CHAPTER 1

MARKET STRUCTURE

Introduction

The long term impacts of electric utility restructuring will largely depend on the degree to which the industry can be restructured to provide for effective competition without market power abuses. While other factors, such as technological advancements, may influence electricity costs, the structure of the market will ultimately determine whether the market is truly competitive and whether anticipated competitive benefits can be realized by consumers. If market power abuses cannot be checked effectively, the benefits of restructuring may be reduced or eliminated.

Given the numerous transition issues that must be addressed in the initial stages of restructuring and the uncertainties associated with future federal policy initiatives, it is difficult to define the best industry structure at this time. In view of this complication, it may be more appropriate to stress the development of key elements of a competitive model than to attempt to specify and enact a rigid industry structure. Consequently, this chapter will describe the advantages and disadvantages of potential models and will attempt to identify those key elements that are necessary for effective competition. Certain elements, such as independent transmission system operators and distribution service providers, are critical prerequisites for any competitive model and will be discussed herein.

While many view customer choice as an appropriate model criterion, it should be noted that models that do not incorporate direct retail access can also produce competitive benefits. Consequently, this chapter will review models that do not specify direct customer choice as well as models that do provide for direct retail access. It is also important to note that customer choice can proceed without economic deregulation of power supplies. Complete deregulation of generation should not be allowed until a fully competitive model, with or without direct customer choice, is in place.

Independent System Operators

The availability of efficient, open access and non-discriminatory transmission is an essential element in developing competitive supplies of electricity. Such access is necessary for the on-going development of wholesale competition, the provision of increased customer access and for the potential economic deregulation of electric supplies. Suppliers need open access to bulk power transmission facilities in order to serve potential markets, while aggregators and/or consumers need such access to have effective alternatives to their local generators. The FERC recognized the importance of open access in Order No. 888 by requiring utilities to file open-access transmission tariffs and by encouraging the formation of properly structured Independent System Operators (ISOs).

Order No. 888[1] also identified six ancillary services that must be offered by transmission providers and that must be acquired by transmission users, either from the transmission provider or in certain instances from other sources. These services include:

- Scheduling, System Control and Dispatch Service;[2]
- Reactive Supply and Voltage Control from Generation Sources Service;[3]
- Regulation and Frequency Response Service;[4]

- Energy Imbalance Service;[5]
- Operating Reserve - Spinning Reserve Service; and,[6]
- Operating Reserve - Supplemental Reserve Service.[7]

Order 888 requires transmission customers to purchase the Scheduling, System Control and Dispatch Service and Reactive Supply and Voltage Control Service from the transmission supplier. The remaining ancillary services may be obtained from the transmission provider, from a third party or through self-supply. The FERC has recognized the communal nature of the electricity industry and is requiring that transmission customers contribute to the overall costs of having a reliable supply of electricity in providing for these ancillary services.

The FERC indicates that these open access transmission and ancillary service requirements are now applicable to wholesale wheeling arrangements and will also apply to retail services, if and when retail customers are granted access to competitive suppliers. FERC's assertion of authority, if upheld, will displace the need for specific state action with respect to requiring open access to bulk power facilities. It should be noted, however, that the legality of FERC's authority over retail wheeling transactions is currently being challenged and that states will have to develop open access policies and ancillary service requirements for bulk power transmission facilities in order to provide for retail access, should FERC's order be overturned.

While states may play only a limited role in requiring open-access to bulk power transmission services, it should be noted that the FERC's open-access policies may not be sufficient for the development of effective competition. States could play a greater role in assuring efficient open-access to transmission facilities by encouraging the development of ISOs. ISOs will likely play a significant role in promoting effective competition by providing for efficient access to bulk power transmission facilities through the consolidation of individual transmission systems into larger ones. These larger systems will enable transmission users to enter into fewer transmission agreements for each transaction and will help to reduce transmission rate " pancaking."[8] ISOs will also provide greater functional separation between transmission and generation and will help to reduce opportunities for vertical market power abuses. Independent transmission operators are also likely, as noted throughout this report, to play a key role in assuring reliability.

States can provide incentives for the development of ISOs by conditioning the deregulation of generation and stranded cost recovery on the existence and demonstrated operation of an efficient ISO. States may also influence ISO policies through approval processes that may be required for transfer of transmission control from a utility to another entity and through participation in FERC proceedings. Such steps may be necessary since utilities with significant stranded cost exposure may have little incentive to participate in the development of an ISO. ISOs may provide customers more efficient access to competitive suppliers and actually increase the potential for stranded costs.

It is envisioned that ISOs will independently manage bulk transmission systems to ensure system security and to provide non-discriminatory open-access transmission service to eligible parties. ISOs will likely be restricted from having any interest in generating resources and may not, at least initially, actually own transmission facilities. In all likelihood, existing transmission facilities will continue to be owned and maintained by incumbent utilities even though access to these facilities will be controlled by an independent system operator. These transmission operators will develop and implement open access transmission tariffs specifying rates and service quality standards that will be subject to the jurisdiction of FERC. ISOs may also be

responsible for planning bulk system improvements, determining available transmission capability,

providing ancillary services, and scheduling transmission transactions.

A number of standards or protocols must be developed by an ISO, alone or in conjunction with a pool operator if a regional power exchange is proscribed by the competitive model, to assure open access and to maintain reliability. These standards include: infrastructure planning procedures; provisions for the construction of needed transmission facilities; the establishment of physical interconnection and metering standards for interconnected entities; effective notification and dispatch procedures; scheduling and congestion management protocols; energy allocation procedures; settlement systems for energy imbalances; and, disconnection or load shedding procedures. The development of a governance structure for ISOs is also critical to ensure that an ISO is truly independent. Such independence is essential to eliminate vertical market power abuses. The development of rates and revenue sharing for the combined transmission systems may also be difficult given the prospect of cost and revenue shifting between utilities or between consumers in specific regions.

In short, the development of ISOs will require the resolution of numerous complicated issues. Most of the details of establishing an ISO have yet to be worked out and require much additional work. Extra work may be required in Virginia since several Virginia utilities, notably Virginia Power, have not yet expressed an interest in joining an ISO.

There are a number of ISO efforts underway throughout the country including efforts in the Midwest and the Northeast (PJM). These early efforts clearly illustrate the difficulties associated with developing and gaining approval of an ISO. After a two year effort, the twenty-six utilities seeking to develop the Midwest ISO are currently drafting an application to the FERC for approval of the ISO. Despite this intensive effort, eight of these utilities recently indicated that they are unwilling to join the ISO without the resolution of a plethora of concerns. Assuming an optimistic schedule, the Midwest ISO will begin operation in the year 2000. Unforeseen complications could easily delay this start date. While a ISO filing has been made for the PJM system, which has historically operated as a power pool, the FERC has not taken any action with respect to the filing. Although the development of an ISO from an existing power pool should be easier than developing an ISO from independently operated utilities, the PJM effort has experienced some difficulty. For example, the PJM filing has been challenged by the PECO Energy Company in an alternative filing.

The development of ISOs is a critical element in providing for effective competition. Since, as noted earlier, generation cannot be deregulated until there is effective competition, any deregulation of power supplies and stranded cost recovery for utilities in Virginia should be conditioned upon participation in an ISO to mitigate vertical market power. However as fully discussed in Chapter 3 of this report, even with an ISO in place, limited transmission import capability could give rise to horizontal market power abuses and prevent effective competition. ISOs may also be ineffective for completely eliminating vertical market power since under most ISO structures transmission system owners may also own generation facilities. Consequently, additional experience may be needed to determine if independent ISO governance is sufficient to eliminate vertical market power or if complete divestiture of generation should be required for transmission owners.

Increased Competition for Generation

Successful restructuring also requires effective competition between power suppliers and provisions for assuring that all consumers benefit from those competitive supplies. There are a number of possible options for subjecting the power supply function of utilities to increased competition. These options range from simple wholesale models with performance based regulation to complex retail access models with full power supply deregulation. Possible models for increasing competitive pressures for electric supplies include:

- increased wholesale competition with performance based regulation of generation;
- power supply deregulation with a mandatory power exchange;
- bilateral contracts with a voluntary power exchange; and
- a system based entirely on bilateral contracts.

As a general rule, the above progression of models reflect increasing levels of competitive pressures, potential for differing customer impacts, start-up costs, implementation issues, and technology-based barriers to effective implementation. For example, Colin Sawyer and Steve Jennings, of Coopers & Lybrand, estimate that it will require an investment of approximately $1.5 billion to implement full retail choice to approximately 23 million customers in the United Kingdom. This investment, which does not include on-going daily operating costs, will be made in three phases. The first phase, which provided for the establishment of the grid operator (Britain's ISO), the power exchange, and direct access for approximately 5000 customers with loads in excess of 1 MW, required an investment of roughly $80 million. The second phase, which provided access to approximately 50,000 additional customers with loads greater than 100 KW, required an additional investment of roughly $410 million. Annual operating costs for these additional 50,000 customers are expected to be approximately $900 per year per customer. The final phase, which will provide direct access to all remaining customers, is expected to increase the overall investment to $1.5 billion.

These estimates clearly illustrate that costs grow exponentially as smaller and smaller customers are granted access. It should also be noted that direct competition among wholesale suppliers and indirect access to these competitive supplies for smaller customers were established with the initial $80 million investment. It is unclear as to what extent further competition between suppliers will be stimulated by providing further access to customers with loads of 100 KW and less. It is at least conceivable that there will be little additional competition between suppliers as a result of full retail competition since those suppliers are already competing on a wholesale basis.

The implementation of any of the above approaches will require the resolution of numerous attendant details not addressed in this report. One area of particular concern is the potential impact of restructuring on nuclear units owned by Virginia Power and the Old Dominion Electric Cooperative. These units may require special treatment for a number of reasons. They represent a significant amount of base-load capacity in Central and Eastern Virginia and are critical for continued reliability. Premature closure of these units would result in the loss of a significant source of low cost energy and would require the addition of new generating facilities, new transmission facilities or both. Needless to say, the amount of capacity represented by Virginia Power's nuclear facilities (approximately 3,400 MW) would be difficult to replace over a shortened time-frame.

As noted throughout this report, the transmission import capability into Virginia Power's service territory is limited. Consequently, closure of Virginia Power's nuclear units could create further market power opportunities for other generating facilities and increase market driven prices until such time as additional capacity can be made available.

The nuclear units also represent a significant complication in the treatment and calculation of stranded costs in that significant costs for decommissioning and spent-fuel disposal may be incurred long after a transition to a restructured industry has ended.

Given the unique characteristics, it may be appropriate to establish special market structures or other mechanisms for nuclear facilities as the industry is restructured.

Increased Wholesale Competition

The electric utility industry is currently experiencing a dramatic increase in competition within wholesale power markets. This competition was initiated, in large measure, by the Public Utilities Regulatory Policies Act of 1978 and was given additional impetus by the Energy Policy Act of 1992. The FERC's open-access transmission policies are further stimulating wholesale competition. These policies, along with the expected development of ISOs, may eventually result in a fully developed wholesale power market if needed information systems and operational procedures for maintaining grid security are developed and if transmission infrastructure improvements are made in a timely manner.

It is critically important to bear in mind that fully developed wholesale competition will ultimately benefit all consumers to a significant degree even if retail access does not develop. Such benefits will result both from a better utilization of existing units and through increased options for meeting future power supply needs. These benefits may materialize without any additional significant industry restructuring, simply through the maturation of existing federal policies and overall competitive trends. However, the benefits of wholesale competition can also be enhanced and advanced by deregulating incremental generation and by requiring that all or greater percentages of future supplies be obtained from competitive wholesale markets, including merchant plants.

Increased wholesale competition may also be used in conjunction with performance based ratemaking (PBR) to provide utilities with even greater competitive incentives. For example, wholesale competition is giving rise to price information which can be used to establish market price indices. Such indices can, in turn, be compared against a utility's supply related costs as a basis for determining stranded costs and as an additional indicator of a utility's relative performance.[9] In fact, the supply component of utility rates could ultimately be based on these market indices instead of embedded power supply costs. Market price indices for broad regions could also be utilized as a tool for measuring whether a utility has market power and for addressing market power abuses.

The use of wholesale price indices in conjunction with performance based ratemaking might provide for a relatively smooth transition to competitive power supplies with minimal implementation issues and wealth transfers. Such a transition could be addressed through a gradual phase-in of market based supply costs under a PBR approach. The transition could be accelerated or slowed down depending on the difference between a utility's embedded supply costs and market prices. Such an approach would minimize the number of bulk power transactions and thus eliminate many implementation issues and information technology requirements that may be associated with more complex models. Wealth transfers among customer classes would also be minimized by this approach since all classes would have equal access to competitive supplies. This model also eliminates the need for a supplier of last resort and other consumer protection programs.

This approach would, however, give end-users little direct input in the acquisition of power supplies. Proponents of direct retail access argue that this direct interaction between suppliers and users is necessary for effective competition. Many proponents of retail access also argue that competitive benefits may take longer to develop under a wholesale based competitive model if policy-makers and regulators do not aggressively move to eliminate embedded cost pricing for supply related costs. However, any extended stranded cost recovery period associated with other competitive models would have a comparable impact.

While a restructuring approach based on wholesale competition has certain limitations, such as the dilution of competitive pressures, such an approach can be implemented quickly with relative ease and provides a great deal of flexibility. Many wholesale model limitations can be overcome with real-time pricing programs and other service offerings. This model can also be used as a transition to more complex models or as a safeguard against unforeseen complications that may result from more aggressive approaches.

A wholesale based model could also be developed in conjunction with direct access for large users. Such a model would be similar to the current structure of the natural gas industry. This model would help to assure that small users benefit from competitive pressures on generators while allowing large users to contract directly with suppliers. This approach could potentially disadvantage small users and result in wealth transfers among customer classes as costs to serve customer classes "liberated" from the incumbent supplier are shifted to classes that remain or as limited transmission import capability is "eaten-up" by customers with direct access. This potential for differing customer impacts would, however, be less than that associated with other retail access models such as the bilateral contract based model. The potential for wealth transfers among classes will be discussed in greater detail in the following discussion of other models.

Mandatory Power Exchange

Another possible approach to restructuring is a mandated centralized pool or exchange. This approach can be viewed as a refinement to the wholesale model in that it will provide more price information and can provide greater flexibility to customers. Under this approach, a central power exchange serves to aggregate electrical supplies through competitive bidding and by reselling those supplies to electric distribution companies, power marketers and perhaps end-users at market clearing prices. In a mandatory pool, all transactions that might affect the physical flow of electricity must be conducted through the pool. In other words, all generation must be sold through the pool. These pools are designed to maximize competition in generation (subject to accepted reliability standards) and to provide for competition based on price rather than cost. A number of restructuring paradigms (England, Alberta, Chile, Argentina, etc.) are based on this model. Although retail users cannot enter into direct bilateral contracts based on physical flows, such users can enter into "contracts for differences" and other forward price instruments which give customers the ability to have price certainty and the economic equivalent of retail access.

Regional pools can be designed in conjunction with an ISO with joint responsibility for system operation. In these systems, a pool operator performs a central dispatch function while the transmission system operator performs the functions necessary for ensuring reliability. Pool operators may perform all of the above functions in certain pool based models. Central dispatch and reliability functions are closely intertwined under a mandatory pool approach.

Many of the mandatory pools currently in place act to ensure adequate capacity reserves by including an additional capacity payment in settlements with generators. These adders are designed to provide additional incentives for the construction and availability of generating units. Capacity adders typically fluctuate with the amount of available capacity. If supplies are plentiful, the adder is smaller. The adder typically increases as the amount of available capacity diminishes. In England, the adder is based on a loss-of-load probability analysis and imputed customer outage costs. In other systems, the adder is based on the capacity cost of a combustion turbine peaking plant.

Mandatory power exchanges offer a number of distinct benefits: they provide all customers with effectively equal access to competitive supplies; they recognize the communal nature of the electric utility industry and serve to require that all customers share equitably in the costs of assuring reliability;

adequate long term reserves can be assured through capacity adders to pool payments; the power exchange could either serve as a supplier of last resort or allow an aggregator who has been designated as a universal service provider to purchase from the pool and finally, mandatory pools simplify the coordination of system operations by reducing the number of potential bulk power transactions and by clearly specifying reliability related responsibilities. This option provides more flexibility to address energy balancing problems and may alleviate the need for real-time metering or for estimating usage patterns for smaller customers.[10] The pool may also lower overall balancing[11] related costs in that it would, in effect, capture customer diversity with respect to supply imbalances.

While there are a number of advantages to mandatory power pools, there are also a number of disadvantages. It may be costly to establish such a pool. Specific decisions, such as those related to the adequacy of capacity reserves, may be based on central planning assumptions and may not be as economically efficient as those made entirely through the interactions of supply and demand. While this may be viewed as a disadvantage by theoretical purists, the mandatory pool could eliminate disruptive supply and demand imbalances that could result in a fully market driven environment. Finally, some may argue that power exchanges limit direct communication between suppliers and end-users and may limit the number of supply options available to customers. However, such communication and interaction can be acquired through the development of " contracts for differences,"[12] which may provide the economic equivalent to physical bilateral contracts.

While a mandatory pool may limit retail customers in certain respects, customers can be given a number of options under this approach. For example, hourly or half-hourly pool prices prove a ready reference for real-time pricing programs and can simplify the administration of such programs. Contracts for differences and other forward pricing instruments can also be developed in a number of ways to provide customers with greater flexibility for managing their costs and for obtaining future price certainty. Pool operators may also solicit bids from users as well as from suppliers to relieve capacity constraints. For example, certain users may be willing to interrupt their usage in exchange for a capacity related payment. Such payments would be appropriate to the extent that they are equal to or lower than costs that would have otherwise been incurred to relieve transmission constraints or to provide incentives for available capacity.

Bilateral Contracts with a Power Exchange

A variation of the mandatory power exchange is to make the exchange optional by allowing customers to enter into physical bilateral contracts or to purchase supplies from the pool. The California and New Hampshire models are examples of this approach. This model would likely require a greater separation between the pool operator and the system operator to assure that neither pool supplies nor bilateral supplies are given preference by the ISO.

It can be argued that this combination approach has an advantage over a mandatory pool in that it gives end-users maximum flexibility to purchase from either the pool or directly from suppliers. However,

" contracts for differences" may be the economic equivalent of bilateral contracts. Thus, the bilateral contract/optional exchange approach may not produce any additional benefit to customers as a whole.

The combination model tends to maintain, albeit to a lesser degree than a mandatory power pool, economic efficiencies associated with central dispatch. The existence of the pool could also simplify the balancing of energy supplies since the pool could effectively capture diversities associated with individual customer imbalances. This approach may also facilitate the development of bilateral contracts since the pool would provide a ready source of information for those contracts.

Unfortunately, smaller aggregators and consumers may not have the same ability or opportunity to compete in competitive markets as their larger counterparts and the combination approach may increase the potential for wealth transfers. Consequently, larger players may oppose or seek to undermine the development of an efficient power exchange that would provide comparable benefits to all consumers. This concern was discussed Dr. Larry E. Ruff, a Managing Director of Putnam, Hayes & Bartlett, in a recent article published in " The Electricity Journal."[13] An excerpt from that article notes:

> *Once the ISO's market-based processes and systems are in place, it is the most natural and efficient thing in the world to allow all traders to buy and sell energy in that market whenever they find it commercially useful to do so. Indeed, such an open, physical, cash market is essential to the efficient definition and administration of the private bilateral and exchange traded contracts that will determine most of the commercial outcomes in a well-functioning electricity market. Without such a market, the ISO would be severely handicapped in maintaining reliability effectively, and commercial contracting and operations would be harder and more costly, particular for smaller players.*
>
> *And that, of course, is the problem: An efficient, open, ISO-operated spot market would benefit primarily smaller, less diversified players who are poorly represented in the political and technical back-rooms where the critical details are being decided. Large players with diversified portfolios can operate their own internal spot markets and hence would get less benefit from an ISO-operated spot market than do smaller, undiversified players. In fact, larger players and arbitrageurs can gain from market inefficiencies that force smaller players out of business or into contracts with the few larger players, while increasing costs for the system as a whole.*
>
> *It is not surprising that some of the larger players in the market, often the same middlemen and arbitrageurs that have made fortunes exploiting inefficiencies in natural gas markets, oppose open ISO-operated spot markets.*
>
> *What is more surprising is the extent to which some policy makers, regulators and consumers' representatives have been taken in by the self serving rhetoric claiming that an ISO-operated spot market would be a market-shifting, un-American central planning bureaucracy, when just the opposite is true.*

Given these economic incentives for larger players, a combination approach may impede the development of an effective power exchange for smaller consumers. Consequently, it is appropriate to focus initial restructuring efforts on insuring that an efficient exchange is in place.

It may also be very costly to establish this type of combination system since it would likely require separate entities for operating the pool and for operating the transmission system. California is attempting to establish such a system and has estimated that an up front investment of $250 million will be required to establish its power pool and ISO. This initial estimate does not include on-going costs of operating these systems. California has also encountered a number of problems in trying to develop these independent systems. For example, it was recently reported that California's independently designed software

systems for the power exchange and ISO were not compatible in certain respects and that needed corrections were likely to delay the start-up of the ISO.

Bilateral Contracts

A final option for a competitive power market is one that is based entirely on the development of bilateral contracts where there is no central dispatch function and all power supplies are obtained through direct contractual arrangements. Under this model individual customers or power aggregators would enter into bilateral contracts with suppliers for their electric supplies. Such a model has much appeal from a purely theoretical perspective in that it would allow "unconstrained" trading and complete interaction of market forces. Unfortunately, this model raises a host of operational uncertainties and the Staff has been unable to locate a " working" version of this model. Consequently, it is difficult to visualize how such a model would actually operate.

A bilateral contract based model was apparently contemplated, but not adopted, in New Zealand. The proposed model was the subject of heavy criticism by Dr. Ruff,[14] who noted that the model:

> *... paints an unrealistically rosy picture of an open access system based on bilateral contracts without spot market or pool, functioning with relatively minor economic inefficiencies until one or more voluntary pools emerge to eliminate even these, and with no competitive issues arising to require Commission attention. If competition in electricity were that easy, it would have evolved spontaneously decades ago, instead of requiring- as it has wherever it has appeared- government-mandated development efforts, hundreds of expert man-years to decide the rules, scores of millions of dollars to write the software, and special-purpose legislation or regulatory rulings to override general competition laws.*

A realistic electricity trading system must provide a method for the buying and selling of energy on an incremental basis without contracts, because it is not possible to know in advance how much energy will be needed or supplied under bilateral contracts and because energy settlements must be based on an "after the fact" analysis. In other words, bilateral contracts cannot reflect actual physical conditions and some communal pool is necessary for operational security. Such a pool would also promote economic efficiency by providing greater information and price transparency to the market. The timely development of such pools may not be assured without some legislative or regulatory involvement.

As noted earlier, ISOs or transmission providers must have some operational control over specific generating facilities in order to maintain transmission and grid reliability as well as to provide necessary ancillary services. The needed control over generation would be much greater under a bilateral contract model since, by its very nature, such a model will result in less central coordination for the dispatch of generating units. This control could limit the amount of generation available to competitive markets and in effect limit competition.

Aside from these practical considerations, a bilateral contract based model is also likely to maximize wealth transfers from small to large customers. Small customers, as noted throughout this report, have a limited ability to participate in competitive markets for a multitude of reasons. These customers would be at an even greater disadvantage if they were forced to rely on bilateral contracts in the absence of a central pool or some other form of aggregation. As discussed earlier, larger players may be advantaged by certain market inefficiencies and thus oppose mechanisms enabling efficient supply aggregation for small users. Dr. Ruff, provides additional insight as to why larger players may oppose a pool by noting that:

> *... some powerful commercial interests (e.g., utilities seeking to preserve some of their monopoly power and large traders seeking to profit from high transaction costs and arbitrage) oppose the creation of open pool-based markets that allow even small players to*

> *buy and sell energy to manage their operations and contracts efficiently. But after several years of debate, even these opponents have had to concede that the independent system operator or ISO... must operate a dispatch-based spot market to maintain reliable and reasonably efficient operations. The debate has now shifted to the details of the ISO-operated spot market or pool, with some players still trying to limit spot trading in order to create profit opportunities for large and sophisticated players at the expense of smaller players, but nobody* [is] *seriously proposing a system that does not have some kind of dispatch-based spot market or pool.*[15]

In the absence of a regional power exchange, a bilateral contract based model may necessitate the establishment of a universal service provider or a supplier of last resort to assure that all customers have adequate access to electricity supplies. This requirement would dictate the resolution of a number of complex issues and create potential market inequities. Rules would be required to determine what customers would be eligible to purchase from such a provider, the conditions under which consumers could terminate or initiate service from the universal service provider, the procedures for disconnection for nonpayment, etc. Universal service providers may also be placed at a competitive disadvantage since they would be forced to serve less lucrative markets.

Conceptually, a bilateral contract based model could function for very large and sophisticated customers. Such an approach is already being utilized in wholesale markets. However, there is some indication that the existing level of bilateral contracts (wholesale transactions) have stressed the reliability of the bulk power system and that information systems needed for handling those transactions are only currently being developed. It is not clear whether or to what extent these systems can accommodate additional transactions for retail users. In any event, a piecemeal approach allowing only large customers access would almost certainly place smaller customers at a

significant disadvantage. Such an approach is also likely to divert limited resources from the development of central power exchanges to the development of policies for bilateral contracts.

Distribution Service Providers

Distribution services will continue to be required under any competitive model. These services still have a number of monopoly characteristics and will, in all likelihood, continue to be regulated. Existing utilities will likely continue to act as distribution providers. Given the monopoly characteristics of distribution systems, distribution companies should continue to have certain public service obligations. These responsibilities should include the installation of basic distribution facilities, maintenance of distribution service reliability and the obligation to connect new customers to assure that all customers have access to competitive power supplies.

It may also be appropriate to require that distribution utilities continue to provide other services necessitated by the public interest. For example, distribution companies are uniquely positioned to be a supplier of last resort where such service is needed. Utilities currently have direct access to customers and generally have experience with acquiring competitive electric supplies. Given these attributes, distribution providers represent natural aggregators for obtaining generation supplies for smaller customers and are good candidates for assuring that electric supplies are universally available. Natural gas distribution companies currently provide a similar service for smaller natural gas consumers. As was discussed earlier, a supplier of last resort for electricity may be necessitated by certain models.

Distribution companies may also be good candidates for providing certain customer services during the initial stages of restructuring. Although some customer related services may not have monopoly characteristics and could potentially be deregulated, such deregulation may unnecessarily complicate initial restructuring efforts. However, competitive suppliers may also view the provision of these potentially competitive services as business opportunities and as a means to enhance their provision of other energy supply services. These potentially non-monopoly services include metering, billing, payment collection, and customer accounting. Although metering, billing and collecting can easily be provided by competitive suppliers, the deregulation of these services may cause customer confusion and may complicate unresolved issues, such as the collection of gross receipts taxes. The provision of these services is also relatively inexpensive and the benefits associated with their deregulation would likely be minimal.

Some customer related services may also raise safety concerns. For example, utilities currently provide meter bases, or specify standards for meter bases, to assure that substandard equipment is not installed on a customer's home. Local building codes do not typically address standards for this type of equipment. Consequently, the deregulation of the installation of meter bases would require the development and enforcement of additional minimum equipment standards.

In short, while many services that are currently provided by distribution companies may be good candidates for deregulation over the longer term, the deregulation of such services requires careful attention to detail in order to assure that adequate consumer protection measures are in place and to avoid unnecessary customer confusion. Consequently, it may be inappropriate to initiate the deregulation of specific customer related services while dealing with the complexities of introducing retail choice. Such efforts could be addressed during a transition period to a competitive market or at a later time. Given the complexities associated with the implementation of retail choice, distribution utilities are appropriate entities for providing customer related services during a transition to a competitive market. It may also be premature to deregulate such services until we are certain that retail access can be accommodated in a cost effective fashion for most or all customers.

As an aside, the functional separation of distribution could result in a greater focus on distribution service quality. Performance based ratemaking could be developed within such a focus and utilized to stimulate greater reliability and efficiency with respect to the provision of distribution services.

Conclusions

An appropriate restructuring model should maintain or enhance reliability, afford all customers an opportunity to benefit from competitive markets, and produce effective competition among suppliers of electricity. Such a model should also provide flexibility to accommodate changing market conditions and technological advances. Considering the need for the further development of information systems and further analysis of the operational uncertainties associated with the separation of transmission and generation, it may also be necessary to establish a model that, at least initially, controls the number of bulk power transactions.

Given the above objectives and/or concerns, an appropriate model should initially provide for the following:

- the functional separation of distribution, transmission, and generation;

- the establishment of one or more ISOs to provide effective non-discriminatory access to transmission services;

- a mandatory power exchange or power exchanges to capture diversities, perform central dispatch and assure adequate capacity reserves; and

- the continued regulation of power supplies until it is determined that competitive markets are free of market abuses.

Once ISOs and power exchanges have been fully established, direct retail access can be phased-in, as deemed appropriate, and mandatory pool requirements can be relaxed. The speed of this phase-in can be responsibly adjusted given additional experience with competitive systems. It may also be appropriate to conduct comprehensive retail access pilots while the above systems are being developed to gain additional insight into the issues that may be associated with full direct retail choice. The provision of customer related services may be revisited if and when the issues associated with providing customer choice have been resolved. The retail access pilots may also provide insights regarding the deregulation of certain customer services.

Based on the foregoing discussion, an appropriate restructuring model should direct utilities to submit detailed plans for functionally separating their distribution, transmission and generation services. Such plans should include the establishment of independently operated ISOs and power exchanges. ISOs and power exchanges should have independent governance to assure that power suppliers are not given preferential treatment. Utilities should also be required to conduct and submit detailed studies of their interconnected transmission systems to identify constraints and to analyze the market power implications of such constraints. An appropriate restructuring plan should also provide the Commission with the authority to defer the economic deregulation of a utility's generation until the utility demonstrates that it is unable to exercise any undue influence over the competitive market and that its customers will be adequately protected.

Development of independent transmission system operation and efficient supply aggregation through a power exchange or power exchanges will enable the benefits of wholesale competition to be realized, while permitting time to evaluate the operational complexities noted herein. If and when appropriate systems are available to address these difficulties and to effectively check market power abuses, implementation of further direct access can be phased-in over an appropriate timetable.

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[1] FERC, "Promoting Wholesale Competition Through Open Access Non-discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities," Order No. 888, April 24, 1996.

[2] The Scheduling, System Control and Dispatch Service provides for (i) interchange schedule confirmation and implementation within control areas, (ii) actions to ensure security during the interchange transactions, and (iii) accounting for scheduling, system control and dispatch.

[3] The Reactive Supply and Voltage Control from Generation Sources Service provides for the maintenance of proper transmission line voltages.

[4] The Regulation and Frequency Response Service is needed to provide for the extra generating capacity necessary for following load variations and maintaining frequency at sixty cycles per second.

[5] The Energy Imbalance Service is required for supplying energy to satisfy hourly mismatches between a transmission customer's energy supply and the load being served in the control area.

[6] The Operating Reserve-Spinning Reserve Service provides for the availability of extra generation that may be necessary to serve load in response to an unplanned event such as loss of generation. Supply for this service must be available immediately.

[7] The Operating Reserve-Supplemental Reserve Service provides for the availability of generation that can be brought on-line within a short time (usually ten minutes) in case there is an unplanned event.

[8] "Pancaking" of transmission rates refers to the frequent practice of requiring a third party customer to pay multiple transmission rates for wheeling services where the "contract path" between a load and its designated generating source covers the facilities of two or more utilities. Pancaking can result in charges that exceed an equitable sharing of transmission costs, thereby possibly discouraging efficient power transactions.

[9] Measures of performance may also be required since price is not necessarily the only indicator of overall performance.

[10] However, real-time metering may be needed to provide better price signals, TOU rates, etc.

[11] Imbalances between energy deliveries for a specific user and usage by that user could impose additional system costs since electricity supply costs may differ widely from hour to hour.

[12] In their simplest form, "contracts for differences" require payments from suppliers to purchasers when pool prices exceed the price specified in a contract and payments to the supplier when pool prices are less than the contractual price. These payments reflect the difference between the contracted price and the actual pool price.

[13] Larry E. Ruff, Ph.D., "An Efficient, Competitive Electricity Industry: Can the Vision Become Reality," The Electricity Journal, January/ February, 1997, at 16.

[14] Larry E. Ruff, Ph.D., "The Counterfactual to the NZEM Rules-Statement to: The New Zealand Commerce Commission," August 12, 1996, at 3.

[15] Id. at 13-14.