

HARVARD UNIVERSITY
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Harvard Electricity Policy Group



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**THE HARVARD ELECTRICITY POLICY GROUP
EIGHTH PLENARY SESSION**

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MEETING SUMMARY

First Session: Regulating for Reliability and the Obligation to Serve

This session expanded on the previous discussion of reliability in a restructured world raised at the September seminar. There is widespread agreement that reliability will be upheld in a restructured electricity industry. What is less certain is how a minimum level of essential reliability will be maintained and who will provide it. What is the proper balance of public oversight and market mechanisms? Alternative approaches may develop in a competitive market to provide and preserve incentives for investment in generation capacity, transmission networks, and demand options. What mechanisms can be designed to provide maximum customer choice and minimum regulatory supervision? How can the many dimensions of reliability be defined and priced? These industry changes will give rise to new operational issues of providing system reliability. What will these be and how will transition in the industry affect or be affected by these problems?

Moderator:

The important point to remember about reliability is that it will be maintained, because the customers will require it. We had a lengthy discussion on this topic on September 27th. It is merely a question of how we will maintain it, and how we can do so within a more market-like industry structure. We looked at it from various industry perspectives.

In the past, the most important characteristic of reliability in the past was that utilities did not perceive themselves as competing with each other. Voluntary

coordination through the NERC was generally accepted with the details left happily out of sight. That world may finally change. The old command-and-control approach, in which decisions are made based on engineering standards on behalf of customers, and costs passed through to those customers, was accepted as long as the rules were reasonable. Everyone figured that the equity would all come out in the wash somehow. The challenge to that system today has competition replacing monopolies, and the tenets of the marketplace replacing the tenets of voluntary cooperation. People are looking at pricing and other incentives and want to take control of their own decisions. Engineering standards are

being forced to meet the requirements of the market and unbundled pricing is replacing cost recovery. There is general agreement that some components of the future system will have to be operated under some kind of monopoly or government supervision, and some can be handled with markets. We now need to consider which aspects of the system fall into each category.

In moving from a traditional command-and-control system to something with more incentives, we must have rules that are consistent with the incentives. If they're incompatible, you run the risk of people gaming the system. Prices that can be unbundled must still be consistent with the rules. Then there are other things we won't be able to unbundle, like government-mandated programs, where we can't define the property rights involved. Many of these issues were raised last time, but we didn't have time to discuss them. Our first speaker will recap some of the analytical approaches that were presented at the last session and carry forward that discussion this morning.

First Speaker:

The question I looked at in September was, "Will there be adequate incentives to invest if we rely on market-based pricing in electric generation?" I talked about work we did in Argentina, where we had succeeded in making some significant investments predicated strictly on future stock-market revenues. It's important to remember that whenever the wholesale function gets disconnected from the retail function, there are two types of risks: the risk of shortage and the risk of oversupply. No one has warned that spot market-based pricing of electricity would lead to oversupply, but I think there are places

around the world where that behavior can be observed.

I used to think that spot-market pricing of electricity generation was a hopelessly naive approach to the problem, that no one would ever finance a major generation project without some sort of long-term assurance, be it a regulatory compact or a long-term power purchase agreement or whatever. The question was never resolved during the UK restructuring process, because the plants that were built with contract distribution companies, so the spot market idea was never put to the test. Interestingly, before the launch of the spot market in the UK it was thought that there would be a rush to sign up large industrial customers who were free to shop for long-term customers. When the industrial customers saw how the spot market was evolving, most of them decided to rely on that. Those contracts that were signed by distribution companies with independent power producers turned out to be significantly higher than the spot market. Indeed, there was a flurry of investigation into whether those contracts had been prudently entered into.

Some time later, in 1992, Argentina was about to launch its own spot market system. Everyone tried to sign up various distribution companies and industrial customers to contracts, based on the same sort of conventional wisdom about plant finance that we saw in the UK. It was fairly common knowledge that although prices in 1992 were reasonably high, they were going to come down. At one point we offered a long-term contract at 3.2 cents, when the average spot market price was 3.8 cents. How can you refuse an offer like that, we asked? The Argentines said, 3.2 cents is about 85% of spot. We like that. Let's sign a contract that

says that our price will always be 85% of spot. I found myself in a room full of our people doing analysis on how we could make the numbers work at 85% of spot. Then the light bulb went on, and we realized that 100% of spot sounded a lot more attractive. That's how we got to the spot market-based system in Argentina.

In Argentina, you have a small amount of nuclear capacity which operates on a must-run basis. About 60% of the existing system is thermal, and gets dispatched in merit order. The remaining 40% is hydroelectric. They try to conserve the water in the hydro reservoir and run their hydro units at times that are highest value. Hydro doesn't bid into the system; it gets the price that is set by the highest-cost thermal generator at the time. They dispatch the system as though hydro had a marginal cost of zero, but they try and conserve it so they can run it. So, skipping some of the details here, you're looking at a price screen that may yield, say, 2.8 cents per kWh. With an efficient combustion turbine your variable costs might be around a penny or a little more.

Having done that analysis, we basically succeeded in financing our first plant, which went into construction last year and was synchronized three weeks ago. In fact, the day it was synchronized, the big line that connects Buenos Aires with the big hydro plants in the south went down, and we were suddenly getting 24 cents per kWh. We have a second plant under construction now. Interestingly, there is not a single industrial customer in Argentina that I know of that has signed a long-term contract. And other than some contracts which were established in the very, very early days of privatization, there has not been any long-term contract with a new plant

that I know of. So everybody from the demand side is quite content with the way the spot market is developing. On the other hand, although we were the first people to get into this game in Argentina, it has now become attractive. Other people have learned from our experience, and there are three or four other plants moving through the planning process right now. As those plants go forward, our returns, which originally looked quite robust, are going to be less than we anticipated. They'll still be OK. As someone observed in September, every time you get into a competitive market like this, it's astonishing what happens to prices. What looked to us like a pretty easy economic decision a year ago has become a much tighter situation, because prices are dropping while people continue to build and find creative ways of financing these new plants.

In trying to understand how all this might work in another jurisdiction, it is important to understand that Argentina has at least an idiosyncratic system in the sense that they do have this fairly steep function in the price duration curve quite early in the game. Let's compare it to the situation in Colombia. Colombia built a whole bunch of hydro plants in the 70s and 80s, so that now 78% of their system is hydro. However, they failed to take into consideration the problems hydro has, like seasonal variation in rainfall and occasional drought years. In addition, there are highly subsidized retail prices and rapidly growing demand. As a result, Colombia found itself with electricity shortages in the early 1990s. Now they're trying to implement a spot market-type system like the UK or Argentina. Because of their heavy dependence on hydroelectricity marginal costs in Colombia are zero for a significant part of the year. So they're trying to implement some kind of

rational capacity payment system to help with that problem. Mechanically, it shouldn't be all that difficult to do, as long as you know the rules. There's where the problems begin. While the regulators are trying to sort all this out, there's another impending shortage expected in '97, so the national utility is building new capacity, something like 200 MW of combustion turbines. By my calculations, the cost of those turbines will be something over 30 cents per kWh. It's not the most economically rational approach. The lesson here is, if your system is out of balance with an overabundance of cheap base load or cheap marginal cost base load, and you don't have a clear set of shortage pricing rules, you're always going to be faced with this sort of rolling emergency. The existing utilities will always want to build, and what they build won't necessarily be economic.

The U.S. situation is remarkably similar to Colombia in some ways. As one of the speakers pointed out last time, the typical market in the US has very low marginal costs for a large number of hours during the year, and it's only in the last couple of hundred hours that costs start to move up as you get into the true peak times. However the load duration curve shows that the load which goes from a minimum and rises quickly over those last hours is being served by capacity that was really built to run a lot more hours than it's actually running. This situation of high capital cost and low marginal cost is the most economically ideal. It is better to encourage people to build a system like the Japanese have, where the price duration curve more closely mirrors the load duration curve. So as load increases, prices increase. Instead, we have fairly stable prices for a great deal of the year, and then they rise only for a relatively small number of hours at the true peak

periods. People in the U.S. are doing just what the Colombian government is doing, that is, building combustion turbines to serve that relatively small number of peak hours. The implicit price of power during that period of time is fifty cents per kWh.

What we need is a set of shortage pricing rules on the system that people can look at and understand. If industrial customers really saw that their equipment price was fifty cents per kWh over 200 hours per year, a lot of them might find ways of becoming interruptible load at a lesser capital cost. Developers would do well to look for the cheapest possible types of generating equipment possible, some old used CPs with a heat rate of 14,000, to serve that limited amount of time. There are other kinds of equipment that will perform in that kind of a range. Given the correct price signals people will find ways of making investments. Supply and demand will become better balanced to handle those peaks and the price curve begins to mirror the load curve.

Isn't it the case that most of the old plants in Argentina were paid off, so they don't have the problems we have with stranded investments?

First Speaker: Yes. The way to deal with that in the U.S. is to put the threatened investments into a fixed charge on the system which everybody pays over and above the marginal costs.

—: How do you pass those costs on to large users who have alternatives and refuse to carry those costs?

First Speaker: I think that as long as the customer and the supplier are seeing the same

price signals, then there are lots of options available. Otherwise you end up having to resort to regulatory solutions to deal with something that the market could potentially handle. Of course, you also have to be able to hold your breath and watch if prices occasionally spike up to 24 cents per kWh.

_: Can you say anything about the capital structure and the required returns for these projects that are based on the spot market? Second, how important is the investors' perception that spot prices are truly market-driven, without the hand of regulation affecting the price they are going to receive?

First Speaker: You have to be a little careful because in the cases I was talking about, you have to consider Argentina's own sovereign risk in addition to spot market risk. So the return requirements would be higher than an equivalent project in the U.S. I would say these projects are expected to produce equity returns in the high teens, with a small amount of leverage built in. What debt there is is probably fairly short-term, and comes mostly from commercial institutions. As for the inviolability of the market, Menem was just reelected for another six years, and as it has been his government that has pushed this restructuring, we can be pretty sure that it will go on for another six years. The movement enjoys a great deal of popular support as well, so unless there's some future abuse that no one can anticipate today, I don't think we have any real fears that the heavy hand of regulation is going to re-enter the electricity market in Argentina.

Second Speaker:

I was originally asked to give a sort of regulator's point of view about reliability.

Like most regulators, my point of view is limited by all sorts of considerations, including the necessity of being policy-oriented rather than essentially technical. Last time I observed that reliability can be seen as a sort of iceberg issue. Everyone agrees that reliability cannot be compromised. That's the one-tenth of the iceberg that sticks up above the surface. I want to focus on what the rest of the iceberg looks like. I ask everyone to consider, what would you define as the principal dimensions of reliability that need to be identified and studied? What mechanisms should we look at to ensure that those dimensions of reliability are provided for or conscientiously left to benign neglect?

It's worth reminding ourselves that not only did reliability as we know it arise from a particular industry structure, but that there's also been a fair amount of trial and error involved over the years to produce these conditions of reliability that we take for granted now. Ultimately, this should caution us to take careful and gradual action as we move to new industry structures. As someone just said, you can provide market signals either by pricing or by outages. We all prefer to provide those signals through prices, rather than experiencing outages and the public consternation that is likely to follow. As all of the system operators I've talked to keep reminding me, the ability to trade off investments in generation and transmission is a very important component of maintaining reliable service in a service area. Obviously, a de-integration regime would threaten this capability. The existence of exclusive service franchise territories also allows the recovery of system investments that will promote longterm reliability, and encourages mutual support mechanisms among neighboring franchise holders. Such mechanisms have frequently

provided reliability in the event of major outages or threats to the system.

While reliability is not the only aspect of industry restructuring, it is true that if reliability problems arise during restructuring, the effect will be to significantly delay the entire process. To head off that possibility, I would suggest three steps: first to identify, second to analyze, and third, to invent. Reliability consists of a very complex set of processes, so identification of the crucial aspects of reliability is the vital first step.

Having identified these aspects of reliability, we must ask a critical initial question: whether or not decentralized market solutions can efficiently deliver the levels of reliability that customers want and are willing to pay for. For each aspect of reliability, can we envision a market solution that will deliver it to the public? At the same time it must be considered, with reference to some metaphors from last time, whether this particular dimension of reliability that we're focusing on is more like a lighthouse or a can of peas. The lighthouse is the classic example of a public good, in the sense that the benefits of a lighthouse cannot be denied to its beneficiaries, so that the private market will tend to underinvest in lighthouses, and some public intervention strategy is necessary. On the other hand, simple market forces can be relied upon to ensure a sufficient supply of cans of peas on grocery shelves. Voltage support, spinning reserves, field diversity, and so on, may well turn out to have the characteristics of a public good, and may have to be provided for in a public manner.

For each relevant dimension of reliability, we will have to consider the most

locations for addressing particular concerns. If a market seems appropriate, who is going to set the rules? In the absence of market solutions, where is the locus of authority? There are a lot of ways to look at the body of the iceberg. For instance, voltage management, automatic generation control and other near-instantaneous aspects of system management are mainly public goods. Unlike commodity markets in the electric control area, all producers and users are inextricably connected. Each significant operating event affects all participants instantaneously without their consent and without the opportunity for market responses.

Moving on to slightly more long-term aspects of the system, load following and spinning reserve exhibit characteristics of both lighthouses and cans of peas, that is, of both private and public goods. Certainly it's hard to exclude any member of a given power pool from these services. However, one could construct rules that would keep contracting customers off-line until their supplier was up and running, and would interrupt the customer if their supplier went off-line for any reason. There is a potential can of peas here as well. Even transmission investments have certain public-good characteristics. Changes in transfer capability at a constrained interface can affect the value of generation assets throughout an entire region. Finally, the longest-term issues like fuel diversity and new technology may appear lighthouse-like. The long-term energy security and environmental health of the nation are surely public goods of a sort. It may be that some sort of diversity promoting intervention will be necessary to ensure such issues are well-represented. I could cite hundreds of other examples, but these should give a general picture of the kinds of considerations we're facing.

Step three in our overall process is the process of invention, of market-making and institution-building. Reliability benefits should be delivered efficiently, fairly and with a minimum of institutional friction. A few decision rules can serve to guide our analysis. First, we are agreed that there should be no significant degradation of reliability. We may have to require that a certain basic level of reliability be purchased, like a certain basic level of automobile insurance, by all participants in a control area. Second, we should always begin by trying to find market-based mechanisms that involve maximum customer choice and minimum regulatory supervision. Can our lighthouses be managed with a minimum of regulatory intervention? Third, in general, customers should have choices and should be required to live with the consequences of those choices. Of course, great caution must be exercised, because such an approach may prove to be politically untenable. It's similar to the motorcycle helmet problem. We can't force people to wear helmets, but we aren't going to leave them lying in the highway if they get into an accident.

The message we just heard from the first speaker was, "Let prices work." We can substantially improve reliability by having better pricing rules. Shortage pricing rules will deliver enormous benefits in terms of overall system operating characteristics and in load factors, and further will end up having positive effects on reliability, provided that the margins are not too thin. Finally, simplicity has merit too. We needn't automatically jump to the most desegregated, most complicated pricing formulas that the mind of man can dream up. It has been made clear by the experience of competition in telecommunications that competition will not be achieved without

leaving an enforceable obligation to serve somewhere in the system. This should be frankly recognized by all participants, who are then going to have to figure out a way to pay for it. We need to address the problem of market power, without making it worse by the way in which we address reliability concerns, and to resolve the need for a truly independent system operator.

Third Speaker:

The issues NERC faces on the operations side are very different from discussions on the engineering and planning side. Installed capacity reserves and the like are issues that everyone agrees can be addressed by market conditions. On the other hand, when you're operating an interconnection, the things the operators have been doing for years and pretty much take for granted suddenly need to be defined, either contractually or otherwise. The NERC operating committee is currently trying to define some basic commodities and standards to handle this issue.

I assume that everyone here knows the basics about NERC, that it tries to separate economic and equity issues from reliability issues in its dealings. The other thing to remember is that NERC is a voluntary organization: there are no penalties to speak of for noncompliance with its requirements. For years the NERC had guidelines and recommendations that covered only certain parts of the reliability issue -- sort of like a recipe for spaghetti sauce, where no one bothers to mention tomatoes because they're just taken for granted. One of the things that NERC is discussing right now is all those issues that were just taken for granted, that now need to be defined and developed as the

industry changes.

The control areas of North America number about 150 or so in the current context of how we think about interconnection. They define their control issues in terms of net flow in and out and a contribution to frequency bias. Over the years the criteria for control have been defined around a ten-minute time frame, meaning that the signal has to hit the target level once every ten minutes. Further, there's a factor of load change over the year that has to integrate to below a certain level for that ten-minute period. Some of the questions that have come up include whether or not ten minutes is the right period to evaluate reliability -- should it be higher, or lower? If one entity in the interconnection is not performing up to standard, the reliability of the interconnection is not affected, but clearly if all the entities don't perform then the reliability of the interconnection would be affected. Where do we draw the line, and what are the equity issues connected with making such a rule? If people are going to be buying and selling these commodities for control, they need to be clearly defined. The idea is to take these sorts of effective standards and turn them into quantifiable rules, using contractual language. I could give you a hundred examples of these sorts of standards that have been left up to the operator's judgement in the past, that are going to have to be transformed somehow into measurable standards. Some of them are more rigorous engineering-type standards, while others will have to be defined based on the experience of operators and so on. It needs to be done, and soon.

Third Speaker:

We're planning an experiment in the

New York Power Pool that would provide some direct access to customers within our franchise territory, while we operate our franchise system underneath the New York power pool. As we'll maintain the full relationship with the pool during this experiment, the issue of reliability, service, and ancillary services has a different meaning for us than if we were to do this on a statewide level -- which is our ultimate hope. It's worth noting, by the way, that the New York pool has never been in compliance with the NERC standards that were just mentioned. Instead, we have a penalty system of sorts used to measure performance. If you're better than the average you get paid, and if you're worse than the average you have to pay a penalty. Each one of our NUG contracts has a minimum standard of providing 5% reactive power. For installed reserve, you don't really need a capacity auction because supply and demand will provide balance based on the bid market. However, as members of the New York Power Pool, we have the obligation to provide 18% installed reserve. We plan to go out for a seasonal auction to acquire the 18%, but we still need to come up with a way of measuring it after the fact, to make sure that we continue to meet the pool obligations. Balancing services will be handled through bilateral contracts and spinning reserve will be put out to bid and we'll just pay the clearing price.

_: Considering how much we're going to have to rely on market forces for reliability, some of the discussions have been pretty theoretical. I'm wondering what the entry barriers to the generation market are in Argentina and how that might relate to the U.S. How might we have to revise our own

siting requirements?

In Argentina, a builder needs an environmental permit and a system operator permit where the plant and its capabilities are described, and do some transmission studies to show that the system can accommodate a plant at that point. Of course, the system isn't congested yet.

_: As for the U. S., the problem applies equally to generation and transmission. The state-level statutes we have now that require us to find some sort of need will probably have to be changed. If an investment were needed in order to provide reliability in the host states then it would probably satisfy the current statutes, but if the facility is needed to provide a benefit that will be felt elsewhere, then it would be harder to satisfy the need criterion. The environmental hurdles would be the same for all participants. The tricky one is establishing need in a market environment. Presumably, if people are willing to invest in a plant, then that's pretty basic evidence that it's needed somewhere. What will that do to the value of a site if it's needed in a different place from where it's being built?

_: It strikes me that the effort to divide the components of reliability into peas and lighthouses is a bit too extreme, and that you almost need a third category, say, the supermarket parking lot or something, where there area lot of free riders, but which nonetheless shows up ultimately in the price of peas. A lot of the characteristics of reliability that we've been talking about this morning are like the parking lot: they belong in the pricing framework, even though they really aren't part of the cost of raising and canning peas.

_: The key to that problem is the network, which makes the electricity market work just a little differently from other markets. We've been talking about the penthouse rule, that says that you can't have a penthouse unless you build the apartment building first. For example, in a transmission network, the fact that the network exists provides a certain capability. If you install a voltage control device that tweaks a little bit of extra capability out of the network, who has rights to that capability? It's a bit like the siting problems that were just mentioned. RTGs have been suggested as a solution to the siting issue, but it doesn't seem that they could move as fast as would be necessary in a competitive market. Meanwhile, the lead times involved in siting generators and transmission lines are so different that there's the problem of getting people to commit to projects.

_: Another problem is that the new system is going to involve a lot more information, computer systems and so on, depending on how much automation we decide on. In the Northeast currently the pool control centers handle all those functions, although they don't get compensated in quite the same way as this proposed independent system operator would. Part of the experiment needs to be making sure that the people who are selling into the pools are fulfilling the standards of the pool membership.

_: We've been promoting a Poolco type model and locational pricing. We would like to see that done on a statewide basis, as the only rational way it can be done. We're proposing that by the first of next year around 130 large industrial customers access to a locational spot price in our own service

territory and we would run a bidding system in a pool model through that process. Hopefully it would eventually be a statewide model.

_: The pattern in the airline industry is exactly the same as in the gas industry, especially with the threat of re-regulation being low. As the underpinnings of our industry are pulled out, we're all looking to find out where the bedrock is and where the quicksand is as we try to build something new. Reliability is obviously one of the bedrock areas, and we need to make sure it's there for us to build on. Much of our current reliability is based on the idea of control areas. What would replace those control centers if the kind of automation we were talking about gets introduced?

There are control areas in North America right now that range from 100 MW to 50,000 MW in size -- so there's no intrinsic limitation there. In any event, reliability is based on adequacy and security. Adequacy is easy to handle, but security requires a very high-speed reaction to changing conditions in the interconnection. The problem really extends beyond the administrative boundaries we establish for our systems, because problems in one control area affect conditions in adjacent control areas. Anyone looking for bedrock in this industry over the next five to ten years had better be prepared for some basic changes in control area concepts.

_: What incentives do we provide to the independent system operator to ensure independence of the office? How can we create a tight link between the performance of the independent system operator and the exercise of all that artful judgement that we

know has to be there? I can envision situations in which the system operator is a private entity which is permitted to earn profits somehow in relation to some established criteria of performance. An analogous question is, what is the incentive for the air-traffic control system to do its job well? The other analogy is the governors of the New York Stock Exchange. They have an incentive to intervene to make sure the market works efficiently, because if it doesn't, many customers could go elsewhere. Under our model the ISO monopolist wouldn't have that incentive.

_: The idea of a provider of last resort, the recognition that there really does have to be an obligation to serve is crucial here. Does it need to apply to all classes of customers, or is it something that should be distinguished in some fashion in the future market?

_: You could establish exit rules that would allow certain customers to enter into relationships that would excuse them from participating in a supplier-of-last-resort system, but it's worth noting that in other areas of society, we find ourselves having to create backup pools even when the law requires every individual to take care of something. Everyone is required to have a certain basic level of automobile insurance, and yet they also have to contribute to a pool to pay for the people who disobey the law and don't have automobile insurance. I think this means that we can put some conditions on the supplier of last resort requirement, but that we're going to have to have some kind of pooling mechanisms to deal with the inevitable mistakes that people are going to make.

— : Are installed reserve requirements needed in a competitive generation market? Is it enough just to rely on a day-ahead spot market with an operating reserve? In this sate, our company seems to be alone in believing that an installed generation requirement is unnecessary. Installed reserves are by definition excess capacity. They depress energy prices; they make it look like stranded costs are larger than they are. We argue that the market should be allowed to do its work, while on the other side there are people who argue that without installed reserves, there won't be any operating reserve available. Will there be political and regulatory pressure to go with an installed reserve requirement? Whenever there's a bad harvest in Brazil and coffee prices spike, there's always pressure on some attorney general to take a stand, even though doing so wouldn't have much effect. Will we be seeing the same sort of political backlash if electricity prices spike suddenly?

—: We'll see reserve margins cut in half, but not eliminated. We don't have enough experience yet to eliminate them altogether. Meanwhile, we have to get customers used to the idea of price volatility before it'll be politically possible to go to a purely market-driven system with no reserve margin.

—: Customers ought to be asked what they want before we decide to get them used to something. As for installed capacity, our experience has been that when we have blackouts, legislators and commissioners are suddenly very interested in the operation of the interconnection. That kind of micromanagement will crop up again if electricity prices start to spike the way coffee prices do.

—: Practically speaking, in my region, there's already so much installed capacity that they've had to shut down one of the major units. I don't think I'll build another new power plant in my lifetime.

: This is one of the toughest questions we have: You ought to be able to operate as efficiently as you want to, but as someone noted, you can't just cut people off if they happen to be short, particularly in a low-income community or, in the extreme case, a hospital. But how do you require some retail customer to contract for more capacity than they think they need?

—: The market should be allowed to do its work, but under three preconditions. One, you have to have enough players buying in the spot market to allow pricing to work properly. Two, you need to recognize that in order to play the market, just like in a financial exchange, you may need to furnish proof that you can deliver what you promise. Three, utilities need to decide whether they're willing to restructure so radically as to provide some insulation for their operations if prices spike upward.

—: Part of the problem is tension between the peas and the lighthouses in supply and procurement. On the one hand, we all want to rearrange the structure so that customers are able to shop for what they want, but the danger is that people will game the system and contract for less than they need in the hope that they won't really be cut off. We'll need to build in an arrangement where they have to pay penalties for having undersubscribed, in order to prevent reliability problems. Longterm undersubscription of capacity is another problem altogether, and the responsible reaction, for captive customers at least, should

be some form of guarantee that there will be ample capacity regardless of the risks end users choose to take.

The incentive structures of the competitive market are already fraying the current system around the edges.

—: I am persuaded by the notion that if you have a gap between your cost duration curve and your price duration curve, that there are real reliability problems that can be solved by bringing them closer together -- even if that means allowing the price to spike to 24 cents if it has to. But if that happens in the middle of a heat wave when people are dying of heatstroke in their homes, it's not going to be politically tenable no matter how well the system works otherwise.

We have insurance mechanisms in place for floods and earthquakes and hurricanes, bank failures and uninsured motorists. Is it beyond our capability to invent the same sort of mechanism for electricity?

—: I wonder if there's a divide here between people who have regulated during periods of crisis and those who are more attracted to the elegant economics of the system. We can't underestimate the enormity of political pressure in a shortage or a price spike. The safety net of an insurance pool is vital for this group to pursue further.

—: During the gas shortages of the early '70s, some people were arguing that we should get rid of price controls because otherwise people will expect us to provide cheap gasoline all the time.

No one is saying that we won't institute price controls in a national emergency. We're

talking about a system that will work 99% of the time. In the gas industry, we were aided by price volatility at various points. Now we have a lot more volatility than we had then. Most of the residential are still being protected from that price volatility, but the industrials haven't been. Interestingly enough, they've managed to fill in the valleys much more than they've shaved the peaks. We now have the highest load factor on existing wells that we've ever had, and we're using assets better than we've ever done before. It's done in a strange sort of way: the residential price peaks in late summer, when the free market is at its lowest point, and the residential price bottoms out in midwinter, when the free market is peaking. It has to do with the way we've incorporated recovery for the fixed assets of distribution companies. In effect, we've not only protected ratepayers from the volatility of the market, but we've introduced a countervailing volatility, by accident. In electricity we can probably count on a large proportion of customers opting out of the regulatory system and choosing to live with the volatility because it will give them lower average prices overall. People will learn to live with the fluctuations.

— : NEPOOL has been struggling with this issue as well. As long as we face reliability issues, there will be some kind of capacity incentive in New England. We're focusing on four different time periods: long term (more than two years), medium term (one or two years), short term (several days), and very short term (spinning or operating reserve). NEPool has an installed type of capacity incentive, regular maintenance scheduling, and a spinning and operating reserve as part of our overall agreement. The key in this planning process is to make sure that the incentives we install don't have any gaps or overlaps.

Moderator: These points are very important. We should note in particular the ideas about lighthouses and peas and the observation that there are aspects of reliability that fall somewhere in between the two. It's a very useful exercise to try to fit aspects of the problem into this metaphor, because it forces us to answer some of the hard questions. It also gives us a chance to start getting new mechanisms in place and getting people used to a new system. If we can get the incentives right, we have a chance to get the whole system working right.

There's a final point that has been implicit in this discussion all along, which should be made explicit. When unbundling of services, is talked about, it's critical to keep in mind the difference between buying and selling services. It's easy to conceive of an independent system operator running a competitive auction to purchase spinning

reserve. It's much harder to imagine turning around and having the same thing happen on the selling side. Even within small regions, the location of spinning reserve can be very critical. It may be impossible to ^{sell} unbundle on the side things that are easy to unbundle on the purchase side. This distinction is not made often enough or forcefully enough.

I hope we can all come away from these conversations with some thoughts about what our strategy should be, the gradual strategy that doesn't require us to completely abandon all connection with the past but gets us going in the right directions in the future. To me it has to do with unbundling the things that are easy to unbundle quickly, and getting the incentives right, and then working more slowly with the other things where we're a little less sure. The question is not whether the new system will be reliable: the question is how to make it reliable.

Afternoon Session: Besides California, What's Happening In Electricity Market Reform?

Moderator:

Although the California market reforms have received the most attention in recent months, there area number of other states pursuing industry reform in various directions,

either through formal proceedings, formal collaboratives, or just sticking their toe in the water and figuring out pilot programs. We thought we'd try to focus on the non-California debate today.

Michigan: *Last June the Michigan Public Service Board gave final approval to a mandatory five-year retail wheeling experiment to be conducted by Consumers Power and Detroit Edison, commencing only when each company needs new capacity. The PSB also overruled its DSM mandate on the basis that DSM is discriminatory against non-participants because the nonparticipants do not receive the benefits of DSM programs.*

Fourth Speaker:

In California they jumped out the window, yelled "Geronimo," and everybody looked. Halfway down, they started wondering what on earth they were doing. In Michigan, things are done with far more care and deliberation. As I look at what we've been doing in the last four years, I think we have a great deal to be proud of in one sense, and a great deal to be disappointed with in another. Our approach was that we wanted a series of limited experiments in which we could find out what the results were, and back off and change directions as those results demanded. Our retail wheeling order was the first step. Unfortunately, we could lead the utilities to water, but we couldn't make them drink. So the experiment stood still, waiting for the utilities to give it a try. Their reaction was to protest strongly that they were all for competition, and then to take us to court to prove that the Commission shouldn't proceed.

Contrary to many points of view, the Commission was not out to flout FERC's authority. We should look at the economics

of the situation and ^{so} right ahead on that basis. Again, contrary to what many people thought, we preferred not to have a confrontation if we could avoid it. Our second move was to set up a system of competitive bidding for new capacity. Again, most of our companies seemed incredibly shy about this competitive bidding thing. They say it's a good idea, but we just can't get them to come to the dance. I think Detroit Edison was the only one who, as a result of a rate case, got caught up in this, and we had some hearings before us.

The next thing the Commission did was to take a good look at DSM, which, to my mind, is one of those notions that runs counter to the competitive model. We examined a DSM program that one of our utilities had, and concluded that it was costing about two thousand dollars per installed kWh, when we could probably get the same capacity installed by new suppliers for eight hundred dollars per kWh. Our staff eventually came up with a proposal called Proposal M. In it they address the new world as they see it, a world in which regulation is largely dispensed with and rates

are set by a process of price caps tied to the Consumer Price Index.

The great problem with most of these proposals at the moment is that deregulation in my mind is not synonymous with competition. Competition is to be preferred. It's awfully important to have the correct pieces in place, so that when you take away regulation, competition stands a reasonable chance of emerging and functioning. There are a series of cases in front of us filed by Consumers' Power. The cases cover depreciation, a rate case, and the MCV, in which a lot of semi-stranded assets, including Midland Nuclear Plant, were combined to form an independent power producer that made a contract with Consumers' Power. It's a very clever scheme. In any event, there are about 325 MW still sitting out there that the Commission has to deal with.

The Attorney General took a look at these proceedings, and didn't particularly like them to begin with. He liked them even less when the staff came forward suddenly with a proposed settlement. It essentially said, let's have some rate caps here, and let's have something like six hundred MW of power that would be open to some definition of open access and use. The Attorney General threw that one right back into the courts.

Massachusetts: *The Massachusetts Department of Public Utilities filed a restructuring order on August 17 of this year. The order lists seven principles for a restructured market and five principles for the transition period. The Commission formulated these guidelines for utilities to formulate restructuring proposals which are due in February, 1996.*

Fifth Speaker:

The Massachusetts Commission's order on industry restructuring addresses what

Meanwhile, Detroit Edison engineered some special contracts with the auto industry and its service area, which the Commission approved. They essentially allowed Edison to offer discount rates to its industrial customers. Unfortunately, it was either that, or they were going to leave the system. As a result, the Commission approved the contracts and issued orders making it clear that the captive market would not cover the thirty million a year in revenue reduction this would mean for Edison. The burden of proof will be very heavy on them in the future, if they want a rate increase as a result of these contracts. A similar thing has happened with Consumers' Power more recently.

My conclusion is that the Commission has pushed and shoved in every direction to try to get competition in the electricity industry in Michigan. Unfortunately, our results have been very limited, and rather disappointing. I hope, however, that we are pointed in the right direction. The problem is that both of the major corporations in Michigan have enormous stranded costs in the form of nuclear plants that will haunt them for another five or six years. If they can depreciate those down to present rates, then this problem will largely go away. I'm confident that Michigan will march continuously forward toward competition and lower rates.

I think are the three fundamental issues of questions that we face as we try to restructure the industry and move forward. First, what do we do about stranded costs? Second, how do

we establish a framework in which a fully and fairly competitive market structure for generation will develop? And third, what are the public policy or social goals we want to continue to promote or deliver through the electricity system?

Back in February of '95, the Department issued a Notice of Inquiry, which received about fifty commenters. We had held several days of hearings last Spring, and comments were extensive. Several commenters offered various sets of principles to guide restructuring. One of those sets was called the Interdependent Principles, a group that was put together by the Division of Energy Resources. They weren't endorsed, but we adopted some of our own that were very similar.

Our Order sets out a conceptual framework for a more competitive electric power industry. The goal was to develop an efficient industry structure and regulatory framework that minimized long-term cost to the customer, while maintaining safety and reliability of electric services with minimum impact on the environment. The principles are oriented toward a final result. They are not a prescription on how to get there. The first four principles focus on the structure of the industry and on establishing a competitive generation market. The next two identify public policy priorities, and the seventh addresses the nature of future regulation.

The first principle requires that customers be provided with the broadest possible range of choices. Choice is what keeps the system honest. The second principle is to provide all customers with an opportunity to share in the benefits of increased competition. This is not about choice for

some customers. It's about providing some kind of choice for all customers. The third principle is to ensure full and fair competition in generation markets. Customers aren't going to have anything to choose from unless there are a variety of competitors on the other side. A lot of attention is paid to stranded costs, because it's the first hurdle we have to cross; but the thing that is going to make this whole undertaking succeed or fail is the question of whether or not we're able to set up a system that does insure full and fair competition in generation markets. The fourth principle suggests that this be handled through the functional separation of generation, transmission, and distribution services.

The fifth principle recognizes the fact that protections for low-income customers that exist in the current framework will continue into the future. Electricity is a necessity today, and it has to be available to all customers at affordable rates. The sixth principle is to support and further the goals of environmental regulation. What we try to do in this principle is define our own role as an economic regulator in contrast with the role of the environmental regulators. We have to have new approaches in response to increased industry competition. Environmental regulators will have the lead role in setting environmental standards, but economic regulators have a particular interest in the effective environmental regulation of competition. Finally, our seventh principle is the one that says we should rely on incentive regulation where a fully competitive market cannot exist or does not yet exist.

A further five principles suggest a way of getting from here to there during the transition. First, honor existing commitments. Electric utilities must be provided with a

reasonable opportunity to recover net stranded costs. Second, unbundle rates. Customers need to know what they're paying for. The third principle was to seek near-term rate relief. In Massachusetts, electric rates, are too high. We also recognize, however, that immediate reductions of electricity are going to be difficult to achieve, particularly given our first principle about honoring existing commitments. Our fourth principle is to maintain demand-side management programs. Then the fifth principle, is to ensure that the transition is orderly, and expeditious, and minimizes customers confusion.

Our Order defines stranded costs under four criteria. Utilities should have a reasonable opportunity to recover net non-mitigatable stranded costs associated with commitments previously incurred pursuant to the legal obligation to provide service. This included, first, the amount of book costs associated with existing generation facilities; second, the amount by which the cost of existing contractual commitments for purchased power exceed the competitive market price for generation; third, liabilities for future decommissioning and waste disposal associated with nuclear power plants; and fourth, prudently incurred regulatory assets. The Order concluded that utilities should have a reasonable opportunity to recover costs, even though our legal analysis indicated that utilities didn't have a right to this recovery. This conclusion was reached for four reasons. First, an appropriate measure of stranded cost recovery will help insure the provision of reliable electric service during the transition to a fully competitive market. The second reason, is the most important: that existing commitments should be honored because the reliability of commitments in general is an essential element in any stable future industry

structure. For people to make investments in the system, they've got to have some assurance that they can rely on the commitments they make. The third point consistent with FERC's NOPR, was that consistent treatment of stranded costs among the New England states and with the FERC would provide benefits from expanded and coordinated economical electricity exchanges. The fourth reason is perhaps the most pragmatic. Failure to address the billions of dollars in stranded costs would provoke litigation by utilities and delay the benefit of the restructuring for a long time.

Departing from the Department's Order for a moment, I think it's important to look at the stranded cost recovery issue next to the two other issues. How do you set up a competitive market for the future? And what are the public policy goals you want to pursue? The only way to get around the stranded cost problem is going to be for people to negotiate something. You can negotiate on stranded costs and policy goals, but there's not a lot of negotiation that can take place on the competitive market structure. And utilities have indicated this to us, that if they know where they are going and what the rules are going to be, they may be willing to sit down and work out a deal. That goes for both issues. As we go forward, if we can address market failures up front, then maybe we don't need to have lots of special provisions tacked on. We'll see in February when the proposals come in.

_: You said unbundling is necessary so customers can know what they're buying. Are you talking about separating the cost of generation from the cost of transmission?

Speaker: We were thinking more than that. We'd like to separate generation, transmission, and distribution. But we'd also like to include some unbundling of ancillary services. There are two elements here: the first is unbundling the rates for the ordinary customer, so that power bills will be broken down into their component parts. The other is the unbundling of rates in general, so that as new providers enter the market, they know what kind of service they're buying and what they're paying for.

—: If you talk about ancillary services, there are two types of unbundling. There's the unbundling of procurement from various sources, so that the system operator can buy spinning reserve from lots of different sources. On the other side, it maybe hard to say that the customer can take care of buying its own spinning reserve, because it's not clear whether that will satisfy the real needs of the system.

Can you just tell us a little bit about the importance of getting coordination among the states? I realize that, historically, that's been very difficult.

Speaker: Certainly, a lot will be lost of the coordination we have. Our hope, as the largest state in the region, is that if we go forward it will change the entire regional market. Other states nearby are doing similar sorts of things to us.

One of your overheads referred to regional coordination on stranded cost recovery. What if you find you can't achieve that coordination? Does that impede the creation of a good market?

Speaker: One of our reasons for supporting

stranded cost recovery was that we thought it was consistent with what the FERC said. If we don't give the companies enough reason to move forward, they won't do it. They'll litigate instead. It strikes me that you can have within the six New England states some fine variation in stranded cost recovery mechanisms, as long as they are consistent and moving in the same direction, that is, toward allowing utilities a reasonable opportunity to recover their costs.

Reasonable opportunity means that the companies need to come to us with proposals that promote competition in a generation market, and as part of those proposals, we expect that there will be an element that provides them with a reasonable opportunity. I'm greatly oversimplifying it, but it seemed to us that companies were thinking about ways to have a mechanism that doesn't present customers with a bill for all costs on Day One. Rather, the companies might ask customers to pay certain costs at the outset, and be confident enough that their performance would earn them back the rest of the money, providing regulators don't step in again later and change the rules because they think the companies are making too much money.

You let a company make monopoly profits and then you let it use the difference between a competitive rate of return and this monopoly profit level to contribute toward the writing down of these stranded costs? In the end what you're saying is that the ratepayer still gets stuck with stranded costs. So why not do it up front?

Speaker: The company is not necessarily given the opportunity to earn monopoly profits. At the same time that they set this mechanism in place, one of our other

principles is saying that they have to let other people in there to compete. Our focus on performance-based regulation is that we need to care less about how much money the company is making, and care more about what it's costing customers. If the company can make money providing a low-cost, high-quality service to customers, more power to them.

_: When you define stranded costs, what do you do with assets not related to generation, such as preferred DSM recovery, taxes, those sorts of things?

Wisconsin: *The Wisconsin Public Service Commission is considering the recommendations of its restructuring advisory committee. The committee split its 21 votes between three models - flexible regulation, incremental change, and commercial restructuring. The Commission will present its final report on restructuring to the legislature by December 1 of this year.*

Sixth Speaker:

In Wisconsin, the Commission set out some objectives early on. Simply put, they were: first, give customers accurate price signals. Second, figure out a system to give them real choices. And third, make sure that you still provide participants with incentives for environmental stewardship. The fact is, however, what we're finding out in Wisconsin and, what people have been finding out all over the country, is that this really just comes down to brass-knuckle politics. In the final analysis, all the great theory in the world and all the claims are not going to overcome the politics of a given situation.

Wisconsin has a pretty good history of people working together. The two things people disagree on are the scope and the pace of what should happen. Unfortunately, the

Speaker: All those are included. They're related to generation, and it was meant to be a very broad definition.

Your principles talk about maintaining demand-side management programs. By that, do you mean to maintain them at their current levels?

Speaker: I think the point was to maintain them as utility-sponsored programs for the next few years as we move through the transition. We didn't say specifically that they must be maintained at their current levels.

ends of the spectrum are, on the one hand, larger investor-owners who say, let's do this all tomorrow, and, on the other hand, the co-ops and the municipal utilities who say this is better put off till some future date, like, say, when Hell freezes over.

The problem that regulators and policymakers fall into is this kind of everyone-will-win scenario. That just can't happen in a competitive market. There are really only two ways to protect consumers in this business. Either you go out and regulate like a mad dog, or you commit yourself, wholly, to a competitive market. If you're only going into this half-committed, you probably won't get the full benefit; nor will it last.

A Committee Report was done in Wisconsin. The goal was never consensus, because we knew consensus couldn't be

reached. but we were able to narrow it down to two proposals. The first was to do all the market reform and then, finally, confront the question of whether or not we should institute retail wheeling. The other proposal was, jump into retail wheeling at the same time as we do the market reforms. The market reforms of the pro-retail-wheeling crowd were not exactly as stringent as those of the anti-retail-wheeling crowd. So we started out with two proposals, and ended up with five.

The Commission set up its schedule as follows: In October we bring in our environmental impact statement. It's not a process I recommend to anyone, by the way; I'm not even sure that environmental impact statements are very good for answering broad policy questions. They're good for answering questions like: should we put this transmission line across this wetland, or that virgin forest? But policy questions depend on a prediction of the future, and a what different people predict depends on their point of view. So, the schedule being set up, I thought we would have some time to mull over the issues

Texas: On October 11, the Public Utility Commission of Texas completed a rulemaking proceeding in which it considered the following five topics: the status of the wholesale market today and the impediments to increased competition; comparable transmission service and other reforms that might foster competition at wholesale; comparable pricing, comparable terms and conditions; and stranded investment and the treatment of existing wholesale power and transmission contracts. In response to the rulemaking, Chairman Wood filed a comprehensive utility competition and transmission access proposal which calls for functional unbundling and allows utilities to collect stranded investment costs through a "reliability charge. "

Seventh Speaker:

At the time that I joined the Commission, El Paso and Central Southwest were considering a merger. As part of the process of that merger, the FERC encouraged

between October and the time of our decision, scheduled for December 12. Unfortunately, the report is 't off the printers yet and already the politic : - has begun. The co-ops and the municipals are threatening to go to the legislature; • d if that happens, the legislature is going t o dump this right back in the Commissio 's lap and say, this is too politically hot for us. We're in the situation where nob o dy has the votes to win in the legislature, but everyone has the political ability to as, re mutual destruction if there's a proposal pu forward that they don't like.

You listed providing incentives for environmental stewardship as one of your three big goals. Why is that relevant at all to what you're doing?

Speaker: It goes back to the fundamental question: hat is the role of the state regulator? I believe it is the economic regulation o monopoly power. But over time, it's evolved into what I would call the robust micro-manag_ement theory of regulation.

the Texas Commission to investigate the number of comparability standards that they had historically applied to open access issues involving merging companies. Eventually, that investigation led to an order from our administrative law judge that this proceeding

ought to be developed into a broad generic proceeding that investigated open access across all the ERCOT utilities in Texas. The ERCOT utilities represent about 80% of the consumers of electric power in Texas. The other 20% are served by four other utilities at the corners of Texas.

Texas has embarked on its proceedings and had started to do so about the time FERC initiatives made recommendations on electric open access. As of a week and a half ago we narrowed our focus to some pretty core issues, and functional unbundling is one of those. We defined the issues so that the staff of the Commission can draft a rule. A public hearing will be held on the rule and promulgate the rule in time for it to be effective on March the 1st. Our basic approach provides for functional unbundling of generation ancillary services, transmission and distribution. The other aspects of our rulemaking area standardized ERCOT-wide tariff for terms and conditions and an ERCOT-wide postage-stamp price for wholesale transmission across ERCOT's grid. The stranded cost issue is pretty small for the wholesale market as it is defined in this rule. The Commission chose not to move forward with any kind of generic statement on the stranded costs of contracts.

Our position is that the benefits of wholesale competition ought to go to all wholesale customers and not to just to the four percent that make up the customers of the municipalities and the co-ops. I made a proposal about a month and a half ago that we go ahead and start treating the distribution parts of the large companies as another wholesale customer and go ahead and address the broad stranded cost issues. I emphasize that it is just *my* proposal. Our legislature have

asked for a report on not only stranded cost but on the whole scope of what is involved in electric industry competition.

Let me briefly sketch out my proposal. Full transmission service comparability is really the key to making it all work. And the definition of that is that a utility should use the transmission system for its own customers in the same way that anyone else can come use the transmission system. As part of that, we'd require the unbundling of transmission from generation and distribution, and the implementation of competitive safeguards to make sure that the system actually does work. Contrary to popular belief, there is a win/win scenario here. If you start with the fact that these costs are already included in everyone's rates today, moving forward from that is not a very difficult concept.

The benefits of competition are not only fiscal, but also a little broader than that. The unbundling of costs really falls into four main parts, as I mentioned: the distribution function, the transmission or wheeling function, the ancillary services function, and the generation function. The dashed line in the generation segment is I guess the one new wrinkle that I added to the mix in my proposal. That was based upon a discussion we had at the Commission on stranded costs during a workshop of people from across the industry in Texas. At this workshop we recognized that there is a market price for each of these goods, and in most utilities in Texas, the actual price being charged is somewhat above the market price. I just decided to take that line of questioning further and say, let's separate that price out. Go ahead and write the contract between the distribution unit and the generation unit as a customer-supplier relationship. The focus of this regulation in the

future would be that the local distribution company must fulfill its social obligations for demand-side management, in compliance with our integrated resource planning statute for low income issues and quality of service. At that point the generation companies are left on a level playing field with everyone else, and we no longer have to exert our regulatory will over 70% of the current ratebase in Texas. We must, however, watch out for concerns about market power to the extent that even this all came about and generation was separated out.

As much as I enjoy doing cost-of-service ratemaking, I think its time has passed. On this trip, I would certainly like to see cost-of-service rates as one of the suitcases that we leave behind on the driveway. It is inevitable that we have direct customer access. Rather than wait until that day, it would be in the public interest to make sure that those benefits start flowing through now in the context of the wholesale market reform. There is a staff report which some of the utilities in Texas have said is too focused on stranded cost. And you have the Moody's report on the other end which, of course, prices everything down to marginal cost. In between those two end points is a number where we can settle. There is a number that everybody can be equally grumpy about. Litigation only staves off the benefits of competition and it is to no one's benefit, including utilities who may prefer to wait.

Eighth Speaker:

Let me add a little background to what my fellow Commissioner has said. We had two key decisions made by the legislature when they rewrote our statute. One was to open the market for the very first time to non-

QF independent power, which heretofore had not existed, because in order for a non-QF supplier to be in business within ERCOT they had to be a utility and subject to the full scope of our jurisdiction. The second key decision they made in rewriting our bill was to require the Commission to adopt an open access regime for wholesale transmission. Texas is unique because we are, the only Commission in the lower 48 that does have jurisdiction over the wholesale market, because ERCOT is not interconnected with the rest of the interstate grid. The stream of interstate commerce does not extend FERC's jurisdictional reach within Texas, except to the extent of section 211 which allows them to mandate transmission for all utilities upon complaint. The legislature gave us a date certain, which is February 28th of next year. They directed us to adopt the open access rule by that date and to provide for a scheme of transmission that would allow for user access on terms no less than what would be required under federal law in other jurisdictions.

One of the questions that we are confronting right now in our open access proposed rule is: how far do we feel at liberty to deviate from whatever the FERC does, given that FERC's final decision is not yet available? One of the concerns that I think we are going to have to address is the question of whether we can process all of our open access tariffs at the same time. As for a wholesale transmission rule, we opted at this time to favor a postage-stamp approach. The thinking behind that decision was in opposition to something which would in theory inhibit the movement of electricity across the grid, if we implemented something that might be related more to a mileage based scheme. Obviously comments can come in over the course of the next few months and try to persuade us

otherwise.

On stranded costs, the only thing I add is that we decided to go ahead and try to work up a methodology for treating wholesale stranded costs on a case by case basis, if and when the recovery is sought by the utility. The bigger problem is what happens when you open up the market for retail access. Obviously that is a completely different ball game. The legislature gave us very explicit instruction under a statute that they wanted a report filed with them by the end of next year, a report recommending what approaches should be taken with respect to the legal aspects of retail stranded costs. Their action may well inhibit us from taking more aggressive action absent statutory authority. One of the biggest problems in trying to act more aggressively to restructure the retail

will
market will probably be the need to seek express statutory prescription for some of our actions. I favor an approach that begins looking at these more basic structural questions at the retail level. We are thinking about developing a consensus-based formulation of goals that we want to achieve in the course of restructuring as a first step, and then working back from there on developing a proposal that we think would be in the best interest of all of the citizens in the state.

_: With regard to the gas industry and the telephone industry we have insisted on a full separation between the bottleneck monopoly facilities, whatever they happen to be, and the competitive sector. I wonder if the states are not thinking much about the one time in which they will really have leverage, namely, in the context of this transmission asset issue.

_: It is on the table in Wisconsin. I think the reason it isn't mentioned much is because most people don't want to send the markets into a tizzy

: One of our utilities has volunteered to do it now. Of course their stock price didn't benefit on the day that they made that offer.

_: What you found in England was that, unlike most acquisitions, where one stock price stays the same and the other one goes up, when one big company made this offer for a disco, both prices went up; which seems to me to say that the market thinks that these assets are worth a lot more together than they are apart.

_: If you have a monopoly and it volunteers or is forced to give up its monopoly power, any rational investor would lower the price of the stock of that.

_: This would not be bad public policy. But would it be good politics?

It may not be good politics to mandate divestiture, but it is quite a different thing when a particular utility volunteers to divest or restructure itself. Our legal analysis indicated that we didn't have the authority to mandate divestiture anyway; but we did think that we might have the authority if it was proposed to us.

What is on our table right now is transmission and its unbundling in a relatively small camp like ERCOT. Do we use the operational unbundling of the Department of Justice? Is that close enough to divestiture to get us where we need to go?

_: I find it strange that the long distance telephone market has one company, AT&T, that has got 65-68% of the market, while the rest is divided among 40 small competitors, and you say that is a competitive market. When AT&T raised its prices recently, everybody followed suit. Sounds to me like price leadership. It may well be that we are going back to where we started from where the telecommunications industry is concerned. We don't have much authority to do anything unless somebody takes something into the court. Then you know when it gets into the court, when we have a ruling, then we may be able to act. Otherwise they pretty much go their own way.

_: I noticed in one of the speakers' list of principles that you were advocating recovering of transition costs within five to ten years. We would love to recover our stranded cost within five years, but we think that it would cause prices to go up at least 20 to 30%. Alternatively, if you don't allow prices to go up and you say you only have five years, then under new accounting rules, that would immediately trigger major write-offs.

_: We recognize that we set up a tension in our Order by saying stranded costs ought to be recovered in five to ten years and rates ought to go down in the near future. However, even the company that we think has the biggest stranded cost problem has indicated to us in discussion that, given ten years, they could resolve their problems in stranded costs.

_: Some utilities in the state of California are cutting their DSM budgets, in large part in

order to be able to freeze rates or produce rate reductions. Is DSM a resource or a program?

_: I think that it is a resource but it is not a resource for utilities. Given that, I think you could do far more by getting it out of the utilities.

_: I think DSM is both a resource and a service. I think in some places it is a resource but it also has a lot of potential, particularly moving into a competitive market. To draw an analogy, rather than talking about fuel-efficient cars, I would talk about airbags. Airbags are the latest thing in the car advertisements. Something the car companies were forced to do for a long time has suddenly become the greatest marketing tool in terms of selling cars. Everyone cares about airbags. If you start mandating DSM, companies are going to find that this is a service that customers want. At least some of the customers want. It may not be the utility as we know it today delivering DSM, but some subsidiary of the utility or related business.

_: Can you talk a little bit more about why you are proposing a postage-stamp rate in Texas? My understanding is that you have some distance-sensitive pricing in Texas now. Why would you go back to a postage-stamp rate?

_: Because in the past, the megawatt-mile method has been good for the small number of transactions that actually were priced according to that method. It probably represents less than 10% of the total delivered price of anybody's transaction there, so it is not a huge market distorter either way, but to the extent that it does distort, I would like it to

be a neutral factor to move power all across Texas.

: Let me just add also that the alternatives & we looked at at this time were whether to go for full postage-stamp or some hybrid of some non-distance with some distance factor.

: It would seem to me that with a volume of transactions in operation, there would be even more reasons to get pricing right.

_: Either model, I would think, would induce self-generation and self-wheeling in Texas. How would you deal with that problem, or are you considering that possibility at all?

Those costs are there and if anyone were inclined to move toward selfgen or cogen, they would have done so by now because rates are generally at a flat rate now and will probably go down over the next several years on a real dollar basis.

_: You said that basically the obligation of the server would be at the disco level and the disco would be contracting in the market on some basis. You also stated that maybe at some point down the road you expected direct access might come at the retail level. What kind of contracts you expect the disco to be entering into, and whether some of those might turn out to be above-market down the road when direct access comes.

_: Postage stamp rates are attractive, however, they make the market power problem worse.

_: The pricing mechanism that you would use for people using the transmission system should be based on opportunity cost. What would be the cost imposed on the rest of the

system if the transaction were carried out at the margin. If there aren't any constraints in the system, that cost is zero. If there are constraints on the system, that cost can be quite large. There is a way to identify that and to charge for it and it uses the market to the maximum extent possible to mitigate that market power problem.

: All loads in ERCOT pay based on firm, so all the marginal transactions that go on to move power from a different section would not incur any additional costs. Something along the line of the second-to-the-last thought you just mentioned is included in our proposal -- a lot of parties in Texas don't want to have to look at a very complex matrix to find out what is it going to cost me to move this power.

_: Our belief was that the use of a postage-stamp methodology would mitigate potential market power by expanding the geographic breadth of the market, as opposed to a distance-based approach, which would favor the monopolist or generation provider. If that premise is incorrect, I would be very interested in hearing why.

_: Removing the distance factor and the constraints and expanding the size of the market reduces market power. Pretending to remove the distance factor and averaging the cost to cross everybody increases the market power.

You essentially acknowledged that transition is a fundamentally political issue, but you didn't want to take on divestiture as a truly messy political issue. Does that make your life easier or harder in trying to negotiate a

stranded cost resolution?

I don't know if it makes it easier or harder in terms of trying to negotiate a stranded cost resolution, but I think it makes it easier in terms of policing competitive market issues and market power issues.

_: Maybe one of the questions that ought to be on the table on stranded costs is who is really responsible for stranded costs and what are their other players? Should we, as we look at what to do with stranded costs, really look back and ask how much of that might have been the responsibility of the government or society as a whole, and do we have an obligation to pick up at least a portion of it?

_: If we say that some of these costs were

caused by regulators and government, if the answer to that question is yes, who's going to pay them?

_: The reason I raised the question is not because we want necessarily the government to pay but rather because we may then be led to decide that we're going to allocate these costs to one or more customer class or to the utility, because our old system of regulation imposed costs that would not otherwise maybe be there.

_: That's essentially what the Massachusetts order did because when you say government should pay, you have to ask, who is government? It's taxpayers, who are also electricity consumers, who are also utility shareholders. It's not some entity out there.

Day Two: Transmission Siting and Expansion in a Restructured World - Rights of Way/Rites of Passage: Who Benefits? Who Decides?

What will be the challenges of expanding transmission lines in a restructured world? What is the impact of access and capacity rights to third parties on the willingness to use capital (political and financial)? How can transmission "capacity" be defined, allocated, priced and traded? What legitimate parochial needs, such as regional power markets, need to be considered? How can system balance be maintained as it is affected by subsequent access and usage?

Moderator: Some of the theoretical discussions that we've had and are going to have are fascinating, but we still face an immensely practical question: regardless of the incentives to construct or expand transmission capacity and regardless of how we allocate it, can we do it at all?

Ninth Speaker:

The answer is: no, we can't do it. I was asked to talk a little bit about the Hydro-

Quebec Line which is a recent New England project that faced tremendous local opposition. And some of the reasons that the opposition arose had to do with the fact that a large portion of the power that was going to come down that line was directed out of state. Central Maine Power wanted the line.

This was a large DC line. Hydro-Quebec was not synchronized with us at the time. That became very significant in later debate. Because there was some speculation

at that point that the health effects associated with electromagnetic fields were a problem caused by DC lines. It turned out that AC lines were the real concern. The proposed line would have gone through Western Maine, a very scenic part of the state and also the part of the state that has paper companies on it. So it would have been about a third of a million dollar joint venture between us and Hydro-Quebec.

Maine's electricity network is interconnected with New Brunswick to the northeast and with New Hampshire to the southwest. There was no direct connection with Hydro-Quebec. And this was significant because, as you'll recall, in the 1980s, Hydro-Quebec had a very aggressive export marketing program. The proposed line would have essentially given us three markets to buy power from instead of two which, we thought, would have put us in a very favorable situation. All through the 1980s, we were having difficulty convincing our Commission to use a lower benchmark for avoided cost numbers. Hydro-Quebec really offered itself up as having that role.

We started negotiating the contract in 1985. The letter of intent was signed, and we filed with our Commission in '87. Construction was supposed to have started around '89 and the line would have been in service in '94. Under a thirty-year contract, we originally had been interested in buying five hundred megawatts or more. As we signed up more co-generation in an effort to appease political forces in Maine, we had to reduce our take. At that point Hydro-Quebec said they would only go forward if they could get additional sales over the line. The line required deal pre-approval because it was an international tie, but DOE found it appropriate

to conduct local hearings all through the area where the line was going to be built. And those turned into, as you can imagine, media circuses. Here are the kinds of things that came out, and I'm sure they'll come out at any one of these kinds of battles: visual impact. Service sides. Out-of-state benefit. Fear on the part of people along the line that they'd actually have their property taken from them. My favorite was the last one: "the line that will eliminate the need for conservation." An interesting reversal of the usual thought about why conservation is important.

_: Because you get such cheap power you wouldn't need to conserve?

Speaker: Exactly. Conservation was beginning to be viewed as an end in itself And if you were in a land of plenty, who would conserve?

It's also possible that the following argument could be made. Once you make a fixed, long-term commitment to build something or buy something, even if conservation is cheaper, the thing you've already committed to is sunk. And you have to pay for it.

Who favored the line besides you and Hydro-Quebec?

Speaker: Our industrial customers favored it. They saw it as a plus. The Governor of the State favored it. We actually did polling and something over eighty percent of our customers thought that it would be a plus for the State. We ended up sinking eleven million dollars into the project between 1985 and 1989 when this was finally brought to a halt. Hydro-Quebec probably put a similar amount of money into it. The PUC voted two-to-one

to kill it. And basically what they said was, the single most important disadvantage of the Hydro-Quebec purchase was the need to build a substantial transmission line. It was apparent that even though there were very substantial economic arguments about the line, which normally would have been the primary basis for considering it, that they were very, very moved by the passion that was exhibited by the folks who would have lived in the vicinity of the actual transmission line. It's clear that if you were trying to get through an existing interface and it was congested, you could come to the PUC and ask for more transmission capacity. But I'm not sure under the existing interpretation of the law whether someone can compel you to build in an area where there is no existing right-of-way.

_: In retrospect, is the rejection of this proposal now looked back on with a sigh of relief?

Speaker: It's hard to know. If we had stayed with the project and if it had stayed on its time-table, the power would have started coming in at a time when we'd just been through a five-year recession in Maine, and there really is no load growth.

_: Don't you think that part of the opposition was actually to the construction of dams for Hydro-Quebec and not to the power line?

Speaker: That would seem to have been more of the case in New York and Vermont. In our particular case it was only occasionally mentioned.

What lessons did you learn for the next time?

Speaker: From the beginning of this process,

we tried to stay very close to the local folks. We had voluntary town meetings. We sent materials to their town library so they could get information about it. We sent newsletters out to inform people. Considering all we did do, I just don't think there is any way in which we could have persuaded people that it was desirable.

Having gone through this, has this changed your view on pricing existing transmission? And has it changed your view on where you site your power plants?

Speaker: There was a proposal that was made in the regional transmission agreement negotiations that is still, as I understand it, alive to some extent in the RTG negotiations. And that is that the Host State would actually get 110 percent of the cost of the line built into their rate structure, to acknowledge the fact that it has a local impact. I think that's a very positive way of dealing with it, frankly. As for the second question, we still think it's preferable to get power over transmission lines than it is to build power plants. We would still like to buy from Quebec.

Do you think that with ten percent more you could have found a way to reward all parties along the line and get the line built?

Speaker: Well, in this case, it might have made some difference. If we had been able to say, from the outset, that we have a thirty-million-dollar fund which we'll give to the Nature Conservancy to be used for the purchase of twenty thousand acres of pristine land to be kept out of development forever, that might have changed the politics.

Tenth Speaker:

I was involved with the siting of a 500 kV line which we tried to build from Pittsburgh to Harrisburg, Pennsylvania. The March, '94, editorial about the effort in *Power Engineering* was entitled, "A Good Idea that Died." GPU and Duquesne developed a transaction that had a couple of parts. The first part of it was a purchase by GPU from Duquesne of five hundred megawatts of energy and capacity. The second part was that Duquesne would refurbish a couple of its old mothballed fossil plants, and GPU was going to buy half of one of them. The five-hundred-megawatt purchase would be made up of 150 megawatts from the Phillips station and 350 megawatts from the Duquesne system. And so we were intending to build a five hundred kV transmission line with fifteen hundred MW of capacity. Five hundred MW of that line's capacity was used for the purchase, and the other thousand potentially would be available to the market.

When Duquesne and GPU first looked at this issue, they asked whether the existing transmission system could bring that energy purchase into the GPU system. As the project got started, we also wanted to look at the question of D.C. And it looked appealing because some sage advisors were saying, well, if you use D.C., you won't have a problem with EMF. But D.C. lines are not without their faults in the eyes of people in the neighborhood. It's 230 or 240 miles between Pittsburgh and Harrisburg as the crow flies, so the economics were not favorable and we were unsure about gaining any benefit in the face of the raging controversy about EMF and health effects. We opted for the A.C. five hundred kV line.

My own take on transmission siting and licensing is that what you're really doing is

running a political campaign. GPU needed energy and capacity. In addition, the West-to-East transmission capacity in Pennsylvania and within PJM was inadequate. And this was a dynamic situation when we were thinking about this project in the late eighties.

Jumping to the end of the story, the GPU withdrew from the project in January of 1994, an extremely cold period in the Northeast. PJM had rolling blackouts, which clearly would have been moderated if not eliminated had we had a transmission system to bring capacity in from the West.

In the process of reviews and approvals, we had really to deal with regulators in both Pennsylvania and New Jersey. What we decided to do was to try to get from the Commissions a fairly quick review that would be based upon, say, the business need for the transactions. The thinking behind that was to try to raise the issue before the Commissions and get some evidence of support in advance of the turmoil that would be associated with a siting case. Since we were going to be transferring our jurisdictional assets from Duquesne to the GPU system, we needed FERC approval. Also, we had to get approval by the -- the NERC region that we were operating in. And in addition to that, trying to add capacity would affect the remainder of the PGM system.

The informal discussions began in 1989. In early 1990 the two companies, GPU and Duquesne signed a Memorandum of Understanding. In late '90, we started the siting work and our technology assessment. In September of 1991 we concluded our siting work and filed the siting case with the Pennsylvania Commission. We also applied

for the power purchase agreement with New Jersey. In April of '92 we received approval from the Pennsylvania PUC for the affiliated interest and so the hearings in Pennsylvania on the siting then got into high gear. In New Jersey we had the power purchase hearings which began with a kind of a bang but then petered out.

That brings us into 1993. During the course of these proceedings, it was clear to us that the market was changing in PJM. Non-utility generation was coming on line. The spot market, if you will, was such that some of the terms of our deal with Duquesne were at risk. The companies, in recognizing that, renegotiated the contract. And in early 1993, we finally convinced our fellow utility folks that the project was an appropriate project. But towards the end of that year, the New Jersey DPU disapproved the project and immediately thereafter, GPU withdrew from the project.

The result of the Pennsylvania siting application will really never be known because the GPU company withdrew the application. The same cast of characters, or a very similar cast of characters except for no property owners, were involved in New Jersey. They turned our argument around on us in New Jersey and asked why is the state of New Jersey proposing to bring electricity in here when we could do this ourselves and create the jobs we had been talking about creating in Pennsylvania?

In Pennsylvania we had some of the utilities intervene just so that they would be involved in an EMF proceeding. PJM developed the theory that what we were doing with this line was building a penthouse on the top of a very high rise building and that the

high rise building was the existing high voltage system. They maintained that the GPU system ought to be compensating the owners of the high rise building, the PJM system, for having this great new view at the top. We argued that it should be considered as more of a garage, an additional improvement off to the side of the building; but we ended up agreeing to participate and pay for or partially pay for enhancements to the existing system. The other intervener was APS, Allegheny West Penn Power, locally known in Pennsylvania. They seriously objected to the design of the project. APS saw it as a major change in the philosophy of operating a transmission system. Our argument was that our design would insure that the existing system would not be negatively affected by the elements of the transaction. Ultimately I think we could have gotten around the problem

One of the things that clearly caused the project to be withdrawn was a market change. The market changed substantially between '89 and '93. In the future, we'd go back to the model that PJM used in the 60s, where there would be regional planning, a number of the issues would get resolved and worked at, certainly among the utilities, if not a broader audience, before regulatory approvals were sought. One final point, and this I think goes particularly to the siting. You really cannot site a project of this nature without clearly having political support and having winners associated with all aspects of the project.

Moderator: Before we take questions let's hear another side of the same issue

Eleventh Speaker:

I think it's important to realize that the

opposition to this particular project was basically waged on two separate and parallel stages or levels, and I realize that the involved utilities knew the distinction. The first of these would be the more formalistic hearing process that most of us are familiar with. The second level is what I would call the emotional level. The opponents of the project were much better prepared for their role on that stage than the utilities were.

There's probably very few people who would walk into a utility's office and volunteer their back yard for a transmission line or a supporting tower. And the landowners had very strong feelings on the subject, whether based on reality or perception and I'm always fond of saying that perception to the perceiver is reality. In spite of all the efforts of the utilities in pre-filing to try to explain what was coming to the people, they still felt that they were being trampled on and given very little consideration. Now, most of the information which they've obtained on the issue has come from the popular media, newspapers, magazines, books, and television reports. Any expert will tell everyone that that's not the best method or means to gain an understanding of rather complicated and highly scientific issues like the potential health effects of EMF. Unfortunately, it does little good on this second level to have people come in to public input hearings and inform them that they shouldn't be concerned about EMF from a power line because the wiring in the electrical appliances that surround them in their home will generate higher levels than they'll experience from the line. That's the kind of information that most of us in the business can review objectively. We're able to distance ourselves from the emotional impact that this has at the public level. It was the same with property values. There's no indication that real

property is going to suffer any diminution in value because a transmission line has been installed nearby. But local property owners are not going to believe that. When you get down and deal on the emotional level, all of the arguments that you would make in the hearing process are worthless. Even if you've gone to some workshop on how to deal with angry property owners or opponents, there's nothing that can prepare you for when you're in a room with about 300 people all of whom are there to denounce the utilities, their executives, the public utility Commission, myself and anybody else who even suggested that this could have any value to it. At that level the people want someone to stand up before them who's got some position of authority and say with absolutely positive, cross-your-heart-and-hope-to-die certainty that if this line is built nobody's going to lose a dime, and there is no possibility of anyone suffering any physical, mental or emotional ailments from any of the electronic and magnetic fields that are coming from all electrical devices. But we all know no one can tell them that. If anybody stands up and does it, they're being less than honest. On the other hand, transmission lines are something that is always going to be needed. Those are the two levels you're dealing with and you can win on the hearing level because you can establish legal principles and gather evidence, but it's going to be very difficult and maybe nearly impossible to try to win down on that emotional level.

Was there any work done in these hearings on comparative ENE levels where the dosimeter is trotted out and placed next to various objects and that sort of thing?

Speaker: There was no actual demonstration in any of the hearings. There was a comparison

of what you can expect to be generated by your microwave, your electric razor, your PCS and so on, but nothing actually demonstrated in the hearing rooms. One additional thing you have to know is that none of the property owners were customers of the utilities that were proposing to build the line.

_: First, a question on the New Jersey BPU decision. Do you think they were swayed primarily by the IPP arguments, the local jobs, local economic development arguments or something entirely different? Secondly, you withdrew the project two years ago; in retrospect would you like to still be pursuing that project?

Speaker: I think the basis of the BPU decision really was the changed market. I don't believe the jobs part had much sway. As to the second question, I think the company feels that we would have probably changed the contract again and made the revised contract even more responsive to the changed market conditions. Certainly, if we had that contract we would not want it today.

_: What do you think of the suggestion that it was GPU and Three Mile Island that really affected the case?

Speaker: In the Harrisburg area where there were some GPU customers, the customers had noticed the company had made substantial improvements after Three Mile Island, but they still had a very negative reputation.

_: I do think the issue of how much people trust the utilities or trust experts and trust government is fundamental to this issue. What is it going to take on the part of proponents of power lines or other controversial issues to work with people that are trusted by the

public?

_: We started having in-home discussion groups with the property owners, and that turned out to be much more effective. We'd have one of our people go in at night with three or four property owners, talk in a rational manner about their problems, their concerns and then try to find a way to do something about them.

_: Is it possible to site a line like this at all, and would it ever have gotten approved?

Speaker: I doubt that the line would have actually ever been constructed, even with New Jersey's approval. There were too many changing market conditions and too many additional regulatory approvals on the state, local and federal level.

_: I did hear some observations that the contest for the line took on the trappings of sort of a political campaign. Typical utility handling of public relations is pretty poor actually. In Texas, where Southeastern Bell very successfully waged a public relations campaign to get favorable legislation through our legislature, one of the first things they did was hire a masterful public relations firm to run some very sophisticated ads all across the state

The sad fact is that general corporate image building is very valuable and is essential. We have a nuclear plant that went through three referenda, and what we learned from that is that the best thing you can do to win those referenda is to have pretty steady and consistent public relations messages out there. Advertisements strike us all as being so empty and vacuous and saccharine, but the fact of the matter is that unfortunately at some subconscious level they build a favorability

that you can really draw on in times of need.

: We have virtually ignored the dispute between utilities, the question of whether the transmission line is a penthouse or a garage and the whole philosophy of how the transmission system ought to operate. I leave you to ponder where that fits into this whole process when you get it down to a local or even a state wide level.

Twelfth Speaker:

Up to the present, siting has largely been a closed circle of decisionmaking and impact. First of all, the line is sited or planned for purposes of benefitting the folks that are going to pay for the line. It is the same jurisdictional body for the most part who will decide who is going to pay for the line and what is going to be sited. The premise for building the line is that there is a need for it: the need for power or the need for the local economy whatever it is. None of those conflicts we've heard about are going to go away. They are all still here. In addition, where before we may have been talking about a line in Maine with benefits in Portland and Augusta, now we are talking about benefits in Boston or Manchester and that is not nearly as attractive. So how are we going to deal with such a situation, where essentially the insult to the environment or the senses of aesthetics, or for that matter the theoretical threats to health associated with ENE, are going to be felt in local areas, while the need for the line is going to be a regional or perhaps even a distant need? The battles are now going to become a whole lot more different.

First, consider the environmental considerations. Trying to balance those out now becomes an exercise in balancing distant

need against local impact. In fact, what it is going to do is create a fundamental confusion over who is deciding. And we are also doing this in the context of a definition of need that is not at all clear. What does constitute need? We have two state supreme courts, Massachusetts and Mississippi, where decisions have been made stating that in situations where the preponderance of the benefits are for out-of-state interests one can't use state siting laws to site the facility. Utilities themselves in that context have an enormous disincentive to ever try to build anything.

That is compounded now by the uncertainty of recovery. You've got enormous problems in terms of whether the pricing signals sent from Washington are sufficient to allow people at the local level to undertake the enormous risks associated with trying to build a power line. Even if you wanted to encourage a non-utility transmitter to get into the business and undertake these risks, how would you deal with the question of eminent domain? The certification for a line doesn't necessarily mean that they can exercise the condemnation rights. Again, that is an enormous disincentive for anybody other than a utility to try to get involved in the transmission business.

Let's talk about some possible ways of trying to deal with these. The gas companies don't seem to run into quite the same problems as electric companies in siting their facilities. Part of the reason also is the state authority is very limited and there is federal siting authority in natural gas. So one set of resolutions for the electricity industry might be to create a larger body looking out for larger economic needs in order to try to decide these questions. The second is to clearly define the need

requirement. Currently there are almost as many definitions as there are states. The third question is the one that we have talked about before and that is to separate the question of who pays from the question of whether the line will be sited. The incentive for the state is always to be parochial, at least on the transmission question. Good economics dictates that they not impose costs on people who are not the beneficiaries of the line. On the other hand, we've just heard about the real downsides to the siting question being decided on parochial grounds. Of course the solution will probably be some sort of tradeoff. Some agreement between at least the main line, for example, environmental groups or for that matter even government and civic groups in local communities, for what the utility will provide in exchange for the community accepting this local insult for the greater good of a regional need.

What we've heard here today, I think, shows that need is a very elusive thing which changes over time.

—: If we take siting authority away from the state decisionmakers, we will end up shifting it to the federal judiciary. Given the nature of our society to take virtually every imaginary or real injury in the court, such a change might just shift the process from one level to another. I don't know that it is going to make things any easier.

—: Why aren't we coming up with proposals that would say to the customers in my state that a proposed line will be sited in the state that offers us the lowest bid to do just that. Customers would get something on their power bill for the duration of the existence of

that line that shows them that they are getting paid rent for allowing the line to be sited in your jurisdiction.

That would only work if "just say no" wasn't an option.

Just say no is an option, but dispersed generation is an option, doing without the power is an option, undergrounding the transmission line is an option. Those options all have various costs and those costs compete with the cost of finding somebody who is willing to let you build an overhead transmission line through their back yard.

—: In order to negotiate, I guess there needs to be some threat that the line is really going to be built somewhere, so that it becomes real.

—: I am not sure that that threat has to be there. I don't see why "no" isn't an OK option. No just means the price isn't high enough. Pay me more.

Now you raise additional questions about who do you negotiate with. What if one town agrees to 10 percent and the next town wants 15 percent. What do you do?

—: Are we not now about ready to go back and take the old study out of the files and ask ourselves, should we reconceptualize this problem? What we need is a national grid and given all of the problems we've discussed before of a national grid, we still recognize that states are interdependent.

In Texas we just went through a wrenching process of developing a coastal management plan that I think was required by the Interior Department to manage our wetlands. It became very politicized because

the criticism was that in fact we were erecting yet another state infrastructure to tell people how to manage their property. While philosophically I may be predisposed to thinking that states ought not to be the ones making these economic decisions, that in fact there ought to be some sort of regional or even federal form of regulation, I'm forced to ask how realistic that is in light of very strong, very vocal opposition in the hinterlands to even local decisions.

We had one farmer who came in and complained that part of his farm was subject to federal regulation as a wetland and he had to abide by all these federal regulations, while the proposed route of this line was going right through the middle of that wetland. He just thought that was absolutely ludicrous.

—: There area lot of arguments for having federal authority on this because, to a larger degree, the GPU-Duquesne line was more for the benefit of New Jersey and Ohio than Pennsylvania and in this case it would have made a lot of sense.

—: The rhetoric on returning things to local decisionmaking and compensating landowners is somewhat out of touch with what's really happening.

—: When we see people in Austin they hate coming to our state capital because they have to get in the car and drive for miles. For me now to tell them they have to go to Washington just won't be politically acceptable to them anyway.

—: If Art and Mike are right that we're never ever going to build another transmission line anywhere where we actually have people, then we have a problem, which is to define what the

existing capacity is in the system and make sure that we have that allocated in some way that is compatible with the competitive market. And if we are going to expand and build some place we're still going to have the problem of figuring out what it is that the expansion offers.

Thirteenth Speaker:

The problem of what's the actual available transmission capacity is one of those issues that's surfacing now. It's a very serious problem. A lot of the foundation of the FERC approach and even the conversations we're having here is that the answer to this question is obvious, that we can define what the available transmission capacity is. There are statements such as PJM's, which says that the RIN is for users to learn what transmission capacity may be available for their use. Because the available transmission capacity defies exact definition. There is a fundamental problem here, and that they are actually talking about something which is quite correct. Changes in the patterns of use can have a big impact on what the available transmission capacity is. It's a fundamental difficulty because the ATC notion is basically a contract path notion, and everybody knows that the contract path is a fiction which doesn't actually have anything to do with how the power flows.

One way to answer the question is to be astonishingly conservative. How much power can I guarantee they will be able to move across this interface? Give a very low number like zero, that's, and there are plenty of examples where that's the right answer. The other solution to this problem is to mumble a lot, which has been the historical solution to the problem. Mumbling works well in

vertically integrated monopolies it doesn't work well when property is sold back and forth and shifting cost onto people. However, there's an answer to the problem, by changing from a physical to a financial interpretation, and the framework is the familiar one that I've talked about many times before.

If there is no congestion on the system, there isn't a problem. If there is any congestion in the system and you have any interface problems or constraints, you run into a situation where the available capacity depends on all kinds of things and is not capable of definition. For example, if you move 1000 MW from a particular subregion of NERC to another, what impact does it have on the capacity to move power across other interfaces? It affects capacities on virtually every one of these other interfaces. In my handout there is a simple hypothetical example with three busses and three lines. If you have a single thermal limit on this line here and then you ask yourself, of 600 MW, how much power can I send across this interface, the answer is that if you put it in at one point the maximum you can send is 900 megawatts cause 600's going to go this way and 300 the other way, and so you could say the interface capacity is 900 MW. If you put it in at another point, 600 is going to go this way and 1200 is going to go this way because of loop flow, so you could say the answer is 1800 MW. This is a reality, and it's a reality with substantial quantitative significance.

Now the question is how to deal with that problem, and an answer to that is built upon the following basic idea. You can actually calculate different locational prices throughout the network when you get these kind of equilibrium conditions. And then the definition of the transmission cost from

moving from A to B is just the difference in price of B to A, which would be the opportunity cost associated with moving across that network. That is a definition which does not depend upon the contract path. I'm not going to go through all the examples in my handout, other than to point out that the principles that are developed in that situation end up generalizing to a more complicated network.

What we can do is define a right to collect a congestion rental, and that has the following effect. If the physical conditions make it possible to actually move the 100 megawatts, they move the 100 megawatts, they pay the congestion cost in the opportunity cost of the transmission to get the congestion cost back, and the net effect is that they move the 100 megawatts with nothing more than marginal losses. If they can't move the 100 megawatts because they get constrained off, they still collect the congestion cost differential. They end up getting power at the destination as though they had generated it and moved it at marginal losses, even though they're physically not moving the power. You can think of it as collecting the difference in the congestion cost between the two locations.

Another equivalent way to think about it is that the person at the distant location B is purchasing the power at the price at C, plus the marginal losses to get it there. Or I can think about it as being dispatched without any congestion payment. All these are different ways of managing the congestion payments, and the result, the thing that's important about this, is that even though it is not possible to guarantee that you can move 100 megawatts across the system because of all the problems we just talked about, it is always possible to guarantee that you will be able to make this

payment and collect this difference in the congestion cost so that the person who has made the investment in the transmission grid is always protected in terms of the property right that they were in effect trying to capture. After you make all the payments you'll end up with excess congestion rentals, which actually have to be dispersed through some kind of sharing arrangement, but you never get in a situation where you don't have enough money to compensate people for the transmission congestion contracts that they have.

Looking at various extreme examples, this one has the following characteristic: there are different prices at every location, and still the highest price any place in the system is more expensive than the most expensive generator that's running anywhere in the system. The reason is that in order to satisfy additional load at this point, you have to back off the cheaper generators and run the expensive ones. Simultaneously, there is another place in the system where I constructed it so that the price actually came out to be negative. This is an extreme case, but nonetheless it could happen.

In thinking about the market, I've placed location 0 as a hub in the system, so that the market is defined at location 0 and people want to sell power to that location or purchase power from that location and have it delivered someplace else. This detail is just for convenience; we could do it any one of a number of ways. Define two sets of feasible transmission congestion contracts as TCC set 1 and TCC set 2. Either one of these could be characterized as a definition of the capacity of the network. So if you ask me what is the capacity of this network, I could say, here's one definition, and here's another, and both are feasible within the network. It's a question

that we can answer in a well defined way. Furthermore, it doesn't matter which of those two, or any other that's feasible, I choose, as long as I keep a consistent set of transmission congestion contracts. I will charge people for using the system at opportunity cost and I will pay out money to people who have these transmission congestion contracts consistent with the same prices. The money that I collect will always be greater than the money that I have to pay out, no matter what I do to the system. And so that means that the person who holds the transmission congestion contracts will be able to generate power and deliver it to the customer, and be guaranteed that they will be able to either do that or do something which is economically equivalent to it, no matter what happens in the network in the future. And so now the question about capacity has a well defined answer, not a negotiated answer. You can always guarantee the financial payments even though you can't guarantee the physical flows.

If you have interconnected systems with networks in them, you have, you have a problem of defining either physical flows, which are going to have complicated loop flow effects, or these pricing arrangements. Take the flows in and out and hold them as fixed loads, and then forget about the rest of the system and model only the system we have internally for pricing, so we charge people internally for prices internally in our system. Then everything I said is true for that system. That leaves a problem then of defining how you price for the transactions going across, which is, again, is back to the same problem you have with dealing with external physical transactions.

One of the characteristics of dispatch is that all the load balances with all the

generation; that's just the physics. Now if it turns out that the customer comes in and says, at 7 cents I don't want to take 100 megawatts, at 7 cents I'll back off to 50. So you charge them for 50 and they're better off because they didn't want to pay 7 cents for that 50 so there's all of that dynamic is in there for people bidding. They will still be in a situation where they'll be compensated for the transmission for 100 megawatts, and what they're saying, in effect, is I'd rather keep the money than take the power. I'm assuming that the system balances, so it's consistent with whatever the actual dispatch turns out to be under the principles of economic dispatch. But it does not depend upon a particular plant running for a particular customer.

—: Are you saying that we only really need to run one scenario for the entire system, and

then all the transactions are modeled off of that one scenario to determine what available transmission capacity is at that point in time?

Speaker: If you want to answer the question, will we have the physical capacity to move a thousand megawatts of power across this interface five years from now, you have to run a whole bunch of different cases to find out what is going on. If you want to answer the question, can I allocate a thousand megawatts of transmission congestion contracts, you only have to run one scenario to determine feasibility. That is a very simple straightforward calculation that is auditable and easy to do compared to all of these other things that have to be done when you are looking at the physical flows. So it makes the problem a lot simpler.