker Seven

Retail competition should probably not be introduced until the effects of competition on the wholesale market are better known, and specifically the effects on the states already on the deregulation path. As a whole, the U.S. has among the lowest electric rates in the world, only Canada and Sweden's are lower among the industrialized countries. Florida's electric industry has traditionally provided very reliable service at competitive prices. This service is particularly impressive since Florida contains little low-cost hydro power, and its generating fuels must be transported long distances. Yet many people, including the Florida Commission, believe that a regulated industry cannot perform as well as a competitive one. Florida did promote local competition in the telephone industry even before the federal law was passed, because a better job could be done through competition than through regulation. The presence of lower-cost marginal power creates regional inequities that force certain states to restructure. It's not surprising that the states with the highest rates, such as California and New England, are moving more rapidly towards competition.

The absence of a concerted effort in Florida to restructure the retail market is attributable to concern about stranded investment. Furthermore, despite complaints of high electric rates by industrial customers, Florida is about at the national average. Indeed, among the largest investor-owned utilities the electric bills are flat in nominal terms, and show a 31% reduction when adjusted for the consumer price index and inflation. While everyone wants lower electric rates, Florida's are not unduly high. The Florida legislature has also not indicated any substantial interest in proceeding to retail competition.

The industry needs to be aware of the potential gains and losses competition in the retail market may bring to Florida consumers. The Florida Commission has educated its staff about the regulatory implications of restructuring, drawing extensively from the lessons of other states to forge an cautiously aggressive approach to restructuring. Since the legislature will be involved, the telecommunications rewrite experience still fresh in their minds, the process will be a lengthy one. Legislators will have to be convinced that restructuring will provide short-term benefits to Florida. Yet preparation for competition has nonetheless begun. For example, IMC Fertilizer has recently requested bids for outside providers to supply its electric needs, and the utilities are preparing for competition by making substantial reductions in their operating costs and their workforce. Combined with the existing low rates, the urgency for immediate restructuring is somewhat muted in Florida.

The Commission has allowed the utilities to experiment in new pricing structures, including real time pricing. The existing system has worked well from the viewpoint of policy makers; reasonable residential rates in a state

where only 11 percent of customers are industrial. With such an acceptable status quo, the Commission is particularly concerned with any negative consequences, such as the impact on captive customers, and the potential loss of energy efficiency programs, discounted rates for low-income customers, and renewable energy considerations in a competitive market. Florida is experimenting with negotiated rates. Gulf Power can now compete with the sister companies Alabama and Georgia Power for customers in the panhandle area. The rates have been set equitably, so that one rate class does not subsidize another.

General Discussion

The retail access revolution began in New England, prompted more by its contracts which were based on the availability of lower priced power on the margin than the region's high prices. California's metering and billing information systems unbundles these systems to make them competitive outside the distribution utilities. The California Commission solved the market power problem through divestiture, and is setting up an ISO and a power exchange. It may unbundle the distribution company by 1998.

Currently, there are proceedings at the state level to discuss unbundling services in the local telephone market. The battle over electric metering and billing pales in comparison to the debates over network interface device, the telephone company's plastic box on the sides of houses. States must address who will perform the metering and billing and who can share the metering hardware with the competitive service providers. In any retail competitive environment, a number of issues will arise that cannot be foreseen. For instance, if an incumbent telephone service

company representative makes a service call, it is assumed that he is acting on behalf of all local telephone service providers on a contract basis. Therefore, the representative cannot affiliate himself with any company.

Distribution services are not natural monopolies. However, just because all suppliers could theoretically have their own meter doesn't render the system infallible. Many retail services do have large elements of natural monopoly services. Achieving retail competition while maintaining all the necessary services, - many of which are inherently monopolistic, requires careful navigation. In Norway, it is argued that customers don't need to be metered individually, but can be assessed on the basis of an average profile. Under this system retailers will simply take the load with the better profile and install the meter. These customers now have all the benefits of having their own meter, without having to pay for it.

The question of whether metering is a natural monopoly depends on whether the meter sits at the customer's home, or at the distribution service. Traditionally, the meters simply count the electron flow, but the technological advances in the wire service could justify widespread replacement of the meters. The new meters have real-time monitoring and information which could provide markedly improved service to the customers by eliminating outages. These benefits offset the monopolistic traits of the new meters. There are additional commercial benefits such as increased billing options.

Business cannot be forbidden to perform these basic functions in any kind of marketplace. Therefore, with respect to metering, the distribution company must be responsible for metering because it is the only independent verifier, the only independent market

participant that can provide usage data to all market participants on a non-discriminatory basis. Technology will be emerging to support the market structure by providing hourly usage data. With customer authorization, the unbundled distribution company will make that data available to all market participants.

The retailer must be allowed access to the customers so it can be thought of as the service provider. What provides a retailer a niche is the ability to differentiate and customize service, not to reduce the cost of metering or shaving a percentage off the cost of the revenue cycle. Retail competition in the gas industry stalled despite considerable deregulation because retailers were unable to penetrate those markets due to a lack of customer contact functions.

The UK proposes that meters for the customers who opt for them be subsidized since customers who opt not to buy meters receive some of the benefits nonetheless. Unbundling of retail services on a non-voluntary basis will not be embraced by many utilities. Forcing unbundling might create a lot of value-added opportunities--those providing the services will make money, but the customers will not receive any benefits.

The task of unbundling all the various components of the system should be delayed until the metering building and information systems are in place. At this point, a bill is ready every month, but where should it be sent? It is generally assumed that it will be sent to the customer's home, but an entirely different possibility is to send the bill to Enron, and have Enron arrange payment with the marketer. Marketers are already looking for increased access to the customers. The wholesale price is avoided, and the UDC loses

customer can choose to receive the bill directly or have it sent to the aggregator or supplier.

Unbundling demand would allow customers to move beyond the choices of either paying the average price, time-of-day pricing, or buying from a different supplier. There are pricing elasticities and acceptable risk factors that only apply to demand load. The major utilities have been the primary beneficiaries of the new system, for they have garnered new customers by changing both demand and supply characteristics dramatically.

One of the major benefits of retail competition is the abolition of uniform utility tariffs and the creation of a market with many suppliers and many options.

How do you charge for distribution when it is used as a backup rather than primary source? A fuel adjustment clause could be implemented to protect against bill fluctuations, especially since electricity prices will be more volatile than other utilities. However, the volatility itself may be one of the primary causes of lower overall cost.

Rate designs require all kinds of implicit averaging and cross subsidies, since load characteristics differ across communities. Regulators must be concerned about a potential rate filing to increase the prices for customers in low-income areas. Cost shifting will naturally occur, or retail competition will center around rate design arbitrage, which does not increase efficiency or choice.

An assessment of the relative merits of wholesale versus retail competition needs to consider how the Load Serving Entity (LSE) would reach agreements with retail customers, and what transaction costs it must absorb beforehand. LSE would need a full

requirements contract which specifies price and load. Anything beyond the contracted amount can be bought at the spot market price which eliminates the price incentive problems since the customer is aware of the spot prices on the margin.

However, since generation comprises a large share of the whole, wholesale-only competition will not provide incentives to contract in the generation market unless the industry accepts captive customers and enters into long-term contracts with generators. Otherwise, many of the competitive benefits in the generation market will be stifled. Once a wholesale market is established, the only drawback of retail competition is the metering cost. With a wholesale spot price and meters, the benefits of retail competition are acquired with no additional transactions cost.

If load serving is arranged along the lines of monopolistic distribution but with the requirement of providing real time prices from the spot market to customers, outcomes as efficient as those driven by a retail access market could be achieved. Whatever benefits happen to accrue from the spot price, customers can react accordingly.

The difference between efficient direct access and real direct access will ultimately be negligible. By passing on the spot price to the retail customers, regulators can allow them to in some sense buy directly from the wholesale market. Can the regulatory system end the obligation to serve traditional retail customers with real time prices? A real direct access system fundamentally alters that obligation so that the incumbent distribution utility does not have to acquire generating assets for their customers. The customers themselves must deal with suppliers. This yielding of

responsibility increases efficiency and accountability.

If the rate design is rational, does the owner of the fixed asset or the seller of the variable product need the meter? Once the industry stabilizes, the retailer needs the meter more than the pipes and wires company.

The utility distribution company has the obligation to provide access to the market, but does not need to guarantee that the kilowatt hour is available at a given price. Unbundling obviates the obligation to serve at the wholesale level. In a distributed generation context, what are the technical prerequisites for a buyer to become a seller?

Utilities must adapt their system to meet new safety requirements, which demand that the company always know what is going into the wires from where. It is very expensive to install the new equipment, for a fairly sophisticated piece of equipment is needed to address the reliability issues.

Metering is less than one percent of a residential bill, and billing is less than two percent. Billing includes the cost of collection and payment processing as well as producing the bill. The UDC would be obligated to put meters in, but if a third party supplier wanted to install their own meters to measure usage, either the marketer or the customer would expect a bill credit from the utility for the avoided cost. Rather than enduring two years of litigation over the avoided cost of metering, the commission determined that metering and billing is a competitive service, and should not be regulated for the UDC. Market based rates for metering and billing can be established, and the UDC should not have to provide meters for cost-cutting retailers.

Session III: Imperfect Pricing for Imperfect Markets

The policy debate on market pricing has concentrated a great deal of attention on the rules and institutions that would govern the operation of a competitive generation market. Although the restructuring debate is not yet resolved, the basic outline of open access to transmission and aggressive trading of electricity is in hand. At the same time, there has been a constant concern with the fragility of the assumptions of competition and the recognition that many generation markets may exhibit some degree of horizontal market power. There is a growing body of analysis which presents either theoretical or empirical investigations which relax the assumptions of perfect competition and show that this would result in incentives to exploit market power. However, the policy implications of these analyses are not obvious. Clearly, any exercise of market power would be worse than the competitive ideal, but it is less clear that any realistic degree of exercise of market power would produce results worse than the policy alternatives that would be available. We know we will not have a perfect market. How imperfect can competition be and still be about as good as we can do? How much imperfection is too much? What policy alternatives would be appropriate, and when?

Speaker Nine

Emerging policies are suggesting that deregulating prices can only occur in the absence of market power. This approach is likely to extend the duration of regulation and create inefficient markets which mix regulated and unregulated competitors. The ideal framework sees regulation yield to competitive market processes. There are very few economic markets in which firms do not possess at least some market power. For example, Gregory Werden, an economist at the Justice Department, writes, "the economic definition of market power means of course that the possession of market power is the rule rather than the exception. The vast majority of firms have at least a little market power. In particular every seller of a product that is differentiated with respect to any relevant dimension almost certainly has market power. This includes, for example, the cornerstone convenience store, which is spatially different from its rivals." Accordingly, the mere existence of some market power is not a

sensible criterion for imposing price regulation. If sensible economic policy marked the existence of market power as a rational sign for price regulation, most of the economy would be regulated. Moreover, sensible economic policies suggest that price regulation should be applied where the market has some concentrated level of sellers, measured by the Herfindal-Hirschman Index (HHI) or the forefront concentration ratio. A rather large fraction of the economy would be regulated even then because there many highly concentrated industries such as breakfast cereals, carbonated beverages, industrial gases, many bulk chemicals, and pharmaceuticals.

Why is market power allowed to be such a pervasive force in the economy? There are costs associated with perfect competition, and there are also significant costs associated with continuing regulation. Moreover, perfect competition is not even feasible in many industries. Any differentiated product industry or spatial market inherently does not have a

competitive solution. A free market economy must contain elements of market power. The appropriate approach for evaluating whether or not to deregulate generation, therefore, is to recognize the need to balance the costs of imperfect competition against the costs of imperfect regulation. The criterion for deregulation cannot be "the absence of market power." Market's power's significance and cost, rather than just its presence, must be discussed. How costly is imperfect competition in terms of higher prices? How long will it persist? How do these costs compare to the costs of continuing regulation? This approach is sadly disappearing in the electric power sector.

There are a variety of market models simulations under various assumptions to quantify the importance of market power problems, and the effects of different types of mitigation. The primary types of information used are market shares and market concentration values as indicia of market power. These tools are far from perfect, yet most decisions on whether to deregulate prices are relying almost solely on stringent concentration ratio guidelines, especially the threshold values in the Department of Justice FTC merger guidelines. If the HHI is above 1800, it reveals highly concentrated market power. The Department of Justice and the FTC don't take these indices by themselves all that seriously, but are helpful as a spark for more intensive analysis. 90 percent of HHI-related merger filings involve no investigation. Mergers that fall in the moderately concentrated range are never challenged. HHI's were designed to deal with whether horizontal mergers should be allowed between deregulated firms, given the very different costs and benefits associated with firms in highly concentrated markets.

Mitigation mechanisms cannot be applied until the market power problem is defined and a coherent framework for measuring both its presence and its significance installed. FERC's merger policy statement emphasizes this point. Mitigation should be designed primarily to deal with specific market power problems, not in an attempt to create a perfectly competitive market which is an impossibility with the system's scale economies disrupting price equal margin cost.

Speaker Ten

These markets operate on "displacement commodity networks"--what is put into the system is not delivered. It's simple to operate a displacement network but it is hard to separate the financial from the physical transactions since utilities argue that they are not using the grid. If there is no congestion, the long run marginal cost will be much greater than that of the short run. FERC has chosen to unbundle the network and the non-network services. They must now create governance rules for the network and trading rules for the commodity and network services. FERC is giving regional groups lots of flexibility in these matters, but will intervene if states are unable to agree.

The electricity industry is moving from a system that had virtually no transaction costs in marketing and retailing to an open market where people fear that marketing costs may overwhelm the system. FERC is skeptical about separating the ISO and the power exchange, and is trying to defer to local solutions while emphasizing the need for communication between the two entities. To avoid conflict, especially in ancillary services, the ISO must take care not to encroach upon the power exchanges territory and vice-versa. The Commission is similarly skeptical over

separate auctions for spinning reserves and energy, and the WEPEX process will hopefully clarify how the power exchange is to operate.

FERC would like bidders introduced into the system to attain a reasonable approximation of the marginal cost in their bids. These marginal cost functions, especially for the day-ahead market, are non-convex, which can lead to potential problems with fixed charges. FERC sees congestion rents as a way of rationing the system and getting efficient dispatch, but has not found as successful a way to deal with transmission constraints. The Commission also expressed some skepticism over zonal pricing and established strict guidelines to minimize congestion. Market power mitigation involves strategic behavior which can only exist in the absence of network constraints. Marginal cost bids should not be foreclosed. Even linear or single incremental bids are too complicated to calculate for a day-ahead market. The process must be internally consistent so that the ISO can decommit generators. Establishing a vertical demand curve to work against greatly assists the marketers.

The Commission is interested in transmission property rights becoming tradeable, and in creating efficient market institutions for trading and exchanges. In the more traditional governance area, the regional groups must be regulated with performance-based incentives.

Speaker Eleven

Experimental economics defines the economic environment as classical, possessing no externalities or non-convexities. In order to analyze the potential for market power, we have developed a model using the following framework. By ordering the buyers from highest to lowest, the theoretical demand

schedule can be created. By ordering the costs from lowest to highest, a supply schedule emerges. Information competitive equilibrium price and quantity must be decentralized. The model for the governance, for the rules of trading, is called the oral double auction, similar to the English auction. Any new bid must be higher than the previous bid to be admissible. The bid-ask spread has to improve. By converging the competitive equilibrium, one discovers that markets work. Furthermore, they work with incredibly small numbers of buyers and sellers, as small as only two or three buyers and sellers. In the model, if everyone was given complete information, competition did not necessarily increase, and the market did not allocate benefits any faster.

In terms of market power, demand side bidding is crucial. Two sided markets tend to be much more competitive than one sided markets, so that fewer sellers are needed if buyers can interrupt demand. In this environment an efficient market can be achieved by evaluating different institutions and distributions of power. The optimization model can predict the total gains from exchange as well as how it will be divided among buyers, sellers and, for electric power, transmission owners. Transmission gains can be accurately predicted from incremental loss pricing, taking into account residual revenues from incremental losses attributed to phantom transmission owners. Congestion on constrained lines increases income, causing consumer prices and transmission-owned revenues to rise.

One institution runs a one-round, sealed offer auction. The other institution typically holds a five minute market. Nothing is binding until the market closes, and then there is one market clearing price on the buyer's node, location-adjusted to the generator node using standard

transmission loss factors. A two-sided market could avoid the notion that the grid's problems, such as reserves and reliability, are all supply-side related.

Speaker Twelve

There are lessons to be drawn from the British experience in the electricity industry. Britain's industry structure was generally considered to be flawed at the time of privatization. There was horizontal market power in the wholesale market, with just two large generators in control, and there were problems with transmission pricing. Generation and transmission were vertically integrated and operated by a public company, the Central Electricity Generating Board (CEGB). Distribution was handled at the local level by twelve area boards, also public companies but separate from the Central Electricity Generating Board. After privatization, the area boards were renamed regional electricity companies. They're still local monopolies, regulated on a price cap basis. Nevertheless, there were dramatic changes in generation and transmission. Both were vertically separated or un-bundled.

The transmission grid is now owned by a private but regulated company, the National Grid Company. Generation was separated, divided among three companies, National Power, Power Gen, and Nuclear Electric. National Grid Company also administers the wholesale spot market. Walter Thompson, the former head of the CEGB, argued that there should be one very large company, a merger between National Power, Nuclear Electric and a small competitive fringe which could be Power Gen. His rationale was that any privatization of risky nuclear assets needed to be buffered by maintaining conventional fossil fuel assets. At the last minute, information on

decommissioning costs made privatizing nuclear assets seem too risky, so the government separated the companies, leaving National Power and Power Gen with horizontal market power.

Both companies place bids into the spot market and the pool daily, and if one participant deviates from the collusive agreement, the government can regulate them immediately. In a market with long term contracts, inappropriate behavior can go unchecked for the duration of the agreement. National Power and Power Gen were also not utilizing all the market power they had. Market power's presence outshone its significance. While costs declined dramatically, prices dropped only slightly. Prices therefore did not reach the level of marginal cost and were not perfectly competitive, but they remained significantly lower than economic models predicted.

Extremely inelastic demand will result in prices above the marginal cost. Economic theory tells us that this elasticity-adjusted mark up should equal the number of dominant entities in the industry, in Britain's case, one. If two companies are operating in a static environment, the mark should be .5, and perfect competition, where the price equals the marginal cost, that the value should be 0. The value of the wholesale pool in England revealed almost perfect competition, due to very inelastic demand. However, attempts to prevent the entry of owners with efficient plants, along with political factors have constrained prices more than inelastic demand. The Labor government, for example, has threatened renationalization of the industry.

The Office of Electricity Regulation forced the generators to divest their plant by threatening to refer them to the Monopolies and Merger

Commission, the British equivalent of the Department of Justice. The Labor government has also threatened a profit tax on not only the privatized electric companies, but the gas and water companies. Political constraints are more likely to work in the U.S.

General Discussion

Deregulation must be rooted in a faith that the market is going to work. Rules for policing gaming reveal a reluctance to let the market run its course. There is no easily attained middle ground between a comprehensive regulatory system and a deregulated market that operates under antitrust rules. Mixing of regulation and competition can only have disastrous effects.

Pool rules are as important as the institutions. Demand-side bidding will prompt the emergence of mechanisms, such as reservation prices or bidding, that will increase consumer welfare. In this model, customers can react to prices. This acts as a power mitigation mechanism in a potentially crucial market.

Utilities have found that some number of plants are needed for local reliability. Under certain load conditions, these plants have to be run in order to provide voltage support and other ancillary services. If these plants were sold to a third party, the ISO would likely determine that under certain load conditions those plants must be run. FERC would have to approve a contract between the ISO and this new owner of this plant.

There are various potential methods to distinguish among the different kinds of ancillary services. Spinning reserves can be dealt either with incentives or reduced costs for more interruptible buyer side contracts, and for those buyers who want firm demand at all

times, safety reserves can be factored into the generators' offers. Adding generators loaded at their minimum loaded capacity allows utilities to augment demand and handle the spinning reserve. Price reserves are simply part of the increased spot price, and those buyers who want firm demand share in that price.

Monitoring gaming and market power behavior requires agreement on some advance ground rules. Gaming is inevitable, and attempting to define and restrain all its forms would mark a return to overbearing regulation. Surveillance rules must require intervention to be infrequent, prompted only by significant problems, not just minor deviation from some textbook model.

Establishing a commission to decide what is acceptable gaming is problematic since the ordinary competitive process often closely resembles gaming. Price discrimination often occurs in a double auction market during the process of converging to the competitive equilibrium. Prohibition of price discrimination is why most-favored nation contracts exist. A buyer who has a price guaranteed to be lower than any other offer, and who is the only buyer that can purchase at that price, has no incentive to talk to another seller. There is no competition, yet there is a contractual obligation not to price discriminate. This situation exemplifies the law of unintended effects.

FERC supports tradeable transmission property rights. Tradeable is defined as the ability to move power from one node to another in a network. Passive tradeability means that unused transmission rights cannot be withheld because the ISO can always reschedule an owner's rights.

The power exchanges being formed in California are anticipating payments for energy alone. A separate capacity payment has not been discussed. There is resistance to nodal prices at the customer level so there will be averaging in prices. Those two factors raise some concern about reliability. Can the problems with the UK's capacity payment, i.e. the incentive to withhold capacity, be fixed through better rate design, and is there merit to having a separate capacity payment or can an effective market energy price do an appropriate job of clearing the market?

National Grid and Power Gen's stock prices has outperformed the Financial Times index by about 250% since privatization. Stock rose dramatically in the first three months, probably due to being underpriced at the initial privatization. Buyers are no longer responding on a daily basis in the pool to threats of re-nationalization. There was a threat at one point to re-nationalize the Grid but not the generators. The stock market incorporated that potential threat into its prices some time ago. The pool rules in England and Wales are complex, having been put together quickly due to extreme governance problems. These rules are unlikely to change, so attempts to undercut the margin has, at present, as much to do with gaming and trying to circumvent the rules than traditional market power theories.

Britain's energy prices are 25% higher than the marginal costs, and this price has been relatively consistent. For example, PowerGen and National Power have seen their share of output since privatization decline faster than their share of capacity. By withholding more supply, relative to the change in capacity, utilities allow prices to remain high, and the new entrants can easily undercut these prices. Though new entrants have a high risk of bankruptcy, without demand-side bidding, new

entrants can often exploit the system's high prices.

The must-run units in the British pool relieve congestion to reach their bid price. Contracts with single plants that have to run only at certain points can rely on cost based principles to avoid the creation of monopolies. Depending on how the market structure, generators can be granted flexibility in setting the marginal price in the pool.

Eliminating the capacity charge completely in the UK would solve the gaming problem but the capacity charge could theoretically be corrected to remove some of the gaming incentives.

Will the market environment create the right incentives for investing in generating capacity without a separate capacity charge? Concerns are justified since averaging prices will not send the customers the right signals.

Electric power can, like all other industries, receive prices sufficient to cover their investment costs, even considering industry-specific reliability issues. Stability of rules is essential to achieving competitive outcomes, yet participants in the market should realize that deregulation is inherently gradual, and that rules are inevitably going to adapt to changing conditions in the marketplace.

FERC wants the local institutions to make the rules, and will intervene only when the system does not work, when new rules can not attain majority support. As a general rule, however, the guidelines should be made by the local participants, and FERC should just resolve disagreements over contentious issues.

Eventually, assuming reasonably well-functioning wholesale markets and institutions,

FERC will become anachronistic. FERC will essentially be letting the market run, granting market based rates, nominally still in charge. At what point is it appropriate to totally deregulate the generation market by substantially changing the federal power act? There really isn't any long-term role for an administrative regulatory body at the generation level.

Any residual control in the generation sector can be done through bidding rules and call contracts. Cost of service generation is unnecessary, and the ISO can deal with market power on the generation side. If the rules and ISO's are established correctly, FERC could be abolished in fifteen years. There might need to be some appeal authority for rule changes, but one of the goals of deregulation would be to de-emphasize petty details.