HARVARD UNIVERSITY

JOHN F. KENNEDY SCHOOL OF GOVERNMENT

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HARVARD ELECTRICITY POLICY GROUP
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MEETING SUMMARY

This session of the Harvard Electricity Policy group was devoted to a brief business meeting, followed by three sessions on issues that had been previously identified by the members of the group as being of particular interest: 1/ *a comparison of approaches which have been developed in answer to the FERC's Notice of Inquiry on "Alternative Power Pooling Institutions";* 2/ *an examination of the future of nuclear power in a more competitive electric industry, and;* 3/ *building on a discussion begun at the HEPG's October* 1994 *plenary, a further exploration of the development of the retail sector in a competitive bulk power market. This summary necessarily abbreviates the presentations and discussion at this session. A list of materials that were circulated at the meeting is included for further reference.*

Business Meeting

Moderator:

When this group was organized, we had a particular set of objectives and a timeline. The objectives were to provide a forum for research and analysis and discussion and investigation exploring the topics that are related to the restructuring and implementation issues that flow from the Energy Policy Act. We have been lucky in that we are not constrained by the need to arrive at a consensus. We have tried to be as balanced as we can in exploring the issues and as open as possible in the exchange of information.

We committed to a two-year effort so that we could have enough time to develop some cumulative contribution and have confidence that we would be able to discuss these issues usefully. Those two years come to an end this summer. We can end the effort this summer as planned with the May plenary session and the wrap-up of some research projects we have underway, or we can extend the project for another year. This is an opportunity to discuss the question of the HEPG's future, and get a sense of where we want to go with this project.

_: Clearly there is more work to be done. One area of future focus might be on the comparable service transmission tariffs that utilities are now required to file.

: A lot of the solutions and structural arrangements that are going to be developed will to some extent be regionally specific. An important issue will be, to what extent do you need commonality or compatible approaches?

_: We have accomplished a lot over the last couple of years, but we have never addressed the causes of all this change. I think it is consumer unrest that is driving the move toward retail competition, and if we want to talk about the real changes that are occurring, we need to talk about what customers are doing with our product. What changes are going on in the way the end-user is making use of electricity?

_: The holding company issue is coming to the fore as the new Congress sets about its agenda. This deserves our attention.

: What are the real costs associated with different policy change options?

: The contributions on market mechanics remain important, but although these models have grown in technical elegance, they have not necessarily grown in intelligibility and therefore in acceptance by some of the critical constituencies. I hope we can make a contribution to making these ideas more accessible.

_: Since at bottom we are talking about a technology-intensive industry, you might want to take a look at possible arrangements to promote healthy technological development. After all, technology is a sort of ultimate limitation on what we can do with the structure of the industry.

_: One of the great temptations in any business or political organization is to move ITomthe discussion of policy to the discussion of administration, which is much easier. I urge that we stay on the intellectual high road with respect to policy and try to avoid getting mired in the parsing out of particular solutions to individual problems.

That is especially true for the commissioners who are taking part in these discussions. If the direction of the discussion were to move toward a more specific consideration of implementation issues, we might start to feel that we couldn't participate.

_: It might be useful, though, to pay some attention to how a general policy might play out in the specifics of a particular region.

_: Perhaps we ought to revisit the current thinking about case law with respect to the development of court rulings on utility anti-trust issues. Where should those demarcations be today, and are they even relevant to the industry as it moves into the future?

Session I: Looking Forward to "Alternative Power Pooling Institutions"

The Federal Energy Regulatory Commission's request for comments on alternative pooling arrangements will attract much attention and analysis. For the existing power pools, the challenge is to rethink accumulated practices and principles within the context of increased competition in the electricity market. Elsewhere, the option of using some form of a pooling arrangement to meet the requirements of open access, comparable transmission service, and economic efficiency is being debated at length. The opportunity to discuss principles, problems and tradeoffs for this fast-moving topic builds on previous sessions on the experience with pools elsewhere, and the theory of competitive market operation.

First Speaker:

There has been a great deal of study of industry structure, but to some extent it is also necessary to look at the *processes* that are going to be involved in the restructured industry. We initially all thought that we had to understand how to allocate the rights of the transmission system. This turned out to be practically impossible, and we are now focussing on service criteria that need to be satisfied by any emerging structure.

It is critical that present users get the same use out of the transmission system without paying a higher cost than they do today. That's not easy. First, there is an absolute requirement that reliability must be preserved, not just in transmission but in generation as well. Second, while the industry has to permit participation on an unbundled basis, utilities should not be required to forgo vertical integration. One implication of these two points is that the process for achieving reliability is really driven by the planning requirements. We have to establish load forecasting and technical criteria for design and operation, all on a regional basis, since load forecasting is what really drives the planning process.

Participants in the market have to be able to relate to each other independent of any affiliation such as transmission ownership. Given a system of centralized regional planning of the kind the FERC has been looking for, all transmission needs can be met without a vast array of types of service:

. There would have to be a service that could be used by firm loads to deliver from their designated generation sources. They would pay a certain fraction of the grid's underlying cost as a reservation fee for that. There are also parties who will want to schedule for firm deliveries from a non-utility generation facility.

. Once the above needs are met, to the extent that there is room on the system, additional services can be made available on a reservation basis, with a contribution to the fixed cost.

. All loads and all generators have to be interconnected, and so there may be interconnection contracts including whatever costs are appropriate.

"Comparability" as applied to transmission services not only means non-discrimination, but also the question of

whether the retail customers which the utility has the obligation to serve are paying the same rates as a third-party user for comparable services? The mechanisms for working that out have many of the same kinds of problems that our stranded-asset issues have.

Second Speaker:

The critical components of the discussion on pooling models are: cost recovery, opportunity, and equity. Most of the discussion on cost recovery has centered on costs that have been incurred already on behalf of customers, but it will be important also to make sure that future costs for reliability, control area services, and transmission access are equitably allocated. In order to develop a truly competitive market, it is important to come up with a framework which allows maximum participation. A broader regional scope means more market participants - that goes for customers as well.

This industry has a long history of using power pools. In the 1960s, they were developed to make sure the lights would stay on. In the 80s, we set up the Western Systems Power Pool (WSPP) to focus on economics -- to try to wring out additional efficiency through pooled dispatch and wholesale market trading. Now the focus is on RTGs, or what might be called transmission pools, to try to solve the open access problem. There has been a lot of debate on pools versus bilateral contracts, but trom a power system standpoint, all power is generated and delivered into the grid or the pool, and customers take power out of the pool. The fiction that I can somehow connect to a generator and take those electrons with my name on them without going through a pool of electrons is just that -- a fiction.

Competition among producers will determine who participates in the marketplace. The pool would then act as an independent system operator, performing load-balancing functions and providing open transmission access. It would assure reliable system performance and service by making sure adequate resources are available.

The pool will also perform settlements. The discrepancies between the production and consumption of power have to be settled out somehow, whether by punitive tariffs or by settlements based on market-generated spot prices. From the point of view of the customer, the important thing is flexibility and choice. Power marketers, brokers, and so on, can enter into any kind of financial bilateral transaction with customers to deliver price performance as required by the customer. That part of the transaction is invisible to the pool, need not be regulated, and in fact is totally separate from the physical operation of the power system. Anyone could decide either to continue as an aggregated customer of a utility, or to turn to an aggregator, to get the price performance characteristics they need.

The keys to this are, first, separation of the financial transaction from the operation of the system, and, second, separation of the monopoly functions from competitive market functions. Under this approach, the pool, which would be responsible for transmission access and the economic dispatch of the power system, would be FERC-regulated. The distribution system would be state-regulated. These jurisdictions would retain the flexibility to pursue local environmental policies, social programs, regional policies -- whatever energy

policy issues they want to pursue. The charges for these programs could be collected from the distribution entity, with concurrence ITomFERC to eliminatejurisdiction-shopping. Competition transition charges would also be levied by the distribution company on all customers so that those transition charges are paid for by all customers and cannot be bypassed.

In the world of pure bilateral contracts, the assumption is that one can get transmission at any time from any place at preestablished prices, without worrying about restrictions based on how the system works. The only way to do that without pooled dispatch is to overbuild the transmission system. Both of these models share a few common requirements: they will need an independent system operator, some kind of economic dispatch and load balancing protocol, and a way of handling asset ownership. It is in both the public and private interest to find the structure with the most flexibility for the most players. By investing decision control in an independent system operator, we obtain open access, comparable service, regional scope and efficient operation.

It's important that restructuring not result in a zero-sum game where some customers benefit at the expense of others. The pool approach assures that competition on the production side leads to lower spot prices, so that the benefits of competition are felt by all customers, whether they stay with the utility or bypass it via independent bilateral contracts. It is harder to spread the benefits evenly if we limit ourselves to a bilateral contract model.

A pool structure can be implemented quickly and easily, making the benefits of a restructured, competitive market available to all customers. Other approaches have suggested a significant time lapse between the initiationof a competitive market and the time when all customers can get the benefit of choice.

Third Speaker:

There are two common elements to all the current and proposed pooling mechanisms:

- a system operator function, which handles information about the capabilities, loading, and use of the transmission system, and generally manages the use of that system.

- a market operator or coordinator function, which is combined with the system operator in most pools today as well as in the pool proposals for the future, and which attempts to move supplies to markets as cheaply and as efficiently as possible.

While the system operator arguably must be a single entity regulated and without competitors, the market-making function of the pool can, should, and must be opened up to competition. Let the pools compete.

This standard can be applied to current pooling institutions and to those planned for the future. A number of pools in the U.S. operate the transmission grid in their area for the benefit of a handful of power merchants. Admission to the pool requires the consent of all the parties to the original pooling agreement. Members get access to the transmission grid at a much lower rate than

that available through tariffs. In some cases, you must either own a transmission system or operate a control area in order to participate in the pool --that's like being required to own a railroad in order to take the train. Thankfully, this is starting to change, but there are still few things left to do. The separation of the system operator's reliability function ffom the bulk power market-making function of pools is the most important.

Discussion:

_: Aren't there constraints in the system that lead to subregions within the larger market at which the prices might differ because of constraint situations and location of generator? That would mean we'd have to operate, say, the whole western region based on disaggregated control.

_: I don't see any limitations from a technical point of view. In terms of technical capability, we have the capacity to dispatch the entire western grid ffom one center, based on one set of rules. From a reliability redundancy standpoint you'd probably want to break it up to reduce risk. But in terms of communication and so forth, I don't see that as a problem.

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_: Do you think we are going to be able to resolve this issue of essential pool functions over the next six months or so, or are you ultimately going to need regulators to step in and make some calls to resolve your fundamental differences?

_: I don't think that we are going to be able to avoid asking the regulator to make a call on some of these key issues.

_: Obviously, the physics of electricity is one of our biggest constraints, which explains why pools keep coming back. Human self-interest, on the other hand, is a constraint of a different nature entirely. There is an appropriate role for regulation in making sure benefits and costs are allocated equitably.

_: Do you feel the need for a few more months of focusing and clarifying interchange before these decisions start to be made, or do you think these differences are ripe for decision now?

_: We're in favor of getting access as quickly as possible. The problems of "cream skimming" are not as great as some people think. When competitors come into a market, they don't "skim cream" for long before somebody else is right on their back and doing the same thing. Competitors do better for their customers by competing effectively.

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_: Is there any incentive for the emergency backup generator, which may cost 25 or 30 cents per kWh, running 150 hours a year, to build that facility in the first place? In going ffom a system in which you overbuilt in order to meet obligations to a competitive system which runs off price signals, what are you going to do about problems of price volatility during the transition? How do you deal change public expectations?

_: There has to be a sort of transitional stage -- loads that want to be able to depend upon service should be obliged to provide to the regional planning structure and to the system operator capacity resources to meet their load plus some reserve requirement. That, in effect, creates a market for the facilities as well as for

the energy. So the incentive for building that backup generator would come from what the capacity market would support.

_: It might be that the typical 55% load factor that we currently have on the power system might start to increase, so that the need for expensive backup generation would go down.

_: Some old fully-depreciated power plant that would never make it into the daily auction, but which might be able to run at 25 or 50 cents per kWh for 150 hours a year, could do a lot over time for the efficiency of the total set of investments.

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: Weare moving toward an industry structure that is based less on a hierarchical type architecture and more on an network model, in which the roles of service providers and service consumers are somewhat interchangeable. The system operator provides both supply services and consumption services. Competing suppliers may be able to provide services to the operator in the same way that customers are able to provide services back under contract to their suppliers through real-time pricing. It is possible that competing suppliers could provide back to the operator the necessary swing margin that it needs under emergency situations. Perhaps we should let competition determine what the optimum role of the system operators should be. Maybe there isn't any ideal size. The role might very well change with changes in the market.

_: You may not be able to predetermine the functions at any given point in time, but you can articulate in advance what the list of useful elements are. In the gas industry, pipelines were given the burden of proof to articulate and identify in writing the kinds of controls and rules they needed to have in order to operate the system --essentially to make sure there was no structural preference built into the system.

_: A focus on the rights of the customers in going to the market might be helpful in that respect.

_: What proportion of the total load has to be controlled by the system operator to keep reliability in balance? What proportion of pooling transactions can actually be out-of-pool to be able to establish a relevant spot price? Is it 10%, or is it more like 80 or 90 percent?

: In 1992 our company was doing 60 percent of our business in the pool, and today it is down around 15 percent. This has had consequences in terms of reliability --in 1992 we were in violation of one of our reliability criteria about 13 percent of the time; now we are up to 20 percent. We had been fairly close to NERC performance standards, but we are getting a little further away every year. Part of this is due to the number of bilateral transactions going on. Under computer-directed dispatch, the computer system would back off the transactions long before we violated a reliability criterion, but because we are using manual intervention instead, the operator has to identify the problem first and then call someone and ask them to back off the generator. So we spend more time in an abnormal state than we should, and the system is less reliable.

: It is not a question of *how much* generation the system operator controls, it's
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how it is controlled. The control should be based on economics, and there is no reason why the market can't provide the economic signals that the grid operator needs in order to operate. There is no reason why spinning reserve and regulation shouldn't be market-based services that suppliers can bid and provide.

_: The rule of thumb of power systems is that 40 percent is base load, 40 percent is intermediate, and 20 percent is peak. Theoretically, this means 40 percent of the power produced in the grid over a year does not need to be controlled, while the remaining 60 percent is going to need some amount of dispatch.

_: Are you saying you want to make room for bilateral physical transactions in the system? Given the need to continue to have control over the system, I assume you're going to have written out the controls of the use of the system by people engaging in bilateral transactions. And you're not going to artificially limit the number of bilateral transactions. What if everyone chose the bilateral option and no one used the pool? Would that present a problem?

_: Yes, because congestion on the system is managed economically. A bilateral participant doesn't want to be treated by the system dispatcher as an economically dispatched resource -- it wants to be a must-run unit. There is a way to bid zero, and in effect get dispatched first -- the financial consequence is just between you and your ultimate customer.

_: Is it really as simple as bidding zero?

_: The grid operator needs to forecast where power is coming in and going out. When the power that is coming in becomes constrained, you need a mechanism to decide which of two deliverers to cut back, and that goes back to economICS.

_: But you can't have the whole system running that way. How are you going to decide how much? How are you going to come up with limits?

_: Some have suggested that people that don't want to provide price information should provide at least incremental price bids in order to establish that order required for operation of the system. If you ask the generators if they should be allowed to ask the system generator to economically dispatch them, it's a sure thing they'd want that service to be available. After all, generators ultimately want to run only when it's the cheapest way to meet their requirements.

_: In our system it is not unusual for us, where we run 35 to 40 thousand megawatts peak load, to have 5 thousand megawatts of change in load in a two-hour period. That's the kind of load following required. A bilateral transaction is effectively a mini control area. You need the ability and the response capability to have the source follow the load. To the extent that it doesn't, there needs to be sufficient capacity available to perform balancing functions. Where there are a lot of bilateral agreements going on simultaneously, there are real practical problems in dealing with the variations in minute-to-minute load.

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: We talk a lot about these theoretical structures. What are these kinds of changes going to do to, say, prices? Can you really tell
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me as a consumer or as a wholesale seller that my prices are going to go down?

_: Prices are going to change because of costs that have yet to be incurred. We will minimize the costs we incur, notably the construction costs for new plants. Prospectively, the decisions about building new power plants in a competitive industry would be market-driven, and not based on regulatory mandates. So we can rely on competition to drive down those future costs, even though we might not be able to foresee them in a specific way. If new power plants aren't built, the efficiency of the system goes down, leading to rising spot market prices. When the cost of a new plant can displace what otherwise is the marginal cost, those decisions will be made.

_: In the airline industry, there clearly needs to be an air traffic controller to make sure that air travel is safe and reliable, but the price of an airline ticket is set by the airline. Is this what you're talking about with Poolco and bilateral transactions, or is Poolco trying to be both the air traffic controller and the airline?

_: Another analogy might be to compare it to the New York Stock Exchange, where the SEC has rules for some parts of transactions. The one difference in power systems is that there is a difference between consumption and production, and you have to have a system to settle the difference. That's why generation dispatch is referred to as a monopoly function -- because settlement is the responsibility of the pool system.

: But some of these functions that we are requiring of the central entity can actually be subject to competition. There are people who run utility systems who are willing to subject these things to competition in order to have the market arrive at the best way of providing service, allocating cost, pricing capital, bringing buyers and sellers together. There are a number of instances from other industries in which the benefits of competition and deregulation were unanticipated at the time the industry was being restructured. If our structure is graven in stone before we even begin, we are closing a lot of doors on innovation.

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_: With a pool in a competitive market, if a generator requests the independent service operator to dispatch a plant to maximize his profit, he would not be permitted to do so?

_: He should have the opportunity to go to any number of different people who might do that very thing. They should be competing for his business and working on the best possible way to provide services. We shouldn't have a situation where there is only one person who can do that; that is starting with a tilted playing field. Let's not begin this race with all the competitors trying to compete while one competitor is also operating the transmission system. The system operator should not be participating in the commodity market beyond what he absolutely needs to in order to keep the physical system balanced.

_: Why not separate the operator and the merchant functions altogether? I as a customer should have the right to tell the independent system operator that I want to consume no more than five megawatts if the price is three cents, if it goes to four cents, it'll be two megawatts, and if it goes to five cents, I want to cut off my consumption completely. Both demand and supply become elastic around whatever the market price turns out to
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be. They are not determined by the operator. So we don't really need to work out the answers to that question. Economic dispatch will solve the problem for us.

_: And the system operator should manage the physical system balance without extending its scope to functions that can be subjected to competition and which are outside of that narrow range of operations.

_: But what if there is, say, the need to dispatch 100 megawatts and there are 400 generators out there? How would the system operator make the decision on who to turn down?

: In the gas industry, they take bids specifically from people who are prepared to turn down or turn on if need be -- not as a competitive act but strictly in order to keep the gas flowing.

_: In our proposal, the system operator buys a certain amount of power and turns down certain loads in order to meet balancing obligations in the short term. That amount is some small irreducible minimum of the total. Now, if you as a generator want to be part of that minimum amount that is bought by the operator in order to balance the system, you should be able to offer a competitive bid for low-cost or flexible service in providing that power. But the operator doesn't otherwise compete or set up a market-making function that competes with anybody else, because he has control of the very thing that everybody needs in order to compete.

: Is that "irreducible minimum" a fixed amount? If one week the operator needs 400 megawatts to balance the system, and the next week he needs 500, will he be allowed to purchase the 500, or will he be limited to 400 because that's his minimum?

_: Yes. He'll be allowed to purchase 500 in order to meet balancing obligations.

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_: Is there an "ideal size" for a pool in terms of the physical nature of the system? Are there advantages to making it bigger or smaller?

_: From a market standpoint, you don't want a market to be limited at the franchise boundary or at the state boundary: that's why we have GATT and NAFTA. There is no reason why the size of the market has to be limited. From a practical standpoint, just as in the air traffic control system there is no one single tower that manages traffic at all the airports, there doesn't need to be one central operator controlling all the dispatch in North America. The control responsibilities can be disaggregated among the existing control centers, with a common set of protocols creating, in effect, a regional grid and a regional market, without shifting operations control to a single central location.
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Session II: Nuclear Power in the Era of Competition

What is the future of nuclear power in a competitive electricity market? Is it, or can it be, competitive? Can the industry survive with investor ownership, or is some form of government takeover necessary? Should safety regulation be altered in any way in order to accommodate competition? If so, how can such change occur without actually sacrificing safety? What happens to decommissioning and waste disposal costs in a competitive market?

First Speaker:

Neither opponents nor proponents nor owners nor regulators of nuclear power have really addressed the implications for nuclear energy of the changing utility business environment. Consciously or not, we have been discussing competitive energy futures under the assumption that nuclear power will playa significant role. What discussion there has been has focussed very narrowly on economic issues and not on the institutional side of nuclear power, which is going to have to make some very large adjustments to cope with a competitive industry.

Even though many people have recognized that some nuclear power plants might not be competitive in the new environment, nuclear power does account for something in excess of 20 percent of U.S. electricity production. None of the discussion of the future of the power sector has been premised on the assumption that we would, in short order, lose access to the better part of 20% of our electric energy consumption. The Midwest and the Southwest in particular would face serious difficulties coping with the loss of that much capacity. Undoubtedly the gas industry can and would cope with those changes, but 20% of our electricity supply is not a marginal change. We need to think about the consequences of not having nuclear power around.

The institutional question is still more important. Who is going to own and operate nuclear power plants with the phase-out of franchised, regulated, monopoly electric utilities?

Second Speaker:

Representatives of the NRC have voiced concerns from time to time about the potential safety implications of incentive price regulation. Competition obviously falls into the same category. The regulatory structure for nuclear power is premised on total openness, on making available to the public and to competitors virtually all information that does not have security implications. That is not the way competitive industries normally operate. The industry has pooled its liability and other financial risks on a basis that reflects the aggregate risk exposure of the industry rather than the particular exposure of individual members. Both the regulatory structures and the industry structures need to be reanalyzed to ascertain how they're going to function in the kind of competitive environments that we have been hypothesizing. If we want nuclear power to stand or fall on its own economic merits, we need to start working on the removal of barriers to the non-economic success or failure of the industry so that we can ascertain what those economic merits are.

Third Speaker:

Clearly an object of concern with the introduction of competition is going to be its effect on capital investment, because people are going to want to leave their options open, not make investments that take ten years to pay off when they don't know what the future is going to be like. That is a development that currently favors gas over both nuclear and coal.

More generally, the outlook for the nuclear industry depends both on the ability of utilities to compete economically, as has been discussed, but also on the continued safe operation of the current plants. Economic competition doesn't have to cause performance problems or safety problems in nuclear plants. In fact, we generally find that the plants with the lowest generating costs are also among the best safety performers. This suggests that the argument that NRC regulation is a real economic barrier to the industry doesn't really hold water. A better question is, will competitiveness kill the openness on which safety depends? In a competitive industry, nuclear plants will not just be competing with each other, they'll also be competing with non-nuclear plants that don't have the same need to share information with the public. Nuclear plants may be disadvantaged by having to make so much of their operating information public.

The safety performance of the nuclear plants of the next ten years will have a big impact on the long-term future of nuclear power. There will be plenty of demand for new capacity over the next twenty years or so --whether or not nuclear energy will continue as an important part depends on three conditions. First, that the current plants continue to be operated safely. Second, that regulation allows nuclear plants to operate economically. Third, that the federal government develops an effective way to deal with high-level nuclear waste. To meet these objectives, the licensees, the NRC, the public utility commissions and the federal government have very specific responsibilities. The utilities must not only maintain safety while running economically, but also find ways to reduce their depreciation charges once competition arrives. The NRC's approach has been to focus on the high-risk plants while reducing the regulatory load on the lower-risk performers.

Much will depend on rethinking regulation. In effect, license renewal offers the possibilities of operating a fully amortized plant for another twenty years. Under these circumstances, aging will have to become a centerpiece of our inspection and research programs. It may turn out that new reactors are more commercially attractive than people generally believe today, provided there is a regulatory environment that is not completely hostile to heavy capital investment for power generation.

This is where the public utility commissions come in. Given the current price of natural gas and the competitive anti-investment environment, public utility commissions and utilities may conclude that neither coal nor nuclear power is economically viable. In this case, we risk overdependence on one fuel, with the possibility of price volatility if supply predictions are wrong. In a competitive power market, public utility commissions are supposed to deal with each project on its own merits, not as part of a larger strategy. On the federal level, the government needs to find a way to cope with

85,000 metric tons of waste reactor fuel from current reactors. While progress on both high- and low-level waste disposal has been slow, it has been steady. Ultimately, the future may depend less on what goes on in the reactors today, than on how and when spent fuel disposal is settled.

Fourth Speaker:

We need to separate the question of the future of existing nuclear plants from the question of the future of new plants. The continuing operation of existing plants should be based only on their viability from an incremental cost standpoint. On that basis, existing plants will be fully competitive in the restructured market. There shouldn't be any plant that shuts down because of some issue having to do with the recovery of some cost, unless the operating utility goes bankrupt. By contrast, the question of new plants depends very heavily on the future climate for capital-intensive technology investment. In a competitive market, the market price sets the recovery of investment, and investors make their investments based on what they think they will get from the marketplace. That sort of model leads to short-term recovery of the investment, which would eliminate nuclear plants from the scene, unless some value is placed on the avoided air pollution they achieve. Further on in the future, if alternate energy prices rise significantly, there would come a point at which nuclear power plants might become competitive.

It is clear that safety regulation should not be altered in any way to accommodate competition. However, as the previous speaker mentioned, it can be rationalized and made more efficient through risk-based regulation and more accurate risk assessment. This is a change which is not responsive to competition, nor should it be.

The solution to decommissioning and waste disposal costs is similarly straightforward -- such costs should be estimated conservatively and then incorporated into current costs, as is done today.

With all of these considerations added to the mix, we can compare incremental costs with avoided costs that result from operation. We have shut down one of our units on the basis of that kind of economic analysis, and the same calculations show that the other units of the same plant can continue to operate economically for the indefinite future.

Fifth Speaker:

It is evident that the demand for electricity for all sources will grow in the future; and if the economics is right, nuclear energy can playa role in that future, both as an industry competitor and as part of a diversified fuel mix. Nuclear power's production costs are low, while O&M and refueling and other variable costs that were rising during the 1980s are now under control and even falling. This should be enough to offset a projected rise in decommissioning costs in the future. In addition, current plants will be fully depreciated by the time they apply for license renewal. New standardized plant designs are being developed and seeking NRC certification -- they can be a competitive source of power on a levelized basis. Public policy will have a big effect on the building of new plants. Support for global climate change policies may engender support for nuclear energy as a

power source even if the waste disposal problem has not yet been fully resolved.

Sixth Speaker:

Nuclear power seems really to be the source of all this talk about restructuring the industry, after the sharp rise in nuclear costs in the 70s and 80s. Most of the issue centers around stranded costs, which come from investments which were agreed upon by utilities and regulators. The essence of competition is that customers get a say in things. So, one way or another, some of these costs are going to get renegotiated. The really salient costs are the incremental costs. On an hour to hour basis, there is no question that nuclear power is the cheapest source of energy, the one you would always want to dispatch. But that isn't necessarily true on a year to year basis -- even if you turn the plant off, you can't turn the costs ofT, because they're mostly in staff or equipment. If you look at the statistics, some plants are doing pretty well at minimizingthose costs; but some are not. In theory, since the difference is mostly in management, all plants ought to be able to do as well as the better plants. In reality, that is still a question mark, and some of those plants at the upper end of the cost range may indeed drop out of the market.

The decision not to run a nuclear plant is a capital decision. To keep your license you have got to keep your 600 or 800 people on site, and you've got to keep improving the plant. So there is an understandable bias in favor of keeping it on-line, but at some point the costs do matter. Further, there are some non-economic factors involved. Nuclear plants are management-intensive, and some companies resent having to deal with that and with the bureaucracy of the NRC. So there are capital problems, cost problems, and management problems. And whichever you think is the most important, all of those decisions are being made in terms of incremental costs.

It would be a good idea to make sure in the future that nuclear plants, whatever the ownership arrangements, are operated in some sort of group where plants can collect and make use of information on a broader level. It is the isolated plants and the smaller plants that have the highest costs. Grouping plants together could also lead to changes in the regulatory system. We don't want to sacrifice safety standards to competition, but the system of regulation has to mirror the industrial setup, and the current system is geared to a lot of small individual operations, which forces it to be strict. Larger groupings with greater degrees of standardization in discipline could allow for more flexible regulation without sacrificing safety.

Discussion:

: What about this idea of grouped ownership of nuclear plants -- some kind of horizontal integration? The thing I wonder about is that that kind of arrangement would seem to fly in the face of flexibility in pricing arrangements in a competitive power market.

There's a big difference between concentration of operational management versus concentration of ownership. I think some kind of O&M services organization running a group of units on a contract basis and sharing expertise makes a lot more sense than having the same company own several units in the same part of the country.

_: There are a couple of case studies that could be done to shed some light on these questions. Maybe we should take a look at them before we go any further into this question.

Seventh Speaker:

The nuclear fleet in 1993 displaced what would otherwise have been 4.7 million tons of S02 and 2.2 million tons ofNOx'

The real question for the industry is how to deal with the huge embedded costs. This is an industry that historically has been heavily promoted and, in fact came into being because of the role of the federal government in the 50s and 60s. The industry has always been subject to a pervasive regulatory regime and statutory requirements, the effect of which has been to lead to a much greater internalization of the costs of nuclear power, including decommissioning costs, which in some respects are unique to nuclear plants. This history will have an impact on the competitiveness of the industry.

Having said that, I believe that the things that can make nuclear power more competitive in fact reside largely outside of the regulatory process. If we were to have a serious incident of any kind at a nuclear plant, regardless of its economics, it would be difficult for it to survive. Furthermore, in revamping the regulatory process based on new industry structures, it may be more difficultto establish the financial qualifications and decommissioning assurances that have until now rested largely on arrangements with electric utilities and rates set at the state level.

Discussion:

: Much of this afternoon's discussion of nuclear power seems so out of touch with the morning's discussion of the likely future ftamework ofthe industry. It seems clear that the push toward competition will sever generating plants from the decisions about which plants will be dispatched. Power plants can no longer rely on the fact that being run is in the interest of an entity that owns both them and the transmission system and makes the decisions about which ones of them run. Given this ftamework, I cannot imagine how anyone could find support to go ahead with construction of a nuclear power plant. The time ftame for setting up a waste repository is essentially the same now as it was in 1977, when we predicted there would be a repository operating by 1985. Now we're looking at 2001, assuming all goes well. Try to imagine siting and building a nuclear power plant in a community before being able to state with very high confidence where the waste is going to go. The existing units may be able to go on operating because their day-to-day costs are low enough to keep them competitive. But year-to-year costs, as someone mentioned, are more of a problem. Even if the federal government manages to monetize advantages like clean air and non-oil dependence, nuclear energy is going to get rough competition ftom DSM and gas, both of which have a lot of the same characteristics. Nuclear plants will probably be the occasion of some substantial write-offs in high cost states like New York. Nuclear, more than other energy sources, already has its externalities internalized in the form of waste disposal charges and decommissioning funds.

What can regulators do to deal with this situation? This morning's discussion

seemed to center pretty much around the proposition that state regulators will be engaged more and more in assuring fair access to the monopoly bottleneck points that remain in the system, and less and less in the direction of making broad resource allocation decisions. Indeed, one of the ironies here is that some of those who are most strongly in favor of a continued nuclear future are those with the greatest reservations about having state regulators making environmental externality types of decisions. And those decisions would be very hard to sustain on a state-by-state basis because of the uncompetitive interstate defects that they bring about.

Could all the nuclear power plants be shut down without causing severe problems? Obviously not. Looking 25 or 50 years into the future, it is difficult to see an energy mixture that doesn't include energy sources that at least have the characteristics that nuclear has: non-fossil and entirely domestically controllable and producible. And that doesn't seem to work with a vision of the near future in which there is no incentive to build new nuclear plants in the next decade or so.

The push toward competition will have one more effect that wasn't touched on earlier, and that has to do with the fact that many states currently collect a very high local property tax on nuclear facilities. At the time many plants were built, utilities themselves often used the potential tax revenues as a way of making nuclear plants additionally attractive to jurisdictions that might be reluctant to accept them. In a competitive market, the pressure on the local community to be more realistic in the level of local taxation that the nuclear plant pays will be irresistible.

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_: The thing that makes the new high-level waste disposal program potentially useful is Senator Johnson's proposal that an MRS be built before a final repository. If that doesn't happen, then I agree that no one is going to be able to get approval for a new plant until there is definitive evidence that the fuel is going to go someplace. A national intermediate repository would definitely solve that problem.

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_: I would like to know if the problem of uneconomic total nuclear cost recovery is any different from uneconomic qualitying facility contract cost recovery. If you foresee a write-off at some point for high cost newer nuclear plants, would you postulate the same thing for these contracts?

_: The origins of both go back to the expectation that by this point in time oil prices would be over $100 a barrel. So the investors in the independent power projects and the investors in the nuclear projects are in conceptual terms on a pretty equal footing. Legally, on the other hand, it may be that the protections of contract law are better than the protections of utility investors. But they are in the same boat unless a particular jurisdiction chooses to go after one rather than the other. And at the point at which the wires really begin to open up on an interstate basis, it may not be possible for regulators who accept the equity of full recovery of both sets of costs actually to deliver.

: You don't think an exit fee or a wires charge is viable over the long term?

_: I don't think it is viable on a state-by-state basis. I suppose if it were national policy, then it could only be imperiled if it turned out that industrial production of some kind in the U.S. was made non-competitive because of high electricity prices. But state-by-state, the problem is that in high-cost jurisdictions, the resulting electric rates turn out either to be too high for industrial competitive purposes, or, if you discount the industrial rates, the burden you have to drop on other ratepayers is just unsustainable.

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_: When the public debate started in California, a lot of people said that rates in California were intolerable. They said, "We had nothing to do with creating this situation, and we are not going to ransom our future by paying any form of stranded cost." Six months later, many public statements have changed. Industry leaders are now saying, "If the costs were determined in a manner that everyone could see was sound, and if there was some allocation of those costs which we would agree was inherently fair, then we wouldn't claim the right to be exempted from a fair share of that burden." But even if we managed to allocate all these potentially stranded assets, it is possible that the competitive pressures on California's economy from the other western states might still undermine the whole matter. Future plants might be built in Nevada or Oregon instead of California.

_: The situation on Long Island is similar -- electricity costs are already very high, and the Shoreham plant adds to the costs still further. A lot of customers are trying their best to bypass the local situation through the FERC or the New York commission. It is hard to see where, other than from some kind of write-off on that stranded asset, the play in that system is going to come ITom.

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_: What happens if we turn out to be wrong? If a substantial fraction of the nuclear units cannot be handled on an incremental cost basis, either because they have unexpected new capital costs, or because there are other, unexpected, environmental or economic difficulties? I am concerned about what happens to the cost of dealing responsibly with the facility that is left. We cannot as a society just walk away from that structure. The costs of disposing of it responsibly are not trivial, and write-offs are not a way of assembling the capital needed to deal with it.

: That cost is a cost that was incurred when the plant went into service, and although it is collected over time, it is not collected as a function of the output of the plant. Therefore, we have as a society incurred the obligation to decommission the plant. We have several examples, for instance San Onofre Unit One and Diablo Canyon, where the decommissioning costs are in rates and are not a function of either the continued operation of the plant or its level of operation. I know that is not true everywhere, and there are some who have told me that operation of their plant is necessary in order to complete funding of their decommissioning trust. I would say that is a misguided policy.

_: I hope you're right. But if you're wrong, should we be looking at creating some kind of a national response mechanism, or just wait till the costs are already there with no ready recovery system?

_: We may end up with a kind of bare-bones decommissioning. I don't know that we have places to put the remains of all these nuclear plants. I know everyone was promised that these plants would be taken apart and buried and that everything would be restored and so on, but I'm not sure that is going to happen.

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_: How might the need to meet the costs of nuclear assets circumscribe our choices in the de-integration of the electricity industry as a whole?

_: The financial qualifications regime that has been established has been premised upon the fact that we've got electric utilities. That's going to limit the options open to us. It might be possible to demonstrate financial qualifications and satisfy the decommissioning requirements outside of the utility context, but provision will still have to be made for insuring that decommissioning funds are available before construction begins.

_: Retrospective assessment issues can be handled through a contract. I believe that some units which have gone through bankruptcy have already dealt with this.

If you're talking about divesting generation in return for contracts, such an approach would only be feasible if the NRC would consent to those types of divestitures without the second lien on the assets that it now believes it has a lien on. It's a threshold issue -- How much security is the NRC going to be willing to relinquish?

_: I think it feels it has a hand on the utility rather than on the generating asset itself, so that the spinoff of a nuclear generating plant with a contract back to the utility for covering these costs is in principle a viable option.

_: I'm talking about the reverse, where the nuclear plant stays but the utility's "good" assets are moved to private ownership.

: I don't think even that diminishes the capabilities of the utility enough to cause a problem.

_: The scenario would only work if you could establish that whatever corporate entity was acquiring the nuclear plants could also self-fund, because there's no way you're going to get private capital for that kind of situation, where you've taken the plant out of the situation where recovery is guaranteed -- it's too risky an investment.

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_: The recent conference in Japan sheds some light on these issues. The Japanese are worried about how they might introduce competition into their industry. The Koreans are worried about how they're going to finance future generation in their industry, given that Japan's electric rates are something like twice our national average. The Koreans use a national monopoly to artificially hold the price of electricity down. They don't see that they're going to be able to attract much international capital in that market. They're looking at the same questions we are: how to keep their economies viable in an increasingly competitive world. But in each of these societies, the future of nuclear power is not in doubt. The Japanese are aggressive on the subject and the Koreans made it quite clear that they are now going to go into the business of designing their own nuclear reactors, and they feel they have quite an export market in

China and other countries. So I would point out that on an international level, many of the countries with which we're engaged in economic struggle --Japan, Korea, and France are primary examples -- are taking a very, very different approach toward the issue of the future of nuclear energy.

One other thought. The notion that somehow the federal government may be able to solve the spent-fuel issue by the year 2012 strikes me as not fulfilling the lesson that we thought we had learned from the Japanese in terms of just-in-time delivery. It places so preposterous a burden on the industry that I wonder if the problem will ever be solved.

At some point, I suggest to you, we have so badly mismanaged the nuclear industry in this country that our assertions of leadership on the international world stage, that we can tell other countries how to deal with nuclear energy, become ridiculous. The Koreans are dearly chafing under this realization; the Japanese think the French did the smart thing, which was to laugh in our faces two decades ago. I'm very glad that we're having this discussion, because I think there's no area of the overall industry that requires a more broadly based discussion and revisitation than this whole area of the present and future of nuclear energy in this society. Because unless all those other societies are extremely foolish, the possibility is that we have handled it very badly.

_: I think you're right in saying that East Asia is one area where the prospects for nuclear energy seem very good, but they may not be as forward-looking as you have just depicted them to be. The Japanese keep going back to their 1956 energy plan. They've got a big reprocessing program going, where they are paying nearly ten times as much for plutonium fuel as for uranium fuel. That just can't make sense. They're going to have to make a lot of changes as they go forward, as they open up the decisionmaking processes to others besides the top government people. Their rates are currently not related to costs, but are simply whatever the traffic will bear. That doesn't mean they're wrong to take a long term approach --they're still hanging on to the idea of fast breeders.

: I think it was Charles DeGaulle who was reputed to have listened to a discussion of the loss to France of a secure source of fossil fuels with the loss of Algeria. He is supposed to have made the prophetic statement, "No coal, no gas, no oil, no choice." And that was the beginning of the commitment of the French government. Japan and Korea are in exactly the same situation.

_: These may be sensible choices on their part. But there are aspects of their programs which are really not related to economic thinking, but rather to a sort of policy by fiat.

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_: The proposals we've been talking about for the transition to a competitive industry typically have various ways of separating generation assets -- sell, spin off, or lease -- and in each case there are two possibilities for decommissioning responsibilities, which could either go with the plant to the new entity or remain with the existing entity. If the eventual answer is that none of these six possible approaches is feasible, then existing utilities who own a significant number of nuclear facilitiesmight be facing serious problems in a restructured market.
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_: But some of those options are definitely possible. There is no transcendent instutional restraint on the ability to spin off or otherwise divest assets, including nuclear plants, from the existing utility. On the other hand, whether or not those options form an attractive possibility is an entirely different question.

: None of the six scenarios would work well for existing nuclear plants unless you make the decision that there are certain values worth paying more than market price for. In that case you want to choose the values that are worth the most to the overall market, not just to the nuclear industry.

_: I thought we were saying that the NRC could look to an entity's non-nuclear generating assets in satisfaction of the obligations of the license holder with respect to nuclear assets.

_: The agency looks for evidence that the operator of a nuclear facility is financially qualified to continue that operation, and that the decommissioning assurance that they have today continues to be provided by the facility's owner. I don't know of any direct example where they have established that assurance based on a non-nuclear hook, but that's not to say that they *can't* do it that way.

_: You can divide the exposure into that which is, practically speaking, already incurred, which is the bulk of it, and that which is going forward. I don't know if there will be a concept of supplier of last resort from a social perspective. If there is, might they not inherit the risk of a shortfall with respect to that portion of the cost that is essentially a sunk cost?

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: We have been assuming during this discussion that there aren't going to be any more serious nuclear incidents in the next five to seven years. A lot of nuclear plants in the world are operated much less safely than they are in the United States. Compare the scale of what happened at, say, Three Mile Island with what happened at Chernobyl. The Three Mile Island incident put the whole nuclear industry in this country in a tailspin. There are incidents every day in the gas industry which are far more serious than Three Mile Island, but because of public perception, I think the nuclear industry faces a very real risk -- all it takes is one more serious accident somewhere in the world to have a ripple effect on the industry here. I think you have to look at that scenario when you think about what your options are.
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Second Day: Panel III. Competition in Retail Services: A Business Opportunity and A Regulatory Challenge

At the October plenary session, we began a discussion of the impact of competition on the retail distribution business. We heard the case for great opportunities to develop new businesses with new products and services in the retail electric sector. This vision has important implications for the organization of utilities in the restructured electricity market, and raises a variety of questions about the proper role and special problems of regulating partly competitive and partly traditional utility activities. Regulators may be more familiar with the pitfalls, having seen similar issues in telecommunications. This session continues the discussion, both to expand the vision and be more attentive to the limitations that regulation may inevitably produce.

First Speaker:

As far as the end user is concerned, the merchant function simply means retailing. It's probably not a very well-understood function; and the reason for that, as well as the reason why utilities are not particularly good retailers, is because it's never been necessary. The utilities have never been faced with the need to really understand their merchant function. That was true in telecommunications a dozen or so years ago. It took rather a long time for some segments of that industry to become better retailers. We need to learn from this experience to be more sensitive to the customer side of the equation.

When we started the debate over retailing, people immediately started to imagine this world of energy services. Things above and beyond just kilowatt hours. The notion of retailing includes packaging some of these products and services together, but they are packaged IT oman unbundled environment, and rebundled specifically for the customer.

Demand side management is another buzzword that is coming up all the time these days -- as a way of managing problems of energy efficiency. Every astute marketer in the future will appreciate the notion that customers must be instructed on how to use the product appropriately. That is a core business value, and no market share will be successful if they don't have those skills. That goes hand in hand with efficiency issues, as we're seeing in the battle of the long-distance carriers. The three characteristics of the telecommunications industry these days are pricing, billing, and promotion.

As far as the environment is concerned, we would like to see a paradigm shift from *not* using electricity as an environmental strategy to *using* electricity as an environmental strategy. This could be managed through applications using electrotechnology to solve air and water quality problems, waste management and so on. The future of electric transportation is also very important for us, which opens up an array of related services like parking and distribution services. Various service levels are another possibility, for instance, offering different outage response intervals or power quality. And there is clearly a multitude of opportunities in the area of communications.

With all these opportunities, of course, come a multitude of questions dealing with the type of regulatory structure in which to realize these opportunities. There are two broad

categories into which these retail approaches can be grouped. One has to do with the actual sale of kilowatt hours. The other encompasses all these other services I've alluded to. Currently, this second category might make up only 2 or 3% of a company's revenues. If you compare this with the telecommunications industry -- custom calling features and caller ill and voice mail and things like that make up more like 10 percent of their revenues, maybe more. So clearly the core business, which in our case is the sale of electricity, will remain highly important even as these extra services grow.

Our market models tend to see a kind of two-way division in the industry, between generation and everything else. Actually, there's a three-way split, between generation, wires and transformers, and the merchant or retailing function. As far as regulation is concerned, we need to determine how we separate these functions while maintaining a level playing field with respect to the customers, so that they are presented with an understandable industry and equal opportunities. The merchant function is important, even though it's not greatly affected by the kinds of market mechanisms that we discussed yesterday. After all, to revive an earlier analogy, most investors don't own seats on the New York Stock Exchange. The pool itself is not a merchant; rather, the merchant function is the interface between the customer and the service.

Second Speaker:

The whole idea of retail service opportunities in the electricity industry is premised on the notion that there will be a regulated bundled customer service which we might call the regulated merchant service. That service will have three broad aims. First, to keep the majority of customers, who are too indifferent to shop around, from switching to some other provider. Second, to protect the sort of middle market of commercial folks. And third, to bundle in a bunch of new services to make a competitive offering and to keep the customers in that middle market trom going to unregulated merchant providers.

We need to ask the question: is a regulated merchant service in competition with unregulated players stable, sustainable, and desirable? I think not, at least in the current context of price and planning regulation. We can choose between an all-unregulated merchant function, or some sort of dramatic change in the structure of price, planning, and risk mitigation. The obvious choice is to deregulate the merchant function; after all, we're trying to introduce competition, aren't we? Thinking about problems in the totally unregulated market raises two basic hypotheses. One is that in a totally unregulated industry, most customers won't be inclinedto shop around and switch companies, so that the monopolist can still control a disproportionate share of the market. The second and more likely situation is that we don't trust a totally unregulated market to handle reliability issues well, and so we'd like to maintain some regulatory involvement. It's like the budget meeting that approved each line item but voted down the total. We like a lot of things about what competition might and could do for us, but we are reluctant to vote for the totally unregulated market, mostly for reliabilityreasons. This is a topic that needs to be addressed. It's the reason why a lot of people want a regulated merchant function.

Unfortunately, it's not a sustainable reason. The merchant business exists in the competitive power market. It's a trading business. And the way you manage your trading business has little to do with the traditional ways that we think about resource planning. We can't keep regulating a section of the business the old way while other people are competing in the new way. So we can't keep regulating a part of the market just because we want to ensure reliability or continue to plan. Imagine the fair trade wars that would ensue if we instituted cost-based regulation of a function that is in competition with the marketplace. If we want a regulated merchant monopoly, we're going to have to find new planning methods and new methods of price regulation, or it just won't be sustainable. It's probably going to be too complicated in the long run to have a regulated merchant function. We will be better off simply finding the least intrusive way to deal directly with reliability concerns in an unregulated industry.

There's one more area of potential opportunity in the area of distribution. The distribution company fulfills the function of vertical integration in many industries. But often no one really knows whether these functions of the business are being effectively managed or not. I think there are a certain number of opportunities for creating and streamlining services in this area which provide an incentive to take a good hard look at the possibilities.

Third Speaker:

Some of the developments in the telecommunications world give us a reason to be optimistic about diversification efforts. But there are also some examples to inspire caution, like some of NYNEX' s overzealous marketing practices after the divestiture. Today's challenge is that as the industry inevitably moves toward competition, utilities will have to be successful in these new ventures into the marketplace, and regulators will have to find ftameworks that protect ratepayers against what we know are some of the past abuses.

A very simple point, but one which utilities and regulators seem not to have totally internalized yet, is that we may be able to slow down the transition to competition, but we will not be able to avoid it. In telecommunications, the relentless demands of large customers for more choice, different services, and lower prices have driven competition into the market. The same thing is beginning to happen in electricity, where recently a large utility got into some trouble with some fairly significant increases in its fuel adjustment clause due to a variety of circumstances. In the past, the commission would have gotten a lot of calls saying, reduce their rates immediately. Now the calls are more like, can't we have choice in this? Can't we go to another provider for these services?

Competition in telecommunications has driven efficiencies and cost-cuttings that we could not have imagined could ever occur in the business. This creates tensions between unions and company management. And it raises concerns about service quality. If downsizing isn't done properly, it's going to end up in the laps of regulators as poorer servIce.

We have to recognize that competition changes a utility's approach to investment. The cost-benefit analysis that utilities use is

much more stringent. We could end up looking at pockets of declining service quality and poorer infrastructure in high-cost areas like the inner cities and very rural areas. We need to put into place mechanisms to ensure that those investments are made, including some incentive mechanisms.

Finally, in terms of utilities going into a retail or merchant function, regulators need to do a lot of hard work to ensure that we start out with a level playing field. Instant deregulation will not yield competition -- it will yield unregulated monopolies. So the regulator has to be on close watch in terms of the unbundling and interconnection arrangements that have to be made to ensure genuine competition. The universal service issue is going to have to be addressed. We need to identify the areas where subsidies are needed to allow competition to go forward while protecting the basic rate.

Here's an example of how one telephone company tried to deal with all these transition issues, in order to get into the vanguard of competition to try to shape it to their best advantage: They figured out a plan that would get them more regulatory flexibility and at the same time achieve certain social objectives that the commission had. Basically, the original company restructured itself into an unregulated retail company and a regulated network company, which is a carrier of last resort. There's a price cap for the regulated entity, so its profits are unlimited on both sides, retail and wholesale. In return, the company granted the regulators a seven-year rate freeze, full unbundling and interconnection of this local network. They've committed to implement the commission's Lifeline program, which is a reduced rate for income-eligible customers. And they've also committed to come forward with a plan to put technology into schools and hospitals in the service area. The universal service part of the equation is based on the idea that through efficiencies, the company will actually come out on top even with a rate freeze of seven years. The commission allowed them to form a holding company as long as they broke the network company into two parts: a wholesale company to house the wires and switches and a retail company to market bundled services in a deregulated way. In the course of negotiations to fully unbundle its network, the company entered into an inter-carrier compensation agreement with another telecommunications company, and within a month, two other providers had arrived on the scene, and the market is developing vigorously. The retail company that resulted ftom the restructuring may bundle any services and obtain them from the wholesale company with which it was once affiliated, but it must obtain them on the same terms and conditions as other competitors in the marketplace. Finally, the company agreed to put a cap on dividends, such that the subsidiaries could not pay their dividends to the holding company if service fell below a certain level.

The key to the success of this program was in making the wholesale company operate as an independent entity. I think this gives us a framework for looking at restructuring the industry as we move toward a more competitive environment.

Fourth Speaker:

The biggest weakness I see in the process of reassessing the distribution ftanchise is that regulators are always looking at what utilities have done, and not what they

haven't done but ought to do. There should be some creative tension between evaluating what utilities are doing and what they should have done. I don't think regulators have even begun to ask those questions. Regulators don't tend to articulate a vision and then evaluate utilities in terms of whether they are getting to that vision or not, and that's unfortunate. The only issue with respect to which that did happen was demand-side management.

The last speaker did an excellent job of capturing the deregulation of telecommunications; telephones, electricity, and natural gas all share a similar experience in the area of capacity utilization, the antitrust competitition issues, and the reliability and quality of service issues. There are almost no limits to the creative economies that could be made in the utilization of capacity. What about making use of the fiber optics networks belonging to the telecommunications industry? This is where the utilities ought to come to the regulators and let them know that they have excess capacity, and maybe even suggest creative uses for it, creative ways to optimize the use of capacity. It is easy to get seduced by the potential for competition and forget the question of just how real the competition is.

The diversification we're suggesting here is not the sort that raises concerns about sapping the financial strength of a utility. It's essentiallydone by unbundling existing assets. And we can do traditional cost-based regulation, or otherwise some sort of price caps in order to level the playing field, as was done in the telecom industry where AT&T still has the lion's share of the market even though it has dropped market share. What the PUCs are going to have to do in essence is become a forum for antitrust issues. We don't want to rely on antitrust litigation to police these markets as they evolve, because if anything will force out new competitors, it's the expense oflitigating an antitrust case. So you have new issues. Who has the right of access to the utility database, which is an enormous economic asset? How much of that information is confidential and how much proprietary? How much of it was acquired because the public bestowed on them a monopoly ftanchise which gave them access to information that they wouldn't otherwise have had? There are all sorts of concerns in this area. What about maintaining equal service to all areas? Regulators should be aware of the potential for redlining problems in this area. Certain services will no longer be available for free. How do you maintain some level of simplicity and comprehensibility to residential customers who don't want to spend hours trying to figure out their electric bills, while providing adequate information to more sophisticated customers who want to know exactly what they're paying for?

Clearly there are going to be some economies of scale, perhaps horizontal arrangements or combined services or other arrangements. In any event, those kinds of issues are going to take on a different dimension as we look at less bundling of retail services.

Discussion:

_: You seemed to say that the relative value of unbundled services or of the non-core services is not all that great. Would that also be true if you looked at this exclusively in terms of the distribution franchise as opposed to the vertically integrated utility?

_:When you talk about the scale difference between the two, vertical services represent a fairly significant source of revenue even though it may only represent ten percent of actual business, because it's very fast-growing and, generally speaking, has high profit margins. But it's a dangerous strategy to take your eye off the core business and focus on these fiinge businesses whether you're looking at a disco franchise or a vertical utility.

_: It's not that the opportunities are unimportant or shouldn't be pursued. From a policy perspective, at the moment the most important regulatory issue to get right is the merchant function.

_: Would you entertain the proposition that there's now a fundamental tension between the retail function of a company and the balance of what these integrated companies are now doing? You mentioned the planning horizons that generation builders have versus the needs of folks in the retail side of things. I wonder if we're seeing a tension being built within companies that is going to be relieved only by some sort of disaggregation of those two functions. Can you see those two still integrated and have your marketing programs go where you think they need to go?

_: The tension is clearly there -- a tension that comes with this transition, that I well remember a decade ago ITom the telecom transition. We were working on a centrex system at a very large state university, and we were struggling with pricing. Someone made the comment, "It doesn't matter whether we win this or not. We're guaranteed a rate of return and it's based on our investment in this." The tension begins to diminish as you get closer to understanding that and learning what the competitive arena is really like. Sometimes you have to lose to learn.

_: But what if it's not in your retail division's interest that your parent build generation as opposed to buying or recovering all its sunk costs or allowing you to provide a competitive price?

: True. Corporate decisions have to strike a balance there.

_: I wouldn't say that there's any long-term conflict. I think it's a transition conflict that relates back to transition costs. If you get yourself past that issue, the people in generation will build plants or not build them, depending on whether or not they can make money with them. Either the generation company or the retail company will be in this risk management business to see if they can get above a commodity price by collectively packaging and managing risk. I don't see a necessary conflict between those functions.

_: One of the painful lessons learned from the telecom industry was that it's important not to insist that there is a correct answer to the problem. Because what you end up with are battles of regulatory fictions where none of the fictions are based on economic reality. You could never get the commission to agree what it was trying to achieve. So when the munis

were competing in the sale of electric power to industrials, since the commission never knew quite what it wanted, it couldn't enunciate very clearly standards of efficiency and so on, and it always retreated back into silly arguments over cost allocations. Unless the regulators can be fairly explicit about saying, this is where the public interest lies, you're facing what somebody just referred to as fair trade wars and so forth. Level playing fields are a mythology anyway. Competition is a form of guerrilla warfare where you take advantage of every niche you can find. Regulators have to realize they do create some of them and they have to defend those they create.

_: I agree. The telecom company I was talking about earlier made a certain proposal concerning fairness of rates. Their competitors wanted the commission to do extensive cost studies, but we refused. We said, we're going to try this for a year and see how it works. If you're not careful, you can get dragged under in the trade wars and never see the marketplace take hold.

: What will the merchant function look like in two or three years? Because on Wall Street, investors see unregulated businesses attracting a much higher rate of return. Now the entities that are still being regulated are complaining to the commissions that they can't compete any more on the financial markets. This is a critical question.

_: It depends on how you do the math. It seems that the classical business model of a manufacturer in a distribution channel to a retail outlet is closest to the merchant function we're talking about, because there are a variety of functions that can be performed in that retail store. That's where the rebundling, pricing and promotion of that rebundled package takes place.

_: The precise definition hinges on the market structure that evolves. In a pool type of structure, the merchant function is the person who is packaging contracts for retail customers. That business is already evolving because in some parts of the country we have what is practically speaking the equivalent of a Pooleo market. In a bilateral world, the merchant function is a little more complicated because someone has to worry about how they can assure themselves of market liquidity. But I think that the essential elements of the merchant function are hard to conceive of as being a regulated function if unregulated competitors are simultaneously providing the same services.

_: One point on which the bilateral and Pooleo models agree is that the operation of the pool has to be handled by a dispassionate, disinterested entity. That being the case, and if we had the same level of composition at the retail level, do we need a pool operator at the retail level to make sure that unfair advantages aren't given to the commodities merchants that are affiliated as opposed to those that are unaffiliated?

_: I don't see why the independent operator couldn't make sure of that.

: I don't think the opportunities to discriminate are anywhere near so large at that level as they are at the transmission and the dispatch levels.

: We start out with an interest in improved efficiency and better operation of the system, which we conclude is better served through a competitive market. Then we start talking

about competitive markets and we start creating new entrants in the markets who become new stakeholders. Then when they arrive, the conversation shifts to fairness for the new stakeholders. And we start losing sight of the first goal, which was to create economic efficiency. This is the antitrust distinction between protecting competition and protecting competitors. It's easy to create a lot of competitors. But is that really the solution?

The clearest example is this problem of spinning off the existing retail company after having absorbed all of its stranded assets. That's an easy one to approve of It's better than spending new money to create new fixed costs in order to avoid the old fixed costs that are already sunk. Protecting the competitors would mean decreasing the efficiency in competition. A murkier example is the one of the accumulated experience base, the idea that people in the existing utilities are good at what they do, and if we spin them off into a new, unregulated retail company, they're going to clean up because they have so much experience. You do want to give everyone access to the accumulated database, but you have to draw the line somewhere. The problem is that politics may drive us to create a lot of competitors and break up that experience base. But it may be possible to draw the line to protect competition and efficiency without protecting competitors.

_: To return to the telecom analogy, in 1989 the commission announced pro-competitive policies and aggressively pushed the companies to unbundle their networks and to interconnect. But in most areas, there's still a virtual monopoly on the local markets. There have been some major inroads into private line services, and some minimal inroads into competitive access providers. The point is that it takes a lot of regulatory energy just to open up the market, long before you get into whether you're protecting competitors.

I think it's not just economic efficiency that's driving the transition in the electricity industry. There's a lot of customer demand for choice, to the point where people are willingto acknowledge that there may be some loss of efficiency, but that choice has to be protected. So regulatory thinking is moving toward what you might call protecting the competitive environment. But the lines aren't drawn yet.

_: There's a key distinction in electricity; you don't need your own network to compete. So it's easier to encourage new competition without a big outlay of capital.

: I think the idea of the accumulated experience base as a competitive advantage is grossly overrated. Too much experience in the old regulated industry may in fact be a disadvantage.

_: It sounds to me like what we're really doing is struggling to find ways to let the big players get into new marketing opportunities, and I'm afraid they'll just blow everyone else out of the water. Today's problem is that our past efforts to focus on economic efficiency have failed miserably. We need to clarifYour focus. Are we going to try to get more competitors or are we going to try to get competition? We've tried in the past by having a lot ofIPPs out there, but we haven't succeeded. I think that now we're risking the large industrials digging in their heels until there is customer choice, and then not caring what goes on. It seems to me we have the cart before the horse in letting these sorts of cash

cows move into new lines of business without giving customers any choice. There's never going to be competition until customers have choice.

_: But once you've given them choice, to the extent that there remains a monopoly, how do you force that monopoly to get more efficient?

_: Don't forget that expanding products and services in a heterogeneous world *is* increasing economic efficiency.

_: We've seen a list of a lot of potential new services and products that could be introduced in a competitive market. How many of those are going to be available to commercial and residential customers instead of just industrial customers. And how many of those residential and commercial customers are going to want to sift through the array of services to make a decision?

: That's a function of the skill of the marketers. MCI is a good telecom comparison. They started out targeting the business market, but later on the sophistication of their billing system allowed them to create services that took a pretty big bite out of the mass market.

_: Pricing is a big issue for the residential consumer as well. Pricing and packaging will sell this as a commodity.

: What if the residential and small commercial markets just aren't attractive to new competitors? They'll resist trying to break into those markets unless there's something in it for them.

_: It seems that ratepayers are concerned mostly about whether or not they're going to be paying for or assuming the risk of loss for items that ratepayers don't need or want or items which are unrelated to the need for electricity. How can regulators be assured that these concerns are going to be balanced with the needs of companies to deploy resources and earnings as they see fit? Especially in terms of providing basic services to low-income ratepayers and so on.

: That sort of assurance could be established as part of the approval when you allow a competitor into the market in the first place.

_: In theory, the independent operator of the pool should be able to moderate that as well. But what if for some reason the costs of providing services to everyone are large enough to threaten the solvency of a small company? What's the regulator's job then?

_: Presumably, the regulators can deal with that on a case-by-case basis as well.

_: It's pretty clear that it's competition that needs to be protected and not competitors *per se*. We need to make those concepts a bit less abstract. Commissions are trying to break the connection between bottleneck monopolies and ownership of some of the competitive entities. But they run into problems like cross-subsidization and the restructuring of rate plans so that utilities may end up owning the plants of potential competitors before competition opens up. In those situations, you may find the commissions driven into competitor protection.

_: I think we're talking around and around the same question without getting anywhere and I'd like to try to jump out of it if possible. Why do we care whether a utility company would contract out for some sort of service or

not? Why do we want to undertake the impossible task of forcing a utility company to become more efficient? That's like the owner of an insurance company trying to force his insurance salespeople to sell more policies by asking what time they got up, what suit they wore, what kind of car they drove and so on. Those are the infinite details that could dump us into a terrible vortex of regulatory administration. It's just too easy and too unproductive to get hung up thinking about these things. Why don't we firmly establish where we want to end up and start looking at outcomes instead? Establish outcome requirements and incentives to meet them. And let the people on the ground come up with the individual, specific solutions. Why get into all this micro management?

_: Actually I was just suggesting that regulators ought to try to come up with incentives for utilities to be more efficient.

_: That's why we have performance-based rates.

_: The problem with looking at outcomes is that an outcome may be a bankruptcy or other public service disaster. There's a good argument for trying to guard against the utilities getting into ventures that sacrifice their financial integrity and put ratepayers in jeopardy.

_: One of the enormous conflicts in the utility business is, are you representing the owner or the customer? If you've established target outcomes, you don't have to deal with that problem.

_: What if a utility proposes to branch out into, say, appliance repair and supply? Do you force them to spin off an appliance repair company so that the consumer sees it as a fair competitive business?

_: I wouldn't do it at all if I were the utility; I'd get beat out by Sears Roebuck and all the other suppliers that have years of experience and a good reputation.

_: The issue of protecting competition hinges on the notion that you do want to spin off the provision of merchant services at the distribution level into unregulated activities. The problem is that in the process of spinning them off you often get people concerned that they're going to be subsidizing that process or something like that. And those fears are not groundless. Sometimes such cross-subsidization is the problem; sometimes it's the solution.

_: There are two ways that you can compete in the provision of merchant service. You can reduce the cost of the product to win market share; or you can provide more value in the product being sold, coming up with something that better fits the needs of the customers. The first method is easier. The second one is basically creativity, and it relies heavily on information as the key to improving value to the consumer. That's where the regulated entity has an enormous advantage over its competitors unless the utility database is somehow made public. Otherwise you just have to keep the downstream merchant function separate from the regulated entity. That kind of information flow was a real issue in the gas industry early on in the restructuring.

The issue is, can regulators ever specify accurately enough all the things that have to be made available to third party competitors? Unless you break the monopoly

on information flow, you'll never establish a downstream merchant function.

_: Is it even possible to spin off the merchant function of a regulated entity into the unregulated market without creating an unfairly advantaged player? How can you be sure of the separation between the two?

_: There's a sense in which the job of the regulator has long been to speak for those dispersed interests which are less capable of handling themselves. The electricity industry is a regressive industry, in the sense that it takes a larger proportion of the income of those at the bottom of the economic ladder than of those at the top. That's where regulators come in.

As an economist, I am interested in the arguments for economic efficiency, but as a citizen, I have a very different sort of interest in the means of production. Someone has to make the decisions about whether or not to constrain the means of production to satisfy the values of the public. I like the idea of regulators who assign a high value to efficiency because it's fairly objective. In some sense it's reviewable. The real potential for disaster in the system is if we spend seven years arguing a trivial point, caught up in this "dismal vortex" that someone mentioned. The most important sort of efficiency is efficiency of decisionmaking. If we were to review the referee's decisions in football the way we review decisions here, the games would last three months.

: I think it's easy to overestimate the potential for retail competition for the small consumer. There's too much potential for the transaction costs to overwhelm the potential savings where small customers are concerned. And there needs to be some equitable flowthrough of the otherwise undivided benefits that come to the industry ITom the introduction of competition. Small customers are going to be on the defensive rather than the offensive side of these changes.

Handouts for January 26-27, 1995 Sixth Plenary Session of the Harvard Electricity Policy Group:

. Alexander, Owens. Untitled draft presentation. January 27, 1995.

. Arkin, Zander. *Benefits of Competition.* Discussion Draft, January 8, 1995.

. Arnold, Robert? *Restructured Regional Power Market.* GPUSC Working Draft and presentation slides, January 1995.

. Budhraja, Vikram. *Competitive Electricity Market with POOLCO.* Draft presentation, January 26, 1995.

. Chandley, John, and the California Energy Commission. *Descriptions of Competitive Market Models.* Working draft, January 4, 1995.

. Dellsy, Harlan. *Nuclear Competition.* Draft, January 26-27, 1995.

. East Asia Electricity Restructuring Forum. *Northeast Asia Planning Meeting Summary.* January 23, 1995.

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. Selin, Ivan. *Remarks.* January 26, 1995.

. Stalon, Charles. *Regulating in Pursuit of Efficient and Just Prices.* Draft, February, 1995.

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. Wall, Carter. *Pooleo: Design for a Competitive Bulk Power Market.* Edison Times, December 1994.