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Rapporteur's Summary[*]

Session One.
Manipulation of Electricity Markets: What is the State of the Law?

"FERC amps up financial market enforcement," (MW Daily, 4/17/12). Investigations and enforcement actions addressing market manipulation have become more evident. Not all cases are litigated, which can create uncertainty about case law definition of what constitutes market manipulation and what legal counsel can advise as permitted or prohibited behavior. The determination of jurisdictional boundaries between FERC and the CFTC is a work in progress. What significance, if any, is there between FERC or the CFTC as the enforcer? Statutory definitions are not dispositive and require interpretation. Where do we stand at present in understanding what behavior constitutes unacceptable market abuse? What criteria should market participants make sure they abide by in order to avoid liability? How do fraud and the exercise of market power implicate the legal foundations for defining market manipulation? How do intent and actions interact? Should the FERC or CFTC publish definitions of what constitutes unlawful manipulation or is it sufficient to let the cases slowly allow meaningful definitions to evolve? Are there lessons to be drawn from elsewhere that might offer insight into what regulators might find to be manipulative behavior? What penalties apply and what principles guide estimation of market impacts and penalties? Where does the law stand, where is it going, and how important are the trends?

MODERATOR: The subject of today's panel is "Manipulation of Electricity Markets: What's the State of the Law?" I'm not a lawyer, but I have four really great attorneys here with me today who have a lot of background in this area. The kind of questions we want to debate today and hear different views on are things like, what's acceptable versus not acceptable behavior? Are the rules clear? Are they black and white, or are they gray? Are the rules and the interpretations of those rules evolving? Should FERC or the CFTC publish black and white definitions? Is that practical?

Let's hear from the lawyers.

[*] HEPG sessions are off the record. The Rapporteur's Summary captures the ideas of the session without identifying the discussants.

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Speaker 1.
I think there's a connection between today's topic and the California refund case, which is currently focused on what happened in the summer of 2000 and whether anybody did anything wrong and whether California should reset the prices, and the connection is that that's a real good reason why we're all sitting here today, because the current statute that FERC has was put in place because everybody was concerned that the rules that existed back during the crisis weren't firm enough and weren't enforceable.

So we have this fraud standard that's modeled after 10(b) [the antifraud provision of the Securities Exchange Act], and you'll hear people talk about it, and there are serious issues about whether it even applies in market power manipulation cases. So there are various issues that the courts are going to have to unscramble, but my hypothesis is that until FERC's enforcement program is tested by the courts, which probably will happen here in the next year or two, the actual rules in play are a lot like the rules that California is trying to enforce in this refund case. The California ISO had this really broad statute, and it purported to outlaw behavior that was anomalous, which prompted one of our participants to wonder what "nomalous" behavior was. I'm not sure that's even a word.

Anamolous behavior is sort of like that old definition--there's a quote from the early days of the commodity exchange manipulation debates in Congress that "manipulation is whatever the gentleman speaking at the moment doesn't like," and I think FERC enforcement, through no fault of their own, is in a position where they actually are pursuing, and probably have no institutional choice but to pursue, an enforcement agenda that, essentially, is formless until the courts step in, because they're not in a position to decline to pursue something and have it come out as a problem. The one thing the Commissioners are not going to want to find out is that they missed something. So, you're going to have enforcement be, if anything, overactive, and right now, I think the state of the law is extremely unsettled and confused and I think if you talk to each other, you'll find a number of folks here feel like the market is at risk of really losing liquidity as people try and deal with the fact that they can't tell where the line between right and wrong is, and that's a difficult problem that I think the courts are, ultimately, going to have to straighten out.

Here are a couple of examples you can point to to show how things are blurred and what the compliance risks are: one of the big categories of market manipulation cases are what I call "related-positions" cases, and the Constellation settlement was an example of this. In general, you can think of these cases like this--the facts are really solid. They certainly could be serious problems. You're somehow acting in some uneconomic, irrational way in one market to benefit some related position in another market, and that could certainly cause artificial prices. If it could actually succeed, it sounds like something that should be illegal--but we have FERC pursuing cases like that, and there are a number of them, with a statutory tool kit that seems ill-suited, because you have to find fraud under the FERC statute. The case law developed under the Securities Exchange Act is pretty clear. This is a catch-all standard, but what it catches has to be fraud, and where is there fraud if you're moving prices in one market to benefit positions in another market? There's market power. Well, I guess you could have a debate about whether there has to be market power. That's a debate that several of us have had in several cases. I would say the answer is yes, because how else are you moving prices over any durable timeframe? There's a question about power over price, but how are you misleading anyone? The FERC enforcement answer, currently (you'll see this in the Constellation settlement) is that you're somehow fooling the market about the real balance of supply and demand, because you're somehow trading at a

price that's artificial, and that's the fraud. We'll see that get tested, eventually, in court. I would not be optimistic if I were the government. It's not the sort of fraud you typically think of. It's not trying to sell somebody the Brooklyn Bridge. It's not really lying. You're transacting at a price, and perhaps at prices that are very similar to what others are transacting at. So, ultimately, there's a real fundamental problem, but if you put that aside, it'll eventually get fixed one way or the other. FERC will get a new statute or something.

Where is the line? There are several pending cases, now, that suggest the line is really hard to see. I used to think it was pretty straight-forward. Are you intentionally losing money in one market to benefit your position in another market? That's how we used to talk about it in the Energy Transfer Partners case. That turns out to be overly simplistic, I think, because you can have conduct that is in the firm's interest--and you hear people talking about viewing trading on a standalone basis--because you certainly don't want people to say, "I made money with this because I made money in my related financial positions," but you can have trading that's in the firm's interest but loses money. Maybe it was intended not to lose money and failed, which shouldn't surprise anybody. It happens. I'm involved in one case, now, where it was about four months until the ISO itself could tell whether the conduct at issue was profitable or not, and they concluded, ultimately, that it lost a razor-thin amount of money, but there's a big debate and a very live case about whether the trades were manipulative, even though the expert with all the information couldn't really tell for months and months. So you have profit-seeking trades that can just lose money.

You can have trades that are risk-management trades, that have an economic purpose and that occur every day but might lose money on a standalone basis. You can have other types of conduct--price exploration, people trying to learn a business, that make economic sense and are profit-seeking on a long-term basis but, somehow, lose money on a short-term basis.

So are those problematic? Yes, they may be. If you're not tracking the profitability of a certain business very precisely, might you have trouble with enforcement? Yes, if you hold positions in other markets that are related, you definitely might, and if you're involved in organized markets with conduct like this, the price tag can get really, really large. Look at the Constellation settlement, because the potential alleged price effect can be so large.

So we have a situation where you can't give advice. I don't think anybody sitting up here could really give firm advice, in answer to a question like, "Well, can I trade positions that are related and not run afoul of the law?" There's not a good answer that says, "Yes, you can," right now. What if your trades are profitable, but you thought of them because, you were thinking something like, "Gosh, I think my financial position is not really performing as I like, and I see a profitable trade I can make, physically, that might help my financial position, but makes all the sense in the world on a standalone basis." Can you do that? I think you should be able to, but I think the answer is that it's risky right now, very risky. So, from where I sit, I have a hard time going and talking to people in this business and listening to what they do or want to do and giving them any real, firm guidance, and I think that's a problem and it needs to be worked through, but it's going to take a while.

The other category of cases that I see in my own inventory is a little harder to categorize. I jokingly call them "non-fraud fraud" cases. One is the PJM Up-To Congestion case where traders are said to have traded for transmission loss credits. There's another case involving alleged trading to collect uplift. These are interesting species of cases, because you have a tariff that offers a range of possible revenues, and, to a first approximation, one would think that it's

fine to try and harvest whatever revenue one might be able to harvest. Since you can't know what market outcomes are ahead of time, you can't really be sure what's going to happen. That seems, I think, to the lawyers looking at it, like it should be fine, but it turns out that the area is a lot more complicated than that, and you can certainly, at a minimum, have a long, expensive investigation, if you might be seen to be somehow transacting in a way that tilts your revenue stream more towards a particular area, other than just energy revenue, than the market monitor of the ISO or enforcement might like, and I don't really know how those cases can fare well in court but I guess we'll find out. I say that for two reasons. One is the tariff does say that you can get paid transmission loss credits. These are payments that just arrive on people's doorsteps, unannounced. You can't know what they are, and it doesn't take a rocket scientist to imagine that people would start trading with an eye towards them. It's money you're receiving, so why would you not take account of it? But you can certainly get in protracted enforcement proceedings by falling prey to that.

Now, what are we doing with this? Is it fraud? I would say not in any readily apparent sense. I think enforcement's doing exactly what they should do and would be expected to do, but the FERC's rulemaking on market manipulation has this little paragraph and a footnote attached to it and it tries to expand the definition of fraud in clever ways but ways that I would submit are just dead-on-arrival. It says, basically, fraud can be (and some of you have heard this) conduct that impairs the functioning of a "well-functioning market," to which I say, "whatever that means," and you could joke and say, "Why is the market flawed if it's well-functioning, and how could one impair it?" but it turns out that is close to a quote from a case from, I think, about 1950--a Supreme Court decision called Dennis, and it's really funny to see this decision cited, once you go and read it, in a FERC case. Not to poke fun, but I will, this Order 670 says, see, e.g., *Dennis*. The lawyers would know, normally, e.g. means there's a bunch of cases and we're going to give you some of them, but *Dennis* is the only one that they give because it's the only one that looks anything like this. *Dennis* is a case about communist agitators who were trying to organize unions in the '40s and lied to the government about whether they were communist in order to get access to the union halls. The question was, "Did they cause any harm?" and the Supreme Court, perhaps unremarkably, said "Well, they're trying to overthrow the United States government, so we think that that constitutes harm, and, yes, they're trying to impair the functionings of the government, so therefore, we can prosecute these guys," but that's a funny place to hang your hat here, because there already was fraud. There was lying to the government and, not surprisingly, it didn't take long for the courts to catch on to this, and there's a wonderful decision--Judge Kozinski on the 9th circuit now, who is a very colorful guy, decided a case that DOJ brought trying to use *Dennis* to go after a firm that was set up as some sort of secret, nontransparent banking center that was, basically, designed to facilitate tax fraud. The government, needless to say, didn't like this any, and so they basically charged them with defrauding the government. The government lost, and Kozinski had great fun with this and said things like, "Look, by the government's lights, if I buy my wife a radar detector, I'm defrauding the government because I'm making it hard for them to catch her speeding." Kozinski actually goes on and says that if you don't like something, this is America, you should outlaw it, you shouldn't just decide to call it fraud, and he has this wonderful quote, "There are places where, until recently, 'everything which [was] not permitted [was] forbidden….[W]hatever [was] permitted [was] mandatory….Citizens were shackled in their actions by the universal passion for banning things…'" and then he cites a Boris Yeltsin speech. "Fortunately," Judge Kozinski goes on, "the United States is not such a place and we plan to keep it that way. If the government wants to forbid certain conduct, it

may forbid it. If it wants to mandate it, it may mandate it but we won't lightly infer that in enacting 18 U.S.C. §371, [which is the defrauding the government statute] Congress meant to forbid all things that obstruct the government or require citizens to do all those things that could make the government's job easier. So long as they don't act dishonestly or deceitfully, and so long as they don't violate some specific law, people living in our society are still free to conduct their affairs any which way they please."

Now, it seems to me, if you're just dealing with a fraud-based standard, you could replace the word "people" with "traders," and you'd have a valid statement of law. If you're not violating the tariff and you're not committing fraud, what are you doing that's illegal? So for what I jokingly call the "non-fraud fraud" cases, where you're going after some source of revenue we don't like, based on this principle of obstructing a market, I think they'll die a pretty early death, so, anyway, I commend this decision to you.

Speaker 2.

I think Speaker 1 really said it well. FERC enforcement staff has a very difficult task. It's a complex market. It's a broad-based fraud statute. I'm here today to hopefully sponsor some debate, maybe get to additional clarity in the future, because it is incredibly difficult to advise well-meaning electricity traders, hedgers, arbitragers, and people participating in the market, providing price signals and liquidity, on what is and is not potentially unlawful. It's easy to advise them on steps to take to monitor and to elevate potential issues, but it's very difficult to currently identify what is unlawful and, therefore, it's creating a freeze in the marketplace, and that's not an artificial statement of fear. It's an actual statement of what's occurring in the marketplace. Most people involved in electricity trading are very concerned about their trading practices and very concerned about violating the law, and I think it's really reducing transaction levels and the types of transactions that could be helpful to the marketplace.

So today I'd like to talk a little bit about triggers and targets and a little bit about monitoring and analyzing. I'll talk about the advice that we can give now to clients and some of the open questions that remain after settlements like Constellation and after folks review the recitations and current alleged notices of violation, and then I'll just make a comment on where we are now.

On the topic of triggers and targets, Shaun Legerwood, with The Brattle Group and the Georgetown Public Policy Institute, has been issuing a number of papers that I think are extremely helpful to move forward the debate in this area. He looks at a causative nexus between triggers and targets. He looks at triggers, particularly the uneconomic trading that FERC has focused on, as well as outright fraud, and then he looks at targets, which are the positions, both physical and financial (so you could have physical positions or swaps or TCCs, congestion contracts) that derive a value from a market price that could be affected by the triggers.

I think it's interesting, too, that this framework is not only for enforcement to use as a tool to analyze and possibly detect unlawful behavior, but it's also for participants in the marketplace to better design their compliance policies to detect early potential trading patterns that may potentially violate the law. So there is an offer to the marketplace to take up this type of analysis as well to better conform behavior, and you'll see this through the rest of my remarks.

There are a number of assumptions in this type of framework (and I think it's a framework that's been adopted by the FERC enforcement staff). One is the definition of "uneconomic trading." Uneconomic trading could mean looking at individual transactions individually, and they could be uneconomic virtuals,

physicals, or other types of transactions. The marketplace could be uneconomic for a day or a period of time, but what is their actual purpose, because you can have trading that is a money-loser as an individual product but is not part of a malevolent portfolio approach. For example, you could lose money on a physical trade, and it could be used to hedge other positions in a portfolio. So, my concern, I guess, with uneconomic trading or a discussion that should be had, is how is that defined? How is that understood, and is it too fine a hair-trigger in today's marketplace?

I think another assumption is a simplified marketplace, that there's a tendency to assume that the marketplace has a static nature to it, that it is not robust or fully competitive, and that participants are not reacting to price signals, and not reacting to pursue their self-interest, both profit-taking as well as hedging, arbitrage, and other risk-management processes. So it tends to simplify the marketplace in a way.

These two assumptions, put together, to me, creates a burden shift that may or may not be perfectly appropriate in every circumstance in every market, clouding and simplifying what is a very complex marketplace. It seems to put the trader, almost immediately in a penalty box if there's uneconomic trading and a marketplace in which there could be benefit, and that does not always meet with every set of facts and every trading strategy that may exist.

So FERC's attention now, and you've heard a little bit from Speaker 1 about this, you've seen the standard--any manipulation, fraud, or a misrepresentation with scienter--intent can be shown through reckless conduct in connection with a FERC jurisdictional market. FERC is focused currently--and you can see this through recent pronouncements--on loss leader and uneconomic trading. I won't go into that too much more because that's really the subject of the discussion, except to point out a very recent quote. Here is FERC Chairman Wellinghoff after the Constellation energy settlement saying, "Do not trade uneconomically on one position in order to benefit the value of another." So that's a very direct and stern warning to the marketplace.

I also look at what FERC is looking at now--related or cross-market or cross-product trading, which don't always necessarily need to have economic loss associated with them. You could be trading and have an economic motivation, but it also could be viewed as attempting to benefit a product in another marketplace.

High-volume or large-position trading [is another area of attention], and I have here a note about Texas. Texas also has a rule, 503, under their regulations, which is an extremely broad antifraud, anti-manipulation standard. They also say in a number of pronouncements around that rule that they will look to FERC as, essentially, a floor, and they have a number of defenses to claims, which include things like due diligence and legitimate business purpose defenses. So Texas is not immune from this discussion, either. So the whole nation is really involved in, I think, an important debate right now.

I'm not going to go into vivid detail here. To summarize a few recent Notices of Alleged Violation that I think fit into one or two of the categories that I've just mentioned, the BP America notice has to do with uneconomical and high-volume trading. The allegation is that the intention was to lower the Houston Ship Channel indices to favor BPs swap positions. Deutsche Bank is a series of physical trades to allegedly influence congestion revenue rights. Barclay's is establishing an index position flattened by a fixed-price position, and that fixed-price position in the physical market is alleged to have impacted ICE clearing prices, which were the prices against which swaps would settle.

The Constellation Energy Settlement. In short, the FERC approved a settlement between enforcement staff and Constellation on March

9th, and you can read into it what you will, but please note that FERC also approved the Constellation-Exelon merger on the same day. Also, note that the settlement is a settlement. There is no admission or denial of wrongdoing, and it is an agreement as to certain facts. Also note that Constellation issued a press-release, I believe it was that Friday or that Saturday, that said that Constellation was involved in lawful portfolio risk-management transactions.

So what did enforcement staff find, or determine is probably a better word, or conclude? They, in short, concluded that, when Constellation had long contracts for differences, swaps in certain zones--in New York, for example, zone A--that Constellation would do virtual load bidding and export physical power, both in the day-ahead market, to influence the day-ahead market-clearing price of zone A, in that example, to create a sense of scarcity and to increase price to benefit the swap position. The reverse is true as well, where there was a short swap position, virtual supply bidding, and imports to create downward pressure on price. FERC also noted, importantly, that this was done in very high volumes, and that these day-ahead transactions, virtual and physical, were done with utter disregard for profitability and, often, at a loss as individual transactions.

Constellation was, as I'm sure you all know, ordered to disgorge $110 million of unjust profits and, as accepted by the FERC commission, agreed to pay a civil penalty of $135 million. Individuals were banned from trading at the company. The settlement noted that Constellation had already started to engage in monitoring of profits and loss concentrations in virtual and physical trading and to document, basically, strategies around those particular types of transactions.

In the settlement, Constellation agreed to retain and monitor trading communications, to adopt enhanced compliance policies, and to make semi-annual compliance reports to FERC.

So what's the advice? This is a slide almost taken from client communications. This is the type of advice that clients are seeking and are hopefully considering. One is, monitor your profit and loss, not just on a portfolio basis. So you have a generator and physical transactions, virtuals, hedges, but you're looking at your P&L on an individual product basis. Clients sometimes resist that because it still does not make sense to them that profit and loss should be analyzed on anything but a portfolio basis. So this is a bit of a struggle, but this is the recommendation. It's also a recommendation to look at margining. A lot of rules already exist on ISO tariffs where products that are losing money will be margined. Virtual trading in New York has a margining process where a party that loses money will have to put up more credit. That could be also monitored and review often. This is not a periodic thing. This may be as much as a daily activity. Monitor the position size individually and also as a group. It's trading volume, it's frequency, and it's direction, long or short. Monitor physical and financial trading that may settle in the same or related markets--that's the issue here. Are you trading in one market that could affect the indices or the market-clearing price that could benefit another product? What's important here is that a lot of trading companies have individual traders that they believe are on different sides of walls, or they have different affiliates trading in the same market so that the advice gets more complex and more difficult as you have additional affiliates, different trading strategies, quant strategy which is driven by computer algorithm versus someone that's a gut player doing something that is more proprietary in nature.

Then what do you do with this information? Say you see that there are consistent losses. How do you flag, elevate, analyze and contemporaneously document what's actually occurring? I think that's critical, for traders to understand that it is no longer the environment to not feel comfortable with documenting an

explaining contemporaneously what a trading strategy is, especially if, over time, it may hit one of these triggers. Clients continue to ask, "This doesn't make sense for my trading strategy. I have one affiliate that is trading on a day-over-day basis. I have another affiliate that is managing an asset. I have another affiliate that is taking a weather-driven approach. We occasionally see the same market signals in the same market. We may be against each other. We may be trading markets at the very same point. Are we in trouble?" My answer to them has been that you must monitor and you must devote resources and brain power to understanding contemporaneously, day-over-day, what's occurring, because of the current atmosphere, and a lot of them say, "It's too risky, I'm not going to do it, I'm not going to bother," so I'm done.

So how to determine what's lawful or not. Here's the press statement I referenced before related to the Constellation settlement. So you had Mayo Shattuck, the chairman of Constellation, saying, we did nothing wrong and you had Chairman Wellinghoff saying, yes you did, and what's interesting about this, if you peel back the settlement, is that you can start to understand what Mayo may have been saying. They give examples of the size of the swap position, the size of the virtual position and the direction and the size of the physical position, and you can start to play out, in your own mind, based on public information, what the position may have been or what the defense may have been, and it may have been, based on public information, that Constellation was involved in risk-management and hedging. If you look at the proportions of the trades, it's about 10 to 20% physical virtuals to swaps. So you could say, well, it's a risk-management approach. It's physicals to hedge a position in the opposite direction as the settlement describes, and it's a virtual play to move exposure from the day-ahead market to the real-time market so the swaps are not fully exposed to a day-ahead market price. They are exposed to two prices. That could be what the defense was. That could be what the CEO was referring to.

So with all of this, how do you determine what is lawful and what is unlawful? Again, my message, and it sounds like Speaker 1's as well, is you just have to be very careful. You have to monitor. You have to understand that it is no longer clear what is lawful and unlawful. My classic example in this is if you're a trader that is looking for a single event over a month, for example, a transmission outage or a very hot day, you may transact in a market and lose money for 29 days but make every penny of it back on a single day because of a weather event. Is FERC going to look at that and say, "You lost money for 29 days, you must be up to something"--when the strategy is one that stock-traders do, a common strategy, to stay in the market over time to capture a high-price event or an event that is favorable to the position?

I think the message here is that you can go through the triggers and targets. You can detect the particular transactions. You can start to hit a lot of issues, but do you get to an answer? I would say, in some instances, yes. However, in other instances, you're in a risk-mitigation mode, and you are trying to detect behavior based on settlements and the notices of alleged violation and trying to constrain risk as opposed to knowing with specificity what is lawful and is not lawful.

Some other open questions. What is the day-ahead market? A lot of these transactions involved the day-ahead market. The day-ahead market is characterized by ease of entry and participation. You can go in and sign up and participate. It's really a financial market. Nothing really happens in the day-ahead market. The rubber hits the road in the real-time markets. So there's a rational expectation in the day-ahead market that you will see people taking different positions, hedging, arbitrage, trying to diversify positions in the day-ahead market. You also have rational expectation that there'll be a

lot of activity and people responding to price signals in different ways. So that's driving to this idea that's a very liquid and actively-traded market that, probably, is not susceptible to manipulative conduct, but there's this other side to it which is--often, all conditions are not perfect. All information is not perfect. Sometimes there is an abundance of trading by one participant that may inject information into the marketplace that confuses the marketplace.

On the nature of the day-ahead market. It's financial, and just as food for thought, is it really a FERC-jurisdictional market? (This is just for fun.) In the day-ahead market, there's no transmission of electric energy that occurs. There's no wholesale sale of electric energy. No title really transfers. So you have to ask yourself, is it truly a FERC-jurisdictional market? What is this market? Is it a financial market? Is it subject to shared regulatory authority, possibly with CFTC? Or not? I put that out there, not as a statement but as a question for the rest of the day to see if anybody wants to bite on that one, but it does illustrate a point, that it is a financial market.

Another open question is price effect. Another issue (food for thought) is, how does FERC enforcement staff demonstrate price effect? The penalty guidelines look for either market impact or pecuniary gain of a potential target of manipulative conduct. How does FERC identify what impact manipulative conduct causes on the marketplace on a day and overtime? If it's a market rerun, ceteris paribus, all things being equal, pulling out the trades of an individual trader and then rerunning the market, that seems artificial to me (artificial meaning inaccurate) and there is significant case law saying that that is illogical, because the market reacts. In the day-ahead market, if there is an impact, the market should, in theory, assuming that it's operating correctly, which is certainly a question, should have the ability to react to the market price, either on an arbitrage or hedging basis.

So I'll leave you with this, just to try to take a different look at this. This kind of reminds me of the Volcker Rule. So the Volcker Rule is that FDI-insured banks should not be doing proprietary trading; in other words, trading on their own behalf and risking taxpayer money. So I look at this and it looks like, to me, appropriately or not or within the spirit of the political and economic climate, that FERC enforcement staff is taking a similar view, which is that proprietary trading, having big positions that require leaning on FERC-regulated markets to manage those positions, is not good public policy. It just reminds me of the Volcker Rule in a lot of respects, because it involves proprietary trading, large positions, and what is appropriate, because if these large positions require leaning on FERC-regulated markets, it's likely FERC enforcement's view--and they're here, so they can obviously speak for themselves--that that can harm rate-payers and it can cause changes in dispatch decisions and reliability and also create costs or inefficiencies in the marketplace that are bad for rate-payers.

So, it just seems like, generally and nationally, we're in the middle of a debate where proprietary trading is of concern and may be rightfully so, but the dissimilarities are equally important to me, which is that the Volcker Rule is being debated publicly. What we're discussing now is, generally, the subject of nonpublic FERC enforcement. So, there is not clear guidance. Again, it's not to say that FERC enforcement is not doing an excellent job, and they are, but it is to say that the marketplace is unaware or is having difficulty understanding what is done that is not in the public realm. So I'll leave you with that.

Question: Just one quick question and it may be, as I think about it, there seems to be a difference of opinion about, that's nine and six is the settlement, clearly there's a reputational issue. Clearly there's a money issue. What eludes me, particularly when

you participate in negotiations like this, is what is the legal content of these statements that neither admit nor deny, and maybe you could all start with a comment about that when you finish, because this seems to be a major element in the toolbox of ending some of the process.

Speaker 3.
I am somewhat unique among the panelists in that my fellow panelists typically represent the supply side interest in the market. I come at this from the other side of the meter, typically. I represent large, commercial, industrial customers and I'm approaching this issue from a consumer perspective.

What I want to do at the outset, though, is scale back out to a 50,000-foot level. We've been talking a lot about FERC enforcement but, looking at energy markets, generally, and the types of products, virtual or physical, natural gas, electricity, pool, bilateral, and trying to match that up with the relevant enforcement authority and looking at it at various layers of the market. We have wholesale market, physical transactions. We have a filter-down effect to retail market, to retail consumers, to retail marketers, and trying to match up the types of products in the left column with the agency, state or federal, or quasi-agencies in terms of independent market monitors or public utilities in terms of RTOs, all with a role in the detection, prevention, and enforcement of manipulation in energy markets and, really, there is no right answer and that's an unfortunate aspect. Some of the other panelists have hinted at this, but there is a lot of confusion about who is ultimately in charge of what products and it becomes particularly difficult when you look at some of the examples that have been mentioned today, where you have virtual transactions tied to some type of physical market and does FERC regulate half of that and the CFTC the other? Does FERC have 100% jurisdiction? Does CFTC have 100% jurisdiction? It's really a patchwork and, from a customer perspective, it scares us.

One of the issues is, how do consumers ensure that they are protected from manipulation in the markets? We've talked a lot about prevention of manipulation--how do you advise suppliers about what is or what is not manipulation--but, looking at the law from the customer's side, customers are, generally, not permitted to intervene in FERC investigations. There are provisions in FERC regulations, 18 C.F.R. section 1B that states, specifically, that no parties are entitled to intervene in FERC investigations. Even when settlements are reached between enforcement and the market participant and are approved by the commission, generally, there's not a right of intervention to challenge that settlement, and we have seen in that past where settlement agreements have stated that this is FERC's final statement on the entire matter, that this resolves all issues related to this particular matter, and customers have no right… It really came to a head in the Edison Mission case several years ago. The issue went to the DC circuit and was, ultimately, withdrawn at the appellate level because the right of intervention by consumers or state commissions or wholesale customers simply does not exist in the enforcement context or in a situation where FERC approves a settlement between enforcement and the market participant.

Another aspect is that the IMM's reports to enforcement and any ensuing enforcement investigations are generally not made public. They are not reported, even on an anonymous basis. So from a customer perspective, we don't know whether the market monitor has referred zero issues to enforcement, a hundred issues to enforcement, a thousand issues to enforcement, and what the disposition of those referrals has been.

Another concern is that customers have no ability to obtain evidence after the fact. So even when a settlement has been reached, and even if the outcome is just penalties and fines and FERC has not addressed a refund aspect or a

disgorgement aspect to the action, there's no ability for customers to get the evidence that led to that settlement. The ability to get refunds is extremely limited. Contracts and possibly even settlements involving tariff rates are generally protected by the Mobile-Sierra and the Morgan Stanley decisions. What that means (and this issue has come to a head recently in some of the remand proceedings, as an outgrowth of the California refund cases) is that in order to get refunds, customers that are parties to a contract must meet a very high standard. They must show that manipulation occurred and that that manipulation directly affected the price of the contract. Refunds are, generally, not permissible under Federal Power Act, section 206 or Natural Gas Act, section 205. The statutes are written such that any relief is prospective. So, for example, if manipulation does occur, if conduct that produces unjust and unreasonable rates occurs, the ability to get refunds associated with that conduct is extremely limited. Even when there are refund possibilities, FERC has expressed a general reluctance--this is not yet quite definitive, but a general reluctance to entertain ripple claims. So if supplier X causes a higher price to supplier A which is in turn serving customer B, customer B doesn't have the ability to go after the first supplier, and we've also seen, from the Commission, a general reluctance to undo or rerun cleared market results. And if action by one bad actor increases a market clearing price, should all suppliers refund their portions of the overcharge, and, if so, how?

So the one-two punch for consumers is that FERC's jurisdiction over the actions in the market is generally considered to be exclusive, and the jurisdiction over customer refunds and reparations is generally viewed as being exclusive. Customers cannot go to a state court or a US district court and generally challenge actions or misconduct in FERC jurisdictional markets. The second part of that is that the judicial precedent is pretty clear that FERC's discretion is at its zenith when fashioning remedies and sanctions. So in the Constellation case, for example, where FERC rendered its approval of a settlement that involved a combination of fines and penalties, any customer's ability to challenge that outcome is virtually nil.

Some of the recent trends of enforcement-- what actions by market participants have triggered actions by FERC enforcement? Failure to adhere to Commission-approved tariff and market rules, and this includes issues regarding, in the natural gas industry, the requirement that a shipper must have title. This includes issues regarding filing in compliance with market-based rate authority. Outright fraud is a primary area of focus. We have seen, just in the last 18-24 months, an expansion of FERC enforcement into demand response activities. We had a case in PJM. There was a case involving several actors in New England, but we're seeing a trend where FERC is looking at all aspects of the market, including demand response.

What we're not seeing is a lot of analysis of any exercise of market power. We know that, in some markets, market power exists. FERC tends to rely heavily on mitigation measures and independent market monitors. This has not been a focus of enforcement. A lot of the enforcement activities have been on traders and public utilities that are not vertically integrated. We see very little in the enforcement realm for vertically-integrated utilities and also, recently, we've seen analysis of market distortions causing prices to go up or down and for FERC, perhaps its central focus is protection of markets, in some sense, and anything that causes prices to go up unreasonably or inefficiently or go down unreasonably or inefficiently has prompted FERC's attention.

There are some areas for improvement. I think there has to be a greater consolidation of energy market monitoring and enforcement in a single agency, whether that's FERC, whether that's CFTC, whether it's the Department of Justice,

whether it's the Federal Trade Commission, but a single agency that is able to see better the connections between physical and financial electricity and natural gas, because there's certainly an interrelationship among all of those.

We need to clearly define the standards against which conduct will be judged. As other speakers have noted, this affects market liquidity. It affects market certainty, which has a downstream, adverse impact on consumers.

We need to specify clearly, in each case that becomes public, the market impact of the conduct, and this is something that does not occur very often in enforcement settlements. So, in the Constellation case, for example, there was a refund component, but what we don't know is whether that was a large percentage or a small percentage of the overall market impact of that conduct. Why is that important? It's important for market design purposes and all of the ISO and RTO markets. Market design is an ongoing and constant discussion. Markets are tweaked almost weekly, it seems, and having better information about the impact of the conduct, I think, would lead to better market design decisions.

We need to provide adversely-affected customers and any adversely-affected suppliers (because there are suppliers that are adversely affected as well) with opportunity to seek full redress. Again, FERC has typically foreclosed that opportunity, has not given affected market participants either the evidence or the procedural opportunity to seek redress.

Finally, we need to shift some of the remedial focus from penalties that line the pockets of the US Treasury to refunds and disgorgement if there is, in fact, manipulation. It's customers that are being adversely affected. It would make sense to try as best we can to get whatever money is available back to those that are adversely affected. Thank you.

Question: Just a quick question on your point number four about full redress. Would that be a matter of requiring a new law or could FERC just make a new rule?

Speaker 3: To be fully effective, I think it would require a statutory change. I think there is some legal ambiguity about customers' ability, under section 306 of the Federal Power Act, for example, to go back and get refunds. Ideally, it would be a statutory change. There is also a procedural element to this, too, and that is getting the information to customers to allow them to pursue that opportunity. So, rather than having FERC enforcement determining what customers deserve, let's let customers have the ability to litigate and seek redress. There are parallels, I think, to some of the actions that are taken by Department of Justice in levying civil penalties in price-fixing cases, and then there's typically ensuing litigation to determine what the adversely-affected consumers or market participants are entitled to, and that's usually a follow-up litigation.

Speaker 4.

One of the advantages of going last is that you can just about say, "Me too," and let everybody go get coffee, but lawyers don't generally do that and I'm not going to either. What I do want to do is focus a little bit on the other big dog in this hunt, and that's the CFTC. I think something that highlights it pretty clearly comes out of the actual fraud and manipulation statute. So if you look at FERC, on the regulation on 1c. 2, it makes it "Unlawful for any entity, directly or indirectly, in connection with the purchase or sale of electric energy or the purchase or sale of transmission services subject to the jurisdiction of the Commission," to do any of a number os specified fraudulent things.

Interestingly, for 30 years and longer, for the CFTC, their anti-manipulation statute essentially read, it is unlawful to manipulate or attempt to

manipulate the price of any commodity in interstate commerce or of a futures contract (and I'm paraphrasing a little bit), and only with Dodd-Frank did their authority in that realm transition to something that looks like what I just read to you from the FERC regulation, so that it now says, in the CFTC's authority, it is "unlawful for any person, directly or indirectly, in connection with any swap, or contract of sale of any commodity in interstate commerce or [futures contract] to intentionally or recklessly" engage in any of a number of specifed fraudulent activities, and it's the same fraudulent activities that are outlined in the FERC regulation.

So, where does that leave you? From some perspectives, and I think FERC's included, it leaves you in a space where, relative to futures markets, potentially, you have the possibility that you'll have enforcement action brought by both the FERC and the CFTC. That actually existed before, but the statutes were sufficiently different that the regulators had to prove some different things. The CFTC has a provision in its statute, however, that gives it exclusive jurisdiction over futures markets and recently, in connection with the Amaranth and the Brian Hunter cases, the CFTC has thought it appropriate to intervene to assert its exclusive jurisdiction and, in essence, say the FERC has no jurisdiction over the Amaranth matter or the Brian Hunter matter because he only traded futures contracts on designated contract markets.

In April, the CFTC submitted its most recent brief on the subject, and there are a couple of quotes out of it which I thought were informative. The "CFTC has intervened in this appeal by Hunter of the FERC's findings that Hunter manipulated gas markets by his futures market trading and imposition of sanctions including a $30 million fine." And "The text of the Commodity Exchange Act ("CEA"), the legislative history of the statute, and the case law interpreting and implying the exclusive jurisdiction provision in the CEA establish beyond cavil [I think that means you can't argue with it] that FERC has no jurisdiction over the futures trading at the heart of this case, and nothing in the [Energy Policy Act] indicates otherwise." They go on to say, "As this Court [meaning the DC circuit] has recognized, '[t]he aim of this provision…was to 'avoid unnecessary, overlapping, and duplicative regulation.''"

It might all be true, but Congress seemed to see fit to create overlapping and duplicative regulation, because not only does it exist as between FERC and the CFTC, but shortly after the Energy Policy Act, they gave the same sort of authority to the Federal Trade Commission, and the constraints on them were that their manipulative authority extended to crude oil and refined products, including heating oil, diesel, and other kids of fuel oils.

So for those of you who have anything that uses oil these days (which I doubt given the price of natural gas) potentially, you have three sets of regulators, all claiming, fundamentally, the same authority. Now, I haven't yet seen (and I don't know that it's been filed) the FERC's response to the CFTC's brief, but what comes to mind is that there's 78 years of authority around section 10B of the Securities and Exchange Act which is the basis for these regulations and for the underlying statute, and across those 78 years of precedent, there are dozens, if not hundreds, of cases interpreting what "directly or indirectly" means and what "in connection with" means, and I have no doubt that our friends at the FERC are digging through those as we speak to come up with the appropriate response to the CFTC.

It's an interesting conundrum, in a sense, because, obviously, when section 10 was enacted, and as the court went through interpreting "in connection with" and "directly and indirectly" as it related to the securities markets, they weren't confronted with a second statute which said this other agency over here has exclusive jurisdiction. So where this will all

come down, I think, is going to be pretty interesting, but at the moment, where it lies is that if the CFTC wins, the FERC's $30 million fine and other penalties against Hunter, presumably, go out the window, because they didn't have jurisdiction to deal with it, and there'll be a circuit court ruling that says that they don't have jurisdiction over the futures markets, irrespective of whether there is some direct or indirect impact on the physical markets.

Where does that leave you? Well, the CFTC statute says "in connection with the price of a commodity in interstate commerce." Again, well-litigated terms, "in connection with interstate commerce." Broadly then, if it's a commodity, the CFTC can claim authority over it, and I think they probably do. Generally speaking, you can see all kinds of things where they have asserted jurisdiction, including cheese and milk and some other stuff that may well be a commodity but I don't think we've ever really looked at them that way, and electricity will certainly fall into that category. What is interesting to some degree is that in connection with Constellation, we didn't see the CFTC. Whether that was a policy decision on that part, whether they weren't aware of it, who knows, but it's an interesting space that we find ourselves in, and Congress has done it, presumably, intentionally, because they have used, fundamentally, the very same language.

I want to skip ahead to a couple of things, because we've been talking about uneconomic trading, which sounds almost like it's a new phenomenon in the enforcement tool bag, and, to some degree, I've looked at it that wa,y but I would harken you back to a case called CFTC ve. DiPlacido, and it is informative on a number of fronts. One, it is an electricity-related case and it started, roughly-speaking, eleven years ago with the investigation. John DiPlacido, who is the defendant in that case, was a floor broker on the NYMEX, and he was trading PJM and California-Oregon Border Futures contracts, and he had a customer by the name of Avista Energy, and they had over-the-counter options that priced against the penultimate day settlement of the NYMEX contracts, and, over the course of basically nine years of investigation and litigation, ultimately it was determined that DiPlacido who, at the customer's direction, was going into the market and, essentially, selling a market down or bidding it up, in either event, at losses, was doing it because the Avista options positions were going to be benefitted from it. At the end of that nine years, the decision of an administrative law judge (because it was tried before the CFTC's administrative law judge) was then appealed to the CFTC and, after about nine years, was affirmed by the second circuit.

One of the reasons it's remarkable is that it is the first and only time that a classical manipulation case has been tried and won by the CFTC, and a lot of the reason behind that, actually, was that the old statute was, in a sense, a little more difficult for them to make their proof with. I think, especially recognizing Speaker 1's comments, I think whether this new 10B-type authority will actually make it easier, remains to be seen, and, again, the 78 years of 10B history have a lot of play in them and we'll see where that comes with the court action as we go forward.

One of the things, I think, from the CFTC perspective, which is a policy position that enforcement has taken and has articulated fairly publicly in a number of different places, is that their new approach is that, essentially, as you come to settle, if they determine that they are willing to settle with you, they will give you an offer. They will give you one offer. They will not negotiate with you. You can take it or leave it. I think what we're starting to see, as a consequence of that, is a lot of people are saying, "Leave it," because settlements, certainly in the litigation world, are almost always negotiated and the "take it or leave it" approach probably will lead us to more and more cases finding their way into the courts, and

I do think that that will be useful, because one of the problems with the whole manipulation area from a CFTC perspective has been that there isn't all that much precedent out there, and I think we'll get more and more precedent as more and more cases, actually, are brought to the courts.

Speaker 2 was talking about the problem of how do you deal with your clients, what do you tell your clients to do, and he was talking about monitoring and surveillance things and I want to be brief on this (and I know I'm doing a scattershot), but it's an interesting place for people who have to look at what their traders are doing, because you can have opposite positions in markets. Most of us would call that, in many circumstances, "hedging," and, as a practical matter, if I am actually hedged, my position in one market is going to be losing money while the position in the other market is gaining money, and I don't say that to say that there's not a place for enforcement activity around excessive use of one market versus another. What I will say is that, as you look at what your traders are doing, one of the things you need to be looking at is the leverage that they have in one market versus the other, because, if you're looking at it on a 1-for-1 basis, you can clearly, in most instances, articulate a hedge. If you're looking at it on a 1.5-to-1 or maybe a 2-to-1, that may still be a hedge, because maybe, given the way the products set up against one another, you have to align them in multiples, but if you start getting into 3, 4, 5, 6-to-1, and you're seeing those economic losses on the 1-side, I'm not going to tell you that it means somebody's doing something wrong, but I am going to tell you that, from your monitoring perspective, you may want to take a deeper look at it. Going down the line, the hedging is easy.

Asset optimization is a big part of trading activity for a lot of companies, and the problem with it is it starts to look like speculation at some level. So, you need to be mindful of that. A trader who looks at you and says, "I'm just optimizing," that can mean a lot of different things, and you've got to dig deeper. Obviously, given the public discussion of speculators, those evil villains that they are, if you're in proprietary trading and you're really doing it from a trading perspective, then you need to be, obviously, more careful.

I was on a panel like this a few years ago and my topic was, actually, on surveillance and monitoring, and, at the time, I had been assisting a company with putting some of those things together, the actual, practical, what are you doing and how are you going to do it, and one of the things that existed at that time as a real problem was that most companies didn't have systems from the paper side, the financial side, that really talked to the physical side, so that when you started to try and put your monitoring tools together, you weren't dealing with a single database and you couldn't, then, align them in the right ways to actually show what was going on. I don't know whether that's changed for companies. My suspicion is most companies have not changed that very much, given what occurred in 2008 and since then, because the process is expensive and trying to get it all done would take a lot of time. The one thing I will say about monitoring, generally, and it's a real hurdle for people and I'm cognizant of the comment that Speaker 2 made that some people just say, "I can't do it, it's too expensive." It is too expensive and, unfortunately, it's a necessary expense. All of the tools that you need to put together are going to take time, and they take people who know and understand not only what the markets do, but what your individual traders do and how to look for things in that fashion, and, probably, apart from systems, the single, greatest hurdle that you find, in this area is people. There aren't very many people that can actually sit back and look at what the traders do, other than traders, and understand what they're doing. That's the challenge for a lot of folks--finding the right people who can sit back and have a look at stuff, and whether it's the folks at FERC enforcement or it's the folks at

CFTC enforcement, they spend a lot of time on that stuff, and it takes them a long time to bring things together. Whether they're getting them right, whether they're getting them wrong, I'm not challenging that, at this point. I'm a defense lawyer, so you can guess what my position is on most of the cases that they bring, but it's complicated stuff, and you've got to find the right people to get there.

With that, I would just leave with one last comment, which is around the whole Federal Trade Commission Authority. Probably because it hasn't yet gored the CFTC's ox, the Federal Trade Commission came out with an industry-wide subpoena to, basically, the oil and refined products participants, and among the specifications were to describe and submit all documents discussing the factors influencing the costs, risks, and benefits of holding crude oil or light petroleum stocks, the impact of the company's decisions relating to crude oil or light petroleum stocks on the value of derivative contracts, to submit all strategic commands relating to the company's buying and selling of derivative contracts, which included futures options and swaps, whether exchanged, traded, or otherwise. To my knowledge, there was no challenge from the CFTC on the FTC's authority to be asking for this. As I say, maybe they didn't know about it, maybe they don't see any reason to get involved at this point, but it goes back to the point that we have got regulators from at least three different places who seemingly, at least until the courts decide otherwise, have the authority to engage in investigations and litigation relating to manipulation and other misconduct.

Question: That last remark you tossed off, if that was in a criminal context, that would clearly be impermissible. It's a fishing expedition. But, it raised the question in my mind, do any of these agencies or do any of these statutes have criminal aspects, and I image it wouldn't be the FERC or the CFTC, it would be US attorneys enforcing. Are they out there?

Speaker 4: Yes, is the answer. There was a time, and I don't know whether it is still occurring, but certainly, the word on the street was that the CFTC was effectively referring any major case to the DOJ, and what DOJ chose to do with it is then up to them. There's, obviously, the President's group that brings together the SEC, the CFTC, FERC, DOJ, and others on the market manipulation and there is, in fact, a criminal fraud statute within the Commodity Exchange Act but, equally, there is a separate criminal fraud statute in connection with commodity and securities pricing. So, yes, it's a big risk and, periodically, it becomes a litigated matter. I suppose the most recent one would have been the propane traders for BP.

General Discussion

Question 1: I think you all have presented us with a very interesting conundrum. Sitting on an ISO board markets committee, we often talk about the appropriate level of detail of governance versus getting in and trying to do the ISO's work as we look at the markets. I'd like each of you to talk a little bit about the appropriate level of enforcement which is necessary and required to prevent market mitigation and the appropriate level of involvement. Because if we overregulate these markets, frankly, the traders will go away and look for other places to achieve profitability. I'm very concerned that if we overregulate, the markets will go away. And if we underregulate, then we have illegal and inappropriate activity.

Speaker 1: I would say that it would be very helpful to the regulated community, and I think ultimately very helpful to the markets, if one simple thing were done. Yes, there can be fraud, and where there is fraud, there should be liability. But absent that, let's have rules, let's have tariffs. And if the outcomes produced by those rules aren't what the regulators or the ISO

want to see, let's change the rules and move on, rather than decide that something has to be prosecuted. And you know, there are a lot of enforcement investigations that go away in the dead of night, appropriately. The staff drops a lot of cases. They do the right thing when they do, because they find there's no intent and there's no violation. But if you're put in that posture, and almost most cases do go away, you've been penalized, because it can cost you millions of dollars by the time you've produced millions of documents and go through two or three years to deal with it. So I just wish we had more sort of a rule of the law approach and less after the fact condemnation of people responding to the incentives that the tariffs create.

Questioner: Let me make sure I understand what you just said is that if something is permissible within a tariff, even if maybe it's not a good idea, it would be appropriate to let it occur, and then look at changing market rules going forward?

Speaker 1: Well, if it's not fraud, it's not market manipulation, then yeah, change the rules and, move forward with the different regime and take care of the conduct that way. And the Commission does that a lot. What is interesting is that the Commission (and this is not really enforcement's problem. They're handed these cases.) enforcement and the Commission, in a number of instances, say, "We're going to change the tariff here. We don't like what's happening, we're going to have enforcement go investigate it," which is an interesting conundrum, because you're sort of admitting that the rules were attracting behavior, and you're changing it. What's wrong with the behavior, other than that it's doing what the rules promoted? But you see enforcement investigations coming at things like that, that I think are just people following incentives that the rules create.

Speaker 3: I think your question really gives rise to two issues. One is the standards, rules, tariff-type issue that Speaker 1 highlighted. And I agree with him. I think if a market participant's interpretation of a tariff can be considered reasonable (and I know that's an ambiguous standard) but if there is a reasonable interpretation of a tariff, if there is a legitimate interpretation of a tariff, I think the market participant's interpretation should be given deference, and the conduct should be allowed to stand. We've taken that position in some recent FERC cases regarding issues in the PJM markets.

Your question, though, also gives rise to another issue. And that is, what is the appropriate level of monitoring? How sophisticated should the monitoring be? And I think it was Speaker 4 who mentioned that within companies, you're struggling to find the experience and expertise to self-monitor. And you take that, and when you expand it to an RTO level or to a national level at FERC, I think the challenge becomes much greater. These are extremely complex and sophisticated markets. There is a lot of interrelationship among the various types of energy commodities--whether it's oil influencing electricity prices, electricity consumption influencing natural gas exploration and production--there is an interrelationship here that, looking at it from a customer perspective, we fear there is not sufficient monitoring on a holistic basis. And I think, whether it's the federal government, or the federal government in concert with ISO/RTOs, but we need to reach that level of sophistication, where you're on par with the most "creative" traders in the market. And that's a challenge. That's a real challenge.

Speaker 2: One quick add-on remark is, for many of these claims, like the Notices of Alleged Violations that are out there now, there doesn't appear to be an indication that a tariff rule was violated. Or, said differently, the rules of the open market have been followed. It's really a question of whether there has been a

fraud in the marketplace itself. You can prescribe rules in tariffs, but creative people will do creative things.

But you know, I also look to the recent series of cases. A lot of them dealt with size, frequency, and things that you see in the current marketplace are being addressed in other markets through position limits and position monitoring. Several ISOs (again, I think I mentioned it when I spoke) have margining requirements, which are essentially losses against credit posted. There are tools probably in place now that can address and remove economic incentive or the ability to trade at certain volumes, and there may need to be a further public discussion about other types of limitations around global issues of size, scale, scope and frequency in a marketplace, which if held publicly, could allow all market participants to have a whack at it. It might be useful in tariffs to try to put some sort of constraint around the marketplace, without going so far as to overprescribe and force out people that can create efficiencies in the marketplace, while making sure that things don't get wildly to the other direction at particularly high volumes and create high risk for the marketplace.

Question 2: Here's what I'm struck by. You know that I went to school here. I was taught about Type I errors, which are when you let the free man get hung, because the rule is too tight, and then you have the other error where it's too loose, and then the murderer goes free. And here it seems like everyone's getting hung together, because you don't have a standard that seems to be open that people can look at, because you're going through enforcement, as opposed to a rule making process. So I guess I would ask that you comment on either that comment, if you feel compelled to comment on that comment, or could you imagine the parameters around a proposed rulemaking that would get at this in a way that people would have certainty around the process and the end result?

Speaker 2: Just a quick remark. That was sort of what I wanted to have a discussion about. I don't necessarily take a position either way. The last slide, bringing up Volcker, etc., was to get at this idea that in order to elicit or, well, create notice to the marketplace, as well as to arrive at clarity and appropriate results, some of this might be better done in a public forum. For example, what is legitimate risk management, versus something that looks like legitimate risk management but is actually an effort to influence price in a malevolent and fraudulent manner? So, yes, it just seems that the debate is worth having. And some of it is occurring in journals, and some of it is occurring in the press. But it would be good to organize it with the right people at the table. And maybe you do that through a rule making that attempts to at least define--maybe looking at past history. You know, what's going right and what's going wrong, and trying to define around that in a rule making.

Speaker 4: I think that the notion of a rule making is interesting, but I'm not sure that I'm in a space where I could see how you could get there. So rule making is going to be one of two ways. Right? This is lawful, or this is unlawful. And I've been around traders for 35 years. And I can assure you that whatever that list looks like, as soon as it's out there, and it says, you can do this, that's what they're going to do, and they'll find creative ways to get to an appropriate economic result for the trader as a consequence. I don't know that you could actually outline in any meaningful way what conduct is or isn't appropriate. And I'll use the example that I spoke about earlier, which is, one of the things that I counsel people to deal with is, look at the leverage. Because the more leverage there is on your financial position, then you want to look at what's happening on the physical side, using that as the example. Well, what's the right amount? Is it two? Is it ten? How do you get there? And there may be perfectly appropriate and legitimate reasons for having a leverage of ten to one against production out of a well, for example. And there may equally be a lot of

reasons why that's not appropriate. So I'm not so much in the space of thinking that the regulatory answer is out there, because I don't know that there's a panacea for this.

Speaker 1: I agree with that. I think you get the wrong answer out of rulemaking. It would be a protracted thing. But it would be a good idea to have much more public debate about some of the particulars of some of these cases and what sorts of fact patterns are drawing enforcement's attention at a stage earlier than the bit we see now. The "show cause" orders coming out would certainly promote some of that. But you know, in areas like this, Congress has typically passed vague statutes. The Sherman Act is an example. And you've got 70 or 80 years, however many years of case law, that's given it some definition now. And 10B has a lot of mileage in terms of case law under its feet, too. And so I suspect that in a few years, we'll have considerably more definition to all of this. But in the meantime, FERC has to be aggressive. Look at what the SEC's doing. Look at what the CFTC's doing. They're not going to sit back, and you can't expect them to. So they're going to press the boundaries of what is a vague statute and refight fights that the SEC fought and lost a long time ago. And the courts are just going to have to straighten it out, I think.

Question 3: I came in a little late, so I apologize if you've covered this. But my experience reflects that with regulatory staff, with enforcement staff, often times inability to respond to requests or to gather information is interpreted as part of the market manipulation. So the question I have is, what's the level of sophistication that the enforcement staff believes now exists in the market for monitoring and surveillance? Again, my experience in the past is that they think it's a lot more sophisticated than it was and probably is. But what level of monitoring and surveillance should we be reaching?

Speaker 1: You mean companies?

Questioner: Yes.

Speaker 2: I think your comments are right, that there's probably a mismatch between expectations and what actually exists day over day in the marketplace. You know, it is a human process. You know, reports can be generated. They need to be interpreted and understood. I can't speak for FERC enforcement staff, and they certainly can speak for themselves about what their expectations are regarding the level of sophistication, but I think it's an emerging area.

Speaker 4: I would agree with that. I mean, it is an emerging area. I think my sense of the staff, and it's more from the CFTC perspective than FERC, I will say, but it is not so much what their current expectation is, but where they're wanting people to go. And I think there are actually some lessons to be taken out of some of the recent settlements that have been publicized, which include pretty well documented compliance programs on what's required. And it doesn't quite go into the monitoring and surveillance piece, typically, but does give some insight as to where they're going with it. And certainly, from the CFTC's perspective, they would love for everybody to tape record, because it makes enforcement a whole lot simpler, because traders, by their very nature, no matter how many times you tell them they're being recorded, they will talk in their own language, talk in a fashion that's unclear, and they will dig themselves a hole that it takes a lot of time to dig your way out of.

Question 4: First, I think we need to recognize this is an important, but a very hard, problem. The markets that we deal in are incredibly complex, which creates a lot of opportunities for things to happen, both as intended and as unintended, and that's one of the many challenges we face. And one of the things I wanted to ask about is something similar to what you've been getting some of these questions

about, which is the degree of clarity we want in the rules.

And so let me sort of set it up by noting, I think there are problems in either extreme. If we simply don't have any clarity in the rules, and regulators or others are going to come in after the fact and say, "Yeah, that isn't exactly what we had intended, and therefore we're going to punish you," even though there was no way of really knowing what made sense and what was consistent with the rules, that could be a problem. On the other hand, if we define that, "You know what, you can't do X, Y and Z, and anything else that we haven't defined, that's not X, Y or Z, is fair game," then all the effort is going to be finding ways to take advantage of things that were unintended, to make money that will be damaging to the market, harmful to customers, and we don't want that either. So there needs to be some happy medium in defining what's right and what's wrong, and I would argue that in many cases, you know when you're engaging in inappropriate behavior, and you know when you're engaging in appropriate behavior.

But there is perhaps some gray area, and we've got to provide some direction and some clarity. And we've heard a little bit about the need for clarity and certainty. But isn't it also true that if we simply give full clarity and certainty about what is not allowed, that by doing so, we're really setting ourselves up, in these complex markets with many people having many opportunities to take advantage of many unintended consequences, for problems that we shouldn't be allowing, and that people need to understand that they're going to be under surveillance for things that you can't find a specific tariff code that says, you cannot do this specific activity, and you can't assume that if I can't find it, then I'm good?

Speaker 2: We were talking a little bit about rule makings. You know, to me, it's not to prescribe particular types of trading strategies, and I'm not advocating for a rule making, but I guess there are two pieces to what I'm saying. One is, what are observable principles that could help guide traders to understand the risks and issues that FERC enforcement staff is wrestling with, as we wade potentially a year or two or more through a litigated setting to see what happens with the Hunter case and possibly with other cases? And those may be narrowly drawn holdings, they may be decided on jurisdictional grounds and so forth. So they will provide guidance, but it will take time.

I look at the market, and particularly right now, it's a volatile and difficult market. So to have a discussion that sets some type of guidance and parameters about what's acceptable--and part of that discussion would be to limit the risk to rate payers and to the marketplace efficiencies. And that's why I threw out there as a concept having discussions. I'm not advocating this. This is a discussion that might need to be had around position limits, to mitigate risk, and to understand that there are tools already in the tariff either to remove economic incentives for behavior that may have an impact on the marketplace, or to incentivize behavior. There are tariffs that allow for payments if you import electric energy into a particular market. So you know, use those types of tools. I'm not talking about proscribing something that happened that probably will never happen again in terms of a trading behavior, because traders are smart, and that's their job. That's probably what you want them to be doing in some sense, is creating efficiencies and being intelligent. But it's creating more policies that might create some level of guidance or at least discussion in the interim until court cases resolve themselves.

Speaker 1: I may be an extremist here, but it seems to me that it's fair to say, if you were raised well, you'll know in your stomach if you're committing fraud, if you're lying. That's pretty easy. You can teach traders how to deal with that. But other than that, if you find a consequence that you think is unintended, and

that you don't like, change the damned rule and move on. I think it's as simple as that. If you tell people, "Here's the rule book. Go play a game of flag football," and you think people are getting hurt, then pass a rule to change something, but don't complain when they play by the rules. And if you need more rules, add them.

Questioner: To connect this with the California case, I did think exactly that was happening in June of 2000, and I went to the ISO board in California, and I begged them to change the rules. And the rules were changed in June of 2001. And by that time, PG&E was bankrupt.

Speaker 2: If I could give one other example. Intertie offer guarantees are what I was referring to. You could see, it was a rule. You could pursue an import into a market, receive payment. That could be viewed as an economic signal to go chase that particular profit motive. But it could have unintended consequences if it was done in a consistent pattern or at high volume. The rules were changed to remove the economic incentive by essentially netting out what you were doing in the marketplace if you were flowing power out the other direction. I mean, there does seem to be, and there is a mechanism to do it in a nimble and quick fashion, ways to address certain types of behaviors by removing economic incentives to conduct those behaviors.

Having said that, there are other things that need to be considered, including broader policies that can let traders and those advising them have a better sense and a stick to say, this is what FERC enforcement staff is concerned about. And I would say--that's what the last slide is about--if it has the potential to harm consumers, intended or otherwise, that's probably a good starting place, meaning, dispatch decisions or creating inefficiencies, even though the rules may allow for that particular activity.

Speaker 1: I guess I would say, what are you supposed to do if you're trading? You're going to go figure out, I'm given an incentive. I'm given a payment stream. Am I supposed to get it or not? I'm being paid this money. That tells me something. Am I supposed to figure out whether the ISO thinks this is an unintended consequence or not? How is anyone supposed to comply with that? You need to go read the orders and figure out what the original intent was by looking at the legislative history? What are you supposed to do?

Questioner: Well, I can tell you what we do. We go talk to the monitoring unit, and we ask them. And if they say, "No, that's not what we intend, that's not appropriate," then we don't do it.

Speaker 1: They often won't answer you.

Moderator: I just want to remind some folks about issues that happened in New York that kind of speak to some of the things you're talking about. We had the Lake Erie Loop Flow issue that really was a major issue causing hundreds of millions of dollars in uplift that was passed on to consumers. And the FERC staff did a yearlong investigation of that, and the report came out and said, "Everybody was following the rules. New York ISO, go take the lead in getting these rules fixed, working with your neighbors." So I think we've got examples where big issues have been addressed exactly like you all are saying, and we've obviously got some other issues where results have come out along the lines of, we've looked at everything, and clearly there has been some things where violations have taken place in their view, and that's led to some different results.

Question 5: I had actually two different comments. But one is, I think the sound bite of, well, just write a rule, is a great sound bite, but personally I don't think that there is the bandwidth within the regulatory community to address every single possible issue in a rule, and if it wasn't written down, anticipated, then everything's free game. I mean, we wouldn't have a rule, a 10b5-type rule, if we had very

specific rules that say, you know, "Do this now. Don't do that." So I think it's a little unrealistic to just sort of chuck it all and say, "Wow, if you didn't write a rule on it, then everything's fair game." I just think that's pushing it a little as to what the realistic regulatory bandwidth is in this country.

That being said, I actually had a different issue when I started this, which was on CFTC/FERC and the Hunter case. I happen to be very involved in the congressional debate about overlapping FERC/CFTC jurisdiction on RTO markets. And what was striking about that, when you're actually there and seeing the discussions, the intent was, notwithstanding CFTC's insisting on this exclusive jurisdiction, Congress really wanted multiple cops on the beat. Many of us argue that wasn't rational, that put people in double and triple jeopardy. But at the end of the day, they wanted multiple cops on the beat. And if you read the language that Congress adopted, it said, notwithstanding the exclusive jurisdiction of CFTC, there is a role here for FERC, and you two agencies go figure it out, which they have not been able to do.

So I'd be interested in comments on, given what appeared, at least in that instance, to be what Congress was actually thinking (granted, that was electricity, not gas) how does an absolute rule from the court play with what seemed to be congressional intent to have lots of players in this act, as messy as that admittedly is?

Speaker 4: I would be inclined to agree with you. Certainly, my reading of the statutes, and I put all three of them in there, is that you may not like what they wrote, but they clearly were pretty deliberate in the words they used, and they pretty clearly and deliberately adopted a 10b5 type standard in all three instances. That said, as an advocate, I'll go a lot of different places backwards to see whether there's actually some place for that to stand. And as I said earlier, the interpretation of that language by the courts has never had the backdrop of this exclusive jurisdiction piece that exists in the Commodities Exchange Act, because one could clearly argue that when Congress put those pieces together, they had the opportunity to change the Commodities Exchange Act and didn't. So did they really intend to give other agencies jurisdiction where they (Congress) had clearly said, you have exclusive jurisdiction. I think the courts are going to make that decision.

And one further comment on your regulatory piece. I think there's a big piece of that, which is, be careful what you ask for. Because I don't know how many people in this room have read all of Title VII of Dodd-Frank or the regulations that the CFTC has passed. But there is a whole lot of detail, and a lot of it is detail that most of us in this room would probably prefer not to have.

Question 6: I think this is a terrific panel, and this is a very important topic, and I'm really worried about it. And I have a seven part question. [LAUGHTER]

But I want to focus on what really worries me about this, and step back a little bit in history. And I'll use the case of New York as an example, back in the mid-nineties, when we were in this conversation in the country about how do we have efficient electricity markets? And I won't rehearse all of that story, but the answer is bid based security constrained economic dispatch with locational prices. And we have a lot of conversations in this group about that.

A centerpiece of that problem was dealing with transmission congestion and having transmission rights. And what we struggled with in the industry for a very long time before that was trying to come up with some approximation of physical transmission rights in the system, so people could have the physical rights, and they could trade them, and they could do whatever they were doing, and we couldn't figure out how to do it. And the financial transmission rights

were invented, and it was something that came out of the conversations here at the Harvard Electricity Policy Group, as the solution to that problem, because you didn't have to have the physical right in order to do the transactions, and you would collect the difference in the congestion cost, and all of that story, and that worked extremely well. And so, "Wow, what are relief. We have a way to do this." And I used to argue that it's a solution to the problem. I now think it's the solution to the problem, that there isn't any other model that works with open access and nondiscrimination. So we can have a long conversation about that.

Now we're in New York, and we're talking about this, and how to do it. And because of New York's particular transmission problems, they wanted to start right off with a day-ahead market, as opposed to having just a real time market, because they had to commit units in order to meet the transmission constraints, and all this stuff. And we said, "Well, this is simple. You can just have a forward market a day ahead, and people can make the same kinds of offers and bids and that kind of thing. And then you can make the commitment decisions, and then they get these schedules, and that goes forward, and then we'll do the real time, and then we'll settle up the differences in real time, and everything's going to work fine." And then we got around to the discussion of, "Well, what do we do with the financial transmission rights?" And it took about five minutes to figure out that you couldn't settle the financial transmission rights against the real time prices. You had to settle them against the day ahead prices, because if you didn't, you would be selling the transmission system twice. OK? And you would get into a revenue adequacy problem immediately. So you would have to settle the financial transmission rights against the day ahead prices. Everybody agreed on that. And then the question came up, "Well, how do you deal with the people who want to hedge against the real time price differential that they have to settle against the day ahead? And we said, "Well, that's simple. There's an easy way to deal with that, which is, you just schedule a virtual transaction a day ahead so that you can then transfer the fixed price from the day ahead to the real time, if that's what you want to do, and then you can settle."

So we have now bid based, security constrained economic dispatch in day ahead in real time. We have financial transmission rights. They're settled against the day ahead. We have virtual transactions from the day ahead to the real time that move it into the thing. Everything works, and it all fits together, and so on.

Now we come to this problem that we're now talking about here today. And I am very concerned about the fact that FERC may not or does not have jurisdiction to deal with market manipulation that's not fraud in the conventional sense, and I think they should have the authority to deal with that. But this is where the legalist question comes up. Now, are financial transmission rights strictly financial instruments? Well, no. I mean, they are financial instruments, for sure. That's the name. But they're constrained by the simultaneous feasibility test that the system operator runs. So the total allocation of those things is constrained by that. The revenues that are collected are constrained by the actual physical operation of the grid. There's a revenue adequacy problem. So there's an intimate connection between financial transmission rights and the physical system. But they are like financial contracts, so they're sort of like derivatives, but they're not like derivatives, and that kind of thing. What about the virtual transactions in the day ahead? Same answer. So, yeah, they're financial, but on the other hand, they're constrained by the physical capacity of the system, and what you can actually do, and so forth, so that the way we often think about these and other commodities that come into the analogy here related to CFTC versus FERC jurisdiction seems to me to often think about futures contracts and other derivatives that are not physically constrained by

these systems and not administered in the same way, and don't have that intimate connection with the market design. And so it seems to me that maybe the traditional way we're thinking about this problem is just misleading us, and that's not going to give us the answer.

Now, the answer, I believe, has to be that FERC has jurisdiction, and they should be doing it, because it's so intimately connected with the market design. And if we don't have a sensible way to monitor and regulate that, this whole market design is going to completely unravel. And it's the only answer. So this is a real problem. This is not like it's a modest thing, and it's going to affect the profits of some traders. No, we're talking about the core elements of the only solution to open access and nondiscrimination for efficiency. And I think this jurisdictional problem and the way it torques the enforcement process is a real serious problem.

Can we solve this jurisdictional problem when we're dealing with something that looks like a derivative but isn't a derivative exactly? And is the rest of the regulatory system prepared to deal with the special problems we have here in electricity? That's part one of the seven part question. [LAUGHTER] But I'll stop there.

Moderator: Panelists, did you pick up a question there anywhere?

Speaker: Maybe I can add to the thought. I just want to note, I guess, for the room, that the RTO/ISOs did seek exemption from CFTC jurisdiction for FTRs, virtuals, physicals, the day-ahead market, with the, I guess, implicit and explicit notion that the CFTC may have regulatory authority, depending on how the swap definitions break. We were talking earlier about book outs, another classic structure. Is that a FERC jurisdictional activity? Well, the CFTC has said that's a non-financial commodity based exclusion as a forward. So that goes back to FERC, possibly. But just keep in mind that that issue may be being solved at this point--at least there's a mechanism, at least in part, for the RTOs to seek exclusion from the jurisdiction that may already be in play.

Questioner: Where does that stand?

Comment: Pending at the CFTC, has been filed at the CFTC, has not been put out for public comment yet at this point.

It does not seek an exemption from CFTC enforcement. Our application actually says, we're not seeking that waiver.

Speaker 1: Well, FERC would say, I think, that even if they lacked authority over virtuals or something, which they wouldn't say, it's in connection with jurisdictional transactions, so they could look at it from a manipulation perspective, maybe not from a market design perspective. But in terms of manipulation, I don't think it's really a jurisdictional problem, at least from the agency's perspective. But maybe this is part two of your question, in which case I'll hold off.

The other aspect of this is, we were talking about trading related positions. Trading, if you have FTR positions, and you move physical power a day ahead in a way that might affect the value of the FTRs, are you in trouble? And that's a thorny question, and I know there are some people in this room that would say the answer is yes. And is that part two? Or do you want to address that now? Well, I'll let you lead off.

Speaker 2: Well, let me just add one other fact or issue, just to try to get some clarity. We're talking about schedules done day ahead through the ISO as a market administrator. There's a whole other market out there that we haven't talked about yet, which is ICE OTC markets, which are also entitled day ahead physical. You have swaps, which are entitled settling against these markets. So there's a whole other market--

your phrasing was great. "Physically constrained and connected or a creature of market design." Then you have to stretch out now to an ICE market and say, is that exchange physically constrained, in terms of how you enter in the marketplace? Is it a creature of the market? Well, it's settling against prices that are market design created. So don't forget that there's this other aspect. And that's a significantly high volume of how transactions are conducted in the marketplace. And ICE exchange has a CFTC jurisdictional aspect to it that is probably worthy to put on the table as well. But you had part two.

Moderator: Let's move on. We have a lot of tents that are up here that want to make some comments.

Question 7: I think it's worth a second pass. Translating once again Question 6 (because I think Speaker 2's comment may have demonstrated that some of us see it a little bit differently) I think the message is, there's a closed paradigm. That's what he's trying to convey. Let's ignore OTC-type issues. Let's put those outside. What Question 6 I think is trying to convey is that within the closed paradigm that has been put together for a day two market, the pieces are integrated. And trying to pick them apart and look at attributes in a free standing way threatens the ability of the paradigm to continue to work reasonably. And it will start to crumble. It's like--I don't know if you are staying in the hotel. They've got the new clocks in the hotel with all the little gears. You're busting some of the gears. They all go together. And that's different from the normal way we might see non-coordinated, non-integrated, non-simultaneously determined markets, with the paradigm that we have in electricity. And that's just a fundamental world view that either you're getting here, or you're not. And it's real important that that translates into enforcement.

Speaker 1: Which is why I was sort of going to the second part of this, because if you have a generating plant that could affect the value of FTRs, what are you to do? You're stuck. Depending on what happens, you're going to change the value of this instrument. And yet, the instrument was created for you to hedge. And so, if we have a rule that says, this is treacherous, you're in serious trouble, and I would assert that the answer is right now, everybody in this room that transacts in these markets is in serious trouble, because we don't know the answer as to whether your physical flows that affect your FTRs are problematic or not. And Bill Hogan has put out a paper that makes a wonderful clarifying assertion that if the physical flows are economic or profitable or profit seeking, in a broad-based way, as I appreciate it, that you should be fine. But we haven't seen the government embrace that yet, and I am fairly certain that there are factions within FERC enforcement that bitterly oppose it. And that means that a lot of companies face potential enforcement activity that may not really understand it, because the cases that create this concern for various of us aren't public to a degree that allows you to see this yet.

Question 8: We have 264 electricity contracts. It's a radical expansion of what we offered ten years ago. We're much more granular. We're much more focused on providing risk management for individual zones. And those zones really differ, and market locations differ from ISO to ISO in terms of underlying liquidity. In the old version of NYMEX, we traded core contracts, like the natural gas contract and the crude contract. The final settlement price is based on trading activity. So the last 30 minutes of the nat gas contract creates the final settlement. With the electricity contracts that we currently offer, and with a broad array of other contracts that are listed in our Clearport platform, we settle on indexes, and with power, we settle on day ahead and real time prices. And our goal really has been to provide risk management support and price discovery support for the multiple ISOs.

But we do have many different ISOs and many different ISO frameworks, not one standard. And so there's a necessity of providing a granular level of risk management that we really don't have a parallel for within other markets that we actively serve. So the final settlement of the PJM contracts and ISO New England and MISO contracts are real time and day ahead. The regulation of those markets is, I think, is a key in providing a level of comfort to the underlying market, that there is a regulatory framework that operates with respect to those price environments. But from the standpoint of our surveillance processes, it's quite different in the core markets, where we're surveilling trading activity, as opposed to cleared activity when we're using an index price for final settlement. And that's true for our competitors as well, the competitors like ICE and others operate under CFTC regulation as well, but it's light-handed regulation, or the ECM category, as opposed to designated contract market regulation. All of our markets are in the DCM. But there is coverage from the standpoint of federal regulation of the other markets, the OTC markets that are using clearing functions.

Question 9: This is just a quick comment. Speaker 1, I know you were talking about the idea that a fraud statute is good for prosecuting fraud, but it may not be good for prosecuting other types of behavior. I was just thinking in terms of uneconomic trading. And when you think about the SEC's prosecutions over the course of the years, some of the activities that they were involved in prosecuting, such as marking the close, or prosecuting bear rates, were involving uneconomic trading. So from your perspective, does the current rule Rule 1c that the FERC has adequately protect against such behavior?

Speaker 1: That's kind of a complicated question, because there is this little subpart of securities cases that address what are called open market manipulation allegations. And I guess what I would say is that they are really hard for the government to prove. They aren't brought very often. If you talk to the people that are in the US Attorney's office dealing with them, they'll say they're a bear to prove. So there aren't very many of them. And they place a fairly high threshold on the government, and it just remains to be seen. I mean, basically, artificially affecting price has to be the sole or predominant purpose, and it remains to be seen how the Commission and how FERC deals with that. But I think it's ultimately a square peg, round hole problem, and one wonders why, there's probably a better solution. There ought to just be a supplementary statute passed to do something about it, because you will have ultimately conduct that should be sanctioned escape sanction, I think, because the statutory tool just isn't really refined enough. It's not built for power markets. And what's the biggest manipulation problem these markets have? It's market power related schemes. And eventually, I think, something's going to fall through the cracks, that people think shouldn't.

Question 10: Good morning. Thanks for the discussion. I wish I had more concrete advice to take back to my company based on the discussion this morning. [LAUGHTER] I guess the only concrete advice that I would have coming out of this meeting is that we probably ought to separate some of the conference attendees at dinner tonight.

Speaker 1: We have a good time talking about this.

Questioner: Well, maybe we should bring them together. It could be entertaining. Speaker 2, you had this kind of interesting teaser out here on this Volcker Rule idea. And I wonder if I could get each of the panelists to comment on something that doesn't address the entire problem, but maybe simplifies the landscape. And that is to say that we're not going to let people engage in proprietary trading around FERC-regulated markets--essentially take a Volcker Rule approach. And let's think for a

moment, from a public policy standpoint, what proprietary trading does for customers, what it does for the markets, and whether we could live without it. And maybe what we could do is, borrowing off what we're seeing with CFTC, is exclude what would be hedging activity, and Speaker 2, I think your PowerPoint addresses that we would have to come up with something that says, here are bona fide hedges where people have a legitimate end use to enter into trades. But we're just not going to let energy companies make big bets on power markets and leave it at that.

Speaker 1: What do you do if you own assets? You already have a big bet.

Questioner: But that's going to be a hedge, right? What I'm talking about is an energy company walking into a market where it doesn't have power plants. It doesn't have load. And making bets on what power prices are going to be, through large swaps, disconnected with physical assets.

Comment: It seems un-American…

Questioner: So do bans on sports betting, but they exist in many states, for other reasons.

Speaker 2: To be clear, the teaser was out there not to advocate for a particular position, but to illustrate an issue. So it's an interesting question, because another way to flip that idea is, is it an attempt to ban or to flush out of the marketplace proprietary trading that is unrelated to physical assets, unrelated to physical load or generation, and is not a clear dotted line to easily understood arbitrage, and is not a clear dotted line to hedging of risk in legitimate volumes and levels that may make sense, versus the asset or position that's being hedged? I put it out there for that exact type of question because, flip it on its head, have we gone all the way, where the goal is to flush proprietary trading out of the marketplace? Maybe it's un-American. But yeah, I put it out there as exactly what you said it was, a teaser to see if anyone would take that up. So I'll leave it at that, and maybe other panelists have a remark there.

Questioner: Well, you teased us. Give us your answer.

Speaker 2: Well, I think that the notion that, as I've said before, a certain scale of trading, certain types of trading may, in terms of public policy, create undue risk for rate payers, in terms of physical dispatch, decisions on the system, as well as financial risk for the RTOs, which ultimately translates into consumer risk, should be looked at very carefully. And the additional teaser was position limits, or this idea of trying to limit that activity. I wouldn't say banning it makes a lot of sense. I also think fully and better understanding what is legitimate or non-proprietary trading is also important. What is hedging? So my view is not advocating this, but a discussion around limiting, I guess at bottom, limiting potential harm to consumers.

Speaker 3: From a consumer perspective, we would like to take a much closer look at the issue. If you recall, a lot of the credit defaults in some of the RTOs, a lot of those are linked to virtual trading. The constant response we get is, "Virtual trading is necessary for market liquidity. Market liquidity increases market efficiency. Market efficiency is good for customers." What we don't have are the data to test those statements, and the information from the market as to whether that aspect of market activity is adding value or detracting from value to ratepayers and customers. So before we get to a discussion point as to whether to apply the Volcker Rule, or to change the way we view virtual trading and whether we prohibit it or allow it or embrace it, we need answers to those questions, and right now we don't have answers to those questions.

Speaker 1: So what I would say, first of all, to take the question a little sideways, if we have overaggressive enforcement activity, we end up

part of the way there, at least, without examining the question on a policy level. And I've heard some people observe that some of that is already happening. But it would seem that if you're going to try and take people without physical assets out of the market, you're taking people out who have the least ability to affect actual market outcomes. So you're really just taking out the counterparties that those guys probably need, and I just resist all these things on principle, I guess. So I would say it's a terrible idea. I agree, it's un-American. And actually, I think that's the right way to think about these things. But then again, I wouldn't have the Volcker Rule or any of the Dodd-Frank stuff, either. So there you have it.

Speaker 4: I'm going to start with a disclaimer, which is, I'm not a member of the NRA. But it kind of comes down to, do guns kill, or do people kill? Does proprietary trading cause the issue? Or is it the people engaging in activity that they shouldn't under the framework of their proprietary trading? And I'm kind of where Speaker 1 is. I don't see excluding people from the market as actually being beneficial ultimately. I do take Speaker 3's point that there is something to be said for trying to gather the economic data and to analyze whether there is some cause and effect that could usefully be regulated from that perspective. But I think overall, what you end up doing is probably taking the people out of the market that enabled people to hedge in the first place.

Question 11: Thanks. Great panel. And following back up on that, Speaker 3 had put out a number of different suggestions in his presentation about, from a customer standpoint, additional transparency, trying to get at some of the data that was just referenced in the last answer, as well as the ability to intervene on a customer basis. And I'm wondering what the others would think the consequences of that would be, other than, obviously, some additional litigation. But in terms of the effect on just what we were just talking about a minute ago, what's the consequence there?

Speaker 1: I've always thought one of the biggest advantages of being a power company is that you don't have the same exposure to collateral litigation in this kind of situation as you do if you're just doing commodities, where there's a private cause of action. I think it's a terrible idea. (It would be great for me, and for all the economists.) But dealing with enforcement is hard enough. I mean, it really is. Speaker 2, I'm sure, would agree. If you had interveners saying, "Wait a second, we don't like your compliance with this data request. We want more of this," and floating their own notions--I'm sure that the enforcement folks would agree with that--that would turn an already complicated process into, I think, a three ring circus. And you know, I see FERC sort of moving closer to the law enforcement model that DOJ has. And you look at the other regulatory enforcement agencies--they're doing the same thing. But none of them do things that way. And Speaker 2 indicated some warmth to the idea, but I think the California refund case is not a model to follow. And that's really what you're talking about. You're talking about everybody coming in and saying, "Everybody give back your money," and everybody coming in and saying, "We don't like what this guy did." And we're still doing this case--and it's been 12 years. We're in the third trial. And my client in this case was my paralegal in the first two. So this is our own Dickens story going on here.

Speaker 3: To respond to Speaker 1, I want to be clear on what we're proposing here. I'm not saying that private parties should have a right to intervene in the determination of whether or not manipulation occurred. It's really on the disgorgement or the refund piece of the process. I'll leave it at that.

Question 12: I've been listening to this whole panel, and struggling with the question: what is really the problem here? Why is this such a hot

issue now? I mean, it's not like 2000 and 2001 in California, when major corporations were going to go into bankruptcy because people were manipulating rules. And I'm still struggling with that, and I'm still baffled by what a big strategic bet on electricity prices would be if it had nothing to do, ultimately, with the delivery of electricity. I'm thinking, who would be the counterparty? I mean, it's not Luigi, the bookmaker, who's going to take a position like that.

So I get that the rules have changed with the new financial legislation, and there's a new player here, and there's ambiguity, and that's very messy to figure out, and I agree with some of the earlier concerns. You can't really unravel this and parse it out without everything coming unglued. But I'm also wondering, hearing you say you had, what, 360 different types of hedging products now, where back in the day there were only two, day ahead and real time in one location--how much of it has to do with things that are going on in the market? Is there behavior that's different that's causing alarm, and people are doing these things that we can point to and go, "Aha, there's a real problem there?" Or is all of the behavior that we've seen sort of business as usual, just the natural evolution of a market? We're learning. We get more sophisticated. We can do these things now. And the only wildcard is now this change in the legislation? Or is it some of both? I haven't been able to figure that out from the discussion that's gone around the room.

Speaker 1: I would say that it is a combination of FERC's market manipulation statutory and regulatory authority and an agenda the agency's had since it got that, to be vigilant, which it's supposed to do. Congress wanted that.

Questioner: How far back are you going with that agenda?

Speaker 1: It's 2005, and 2006/07 is when you really started to see this with the ETP and Amaranth cases. And I think that a lot of the conduct that is currently in the sort of grinder at enforcement is conduct has been going on for a long time. It just was not viewed as problematic, and there's a debate about that. But I chalk it up to people like Sean Collins and the folks over there at FERC who have highly developed--compared to what they had before--particularly surveillance capabilities now. And the combination of that, and people calling them up, and then you've got all the market monitors running around looking at their own markets, and they've got a lot more information than FERC does, in a lot of ways, a lot of things pop up to the surface that say, "Well, maybe this is something that someone should look at." And it may or may not be problematic. So you've just got more cases bubbling up. But I would assert that most of the conduct being examined is something that you would have seen years ago, too.

Questioner: If you had to ballpark how much money is at stake, like if all of the major investigations that were going on were settled, and they were found guilty, are we talking about tens of billions of dollars? Hundreds and hundreds of billions of dollars? I mean, how much are the economic stakes that the consumer types, like Speaker 3, would say, "Hey, my clients are getting robbed here, and it's real money, and we really ought to be concerned about it?" Or how much of it is just the principles, and you have to respond because the laws have changed?

Speaker 1: Well, it's not hundreds of billions, and it's not tens of billions of dollars. But actually, the question of price effect or market effect is a really complicated one.

But the assertions by the investigative staff would total in the billions, I think.

Questioner: Single digit billions?

Speaker 1: I don't know. You'd have to ask them, but probably. There are a lot of little cases, by the way, too. A lot of little cases. And there are cases where people may fight about insignificant amounts of money because of the principle, which I think is a great thing. But you have the question of price effect, which we should talk to the economists about, because that's really hard. That is really hard. You know, how do you answer this counterfactual "but for" question of what would have happened without this conduct, when this conduct may have affected what everybody else did? And what are you going to do? Rerun the markets for a year and a half? And the economic tools available to deal with this question, that some of the economists who will be on the panel later deal with, are complex econometric tools I don't begin to understand. And in the world of securities litigation, the cases seeking damages have ended up devolving into basically wars between competing economists who are expressing points of view about this. It's really hard. So you could have conduct that one expert says has no effect whatsoever, and the other one says, this is hundreds of millions of dollars or billions of dollars, and it is easy to count really high in organized power markets, and easy to get the answer wrong, I think, on the high side more often than not.

Speaker: Yes, to echo--the idea of rerunning markets, as is in the slide deck, is a difficult one. And that would be a good area for professionals to continue to focus on. What is another way to analyze market impacts of potentially fraudulent or manipulative behavior? I don't think we have the analytical tools to do it right now.

Question 13: My question relates to this frustration that something really important has been resolved beyond public scrutiny, and even the parties are frustrated that it's beyond public scrutiny. Given that there are parts of this that are not resolved, is there an opportunity for FERC to make a forum that could shed some light on this problem and issue? How do we move forward? That's something I'd be interested if anyone on the panel has ideas on--around the Constellation settlement, or any settlement, to the extent the matter is not entirely settled, and I think that's the case in that situation. Like the commissioners have opined in the trade press, "Well, gee, I wish this had been a hearing, and we had proceeded." Is there a way to use a hearing on the remaining parts of this? Or would that do more harm than good?

Speaker 1: You mean distributing the money?

Questioner: Well, I thought that there were some additional allegations that were not entirely resolved yet. Is the entire matter resolved?

Speaker 1: Yeah.

Questioner: OK, I did not think that it was entirely resolved. OK.

Speaker 2: To your broader question as to sort of a forum, I don't have any easy answers for that. It does sound that a forum involving market participants to continue to discuss all the issues we've talked today about in a more frank and direct manner (not that it hasn't been frank or direct)--but in a more public manner, is not a bad idea. Do I have the ultimate method to get there? You know, we talked about rule making, which is a general term sometimes. It could be a technical conference. It could be simply a series of conferences that the Commission holds to try to better understand the issues we've talked about and, to me, I would like to see some type of guidance from the commission generally about its current view on fraud and market manipulation that goes beyond what you see in the texts of settlements, because there's just not a lot of binding authority right now on what is fraud and manipulation.

Question 14: To follow up on that comment, because the statutes that we're talking about are based on the federal securities laws, and

particularly 10B, has there been any thought on those agencies doing what the SEC does, which is using both a combination of no action letters, as well as advisory opinions or their informational releases, where they actually tell you what their view is? Or if it's no action letters, there's actually what amounts to case law, if you will--it's not case law, but basically--and periodically the SEC actually will do a release that summarizes these no action letters in order to give practitioners in the area guidance on these questions.

Speaker 1: They used to do that, the Loop Flow investigation is an example. And I thought it was an interesting thing. I actually liked it. But it hasn't happened very much recently. And my distinct impression is that there are a number of people within investigations and enforcement that would not resolve the Loop Flow investigation the same way now. And you try and use it in cases, and it doesn't really get you anywhere. So we'll see if that practice continues. But enforcement used to give basically a long explanation of why it wasn't doing something in a case, which was unique in the annals of enforcement regulation, to my understanding, but a very useful thing for people trying to advise clients. But that hasn't happened in a while.

Questioner: But with the SEC, you can actually write, pay a fee, and say, based on these facts--you outline the facts, and they often would ask for additional information--but then they'd say that based on these facts (sometimes they'd just attach your request letter, sometimes they repeat the facts) we won't recommend enforcement action.

Speaker 1: Let me give you an analogy. One thing that you can do, but it's fraught with peril in a way that you would not expect, is you can go get a no action letter from FERC. People have done that. But you can go to the monitors. They may come to you, in fact, and do. And say, "What do you think about this?" I have one matter now where that happened years ago, and there was an investigation about whether the subsequent conduct, which the company thought was blessed and was, in fact, is a problem, which is hard for me to understand.

But the other problem you run into, and we haven't mentioned this, but it's a really serious problem. There's a thread that you see in, it was in the Constellation case, and it's in several other investigations now, of, "Not only did you manipulate the market, but you misled the ISO about what you were doing. You didn't tell them the full story." And while you don't end up getting penalized in some noticeable way separately because of that--it's another million dollars, but if it's a lot of money, it doesn't really matter--you end up going through a lot of discovery, and you're basically accused of lying. And that is a very, very important sort of item for enforcement to pursue right now. But it really creates an interesting kind of conundrum. It really makes you really not want to talk to anybody who calls, because all you're going to do is get yourself in trouble, would be one way of looking at the world. But so if you go and talk, you have to be very careful about how you do that, because if there's ever an investigation after the fact, you have to worry that you'd be accused of providing misinformation or incomplete information. And that's actually a really thorny problem right now in several pending cases.

Speaker 4: From the CFTC perspective, there's a pretty well developed sequence of interpretive letters and no action letters. The process is there. I think the complication in a trading scenario is, the no action responses are only as good as the facts you give them. And so you can pretty much look at it and say, every trading decision has a different spin to one degree or another (and I don't mean that in a negative way), it's of pretty limited utility, and the risk that Speaker 1 mentioned is, you have to identify who you're writing on behalf of. And the suggestion then is that, OK, these folks are out there probably

already doing this. Are you inviting investigation by sending that letter in? And the other complication to the whole thing, at least from the CFTC perspective, is, you're going to get a staff opinion that applies to that set of facts. But it also has to work its way through all of the divisions before you're ever going to get it. And about the time you get it, which is probably six months after you've asked for it, the trading strategy that you were thinking about employing is no longer any good, because the market's changed.

Question 15: Just a quick comment, and then a question. The comment's about rerunning markets. And I agree with what was said on the panel. But I think one of the things we often overlook, if we start taking out the positions of entities who are accused of manipulation, I think the first thing we have to worry about is, is it even physically feasible? Are we violating Kirchhoff's laws by taking out these positions? So for example, if you take out an entity who's got a financial position, they may also serve load as a retail load serving entity in a competitive market. They may also have generation. How do we ensure that we make that physically feasible? I think that's the first thing.

I think the second thing, though, is the link to other markets. So let's suppose we're talking about FTRs or TCCs, whatever, whether we're in PJM or New York, and that's the subject of manipulation. Well, if we take out those positions, then what happens in the case of PJM if they were in the FTR market? We'd have to actually rerun that in the FTR market. How far back do you have to go back to try to rerun those markets to peel back the onion to get at the actual manipulation? So I draw the conclusion, as I think the panelists have done, that it's almost impossible to actually rerun the markets and really make sense out of this.

So then I have the following question, which is, why don't we go back to first principles? When I used to teach industrial organization, back in another lifetime, we talked about market power as being the ability to unilaterally move prices, or through coordinated action move prices. Very simple definition of market power here. And then we'd look at structural screens for market power that all the RTOs use, and we use behavioral tests in some cases for market power, as many of the RTOs use. And then take a look at these position limits. I think the question is, what is really hedging, versus something that's kind of out there, in terms of taking those hedge positions? And couldn't we come up with at least a structural screen, followed up by a behavioral screen that says, are the positions that are being taken here hedging? Or is it potentially manipulative? And if it fails the structural screen, then look at a behavioral test. Were the actions of the entity involved actually able to move the market, yes or no? Before we start going down the road of saying, "Well, you've had a loss in this market. You've gained over here. Therefore it must be manipulation." Am I being too simplistic?

Speaker 3: I think FERC enforcement has indicated there are actions where you just have outright fraud, and complete absence of market power, but just simple fraud in the market. I would have trouble, from a consumer representative standpoint, with ignoring conduct that at the time that conduct occurred did not have an effect on the market clearing price. Because it gets to the issue of rerunning markets. If you get to the point where it does have an impact on market clearing price, trying to unscramble that egg is next to impossible. We have to be vigilant up front. The monitoring has to be as tight as we can possibly get it. Enforcement has to be as tight as we possibly can get it before it has an impact on market clearing price. So I would have a strong problem with ignoring conduct that at the time it occurred did not necessarily have an impact on market clearing price.

Speaker 1: What I'd say is that you'd have the question, while FERC hasn't successfully

brought an attempted manipulation case yet, I'm sure they will. And they claim that that is a violation. And so, they would claim your penalty under the guidelines would be based on your intended profit, which kind of creates the same problem of, how do you measure that? So I don't think they're going to not go after something because the economists say it could have no price effect. I worry that what might happen is, they might say, "Well, we think you intended to try and move prices, and you traded. And so we're sure you did. And so this is manipulative. You've injected some sort of artificiality, and we'll find some way of measuring it. And the fact that it's imperfect is your problem, because you're the bad actor to begin with, so don't put the risk of imperfection of detecting your harm on us. It's your problem." And you end up with a case that really could never have really existed. It was not really plausible to begin with, because no one would think they could have the effect on prices that's alleged, but it ends up going well down the line of a prosecution.

Questioner: Are we not actually diving into the waters of being guilty until proven innocent now?

Speaker 1: Well, that's going a little too far. I think that's true in the case that I have. [LAUGHTER] But I mean, look, the enforcement stuff, I've been critical in various ways. But they're public servants, and they're trying to do the right thing, and they're being aggressive, because that's their mission, and that's what the chairman at the time wants from them. And so they're not trying to attack conduct that's really innocent. But when you're in one of these investigations, it can cost so much money and take some much time that you feel like you are being held guilty. And a lot of cases get resolved at the end with nothing, and that's as it should be. But the whole process is so intensive, and the risk of false positives is, I think, right now really high, that you feel like it's guilt first, sentence later. Sentence first, trial later. Whatever it is. You feel that way. I don't think that's really true, though.

Session Two.
Manipulation of Electricity Markets: What is the State of the Economics?

Market manipulation in real-time electricity markets is easiest to define in the case of an exercise of market power. Trading in financial contracts in natural gas is often cited as an example of potential manipulation of forward financial trading in commodity markets. However, in organized electricity markets, and with the special nature of electricity, many of the features of real-time markets or financial contracts for other commodity markets may not carry over to day-ahead financial markets and virtual transactions in electricity. There is no meaningful economic storage of electricity that could interact with financial trading to corner the market. Hence, there must be some other mechanism by which day-ahead and other forward markets could be manipulated. What is the economic theory or model to define and test for manipulation of forward financial markets in the case of electricity? How does the theory of market manipulation integrate with the theory of efficient electricity market design in organized electricity markets? How does integration of physical transactions and hedges like financial transmission rights affect the market design and the theory of market manipulation? How does or should the stand-alone economics of a transaction affect the determination of market manipulation? How can permissible trading activities be distinguished from impermissible market manipulations? What is the counterfactual that can be used to define and estimate market damages in forward markets? How does the economic theory of market manipulation connect with the legal framework and precedents?

Moderator: This afternoon's session is a continuation of this morning's topic, except that the focus will be on what is the state of the economics.

Speaker 1.

Good afternoon. It's good to be here. I appreciate the opportunity to talk to you all. So I'll be talking a little bit from an economist's perspective. I'm going to be a little bit more specific than some of the conversation this morning.

So, market power. What is market power? Market power in the basic economic definition is the ability to raise the price above the competitive level--or the ability to suppress the price below the competitive level. We can't forget that side. Other features sometimes added to that include something about the duration and whether or not it's profitable. But it is the case that that definition, as straightforward as it is, can be applied across multiple mechanisms and multiple market types, including forwards.

So, market power mitigation and PJM. Market power mitigation in the PJM energy market is primarily about local market power rules. And it doesn't happen very much. And there's a lot of discussion about the local market power rules. And they are very effective, and they do what they're intended to do, but the result is actually not a very widespread application. Those rules are applied in both the day ahead and real time.

In addition, the other key market power mitigation tool in the energy markets is the "must-offer" requirement. Every capacity resource is required to offer into the energy market every day, and I would assert at a competitive level. Some disagree with that, although in fact that's the way they really do get offered. There are no aggregate market power rules. There's no rule governing offers in the aggregate market. And those offers can be whatever folks want to make them. However, if you look at the aggregate supply curve in PJM, it's quite clear that, except for maybe a thousand or two megawatts of the tail, that those offers are generally at or close to marginal cost.

But there are also no rules--given what we were talking about this morning, and part of the topic of this panel--there are no rules about price suppression in the energy market. There are no rules about self-scheduling, at least banning it. There are no rules about offers at less than cost. There are no rules about day-ahead load being

bid in at less than expected actual load. And there are no rules about non-profitable offers.

The other big market in PJM where the rest of the money is is the capacity market. The capacity market actually is a forward market. In the capacity market, there's all market power all the time. There's almost no clearing, almost without exception, where every offer has not been mitigated. There is in fact a price suppression rule in the capacity market, which some of you may have heard of recently, called the MOPR (Minimum Offer Price Rule). It's gotten a bit of attention and a bit of misunderstanding about what happened. Happy to talk about it in more detail during the discussion period. But the intent of that is to prevent those with an interest in lowering the price below the competitive level from doing that.

An additional element of market power mitigation in the capacity market is that there is "must offer." Everyone who has capacity must offer it, and all load must buy. But there are no rules about offering at less than cost for existing, although there are some rules about unprofitable actions. Retirement decisions are reviewed for market power in every case, and there have been a lot of those cases lately, and the key test is whether or not the retirement actually makes economic sense. That is, whether the unit is actually unprofitable. If the unit were profitable, then retiring it would be an unprofitable action, because you'd actually be giving up money. So that would result in a finding of economic withholding. But again, that is a test for unprofitable behavior.

Now one issue that's not addressed in the rules, and probably should be, and should be better, is the timing of the retirement decision. If retirement decisions are announced a week or two weeks or even a month or two before an auction, it's not possible for new participants to compete to replace it. And that's an issue in capacity market.

So a question that's been raised as part of the questions that we're intending to address is, can market power be exercised in a day-ahead market? The day-ahead market is liquid, it has relatively low barriers entry. Can market power be exercised there? My answer is yes, it can. Despite relatively low barriers to entry, there is still substantial imperfect information and there's unpredictable behavior. Now, can it be done for the long-term, systematically in the same way? Probably not. But that doesn't mean market power can't be exercised and we shouldn't believe for a moment that it can't be.

Virtual activity is an example. Virtual activity, for example, can affect both dispatch and unit commitment. And all that this slide stands for is that about half of all virtuals are at the top ten locations. So despite the sometimes presumption that virtuals are somehow spread equally across all the busses and nodes, in PJM, it's not the case. They're fairly highly concentrated at a few pretty liquid trading hubs. But that leaves the other half, which are and can be spread at smaller individual locations. The result of all that, to repeat, is that day ahead activity can and does affect both unit commitment and unit dispatching, and therefore can affect what happens in real time. It can actually affect the real time market. It can affect prices in real time.

The next two slides are about the differences between volumes in day ahead and real time, just to get a feel for it. This is day-ahead loads versus real time loads. You can see, day-ahead loads, the top curve, are substantially higher than real time loads. Nothing wrong with that, obviously, but it's a fact that day-ahead loads are substantially higher. That's part of the reason there can be an impact from behavior in the day-ahead market on the real time. Same thing is true on the generation side. Substantially more generation than in real time. But notice that a large part of the difference has to do with up-to congestion transactions, virtual transactions. If you actually distill all that out and look at the offer of real generating units and the offers of

real load, they're actually very close, with a mean difference of close to zero against the real time market.

There's been some discussion about whether the day-ahead market remains liquid. The day-ahead market remains very liquid. There's been a huge substitution of up-to congestion transactions for virtual transactions. And that's not surprising--when you reduce the cost of the transaction, it's not surprising that people switch to it. There are no operating reserve charges and no significant credit requirements associated with up-to congestion transactions. But nonetheless, what it stands for is there's still substantial volume, substantial liquidity in the day-ahead market on the virtual side.

So virtuals can be used for a range of purposes, all of them totally legitimate. They can be used for hedging. They can be used for speculation. As I say, all totally legitimate. And this simply gives a breakdown of the use of virtuals by physical and financial players. And we've divided players, using an approximate approach, into physical and financial. And clearly both types of players use these. And it's critical for both physical participants as well as financial participants in the day-ahead market to have that ability.

So one of the claims about virtuals is that as a result of competition, they produce convergence with day-ahead. And that's part of the reason, at least assertedly, that there can be no market power in the day-ahead market. So if you look, and I'm just presenting data here for the first quarter, so that line looks a little bit truncated, but you can see that the difference, on average, between day ahead and real time is very small.

Each one of these points on this graph is the average for hour one, average for every day, 365 days hour one and so on. So again, there's some differences, but not huge. But if you actually look at what happens (and this is just the system-average LMP) if you look at the difference between system average LMP day ahead and real time, there are huge fluctuations. It's impossible to predict, and clearly impossible to react to in such a way as to force convergence in any meaningful real time sense. So you have to be careful when you think about how competition works in a day-ahead market, not to focus only on the longer-term averages, which are quite close.

So one of the questions here is whether unprofitable transactions are a bright line test for the potential exercise of market power. And I would say the answer to that is no. But I would say it's an excellent screen. So if you look at FTR data, this shows, as it does for virtuals, that FTRs are used by both physical and financial players. They are used to hedge positions. They're also used to speculate. And they're used by both significant kinds of players in the FTR market. But if we were going to simply say that every position that was losing money and was unprofitable was a problem, then virtually every FTR in the first quarter would be a problem. And we'd have to look at it.

Now, there are reasons why they're unprofitable, having nothing whatsoever to do with the reason that people entered into them in the first place. But nonetheless, it's interesting just to take a look at an aggregate level of the profitability of FTRs. The profitability of FTRs in the first quarter was almost uniformly negative.

Question: This is relative to what they pay to get them?

Speaker 1: Yeah, right. Good point. So definition of profitability of FTR is revenue minus cost. So if you paid more than you received, then it's unprofitable, in my definition.

So for up-to congestion transactions, similarly, about half of them are unprofitable. Does that mean that half of them were entered into for the purpose of manipulation? I don't think so. If you look at an individual participant and see them

entering on a persistent basis into transactions that lose money, then it certainly raises a question. Now, losing money when you don't have to pay any costs is a trick. But nonetheless, for up-to congestion transaction, about half of them were unprofitable in the first quarter. Some transactions were unprofitable simply because traders make bad decisions, and not everybody can be profitable in every case.

So one particular rule that came up a little bit this morning in PJM that addresses some of the issues that are being talked about is the FTR forfeiture rule. The FTR forfeiture rule says that if you have an FTR from A to B and you affect its value by engaging in virtual trading, you have to give back the profit. You just give back the profit for the hour, net of what it cost you, so you're giving back the net profit. And it's triggered when virtual transactions, more specifically, result in more congestion in the day-ahead market than they do in the real time. Now what that actually translates into when we think about profitable and unprofitable transactions, is that it's a screen for only using unprofitable transactions. If you create more congestion day-ahead than real time, and you think about how decs and incs work clearing against real time, then it only fails when it's unprofitable. Now, that wasn't the explicit intent, but it nonetheless works out that way. So it's an application of the notion that only unprofitable transactions are being screened. And that's generally what happens here. It's not to say that a profitable virtual can't make an FTR more valuable. And that's particularly the case for counter-flow FTRs.

So this is the profitability distribution of the up-to congestion transactions that I was describing.

There are other types of manipulative behavior that don't fall quite into the neat categories that have been talked about. One of them has to do with loop flow. There was some general discussion of loop flow. This slide is just an example of a transaction which is profitable only because of what I would regard as an exploitation of the rules, having nothing whatsoever to do with the fundamentals. What this really is is a transaction from ISO to MISO with a scheduled transaction from ISO to MISO to PJM, and then another transaction back from PJM to MISO. It's much more profitable to do it that way, clearly not reflecting the underlying economic fundamentals. It's a profitable transaction. It's probably consistent with the rules, but in my view still manipulation.

So just to wrap up real quickly. There are multiple ways to exercise market power. You can do it directly based on the ownership of physical generation or physical load, the obligation to serve load. You can just increase profit by a form of withholding, or you can try to suppress the price if you're serving load. There are a variety of ways to abuse the rules that result in non-profitable transactions appearing profitable--sort of the opposite of what we've been talking about. And there are also offers designed to affect other transactions. FTR forfeitures is one example. But the examples more broadly talked about this morning also include cross-platform issues, attempting to affect prices in ICE or NYMEX or whatever by affecting prices in PJM or vice versa.

So there remains in all this a tension between clear, definitive rules and the fact that reality changes and market participants are creative. While I agree that it's preferable to change the rules going forward, it's not always the right way to deal with issues of market power and market manipulation. Thank you.

Question: Your last phrase, which was very carefully and subtly delivered, was that it's not always the best way to do it. What would you say is the best way to do it?

Speaker 1: You call that a clarification? I'm kidding. I'm kidding. It's a good question. I don't know. But that's the problem. I don't think

there is a perfect answer. I think that's really the tension that was described this morning, the tension that we all have to live with. But the point is, we can't pretend that either is perfect. We can't pretend that there can be an exhaustive, comprehensive set of rules that addresses every possible form of behavior. So, let me leave it at that.

Speaker 2.
Thank you very much for the opportunity to be here. And thank you all for attending. I'm going to talk about the economics of manipulation in electricity markets. And I've studied manipulation going back a long time, since I was a small child, [LAUGHTER] in the aftermath of the squeeze in the soybean market by a company called Ferruzzi, and I'll talk about that a little bit.

And although I'm going to talk about electricity markets and sort of focus on that, I'm going to try to bring into the discussion stuff that we've learned or haven't learned about manipulation from other commodity markets and other financial markets as well. And perhaps the best way to start that is to just go through a manipulation taxonomy. Because I think one of the problems with manipulation is it's a word that is used extremely promiscuously to describe a lot of different kinds of conduct that are really quite distinct. And so I think it's really important to try to understand what different kinds of manipulation there are. And this also comes to bear when you talk about remedies for manipulation. Because one thing it suggests is that very broadly crafted rules or regulations or statutes frequently can create more problems than they solve, because they don't adequately distinguish between different kinds of manipulation.

So this concept has been brought up several times, but probably the canonical type of manipulation is a market power manipulation. And if you look at the use of the word "manipulation" in a commodity market context, usually it's used to refer to things like corners and squeezes in traditional storable commodity markets, like for corn or soybeans or something of that nature. And a corner or a squeeze is a variety of market power manipulation. And it is, again, in these kinds of markets, in storable commodity markets, it is probably the most common type of manipulation. And I'll talk about the application of that to electricity in a moment.

Another type of manipulation is fraud, basically the release of false information. So people sort of releasing rumors or false information to try to influence prices for at least a little bit of time anyway. A good way to get out of a losing position, perhaps. And so fraud is another kind of manipulation.

And then I think another important kind of manipulation is trade-based or price impact manipulation--you're buying or selling a lot in order to try to impact price. And you can think of this as sort of a market power type manipulation and think of it as sort of a fraud-type manipulation. I just think it's worthwhile to consider it as a separate type of manipulative conduct. Because how you'd look for it and how it would work is going to be somewhat different than these other kinds of manipulation.

In terms of market power manipulation, I think it's important to note that to distort prices you have to be able to distort output, either in space or time or in total quantity. And if you look at traditional cornering strategies in a commodity market for a good like soybeans, you're typically going to engage in a strategy that creates either some spatial or temporal distortion in output. And here the important thing to note is that when you look at electricity, these kinds of strategies are not going to work. Because, essentially, of the sort of the instantaneous match between production and consumption, the kinds of strategies that would work when you're manipulating or cornering a corn market are not going to work in electricity. One exception for

that might be if you have a hydro operator, but for the most part, traditional cornering strategies, particularly as engaged in by a speculator, somebody that doesn't control generation, are not going to be feasible.

So what this means is that in electricity, market power manipulation is going to require control of generation and transmission. And so you can't have a purely financial speculator executing one of the kinds of market power manipulation that would work in a storable commodity market.

In terms of trade-based manipulation, this is basically trading in size to impact prices. And how can this work? Well, one way that this can work is that when you have markets with asymmetric information, where some people have private information, trades generally are going to impact prices. Why is that? Because people are going to make inferences about whether the buyer or seller has information. All right? So, "Hey, somebody might be buying because they have private information. I see a buy order come into the market. Hey, that might be informed." Prices will go up as a result.

A manipulator can exploit that kind of thing by basically just entering in large buy or sell orders that people might confuse or attribute some probability that those orders are actually informed rather than manipulative, and they're going to have a price impact. Typically, just doing that by itself, just moving prices by itself is not going to be profitable. But to the extent that there's a related position in some other market that is tied to the prices that are being impacted by this trading, this kind of strategy can be profitable.

This is most likely to work with storable commodities and true assets. It's going to be a little bit more problematic for electricity for a reason that I'll talk about momentarily. But I should note that trades impact prices even in markets where there's not asymmetric information, even where there's not private information. There can be purely transitory price impacts, just due to limits on risk-bearing capacity in the market. So essentially the supply curves can slope up, just because the amount of speculative capital to make markets is limited. And the market makers, the middlemen, are essentially going to expect a profit from absorbing risk for short periods of time. And this is going to mean that transactions can have transitory price impacts. And again, potentially, that impact can be used as part of a manipulator's strategy, or exploited as part of a manipulative strategy.

Now in terms of electricity, essentially the high degree of mean reversion in fundamental supply and demand shocks is going to make the first kind of manipulation, based on private information, less likely to be profitable. Moreover, I should note that the academic literature on the subject, a paper written by Kumar-Seppi, and another paper that I wrote some years ago, shows that in order to sort of exploit this illiquidity persistently, you essentially have to engage in randomized trading strategies. If you're always doing the same thing, people are going to figure that out, and your manipulative strategies aren't going to have an impact. So essentially you have to randomize, mix your strategies, sometimes buying too much, sometimes selling too much, in order to do this over time.

Also, I should note that attempts to exploit temporary price impacts over the long term is going to attract additional liquidity supply that's going to reduce the profitability and impact of these strategies. Essentially, the money that you're losing on the price impact leg is money that somebody else is going to be making, a liquidity supplier that's going to attract more liquidity supply into the market, that's going to limit the potential price impact.

Now, in terms of detecting manipulation, I think it's pretty fair to say that manipulation is

inherently harder to detect in power markets. So if you look at market power manipulation, detecting withholding can be very difficult, just because it's very difficult--particularly after the fact--to sort of second guess what the appropriate actions for a generator should be. In terms of trade-based manipulation, I think it superficially seems possible to do this. I'll talk a little bit more about it in a minute. But again, I would note that the sort of permanent price-impact type of strategies are unlikely to be practical, due to lack of storability and rapid mean reversion of real shocks--again, a point that I'll go into a little bit more detail about in a minute is that there may be good reasons, good justifications, for trades that impact price, even when they can benefit related financial positions.

Now, the role of intent is actually something that's changed. I think it was brought up in the first panel. Traditionally in the Commodity Exchange Act, in order to prove that somebody had manipulated the market, it was necessary to prove that they'd had the specific intent to do so. That's been something that was relaxed under Dodd-Frank. But it is worthwhile to speak a little bit about intent.

This actually relates to the issue of evaluating and how you would determine intent. And, frequently, evaluating the stand-alone economics of a particular trade can provide powerful information on intent. To the extent that there's an existence, or not, of a more profitable, nearly perfect substitute trade is a powerful way to identify whether a particular trade is manipulative. Again, this is pretty easy to demonstrate in a traditional commodity context.

My favorite example of this is the Ferruzzi case that I mentioned earlier, where a large merchant entered into a large futures position. They stood on a huge number of deliveries for soybeans. And their justification was that "Well, we needed these soybeans for export and to process in our facilities in Indiana and Illinois." Well, you can get out your sharp pencil and say, "Well, gee, if you wanted to export these soybeans, you're going to take them to the Gulf of Mexico, load them on a boat. Let's take the price in Chicago, take how much it costs you to load it out of the elevator, how much it costs you to ship it to the Gulf. It comes out to $7.80. You could have bought those soybeans in the Gulf for $7.50. How does it make sense to do that? How can you possibly justify that transaction of taking delivery when there was a perfect substitute that was 30 cents cheaper?" And this is in a business where people would basically sell their mother for a cent a bushel if the deal was big enough. OK. So people don't leave 30 cents a bushel on the table.

Other times it's more difficult. In particular, frequently it's difficult to evaluate what the alternatives are, because trades can differ on many dimensions, in particular when you're talking about firms that are engaging in transactions in a wide variety of markets, when they're essentially managing a portfolio. The risk characteristics of transactions can differ. And firms may engage in trades that lose money in a particular instance or even on average, if this reduces risk. And, in fact, to the extent that you're on the net hedging side of the market, under traditional sorts of explanations of how these sorts of markets work, on average, if you're a hedger, you're going to lose money on your transactions. That's what you're doing. You're essentially paying an insurance premium to alter a risk exposure in a way that you deem favorable. And so, particularly in a portfolio context, that makes it sometimes difficult to evaluate whether a particular transaction or set of transactions is manipulative or not. And the profitability test might be somewhat informative, but it's not dispositive by any means.

And again, you need to be careful about identifying what the alternative trade is. You need to be careful in identifying feasible alternative trades to achieve the same outcome in all relevant dimensions, including the risk. So

you could just basically say "Well, gee, what if you didn't trade at all?" Well, you really have to take into account how that's going to impact your overall portfolio risk exposure. And so that's not necessarily going to be the right alternative.

Again, as I noted earlier, and particularly in the Ferruzzi case, sometimes somebody who's accused of manipulation is going to identify a motive for a trade that does permit identification of alternatives, estimation of the relevant opportunity cost, and evaluation of the economics of that transaction to see whether that story makes sense.

Another element in traditional manipulation law is, you know, did the conduct at issue actually impact prices? Did it cause prices to become artificial? And this, again, is sometimes challenging, and the degree of the challenge sometimes depends on the context. And it's important to control for other factors when attempting to determine impact empirically.

In some markets—again, in traditional storable commodity markets—frequently, you have good comparables to look at. And one of the effects of manipulation typically is it distorts relative prices. It moves the manipulated price, relative to close substitutes that are not being manipulated. So, for example, if you're looking at the soybean market in Chicago and Ferruzzi's squeezing in July 1989, you expect to see the July price rise, relative to the price for delivery in November. And in fact that's what we did see happen, in a degree that would have been highly unlikely to have occurred in a competitive market. And so that's a pretty strong basis for inferring that the conduct at issue did in fact affect prices, and actually being able to quantify it in a way that would allow you to assess what the damages of that conduct would be.

In other circumstances it's not going to be quite so easy, particularly when you're looking at electricity. Again, I think it is important to look at relative prices. Because that is a way of controlling for other factors that may be rather difficult to come up with control variables for otherwise. And again, the basic idea here is that the price in the market with a manipulator trades should move relative to prices in other markets where he doesn't. To the extent that these prices should be affected by the same fundamentals, divergences between these prices can be valuable as a way of identifying whether the conduct at issue actually did impact prices.

Now, in terms of manipulation economics and the law, don't get me started. How much time do we have here? To be brief, what I would say, and this is an opinion I've held for a long time, and nothing that's happened in the past 18 years or so has made me change that opinion, in fact the reverse is true, that if you look at manipulation law, whether it be in securities, commodities generally, or power specifically, I would pretty much say that it's a mess. And frequently it's almost completely at odds with the economics.

And yes, the reason I say that things have probably gotten worse is that Congress in its infinite wisdom has essentially decided that the Securities and Exchange Act and the anti-manipulation language of the Securities Act is sort of the right template to apply to basically any other market where manipulation can potentially occur. And so, essentially, if you look at the anti-manipulation language for FERC, the new anti-manipulation language that gives the CFTC authority, and the anti-manipulation authority given to the FTC, essentially what's happened is that Congress has Xeroxed the anti-manipulation language of the Securities Act and applied that to these other markets.

And I think that that's extremely problematic, because this kind of language is appropriate, arguably, in a securities context, where fraud-based or manipulation distortion kinds of cases are more likely to arise, but in many commodity

markets, the most severe problems are likely to be market power problems. And so using a fraud- and information-based statute as the basis for going after manipulation in commodity markets is typically going to be a recipe for incoherence. Because enforcement is going to constantly be forced to pound a square market power peg into a round fraud hole. And that, in specific instances, a couple of which I name here, has led to some serious problems.

So I think that this conference is timely, because these are important issues. But the sad thing about it is that this conference would have been timely 20 years ago, 10 years ago...[LAUGHTER] And I think it's probably going to be timely 20 years from now. Thanks.

Question: In the definition of manipulation, is it any form of power over price? Or is it like an entity that has power over price and can bid higher? Is it bidding separate from cost? It's a big taxonomy there…

Speaker 2: I agree. This is the panel on the economics of manipulation. And from an economist's perspective I think that the objective should be that we should have public policies that essentially result in outcomes that are approximately competitive outcomes. So that's essentially the benchmark for which we're trying to stand. And a lot of the things that were in your question were sort of related to how one could behave in such a way that would cause departures from a competitive outcome.

Question: I'm asking, what is the competitive outcome? How do you know what's a competitive outcome? Say I've got a generator that's on the margin, and it could be bidding 30 or 31. And let's say it's just a small generator. It happens to be on the margin. It has some degree of power over price to bid between 30 and 31. Say it has perfect information and knows if it bids 31, it could be accepted. Is it manipulation if it bids to the higher level, or not? That's what I'm just trying to understand.

Speaker 2: Well, this gets back to one issue which I raised earlier, which is that, particularly in an electricity context, frequently it's going to be harder to identify non-competitive outcomes than in other commodity markets. And the other important piece of information is that in terms of sort of being a practical legal standard, you talk about the information on behalf of the bidder. But essentially the question is, what is the enforcement authority's information, the tryer of fact, what is their information? And that's, I think, one of the things where electricity presents difficulties, primarily because it is very difficult to in a verifiable way communicate that to third parties.

Questioner: Right. But say you had perfect information as the regulator, and you're wondering what is the public interest. The question I have is just, from that perspective, what's the standard there? Is any exercise of power over price, whether in it's in the electricity market or another market, manipulation? Because we're throwing around this word manipulation. And I think a lot of things impact prices, and people may have some degree of power over price. And I'm just trying to understand--do you believe that any exercise of power over price is the same as manipulation?

Speaker 2: Well, you can get into semantic difficulties here. And basically implicit in your question is that you want a dichotomous answer. Where's the line between manipulation and non-manipulation? And as an economist I'm uncomfortable, frequently, with those sort of dichotomies. Essentially there's going to be a range of conduct on a continuum. And what I would essentially argue is that the social costs, the dead weight costs associated with departures from competition are going to be proportional to the square of the price deviation. So, from a practical perspective, in a world where we're really not operating with perfect information, I think that the important thing is to focus on the big problems, the big questions, the big potential

departures from competitive outcomes. And basically not obsess over smaller potential deviations that we might be able to identify if we did have perfect information.

Speaker 3.

I can't resist addressing the last question a little. I think there is a dichotomous answer. And that is an exercise of market power. And we have made determinations as to what degree of the exercise of market power is deemed acceptable when we see the term "workable competition." And so, if that falls within the continuum, if you would, of where the market rules are saying, under PJM, if it was in one of the major interfaces it would be deemed not perfect competition. It would be workable, and therefore it would not be an exercise of market power with respect to enforcement. And it's as simple as that. In the paradigm of the perfect information, for any deviation from that, I think semantics would say, "Ah, you're exercising market power." The issue is that almost by definition we've accepted that there are bands in which we accept…I think I've actually had the discussion with you about gaps in the supply curve. And whether or not people are able to, and under what circumstances are they able to, try to capture gaps in the supply curve. And that's basically what we're talking about. And we usually, in most markets, define limits for that.

I'm here today representing myself. These remarks don't necessarily represent the opinions of any of my clients. I've participated in a number of enforcement-related activities. It possibly comes out that there is a removal of content from the discussion, because I've tried very hard not to include anything that might be deemed specifically related to the facts of any of the engagements. I think that created some of the issues this morning in discussions. And there would have been a lot of interesting things to pursue. We probably can't. I think I'm going to fall into the same bucket probably, just a little bit in between the straight economist's side and the legal side.

The general complication that anybody, be it a lawyer or an economist, faces in this environment is that virtually all information is anecdotal. Almost all the good information is embedded in confidential exchanges. Detailed discussions like what we might want to have here today on the very specific notions of what conduct was involved, or the timing--even now in some of the cases we're looking at minute by minute trades-- that kind of information is difficult to exchange here.

And one of the things that this always brings me to, and it's going to come out, I think, in the comments that I'm going to try to offer, is that as we move forward in the evolution of the enforcement process with respect to manipulation, even though there may be things that you don't agree about specifically with someone, one way or another we have to have guidelines that are easily transferable. They may not be universally applicable. There may be exceptions. But they have to exist. There has to be a way for practitioners, not only lawyers and market participants, but advisors like myself, to offer judgments in the marketplace that mean something, rather than a set of five days of conditional statements coupled with legal advice. And there needs to be associated with that, I think, some reasonable understanding and agreement on what constitutes safe harbors for behavior.

And in the absence of that, we face enormous, absolutely enormous… One of this morning's speakers mentioned the kinds of expenses people go through. If anything, he understated the kind of agony that people go through, not after an enforcement action takes place, but simply in the due diligence process to figure out whether or not they can do something in the first place. And this is a huge, huge cost to the marketplace that none of us are seeing directly,

and that has to be recognized and has to be addressed.

Here is my version of the simple background of the law. We have essentially two historic standards, the FCC 10b-5 standard and the CFTC CEA, one relating to fraud or misleading information in the marketplace, the other with respect to establishing an artificial price. And in electric markets, the FERC market behavior rules were established in 2003, and then got supplanted with the Energy Policy Act of 2005 and Order 670. And with the fine tuning we now see going on in Dodd-Frank, there is an interesting part of the associated code of federal regulations, 18 C.F.R. Part 1.c. There's parallel parts for gas and electric. And in the summary line all this comes down to under 1C, the use of fraud in the jurisdictional transaction with the requisite scienter.

What's different here? What are the components that go into these markets that should be considered? This is trying to get at the same notions that came up this morning, which is that while we certainly can have trading, we can have over the counter, we can have ICE trading around our markets, there is an internal paradigm that we have established that represents sort of a fundamental structure that makes this look a little different.

To list basics in electric markets: Bid-based security constrained economic commitment and dispatch, establishing LMP, day ahead and real time--I think that's almost verbatim from Bill. I've heard him say it so many times, I plagiarize it without knowing. Implicit in this is a centrally coordinated network. We've talked about the fact that the market must continually be in balance without storage. We have established tradable transmission rights, which are the financial equivalent to firm transmission. And at some stage, if it's relevant, we'll go back and talk about understanding the old paradigm of physical transmission, and how that maps into FTRs or firm transmission rights is very important, particularly with respect to funding issues.

One of the things that doesn't get spoken of is that we have material uplift credits and charges. And that is, we over- or under-collect in certain areas. And we make up the deficiencies or allocate the surpluses via charges that are not directly tied, necessarily, to explicit market action. They may be by your total megawatt hour transactions. And they are not marginal or price setting in the traditional sense that we think about it, but yet can constitute material incentives for behavior in the market.

We also have material seams issues. That is, at the borders between RTOs and the borders between market and non-market areas, we have discontinuities in both rules and representation of information. And that introduces a lot of noise into what is already a complicated system, and it is material in terms of understanding or possibly, not excusing, but explaining what may otherwise appear to be abnormal or atypical price formation.

And obviously it's much more complex than a non-networked commodity. This paradigm is a closed system, or pretty much close to what we have concluded is a closed system, even when we get it just right. And it does not display all the characteristics that people attempt to impose on it by looking at it in the light of other commodities.

Turning to complications, again, I'm sort of sitting in the middle. So I'll take it from my perspective. For participants/advisors, complications are the lack of the clear rules and the overlap of jurisdictions. The overwhelming level of confidentiality about things that materially would be important for practitioners at all levels to understand, so they could do something constructive going forward. As a practical matter (and I understand why it occurs) there is a high frequency of what from my view of at least having been involved on the inside,

are opaque settlements. That is, reading settlement decisions and knowing the facts, you're hard pressed to understand that the two things were addressing the same situation. And so we don't build (although perhaps cumulatively in experience we may build) a backlog of precedent. Certainly the settlement structures don't seem to me to be worth anything in terms of precedent, and probably, if anything, confuse the situation. And they certainly, I think, are misleading and potentially confusing to the market participants.

Again, the data that most market participants are working on, other than explicit rules, where we find they are not always a safe harbor, are anecdotal. And the differences between the details and the anecdotal situation are usually opaque to the participants. As a practical matter, it seems to me, from my experience, that there are different perspectives on market rules and properties at both the RTO level and at the Commission level. So you may get different answers to the same questions from people who presumably should be in a position to answer your questions the same way across the board, and don't.

And on top of this--again, maybe it's a practitioner's perspective or the need to be continually vigilant, either in my mind or in the perspective that I perceive from dealing with people on the regulatory side--there is what I would call the "creep" of scienter. Which may be my paranoia, but it seems that the notion of intent and an understanding or knowledge of the implications of some of these actions seems to be broadened ex-post, and to be broadening ex-post, which is really an awful environment for people giving advice in the marketplace. You now have to be paranoid about the worst possible implications that someone might give to the actions of somebody you're advising. And you may be better off not even asking for advice, which is one of the conclusions that bothers me enormously.

We have to have clear demarcations. Market participant versus market fiduciary. This is a statement I've made a number of times. The profile of the people in this room extraordinarily exceeds the average participant. And most of the people in this room would be at a loss to make some of the decisions that are necessary in terms of activity in the markets with respect to engaging in certain types of trades. And what can you do? The only thing you can do, reasonably, is depend on the rules. And that means that you must be a participant, and you must be able to read the rules and make a decision. And to the extent that you say "Gee, that's not a really good rule, but I could live with it as long as it's written down someplace. I can understand it and I can tell somebody else what it means, and we can all agree on it. And then we go off another day to fight at the Commission or someplace else…"

The absence of that ability is paralyzing. You have to be able to at some level rely on the rules. You have to be able to have some notion about whether or not you are responsible to second guess the rules. Do you have a duty, if you figure out that this isn't a really good rule, and it may be adverse to the market, it may be beneficial to you, what's your responsibility? Is ignorance bliss? And if somebody asks me, and I say "Well, what would you have done on your own?" And they say, "I read the rules, pretty straightforward," and they go forward and they do something. And I say "Yeah, you know the trouble is, I talked to an enforcement officer the other day, and he said he's suspicious of that type of behavior." What does the market participant do? Is he paralyzed? How does he make a decision? How do I make a decision? How do I advise him?

And it's easy for me. I say, "I'm not going to tell you anything other than what I think, but let's call your attorney and have him in the room while we have the discussion." And that may be, hopefully, my safe harbor. But it still doesn't do a lot for somebody else that's involved in day-

to-day transactions. And in the same context, if following the rules becomes a safe harbor, and if you can truly be confident that you are a participant and not a fiduciary, if somebody decides that something is wrong, should the remedies then be limited, as we discussed earlier today, to simply fixing the rules? So, we disagree. We think something is wrong. You follow the rules. It leads to a bad outcome. We won't get into things like fraud for the moment--you've done everything appropriately, in terms of following the rules. Should the end of the story there be a change of the rules and possibly, at worst, disgorgement of profits from the activity involved? And the distinction I'm trying to make here is that there not be any element of punitive results associated with somebody simply doing what is written in the rules.

There were comments today about unprofitable behavior being sometimes appropriate--but should profitable behavior always be a safe harbor? I think it should be. I would like to hope that we could get explicit guidance, which does not exist right now, that it is a safe harbor. And I'd like to understand why it shouldn't be a safe harbor if it's not. And I think we need to move forward, at least in terms of the kinds of enforcement guidance we're getting from the RTOs and, in this case, FERC or the CFTC, with an understanding of whether or not those types of behaviors constitute safe harbors.

The consequences--I think I've gone over this. It's impossible to give a metric to the wasted efforts that go on once this uncertainty is put into the market. I'm sure a number of us have had discussions about, "Can I do this or can't I do this?" I've had those discussions over extended periods of time on certain issues. I've had them with multiple market monitors. I've had them with multiple market monitors over extended periods of time with different answers. And I think I know the answer.

And I think I've actually had cases where I know the answer and I shared that, and council and everyone agrees, and the participants agree. But the risk is too high to move forward on taking a profit maximizing and, in my view, legitimate, transaction and improving market efficiency, simply because there is so much uncertainty in terms of the rules to follow and the enforcement, or the consequences of you taking those actions. And that's not a tenable position for us. It's not a tenable position for the market. Forgetting the integrity of the paradigm or anything else, you can't do business that way. And it's not fair to market participants to perpetuate an environment where that exists. And I think if anything, it's getting worse.

To the point about an integrated paradigm, looking at the type of transactions that we do internal to the market with respect to just day-ahead, real time and associated FTRs and transmission rights. You need to see these as somewhat differentiated from the normal, independent financial versus physical products. And I don't think we have to go on any further with that.

Right versus wrong. These are the kinds of questions that I ask, and I think we all need to have answers for. The first one goes to a question that was raised this morning. Can it possibly be wrong for the market participant to have an incentive placed in front of him and pursue it? So, if someone says, "I'll pay you $3," and then someone says, "I'll pay you $7," can it possibly be incorrect for the person to say, "Better deal at $7. I think I'll do it, or I'll do it more often?"

Can it be wrong to engage in incremental profit seeking behavior? Should there be a safe harbor if the incremental action is profitable? Why can't we have some sort of general policies to either guide, or at least delimit behavior in these situations when faced with these incentives? And this, again, is from the perspective of a practitioner in the market: why, when confronted with questions like this is the current response, "I think I need to go talk to my lawyer or your

lawyer with you and have a further discussion about it?"

A couple of quick examples. I think we have a general consensus, with a lot of caveats, on what's wrong, or what shouldn't be done. We all have talked to some degree. We have different terminology. I referred to it as "leveraged trading against interest." We had comments earlier this morning about leverage and the importance of leverage as a consideration. Assuming that we agree about what "against interest" means and can distinguish this from hedges, certainly moving to adversely impact prices against your interest for a leveraged gain in another market would be a consensus conclusion, I think, that something is wrong.

The exercise of market power to gain non-competitive advantage--and I think this is the biggest problem we face in the market. And I think that it's something we pretty much all agree on, that the exercise of market power, or economic withholding, is wrong. Certainly, if we can agree on what the action is, there are some obvious things there that are wrong. And clearly a direct fraud, injecting erroneous information into the market, misleading people, is something that we're reasonably content with respect to being inappropriate.

But what's right seems to be a moving target, because of all the problems that I talked about before. We talked about how there's a sort of a fat tail problem. Say a spread trade has a 10% chance of earning a hundred dollars, and a 90% chance of earning zero. It costs $11 per attempt. And all the actions are allowed. Is it a legitimate trade? You expect the value may be negative. But if not, why? There may be reasons you would still undertake this. But you can certainly see an issue as to whether or not that's right or wrong.

But if we do something akin to what this morning's Speaker 1 talked about, and we lower the transactions cost so that instead of it being $11, it goes down to $8. Well, on a simple expected-value basis, it starts to make sense. Should that automatically, with that change in incentive, be good behavior? And if not, why shouldn't it? And how do you develop guidelines for giving people guidance in these situations? What do we do? We need to have some sort of clarification with respect to how to do that.

This is the simple withholding problem. And the notion of what I call a creeping scienter. You're going to retire a unit in PJM's capacity market. We have a very steep demand curve. It's sort of trivial if you have a reasonable portfolio that is not otherwise hedged, to conclude that you will make a lot of money simply by the retirement. You also conclude that it is profitable and rational to retire the unit on a stand-alone basis, regardless of the portfolio impact.

You would like to think someone would only look at the second dash there (the stand-alone profitability). But it's irrational to assume that they wouldn't also consider and understand the first, that is, the impact of the reduction in supply. Does the recognition of the market power impact taint any subsequent decision? That is, is it merely the understanding that you can and will influence prices in a way to improve your overall portfolio that constitutes scienter, regardless of the fact that the stand-alone action in and of itself is profitable? And this is where you need to have a safe harbor.

My subjective impression is simply that the knowledge of the stand-alone profitability is no longer sufficient. And it would give me a source of concern in advising someone if they did not understand that that was a source of potential concern. And in looking at this, does it matter if one factor is more important than the other? Is the relative contribution important? No guidance. We don't know how to tell people what to do in this situation.

The last example I'll try and do a little in the abstract. Say you understand that you have a profitable trade incrementally in front of you. Unambiguous--say you're going to make a million dollars. You understand that it interacts with all sorts of things in your portfolio. Many of you would take a look through your books, you'd see, if not dozens, maybe even hundreds of different types of transactions in there. Do you need to understand the interaction with every one? It was suggested this morning that you do. I certainly suggest to people that they ought to think about it. I'm not sure if it's a feasible task for them to do it.

Can you expect there to be interactions? That is, can you expect it to aid some positions and harm others? And in a network market like we have, the answer is, absolutely. And what does it mean you should do when you see that? Again, is any of that other information relevant to the fact that on an incremental basis you are facing a profitable transaction? And the moment we let all these other things come in the door, we sweep away the notion of a safe harbor, and we create an incredible overhead uncertainty, an impediment to us being able to give advice and to move forward in transactions. And I think that's it. Thank you.

Question: I'm just trying to understand the two statements that individually seemed to make sense, but together I don't quite get. You said that market power is a problem. So if I can raise the price (I like the earlier questioner's example) because I know I'm pivotal, not from 30 to 31 dollars, but from 30 to 300 dollars, and I do so, that's clearly profitable. So I don't understand how profitability in and of itself is a safe harbor when market power was also something you said was a problem.

Speaker 3: I hope I clarified that there were some things that were clearly wrong. And the exercise of market power--I'm not going to argue with that. I'm talking about a free-standing incremental trade. I can buy at $10 and sell at $20. Should that be sufficient information for me to be able to say, "Go do that?" Clearly, if an intervening step was, "By the way, I need to withhold some capacity from the market or some energy supply," that's a different problem.

Speaker 4.

In your example, I can buy at $10 and I can sell at $20 and I can lock in the 10 bucks--is there any problem with that? If you do that simultaneously, that's a hedge. You bought something. You sold something. There is no problem. If you say, "I can make a million dollars, I can buy it today at 10 and wait till tomorrow, and maybe I'll make that," that is not a hedge. And so that transaction might be something that enforcement or a regulator would care about.

OK, so before I begin, let me thank our host, the Harvard Kennedy School and Dr. Hogan for inviting me. This is my first opportunity to, I don't know, come out from my hidey hole and talk about what it is that I do and what I've done for the past eight, eight and a half years. First I want to thank the people who read my mammoth tome, which would have run about an hour, and cut it into something that's much more reasonable. But I will say that all the good parts are now gone. I only have the dry parts. [LAUGHTER] All right.

I need to tell you, first, that I have to make the usual disclaimers that [I am only speaking on my own behalf, not on behalf of any organization.]

I need to tell you a few things about myself off the top. I'm not an economist. I don't think like an economist and I don't involve myself in economic theory. I'm not an attorney, so all of my legal opinions are worth every dime that was spent on them. I am an ex-commodity trader, I started in 1974, and I traded for over 25 years.

And I've been eight years or so in the government.

I want to say upfront that because of my trading history, it's my opinion that I understand risk, risk management, hedging, and speculating in more deep and more fundamental ways than people who have sat on the side and talk about it and have not actually executed it. And my perspective is through the lens of a professional trader. So for questions like, "What should we do when we're not sure about the rules?" I can tell you absolutely that my perspective was, "Don't do it." I worked for any number of firms. I said, "Reputational risk is something that we should think about, because if you move the share price, you will never move it up, but you certainly will move it down by trading." And you should be very cognizant of that fact when you approach a rule that you're not absolutely sure of.

So as has been mentioned before, I'm going to mention again that there are any number of laws against market manipulation. There are a fair number of jurisdictions who are on guard to protect the markets and the public. And some of those entities that prosecute market manipulation or laws applied to protect the public from nefarious market actions are the Department of Justice, Federal Trade Commission, CFTC, Federal Energy Regulatory Commission and any state's attorney general. And frankly speaking, we've talked to them all. I will leave the matter of which law can be applied to prosecute actors who are interfering with market functions, whether directly by participation or indirectly by lying to publishers or indices or other defrauding acts to the public, to all the others. I'm not going to speak about that.

I stress that my approach to the detection of manipulation is very straightforward. It is my opinion that the portfolio of any firm is a speaking document. When a trader or traders have a price risk or a position--and I will call that a benefiting position. It doesn't matter if it's physical or financial--and trade intentionally to enhance the value of that open position, they are manipulating. This is a risk-orientated understanding. You can read the risk profile of the firm and understand what the actors are doing. This is not a position that looks like pornography, which was famously said to be, it's known when you see it. Manipulations can be diagrammed and illustrated well before they are detected.

It's not an outlandish position for a regulator to take. In fact, it pragmatically addresses some distinctions which separate manipulative conduct and legitimate trading. Consider the act of hedging. Hedging itself is never manipulative. If a hedge is 100% effective, there is zero incentive to move prices deliberately. We can walk through countless examples of hedges which impact prices. But if a position is hedged, engaging in the price formation process does not reap a benefit to the trader.

So why is the portfolio the speaking document? Well, there are a number of principles or Golden Rules at work. And the first one is, every trader knows is "Know Thy Position." The price exposures and the obligations of the firm are known. The desk positions and exposures are known. Individual traders' exposures and positions are known. There aren't any accidental positions. Economists have trouble with this one. If every position is known and all actions are deliberate, then the behavior matters, because they're linked.

Nothing matters except the open positions. And there are two types. Exposures to price and exposures to physical performance obligations. There are enough mix-and-match instruments to allow traders to slide between these two risks at will. Remember always, the trader knows their position.

The second principle or Golden Rule is that a true hedge lays off risk. It locks in value. A speculative position such as a time spread

position can have relative value exposure, but it's still a speculation. Anyone worth their salt as a trader knows the difference between a hedge and a risk or a speculative position.

I'm going to assume that this audience knows the real difference between speculating and hedging. And I will leave it as a basic understanding. (Now, if anybody wants to talk about specific examples later--well, could this be a hedge or that one? I'd be very happy to do it.) By comparison, a speculation or a risk position seeks to gain value but could lose. Diversification of risk by accepting more risk does change the character of a total portfolio, but itself is not a true hedging strategy as defined by locking in value.

So I'll explain this a little bit with an example from the wholesale electricity markets. In RTOs, a financial day-ahead settling instrument cannot be hedged by extending its risk by one day, such as by adding a virtual trade that happens to contribute to price formation of the day-ahead price. Such trades alter the risk exposure of the portfolio, but do not mitigate risk. The two trades are independent of each other. This is important to recognize.

Many trades, while having similar components, are not actually dependent trades. They can't mitigate the risk, except as an aggregation of profit and loss after all settlements. If a one-day extension hedges, so would a ten-day extension, a one-year extension. And everybody recognizes that putting on a one-year position does not hedge a one-day exposure. None of these examples are true hedges.

It matters if the ratio of a trader's volume of action in the virtual market is less than the financial price volume exposed to the settling instrument. If this is so, then what we call leverage to a benefiting position has been obtained. And this can provide the incentive to manipulate, and in some cases, create the tools to manipulate. A benefiting position coupled to specific market behavior--the contribution of prices to a settlement price formation, which benefits the position itself, translates into an equation, sort of like, "move the price, receive some sort of gain equals manipulation."

Some will try to convince you that altering a risk profile is actual hedging. It's not. Changing a portfolio's value-at-risk profile without locking in value is only a more complicated speculation. Because it's a very basic tenet of trading--a fixed price exposure can never be hedged by a floating price. It can only be hedged by another fixed price. Extending the time of risk is never a hedge. Firms that have a one-to-one ratio of exposure of day-ahead volumes to virtual trades can argue that the risk of a portfolio has been moved. For this argument, and this argument alone today, I can accept this perspective for the discussion to get on to the more important concern that virtuals make price contributions that impact the rest of the trader's portfolio.

Making or losing money independently of the initial position matters. So, giving a bad analogy, compare, "Hey, I lost money on virtual bids today, but made or saved money on my real position," with an action with the same validity as market manipulation: "That gun that I bought was expensive, and the gas I had to buy for the stolen get-away car, that set me back, too. But the bank robbery paid off." [LAUGHTER]

I am speaking to manipulations of settlement prices for the benefit of positions in a portfolio, both physical and financial products. FTRs are day-ahead settling financial instruments. Therefore, because FTRs are pure financial swaps--and I know it's a loaded word, and I know all about the issues about whether they should be jurisdictional or not, but just accept the term for the moment, that the FTR is a swap that expires prior to any actual delivery. Their accumulation, purchasing them in advance, is of no consequence if held on a stand-alone basis. Spec-ing with a swap and leaving the market alone--nobody cares about. FTRs themselves do

not contribute to price formation, and are as such passive instruments. There are any number of passive power products that settle on RTO prices. By comparison, instruments to manipulate--all day-ahead settling financial instruments consequently must contribute to the formation of day-ahead prices.

Those instruments within an RTO are limited. Virtual trades, up-to congestion and/or physical schedules across inter-ties. Given the contribution of virtual trades to the day-ahead price, it isn't necessary any longer to own generation to manipulate prices in an RTO. Financial capital and a will are all that are required. In an RTO, large-scale manipulation isn't the only kind that can take place. Very targeted, small volumes at vulnerable times of system stress or at points or nodes with unique characteristics can be influenced to produce significant rewards without requiring massive capital.

So all said and being done, storage is not necessary to manipulate RTO prices, which means generation is not necessary.

My perspective is that any and all indices can be weaponized to attack price formation processes. Buy an index-based position in sufficient quantity, and you have the means to sell aggressively during the price formation process. Sell an index in sufficient quantity, and you have the means to buy aggressively. The cost of acquiring the index isn't a factor in the decision to acquire and use the weapon by traders, though economists spend a considerable amount of energy on this subject.

Going to the RTO model, the RTOs model their day-ahead pricing processes through multiple iterations. The outcome often is one that can be best characterized as “system impossible.” What went in can’t possibly be what will be delivered. If a participant has sufficient financial capital, it can place any amount of virtual load or generation and physical day-ahead schedules into the mix, and prices will be generated by the RTO. Nothing will be rejected by the pricing model.

System impossible outcomes can and do determine day-ahead prices. Note, system impossible pricing outcomes don’t impair real time power delivery, though there could be some blowback of day-ahead prices impacting the real time. And Speaker 1 has already mentioned, and he can address later, the issue of day-ahead financially bound generation and impacts to real time prices, if he chooses to.

So back to the Golden Rule, Know Thy Position. Traders can be fired for many things. But the top of the list is, if you don’t know your position, you can be fired. And I have seen this, and it is the one thing that will bring management down on top of you before all others. Necessarily, traders know what directions prices need to move to benefit their positions, whether it’s a spread, a fixed price, or a physical volume priced at an index. They know whether down is good, up is good, narrow is good, or wide is good. And they also consequently know what’s bad for them.

It becomes interesting when the passive instrument, which has no tie to trading physically, such as an FTR or some other fixed for floating swap or floating for floating swap, become the motivation for trading physically. When a participant accepts a passive instrument as a vehicle for speculation, there isn't any necessity to contribute prices to the price formation of the floating component of their position. When a market participant seeks, obtains, and injects an interest to contribute prices while holding a benefiting position, that participant is manipulating.

What is most interesting to me is the change in the market structure. Years ago, concerns to manipulation such as corners and squeezes meant that the actor had to own either the futures and/or the underlying physical to attempt to

dictate prices. Market power also is a concern, as utilities could withhold power capacity to benefit other resources. By comparison, in power you can get all the market concentration that a trader needs or desires or is willing to pay for by simply incing and decing within the RTO. Such trades buy us day-ahead prices to benefit FTRs and other derivatives.

And yes, a manipulator could also schedule to move physical electrons in a day-ahead market from neighboring RTOs. And in this instance, power flows and manipulations tend also to be uneconomical. In the old days, physical capital enabled withholding and market power, while financial capital enabled sophisticated traders to try and corner or squeeze markets. Today traders have the ability to acquire similar concentrations in a transitory way. A kind of at-will and temporary market power.

Virtual trading is the perfect example. A trader can place a very significant volume to a market which naturally resolves and with results that substantively alter day-ahead prices advantageously to a manipulator at some cost--and what's interesting in RTOs, is even accidentally to a profit or a winning lottery ticket. Everything comes back down to Know Thy Position. It's still leading the trader and it leads the examiner.

So, because I was concerned about time (I only kept five pages of my 20 pages) I'm getting to the end. I'm going to opine on a slightly different subject, and that is, the financial side bet is not the same thing as physical infrastructure position, and does not entitle the financial holder to act uneconomically to benefit the bet. If there is a logic that financial products allow physical hedgers a means to accomplish their goals and to have an entitlement to access the physical market, it does not hold that financial speculators have the identical entitlement.

When the transactions are all examined, physical participants do not have exposures to benefiting positions enhanced by predatory behaviors. And financial players do. I have an analogy here that I would love to share, but it consumes a lot of time. So if you want to hear a story, I'll tell you one later.

The RTO market, as has been discussed, was created to generate cost efficiencies to the benefit of consumers. The goal was to move off of cost of service and into a world of competitive market outcomes. No one thought that the physical end use and production was to provide a vehicle for gambling that dwarfs the real physical interests. And certainly manipulation as a hedging strategy was never contemplated by electricity market designers. Bets with financial instruments, fixed for floating swaps deriving their settlement prices from day-ahead prices, and FTRs, are not at all the same thing as owning a generator or servicing a load. Yet this argument creeps into the discussion as proof that speculators who say they are laying off risk are the same as physical enterprises. We could spend an hour discussing how physical ownership and commitment is different from a bet. We can go to trial about how they are or they are not laying off risk. Making bets do no confer the right to interfere with market fundamentals. A speculation in financial power trading instruments is not the same thing as building transmission, owning or operating a generator, or supplying customers with power.

I thank you all. I appreciate the opportunity to speak. And I hope that some of the questions will bring out some of the more interesting topics.

General Discussion.

Question 1: I wanted to ask Speaker 4 to expand on the comment about holding a passive settled position, like an FTR, and then

undertaking an incremental trade that would add value to the position.

You clarified to me the distinction between an open ended position that would benefit the passively settled FTR versus a closed transaction of purchase and sale. Could you expand on that? Because you explained it to me, and I think --

Speaker 4: The question was, we're talking about the profitability of a deal where you can go, "I can make ten dollars." And you go, "How does that impact this equation of a pricing settling instrument?" Well, in a settlement, where you exchange a fixed or a floating risk--so you take day ahead, and you say, "I'm going to take more day ahead on. I like the day ahead exposure. I want to have an exposure to real time." There's no guarantee that that makes money or loses money. You don't know when you enter the transaction, as opposed to one where you go, "Oh, I have an opportunity to take money from the market and lock in something." As a regulator, I would never care about the near-simultaneous transaction or the hedge of a commercial deal and its price impact into the market. I wouldn't care about that. So if you were saying, "I'm selling power to a load, and I'm doing it at a fixed price basis, and I buy fixed price power," I don't care. If you were to sell index-based power to the load, I wouldn't care, if you were hedging with an index against it.

Questioner: OK, and to clarify, that was in the context of whether or not that had an incremental impact on an existing passively settled position.

Speaker 4: Right. So long as we're talking about, essentially, it's a hedge transaction. Hedge transactions are not what we're describing. We're describing conditions of producing a new risk into a portfolio to get at the value of a portion of that portfolio. And I think they are distinctly different.

Question 2: Speaker 1, I'm going to ask a question, use my prerogative as moderator. In your presentation, you gave an example of a transaction that you said was permitted under the PJM tariff, or would be permitted, but you still thought it was manipulation, and therefore presumably was punishable, or some sanction could be imposed. Would it make a difference if the RTO had a rule like we do in ERCOT that requires market participants to notify ERCOT if they discover a rule or protocol that produces outcomes inconsistent with an efficient and reliable operation of the market? And then requires all market participants to fix the problem?

Speaker 1: I have to admit, I wasn't aware of that rule, hadn't thought about it. It sounds like an interesting idea. I don't know if I want to actually endorse it at the moment or not. But I think it raises a broader issue, which is, I think that there's been a lot of discussion about whether or not people know when something's wrong, and they have to come for advice, and it's so hard to get advice and takes a long time. I actually don't think that it's as difficult as it sounds, and if you have to ask the question, you probably have a pretty good idea that there may be a problem with the transaction. Now, that's not always true. But I think market participants understand what the fundamentals are, and the fundamentals are about, and I think everyone's been consistent about it--about exercising market power, about affecting the price, manipulating the price. And I think participants have a very good idea about that. They ask when they know that the rule permits it.

I mean, if you look at what was called the Loop Flow case through New York of a couple of years ago, we heard from lots of participants who were very much aware of that situation, who chose not to do it, because they knew it was effectively manipulation. That was not the choice of everybody, and some chose to do it,

and FERC ruled the way they ruled. But it's an interesting example, because it really wasn't that hard to figure out. So let me consider your question. I mean, I like that. I'm just not sure how enforceable that rule is. But as a general matter, I think participants should tell us when they think a rule is bad, when they think the outcome isn't consistent with a competitive market.

Questioner: Well, presumably if they trade on the inconsistency without promptly reporting it, either in advance or trade on it, you may not get them for the transaction, but you can get them for violation of the notification rule, as an enforcement matter.

Question 3: I have a question for Speaker 4. I understand your position, but I want to find out if I'm right, and I want to find out if you can help me understand why you think that's the right answer. We've being bandying about a hypothetical about holding FTRs and engaging in physical and day ahead transactions that affect the value of the FTRs. And the hypothetical we were talking about earlier, and similar to some of the things that have been discussed here, and certainly to what Speaker 3 was getting at, is that you realize that your physical transactions might well increase the value of your FTRs, but you have an independent expectation that they're independently profitable, and in fact, they are. That's our hypothetical. You and I aren't economists, but a lot of the other people here who are say, "Well, we want that transaction to occur. It helps prices move towards the right level, and it's efficiency enhancing, and that's good." And I hear you saying it's not. Am I right about that or no?

Speaker 4: From my view, there is no guarantee that you are going to make or lose money in a day-ahead to real-time arbitrage. You don't know whether you're going to make or lose. All traders say, "I do a trade because I expect to make money." But I know I make money if I move the value of the FTR. That's what makes it different. It isn't, "Oh, I could make money on this other trade"-- and maybe I won a lottery and did, because for the most part, when we look at virtual transactions, they don't make money, when they're used in a manipulative strategy. But every once in a while, they might, and they go, "Well, it's the lottery. You see, it was all about the lottery. It was never about this other product." But when they don't have the financial product, suddenly they don't do the same behavior. They don't do this repetitive, "Let me do these virtuals every day, or near every day."

So you have to ask the question, what does the trader know? And having sat in the seat, you know for sure whether you have a day ahead exposure and how big it is. And you also know what the dollar value is of that exposure to every dollar change in price. And so to say, "I'm only dealing about the new trade," is living in a fantasy world. Traders don't live in that world. I will say, let's talk about could there potentially be a Chinese wall between an actor on a desk saying, "I want to pursue this strategy today," and that happens to benefit some position that, if there's a true Chinese wall, he doesn't know there's a position, and he acted in the market to capitalize on a potential day ahead to real time arbitrage? I would say that that's legitimate. But it's very different when you have a desk that has a significant amount of exposure to the day ahead, and suddenly saying, "I don't know. I have this exposure, and the only thing I care about is this new trade," which we know that we have different ways of evaluating every day.

Questioner: It would be interesting to cross examine you.

Speaker 4: I'd love to be cross examined, actually. I'd love that.

Questioner: Let me refine my question a little bit, and then I'll cede the floor. I wasn't talking about virtuals. I was talking about just a physical day-ahead transaction. You're buying or selling, and you know, it's like, you think it's going to help your FTR. But you also have every expectation --

Speaker 4: You just said the key word.

Questioner: Let me finish. Let me make sure we're on the same wavelength. I then want to ask you why that's the key, because that's kind of the question.

But say I also think, based on the way prices are moving, there is a legitimate and verifiable basis for profiting on a standalone basis. Now, you're saying, I think, that you don't care about that--as long as you think you can benefit your financial position, it's manipulative. My question to you is, you have to have manipulation. Something has to be wrong with the physical transaction, I think, for there to be an issue. And what's wrong with it if it's independently intrinsically profitable?

Speaker 4: Let's examine the position. So in my example, I actually had one of these, to say, "OK, I own a financial product at a premium to another RTO. So I have two RTOs. And I own that at $5.00. And I bought it a year ago. $5.00 premium. And I get to the first day of scheduling, and it's $5.00 premium at the day-ahead market. In all those markets that indicate and could be traded, the ICE markets and what not, it's there. It's $5.00. The expected trade is five bucks. The economical trade is to capture the $5.00, which would be, buy the cheap power and move it up to the expensive power and capture it. But that's not what a manipulator does. They buy the expensive power, because that's what they own at a premium, and they counterflow it, and they lock in the $5.00, and they say, "That's a hedge. I am hedging a portion of my position." Now, a $5.00 financial product across two inter-ties that settles at $5.00 has no P&L. Net nothing. But to counterflow that power would guarantee a lock of a $5.00 loss. And that trade is the one that I have a problem with. The other trade --

Questioner: Do you have a problem with the trade that I talked about?

Speaker 4: The economic trade between A and B, or between B and A, absolutely not.

Questioner: That also benefits an FTR position or a swap or what have you.

Speaker 4: By definition, I would argue it doesn't benefit it.

Questioner: By definition?

Speaker 4: Yeah, because buying power, right, at one place, to raise its price, that's been exported to another, right--what spread do you have on? You would be short where you would be delivering power, which would lower the price, though you would be buying power at the place that you would be long.

Question 4: I'm going to take up the same question, because I am confused.

Speaker 4: Well, maybe I am, too.

Questioner: So let me try to do this in a simpler setting. So it's PJM, and it's 1998 or something like that. So we don't have a day two market. We have a day one market. There's only real time. And our financial transmission rights are settled against the real time price differential. And I am a generator, and I have a load. And I schedule physical delivery between A and B. I know that scheduling that physical delivery may add to the congestion between A and B. I will increase the value of the financial transmission right. Stop. OK? Is that market manipulation?

Speaker 4: I would argue no. Now, let's go through the rest of the exercise. So if I use that FTR to enable me to price fixed price power at the source and deliver fixed price power at the sink, to my load, all right, the purpose of the FTR, the legitimate reason that it was invented, would be fulfilled. Is that correct?

Questioner: Right.

Speaker 4: So if I owned 100 megawatts of generation. I had 100 megawatts of FTR and I delivered it, I would have absolutely no problem.

Conceivably, if you had 200 megawatts of the FTR, right, but we're only delivering to 100 megawatts of load, I still would have no problem, right, conceivably. When did you enter the transactions? And how did they get scheduled? That matters. Now you're into nuance, as opposed to, this is a targeted activity. Right? We put it on yesterday to get at a value, and we don't know what the outcome is. In the example that you proposed, you have two known prices with physical transmission. That matters. It says that the transaction is hedged. There isn't this other instrument that I'm targeting with that transaction. You can't target it.

Questioner: This is helpful. But now let me take the example, to the next step. So now we go to day two markets. OK? I want to do effectively the same thing that I did in the day one market. The mechanism for doing that is having a real physical schedule in the real time market, getting a virtual transaction in the day-ahead market to settle out against the FTR in the day-ahead market. When I do the virtual transaction in the day-ahead market, am I manipulating the market?

Speaker 4: It depends. I mean, in your example, where it's effectively talking about generators and load, and in an RTO, if you were saying my generator was, and I'll pick on New York. It's zone A, and I have load that's in New York City, and I bought an FTR, and I delivered to there, and let's say, and then on top of that, I went out, and I did ten megawatts of virtual, to capture the value between day ahead and real time. I would argue no, that that transaction is not about moving the price to enhance the value of something in your portfolio. I would not argue that, particularly if the generator had the ability to produce more power. As an example, if you have a contract that's load following. I wouldn't argue that just because you entered into a virtual transaction, that you are entering into a manipulative scheme to benefit something.

Now, having said all of that, if you really have a 10,000 megawatt per hour financial instrument in A that benefits from higher prices, and you suddenly put in 800 megawatts of demand into zone A as a virtual transaction, I would separate out your hedge transactions and say, I'm not interested in those. I am interested in the large transaction and the large virtual that you put against it.

Question 5: I want to change the subject a little bit. At the beginning of Speaker 1's presentation, I appreciated the fact, given my perspective, that he talked about both seller and buyer-side market power, and he did indicate, if I heard him correctly, and it's timely and important, the recent auction and the Minimum Offer Price Rule may be misunderstood. I think he invited us to seek further comment there, and I think we ought to give him that opportunity, because I think it's something that we'd all benefit from.

Speaker 1: Just very briefly, for those who aren't totally on top of it, the Minimum Offer Price Rule says that if you wish to offer a new unit at less than what's the predetermined net cost, that is net cost of new entry, or in fact less than 90% of that, you have to have an exception. That exception process means

coming through the market monitor unit and through PJM. And the point of that is to show that your actual net costs of entry are less than the net CONE (cost of new entry). The object here is to prevent those with an incentive to reduce the price from reducing it. And in fact, what we had in PJM in this last auction was a number of entities who had subsidized contracts from individual states, New Jersey and Maryland, who had an overwhelming incentive to offer at zero, because they only got paid under those subsidized contracts if they cleared in the RPM. So it was our job and PJM's job to review those to verify that they were consistent with actual costs.

Now, there's been a fairly substantial amount of misunderstanding, particularly among the investor community, about what actually happened in the auction, and many are saying that this means that MOPR didn't work, and there's been a lot of angst about it. One of the things that people failed to note is that the net revenue side…so on the gross CONE side, the costs are a fairly identifiable—the amount of money to build a power plant. There are ways to get competitive advantages. And if you actually have those, those are acceptable. But one of the key pieces of the net CONE calculation in the capacity market construct in PJM, is that it uses three years of historical average net revenue. Now, by definition, that's wrong, absolutely wrong. And the more that the market is changing at the current time, the more wrong it is. Well, obviously, the market's changing pretty dramatically right now, and that three year historical number is quite wrong. So any of you who have looked at forecasts, have looked at forward curves, know that those numbers are very different. That by itself could have accounted for what people saw in the market.

So it's our view, first of all, that the MOPR rule is nowhere near adequate, that it's not tight enough, it's not clear enough, it's not transparent enough. It's too ambiguous, and in fact, as we pointed out several times to the Commission, simply by making assumptions without changing the underlying cost facts, you can make your unit look half as expensive as it really is. That is unacceptable. Those rules have to be clarified. We're going to continue to push that. But the fact that markets cleared at less than net CONE does not in and of itself demonstrate that something was wrong with the MOPR review process.

Question 6: A couple of speakers today seem to have indicated that they think that market power exercise and market manipulation are two different things. I'd like to ask Speaker 1 and Speaker 2 to respond to what I think are two arguments I've heard on the market power issue. One point of view is that market power should be prohibited. It's inefficient and a transfer of wealth. The other point of view is that market power should be allowed, because if market power is exercised, it's where you get new entry. And if you mitigate or prohibit market power exercise, you disincent new entry. So those are two conflicting points of view, and I'd like to hear Speaker 1 and Speaker 2 respond to both those points of view, or a third, fourth or fifth point of view if you are lawyers, but you're not. You're economists.

Speaker 2: I plead guilty to that. Yes, exercising market power results in a dead weight loss. And the wealth transfer doesn't necessarily bother economists so much as the fact that you distort output. You're producing too little, and value is destroyed. In terms of the incentive to entry, well, I mean, maybe you can make some argument that it's sort of a second best, that there's some other market failure that's preventing entry into the marketplace. But actually, what can happen is you can have an exercise in market power. You can have excess capacity. So really going back way before my time, even, to monopolistic competition sorts of stories, where you have firms who are exercising

market power, and as a result, you get excess capacity in a market. So I would be very reluctant to buy into the idea that we should encourage market power, because that encourages entry, because if it does, it's likely to encourage too much entry.

Speaker 1: So, short of just saying, "I agree," let me just expand on it a little bit. So, market power is always a bad idea. There's no reason for it, as Speaker 2 said. It's a cause of dead weight loss. I'm actually apparently not enough of an economist to think that I'm not also worried about the wealth transfer, in addition to the dead weight loss. I think those are both issues.

But the argument about new entry we've been hearing from the very beginning of PJM markets--I also agree that that argument doesn't make sense. If you're not getting entry and not getting entry signals in the market you have, then there's something very wrong with the design. Now, it's clear that the energy-only construct in PJM, done the way it was, was never going to result in prices and revenues adequate to induce entry, primarily because the system was overbuilt by exogenous requirement for reliability. You have to build more power plants than you actually need. If you're really going to let the market solve that problem, you're going to have black outs from time to time. That would be a market response. We've chosen not to go that way. We've chosen to be long. The solution is either administrative scarcity pricing or administrative capacity markets. PJM has chosen capacity markets. Other markets have chosen administrative scarcity pricing. Either way, the market design has to endogenously provide for the incentive to enter. And relying on market power, as was pointed out, is an inefficient way to do that, and also just an indicator there's something wrong with the market design.

Speaker 2: I will go back a little bit in the sense that actually I wrote my PhD thesis on shipping markets, of all things. And I mentioned a minute ago about some other sort of market failure, that you can show that in certain kinds of markets, we have really lumpy costs, and depending on the way that spot prices are determined, you can have prices that are not sufficient to support the efficient level of capacity in the market. But I think that that's sort of an exceptional situation, as opposed to the normal situation. And so, as Speaker 1 noted, I don't think that those conditions hold in electricity markets in particular, and that there are alternative ways of dealing with that situation, like a capacity market.

Question 7: Switching gears for a minute, I heard on both panels a concern about the opaqueness of settlements that come out of FERC. And I've heard this for a while. And FERC, I think, has tried a number of things to improve the visibility of its views of these cases and try to give some guidance. And I have been on both sides of this. In my prior life, I wrote a pleading for investors and utilities opposing one of those efforts, which was the Notice of Alleged Violations. And when I went through that process and talked to folks in the industry, I always got the same reaction: "This is really good, if it's not me. But if it's me, my stock price is at risk. So I'd support this if I was sure I wasn't going to be the first guy to get hit with one of these."

So with settlements, we've kind of heard the same thing, which is, "Yeah, boy, we need more details on these settlements so we know what's going on and what was settled. But I don't have any incentive to settle if all the details of what happened are going to be in a Commission order." So I heard Speaker 3 mention this, and I think it was also mentioned on the earlier panel, and maybe it was a question for them as well. But how do you bridge this gap, I guess, is my question? Or

just something to throw out there for discussion. Because I've thought about this a lot. I'm kind of at a loss.

Speaker 3: Part of this isn't that the settlement process continues the way it is, and all the facts are out. It's that the rules become transparent. The violation or lack of violation becomes transparent. And you get a yes or a no at the end of the day. Settlements are, by their nature (at least, I have a limited sample)—they're imprecise. They're often structured to not address what is of most interest to the parties that are in dispute, and intentionally so. So having settlements that are very explicit is somewhat of a nonsequiter.

What I'm suggesting is that the opacity of these settlements doesn't add to the ability of the market to move forward so that people behave better or understand the rules of the road. Ideally, you'd like a world where there is, quote, "no settlements," and that probably is too extreme of a world, but where "You broke a rule." We fix it. You're penalized. You disgorge. You whatever. Or, "You didn't break a rule," and it's over, and we move on. It's this sort of obstructing or obscuring instrument that is hiding information from the market. And that's really what it is. If you look at it in terms of efficiency notions in general market behavior, we would be very unhappy with these kinds of transactions if we were regulating. The settlement, as a transaction, is a bad transaction, because it really doesn't convey any information to the market, or the type of information we want.

Speaker 2: Yes, I'd follow up on that. You know, information is a public good in the sense that it produces value that other people can use at no additional cost. And the problem is that private litigants frequently have no incentive to produce that public good, and so they have probably an excess of incentive to settle. So from that perspective, it is problematic.

Questioner: First…what I'm about to say does not necessarily reflect the views of [my colleagues or staff.] As a matter of fact, it probably doesn't.

The best bad example I can point to of how FERC's examination of conduct sort of lags reality--and I say it lags reality because of two things. First, when we had an integrated market, where the individual public service commissions and their equivalent around the country regulated both generation and distribution, we wouldn't be having this subject matter discussion right now. Similarly, I was involved in the first formal CFTC complaint against someone manipulating a market. It was a guy named J.R. Simplot. He was trying to corner the market for potatoes in Europe, and I happened to represent a shipping company that shipped most of the potatoes from Maine to Europe.

So I'm old. I go back a long way. I'm not from this industry. And I looked at the derivative that Keyspan Corporation entered into to basically manipulate the market in Zone J in New York City for three summers--three years, but it was effectively three summers--and the cost to the individual ratepayers in the state--and I did the head count. There are about 20 regulators in the room here. And I think the reason for the heavy turnout is because we're interested because we're the constituency that represents the ratepayers. A lot of people around this table represent various people that have advantaged or disadvantaged involvement in the markets. But ultimately, our constituency pays the price, one way or the other.

So we had a complaint that wound its way up to the FERC. It looked like it was going to get a clean bill of health. All of a sudden National Grid expressed an interest in Keyspan. It was communicated in words of one syllable, by me at least, that if they had any interest in having a transaction close the third summer, they

wouldn't take advantage of something that cost the ratepayers in Zone J $250 million for the summer.

I wasn't here this morning, but I noted easily when the Constellation settlement was issued, it was issued in the context of, "Gee, you want our approval? This is a good time to settle." I see these two strands of, electricity didn't use to be a commodity. It now is. The public service commissions used to have a regulatory compact, which said, "If we don't get you now, we'll get you at the rate case. And all of a sudden your allowed returns are going to go down, because you've been messing with your customers." Those two things aren't here now. We're now just in a straight market analysis. That's what this whole conversation has been about. It's a market designed by economists who are trying to do the right thing in the right way. My question, I guess, to anyone on the panel is, is there a better way? And if so, who is going to mount the political offensive to implement that better way in Congress? Because, certainly, most incumbents don't have that much enthusiasm for massive changes to the rules. They have enthusiasm for the kind of changes we've been discussing thus far.

Speaker 3: I'll stick my head out. One observation might be that the Ravenswood capacity price result, one, was anticipated by the Commission. That was clearly the case in terms of the economic withholding. But if I remember correctly, the disputed price was at what Con Ed had estimated its embedded costs were at the divestiture. And that's what set the cap for the market. And so, you will see, if we go back to the divestitures, the ones that I've looked at in detail, like PJM on PECO, the realized prices for assets that were sold, versus the assumptions in capacity receipts, have been less than half.

So I'm not sure where the market failure is, is my observation. The actual payments by customers that were anticipated have been much lower, and had they been anticipated in the divestiture at the lower rates, the stranded costs would have been higher, and the base of business deals at the time of divestiture would have been different. So consumers would have paid a lot more on day one.

That's certainly the case pretty much throughout PJM. In the specific Ravenswood and in-city divestiture, that 105 (and that got changed to 111 by the adjustment for UCAP), that number was Con Ed's estimate of its embedded cost. And so, the worst case that was realized, and we shouldn't talk about the current market, because that's a bunch of stuff going on. But the worst case realized was, people would up paying the average cost that Con Ed would have been collecting at retail. So I don't know --

Questioner: The whole idea of the market was to advantage the consumer. It wasn't --

Speaker 3: No, it was to get an efficient price, whichever way it cut, and that could mean increased or decreased prices. It was to improve efficiency.

Questioner: My wife tells me those two are somewhat related.

Speaker 3: Well, in the long run, it should be efficient and cheaper. I mean, someplace, for a number of years, there were in rate base, the floating islands for nuclear plants. I always bring this up, and I always get a dirty look. But PS had recovery for ten or 20 years for investment in the idea of the conceptual and some of the design work for floating islands off the coast of New Jersey for locating nuclear plants. When Genon or its predecessors went bankrupt, rate payers aren't paying for any of that. So those are good things that are happening out of this.

Should there have been a different rule for setting the in-city pricing for the capacity market for New York? We could have days of discussions about how those rules should have been structured differently, and how the divestiture worked. Quite honestly, I represented a party in, I guess it was ’95 or ’96 at the formation of the NYISO, and my recommendation was for New York City not to be deregulated. Because I felt structurally there were problems that were always going to be a pain. And that we could have an LMP market for the state as a whole, but for capacity and for general ownership, it would have been better for Con Ed to maintain its ownership position, and for there to be a contract for differences on energy.

Questioner: Your lips to --

Speaker 3: Yeah. And just to close this story, the realization was that my client was induced to shut up and be happy with some other side transaction that took place and to stop complaining about this and move along with the rest of the structure of the market.

Questioner: I guess if Keyspan thoroughly bought into your argument, they would have continued through the third summer. But that wasn’t the case.

Speaker 3: Obviously there’s other things, right?

Question 9: [One thing that can be seen in] the electricity market from the standpoint of futures and options trading is that, of the market locations, there is an ebb and flow in the trading process. It’s undeniable. The participants come and go. Industry circumstances, related fields all go into how liquid or less liquid markets tend to be. You can start with a market, in one year, that was relatively active, and participants can shift for whatever reason. So the assessment of liquidity is a key in analyzing the potential for manipulation, and does argue for an adjustment for the underlying market liquidity in its current sense.

The question that I’d like to pose to the panel, though, has to do with financial tax treatment related to hedging. Now, in order to qualify for favorable tax treatment, meaning an adjustment on the income statement, you need to formally designate the hedge. You need to identify the instrument. You need to identify what you’re hedging. You need to identify the hedge ratio in terms of the relationship between what you’re hedging and the instrument you’re using to hedge. And that is a periodic updating process. There is some latitude in terms of how the hedges are documented. But I’m wondering if those standards might go a long way to reducing the uncertainty as to what constitutes a bona fide hedge, possibly with an adjustment on the financial accounting side in terms of more specific hedge designation environment.

Speaker 2: Just a couple of remarks, and I think that this relates to what Speaker 4 was talking about as well. And it’s also an issue that’s coming up in other contexts. So for example, it’s also coming up in the Volcker Rule. It’s also coming up in the context of position limits in what constitutes a bona fide hedge. And I think that fundamentally the issue is that all hedges defined in that way reduce risk, but not all risk-reducing transactions can be defined as hedges in that way. And that’s what makes things problematic, is that I think that you can essentially constrain market participants’ ability to manage risk by imposing those sorts of constraints on what are allowable hedge transactions.

The flip side of that is that sometimes you can--and this is what we’re potentially seeing in this JP Morgan situation out of London, is that people can dress up things and say that they’re hedges, and it turns out that they really aren’t. I

think it's going to have to be very fact-specific after the fact to determine whether something really was a risk-reducing transaction or not, and that it's very difficult to identify ex ante criteria by which you'll say something is a hedge, or something is not.

Questioner: It falls to the auditor to identify whether or not the hedge is still a hedge or not. And you're certainly right that circumstances will change, and the correlation relationship can break down. And when it breaks down, then that position is no longer a hedge. Or it can be taken out in other ways as well. But the correlation relationship is certainly a key to the viability of the hedge from the standpoint of the auditing accountant.

Speaker 3: For the non-accountants, does this have to do with the mark-to-market accounting? Or is this actually a tax provision?

Questioner: This is the designation of the derivative position as a legitimate hedge that gets treated as an adjustment to ordinary income or loss, as opposed to a capital gain.

Speaker 3: So that gives it the mark to market accounting. OK, that's it.

Speaker 2: So you're pointing out that in addition to the list of regulatory agencies involved in overseeing market manipulation, you have to add the IRS. [LAUGHTER] New business line.

Man: I guess we'll have to add the Financial Accounting Standards Board to this.

Question 10: I'd actually like to follow up on [the Question 4] example, and take that one step further with a little bit of a twist. And as I understand this, a necessary condition for looking at manipulation, and Speaker 4, you're talking about it, is having an open position. But let's suppose we have the same generator in the day two market, but that generator has an FTR position open, and they acquired that FTR position because they built transmission to get interconnected to the system. And so, in order to do that, you also get FTRs that are associated with that. Is that potentially market manipulation? And what would be the sufficient condition to make that market manipulation?

Along similar lines, suppose that you've got a financial entity that is in the FTR market and takes a counterflow FTR position that clears in the FTR auction, and they have that open FTR position. Yet because that entity has taken the counterflow position, it actually creates more room for prevailing flow FTRs that load serving entities may actually demand and want. And so that transaction may be socially beneficial, if you look at it overall. So again, that might be a necessary condition to say when maybe we should look at it, but what's the sufficient condition to make that market manipulation?

And then finally, the last issue is about transactions that are risk reducing, versus risk increasing. And I'm struggling with that, because risk is inherent in everything we do. There's a certain, in my mind, I'll call it the law of conservation of risks, sort of like the laws of thermodynamics, but now this is the law of conservation of risk in finance. There's the same amount of risk everywhere. We can't create it, destroy it. We can simply transfer it, hide it, make it more transparent, do all kinds of things with it, but there's a certain amount of risk out there, so that if somebody is engaged in a risk-reducing transaction, from their perspective, as a hedge, there may be a counter party on the other hand that's actually increasing their exposure to risk, and willing to do so in order to take that position. Does that mean if there's one party engaging in that hedge, that there's a counter party out there that's potentially a market manipulator? I'd just like to get some reactions to that.

Speaker 4: If you're asking, if you enable a market manipulator--and I'll use a simple example. If you give somebody an index knowing that they intend to manipulate the market, are you collusive in the behavior? I'll leave that to lawyers. I'm not going to be the one to raise it up and say, "Oh, this is collusion," right away. Right? Supplying an instrument, an index…

So let's use an example from power--let's use an example from natural gas, because it's even easier. If someone says they want to buy the bid week product at index for the next month, and someone else has the intent to use that to move prices, the person who gave them that may be satisfying a completely legitimate hedging transaction. We would not care at all about the, quote, "enabling." The idea that someone would call up and say, "Gee, would you give me some index? And I'm going to be spending a lot of money, and you can capture that money"--that's an entirely different animal. So for the most part, the enabling of someone to manipulate, where there is no collusion, I don't think anybody would care.

The other argument that you were making, about, let's call it affiliates, one having an FTR position for flow and one having a counterflow position, and then virtual transactions or other physical transactions that could enhance the value of one position or the other--that becomes very situational. If we're looking at the portfolio of each affiliate, because FERC believes some sort of affiliate violation took place, that would be something to look at. If you were looking for manipulation, you'd probably be looking at one entity or the other, but not both. So who's acting in the market, and what position do they have that would benefit from that action in the market, even if it causes harm to some other actor in the corporate family? You'd have to look at it very specifically. I mean, most of the time what we're talking about is footprints at a high level. You say, is this manipulation? And so I would say, if you have a significantly leveraged position in power, and you trade virtually, or move physical power around, because you have this financial position, likely you are manipulating, and I would say, I'm going to look pretty heavily at that if I have the opportunity. It's not the same thing as saying in every instance, that every action is a manipulation. It's not. But you have to look at it. And so the very first flag is, do you have a benefiting position? If the answer is no, no one will care. If the answer is yes, they're going to look some more.

Speaker 1: Just one last addition to that, the PJM FTR rule does look at it on an ultimate parent basis, so it does care about affiliate relationships, and it treats them all as if they're one single company for purposes of enforcing that rule.

Speaker 3: A corollary to what Speaker 1 is saying is what's sometimes called the "claw back rule."

Speaker 1: I've never called it that. [LAUGHTER]

Speaker 3: Whether you agree or disagree, it's totally transparent. And so I've heard several times people who are in the FTR markets, who are potentially virtual traders, they understand the distribution factor criteria. They know exactly what they're doing. We could differ about the theory of whether those are the right numbers or anything else. But that's a great example of "everyone knows," and everyone knows, it doesn't matter what your intent was or anything else. There's a bright line. I know that that's sort of a dream world for all manipulation considerations, but it's a great example of how, to the extent somebody's worried about it, those kinds of rules are the kinds of things that would work a lot better in the market whenever possible.

Question 11: The '34 [Securities Exchange] Act has been referenced quite a bit, and I think, as most know, for the policing or supervisorial function, there are self-regulatory organizations, like FINRA, or MSRB on the bond side, or NFA on the commodities side. When we're looking at these power trading markets, and particularly the ones that are having impact on the ratepayers that we're here to protect, is there a need for a layer of a self-regulatory organization of similar ilk that has the rule-making capacity and can work with both state and federal regulators? I know to some extent the ISOs and RTOs play this role. But again, it doesn't seem to be under the same type of continuity, from my observation, that you have in the capital markets.

Speaker 1: Well, I would agree that the RTOs and the market monitors substitute for the SROs. I think to have an SRO would be to take the RTOs to the days when California had a stakeholder board. I mean, that's effectively what it is. It's the industry policing itself. So the current setup (you know more about the law on this than I do) would seem to me to be stronger and more likely to get the enforcement right than would an SRO.

Speaker 2: Back in the mid '90s I wrote a paper about the self-regulation of manipulation, focusing on the commodity market experience. And basically the lesson of that paper was, historically, SROs, partially because of these issues associated with the fact that very interested parties are involved in enforcing the rules, they turned out to be relatively ineffective at dealing with manipulation, specifically. So at least some historical experience suggests that that's not something that you would look for going forward.

Speaker 3: Yes, I agree, the market monitor, internal market monitoring, is a better place for this to exist. The only thing that struck me, and I think we went down a path, and I can't even remember where, where there was a considered review of 205 versus 206 rights among the party holding a market monitoring function, and whether it's internal or external. And that seems to be shuffled among the various RTOs, and it may be that there's a better way to do that. And that might be something that might be worthy of people reviewing. But I think having the market monitoring function is probably better than an industry-based review.

Question 12: Speaker 1, you mentioned the impact of the projected energy revenues on the net CONE of the bid. Is the issue a disconnect between the net CONE that's used, that's looking backwards, and the net CONE that's used for the energy projection for MOPR purposes? And then a follow up is, does PJM and the market monitoring unit--is it their number? Or does the bidder get to basically say, "This is what I…?" Who's the final determiner of those projections?

Speaker 1: OK, so the answer to the first question is, yes, there is a disconnect, a very substantial disconnect, between the way that net revenue may be determined for the purposes of a MOPR exception, and the way that the MOPR floor is determined, and the way that the net CONE floor is determined. The net CONE number is determined using average three year historical. As I noted before, that's wrong by definition.

I think it also raised the broader issue, which is, regardless of what financial modeling assumptions you think are correct, they have to be consistent across the MOPR and the net CONE. It seems obvious, but they're not now. So that's an absolute essential to make it work. And I do think it's time for PJM stakeholders to figure out a workable way to use forward-looking numbers of the net revenues in the net CONE, as well as the offer capping numbers. Because that can move both ways, and it's clearly wrong to do it looking backwards.

We've done it that way because that was the easiest thing to do. But the more discontinuity you get in market conditions, the wronger it is.

And then to answer your second question, the forecasts are brought in by individual participants looking for exceptions, as I think I indicated before. I believe that it would make sense to have a single forecast that everybody uses, so it's transparent and there can be no gaming of forecasts. I mean, that is a risk of the current process which absolutely should not be there.

Questioner: Just a quick clarification. Could you have two new bidders ending up with different energy forecasts to set their MOPR? And how can they--assuming they're the same type and same heat rate and same location, as we were talking generally? It seems to make no sense to me.

Speaker 1: I agree. So if you add the caveat, it's the same location, in theory you could… I mean, we look at them, and if we see two entities with very different forecasts, that's an issue we'd raise, and we would try to ensure that we were getting a reasonable estimate. But at some level we actually don't have the authority, given the rule, to make them change their forecast. We can tell them we think it's incorrect, and one of the issues that we raise is people not only using forecasts, but using average forecasts, which is clearly wrong. That is bringing forward some of the 20 year numbers. So I think the cleanest way to solve that problem is to have, if you're going to use multiple locations, a single forecast or a single forecasting firm who's using exactly the same approach across the footprint, so that everyone is facing the same forward prices, and it's not gameable.

Speaker 3: And mechanically, just so you understand, the process goes that the exception goes to the market monitor first, and up to 30 days, if the party takes exception, there's like five days and then ten days at PJM. And then, if there's no agreement, that can be taken to FERC. And it's PJM's tariff, I think, is the way of looking at it, so they have the last say. So I guess if any of the parties takes exception, like if the market monitor disagrees, which he did in the last case, he can file. Or if the party disagrees, they can go to FERC. So the lack of a standard approach is unreasonable. Because the situation you point out allows people to take different views on the mechanics of a calculation and get a different offer floor, as well as have two different forecasts of the exact same location, which seems ridiculous.

Speaker 1: So just to add to that, without getting into all the process question, it allows for a form of forum shopping, and it also prevents a fundamental review by FERC, at the end, of whether the process had a reasonable outcome, because, as happened this time, the Commissioners are not prepared to deal with things with that level of alacrity, given that they might have a week or two weeks to deal with it.

Questioner: So just postulating, if it was an intentionally inaccurate forecast, could that rise to the level, to bring this back to market manipulation?

Speaker 1: Of course.

Question 13: I was just going to mention, on the idea of SROs, one of the phenomena we found in the early days was that people were behaving in certain ways, and the market monitors--multiple market monitors on different matters--threatened the people with, if they didn't stop, they were going to bring the matter to FERC. And as we learned about it, they were matters for which FERC would have been fine with the behavior. But the very act of that threat back and forth stopped a behavior we thought was fine in the marketplace. And I just wanted to chalk it up to unintended

consequences. (Not on some peoples' parts, I guess).

The other thing I was going to mention about the idea of SROs related to FINRA, is that we gave very serious consideration to the idea of certifying traders so that if there were repeat offenses, that you just take away their right to do business. You know, today, they can just move to another place, and sometimes I think the fact that you've been in some trouble gets you some credit for creativity. So this was something that never moved out, because of the change in chairs, but it was something that was under consideration in the earlier days.

Question 14: So what I was hoping to find this afternoon, which I have not found so far, would be the explanation--let's set aside cases that don't involve manipulating prices, so going around PJM with the MISO stuff, or chasing the loss allocations and that sort of thing is a different issue. But price manipulation in the day-ahead market, and if you take sort of simple-minded models, and you've got speculators coming in who are more or less close to being risk neutral, or close to something like that, the naïve model in the simple case is that you have entry, and it can't happen. You can't actually successfully manipulate. You might be able to surprise them once, but you can't get away with it on a steady basis. And what I would be looking for would be the explanation of how you could actually do this, and to what extent is it a defect in the market design that we could actually fix?

I mean, it seems like maybe what the problem here is is that we have too many costs imposed on speculators and virtual traders and treating them differently that are making it harder for them to enter in order to get closer to the naïve model which makes it impossible to manipulate the forward markets.

So I interpreted Speaker 4's discussion, which surprised me when he explained it, but I understood it, but now I think I understand the distinction, which is that exactly the same transaction is treated differently if it's (in his description) a "speculator" versus a "hedge." That seems to me to be a problem. We have limitations on what kinds of virtual transactions can take place, and we load all kinds of uplift overhead changes onto them, and fees, and there's this differential between up-to transactions and virtual trades, and so forth. Maybe the direction we should be going is trying to make it easier for all of this speculation to take place, not harder, because if it's easy enough, you can't manipulate the day-ahead market, as I understand it, unless somebody can come up with an explanation of something that I haven't heard, and I can't think of.

So I just pose this as a question going forward, because I still don't see how, if you have entry, and you have people with deep pockets, and so forth, that you can maintain a differential between the day-ahead and the expected real time. Now, in every day, it's going to be highly volatile, that's for sure, and Speaker 1's pictures show that. But what we're interested in is how it performs on average, and on average, it performs pretty well. So I don't understand why we wouldn't be worried more about improving the market design to allow more of these speculators, rather than less.

Speaker 1: It's only an inch deep on average. Right? So, to answer the first part of the question about how it can occur. There are thousands upon thousands of buses in PJM, and as you saw from one of my tables, half, right off the top, of the virtual transactions taking place are just the ten most liquid hubs. So you've now reduced the volume by half that's even interested in looking at individual buses. And there's lack of information. You can see the prices every day. You don't know if it's going to recur. So there are

opportunities, and I think others have pointed this out as well, for short term games. And if you do what Speaker 2 suggested, which is randomize your behavior, you can always stay one step ahead of your competitors. So it can certainly occur. But to the --

Questioner: I don't think that follows. It's not an equilibrium solution, because you can randomize against them. You know? If you assume everybody else is an idiot, and you're smart, then that's one thing. But --

Speaker 1: I'll let the former trader down there answer that question, and I'll go to the second part. Speaker 2, did you want to say something?

Speaker 2: Conceptually, I think that the issue is, why are these short run supply curves not--let's say liquidity, if you want to call it that--essentially, why aren't they perfectly elastic? Essentially, if those curves were perfectly elastic, your hypothetical is, "Well, if entry is easy, there's a lot of capital out there. Why shouldn't it just flow into the market in order to make those supply curves elastic?" And I think it's unlikely that that's really going to be the long run equilibrium solution, but I certainly think that it can't hurt, and will likely materially help, if you did eliminate barriers to entry to supplying capital and risk bearing capacity into these markets. Because the lack thereof creates the potential for these types of things to take place.

So I don't think it would be a panacea, but it would certainly substantially reduce the need for regulatory oversight if you essentially made entry more easy. But I think the issue is going to be that, when you do have a sort of a proliferation of locations, given that there's likely to be a fixed cost of participating in any one of these markets, it's still likely to be the case that you're going to have some illiquid points that are going to be susceptible to this kind of activity.

Speaker 1: But let me just add to that, particularly on the second part of the question. I agree that it makes sense to reduce barriers. And one of the things we demonstrate in the State of the Market Report is showing the potential risk to virtual traders of the uplift, because it's not the level of the uplift so much as it is the uncertainty. The range is $15 to a dollar. Even though the mean is fairly modest (it's in the two dollar range), the variability is very substantial. So I certainly think that getting our arms around operating reserves, or so called uplift, reducing the numerator, increasing the denominator, and driving that cost down is critical, I think, for up-to congestion transactions, which pay no uplift whatsoever, and for virtuals, it needs to be carefully relooked at. It's certainly the case that up-to congestions transactions are underpaying, and it's probably the case that virtuals are overpaying, and if that's true, that should be eliminated for the reasons you suggest. As Speaker 2 said, you're not going to get to the Promised Land, but you're going to get closer.

Question 15: This gets back to the earlier questions about the buyer side or MOPR type of mitigation. A question for Speaker 1 and any of the others on the panel that deal with this--when you have a situation where you have an old plant that is not efficient, and is not clean, it kind of needs to go, and it wants to go. It wants to repower itself with clean new technology, replace the old facility with a new facility. And let's say it's a merchant plant. Should a plant like that be exempt from the buyer side or MOPR kind of a mitigation?

Speaker 1: My view is, no plant should be exempt from MOPR. And let's just take the first part of it, which is dirty plants. I mean, what I said to New Jersey, who was saying that they wanted to have a discriminatory auction because they wanted to get rid of the dirty plants is, why don't you just address it

directly? If you think your plants are too dirty, have your DEP impose regulations which say, "You can't be dirty." The market will address the rest of it. The market will say, "It costs X million dollars to clean it up," or "It's simply not worth it, it won't clear, and a new unit will be built to replace it." But I can't think of any reason why in that situation you would want entry to occur at below cost, or why it would be in anyone's interest to do it. If it's economic, it's economic at the actual cost of the unit. And if it's not, it's not. But I think there's a way to let the market solve that with the appropriate forcing, internalizing of these external environmental costs to make sure they make the right decision about retiring.

Speaker 3: In fairness to everybody, this is an issue we're debating in New York. And there is yet to be, at least to my satisfaction, any explanation as to why the decision for the new plant is not divisible. It may be cheaper, because we are grandfathering in New York the injection rights, CRIS rights, and somebody may own the site, and we can argue about what's sunk and all those kinds of things. But it's still an incremental economic decision, and if it's uneconomic, the build they're going for, it shouldn't be built. And if it makes sense, then we have mechanical issues on the rules in New York. But assuming the rules work the way we intend or want them to work, it's an incremental decision, and a new facility should stand up to it just like anybody else.

MODERATOR: I want to apologize to those who didn't get a chance to ask their questions, but we've already run over time. I want to thank the panelists, and let's give them a round of applause. [APPLAUSE] And with that, we're adjourned.

Session Three.
Does Price Suffice? Natural Gas Prices and Resource Choices

The impact of shale gas on U.S. electricity markets has been profound. The abundance of supply of the fuel that drives the marginal price of energy has caused electricity prices to plummet to levels that may be pleasing to consumers in the short run, but may be problematic on other levels. How much do short term (although how short term we cannot know) fuel prices drive resource selections for the long term? What is the effect of low gas prices on other resources such as coal, nuclear, or renewables? What is the effect on the efficacy of resource portfolio standards (RPS)? What effect are they having and will they have on demand response (DR) and other energy efficiency programs (DSM) in designing programs such as DR, CSM, and RPS? How will technology innovation programs such as clean coal, energy storage, and smart grid devices be affected? Is there a paradox at the heart of our energy policies that seeks to promote responsiveness to price signals while, at the same time, promoting longer term policies that often run counter to price signals? Does price suffice? If so, how do we figure in longer term considerations?

Moderator: The topic today could not be more timely. It's one that's arisen relatively quickly and has come to the agenda of regulators like myself. Policymakers, those who watch the field, the private sector, are all very engaged with this, especially in New England. This is something that's true around the country, but especially in New England, where we have seen our natural gas use for electricity generation jump in the last ten years from about 20% of our energy use to about 50%. We know that in Massachusetts we are at the end of the energy pipeline, figuratively and literally, and our increasing dependence on natural gas for electricity, in addition to its use in industrial and heating settings, is becoming a much greater concern. So there are pretty important reliability questions that we are trying to deal with.

And in addition to that, there are interesting interactions with other policy goals that many states have, and the federal government has, and that's in moving toward a more clean energy future. In fact, our agency is struggling with questions of how do we now think of the cost of energy inefficiency as it compares to the cost of electricity generated by natural gas, as natural gas prices drop? Is that the right comparison to be making? How do we think about renewables in this context? How do we think about the choices that we are making, that are trying to balance reliability and cost? And as I mentioned, these are things that we are struggling with right now, day to day. I know that ISO New England has been doing a huge amount of work on this as well, and we are partners with them, and the other New England states are partners with them. It's a huge focus.

And it definitely speaks to how--again, I want to speak for the state of Massachusetts--how do we as a state move to a clean energy future in the context of these kind of market changes and these price changes that we are experiencing? And how do these interact with the other goals that we have, ultimately, to move to a low carbon future? I think those are the kinds of questions that we are struggling with: reliability, cost, how we move to a low carbon future. And our panelists today are going to be extraordinarily helpful in framing that debate, raising the questions, answering some of the questions for that. So it's a pleasure to have the different and diverse views that we have on the panel today.

So without waiting anymore, we're going to jump right in.

Speaker 1.

Thanks very much, and I appreciate the opportunity to be here this morning. I think I'm starting because I have sort of the big picture view for you. And I want to kind of walk us through. I'll be focusing on the US as a whole, even though I have still a lot of interest in the New England area. And the moderator is right, the dependence on natural gas in this region is particularly stark, but it is certainly true that across the country, the rise of unconventional gas, shale gas particularly, as a domestic resource, has really changed the picture, not only for the natural gas industry, but certainly for the power sector as well. So I want to talk a bit about that in a couple of different dimensions.

In your packet, you'll see the first slide is actually the share of natural gas that's changing. And let me just preface, before I talk about the price--if you look historically, going back many decades, we've had a very diverse power supply in the US, and in North America as well. Coal has been the dominant resource for the power sector for more than 50 years, but the share of coal is now starting to decline, and what's taking its place is natural gas-powered generation. And it's two-fold. It's not only that we see certain coal assets being retired under the pressure of natural gas and EPA rules, but also that the utilization of the existing gas fleet is starting to change, and it is starting to be used more heavily, as well as we see new gas plants being developed. So the change is fairly stark, looking out ten years, it's pretty significant in terms of where you see the share of coal declining, and what fills that in is natural gas.

Also of interest, of course, is that renewables are starting now to become a visible piece of the pie, and they're certainly important, and we certainly see continued additions of renewables. But really probably the biggest change going on for the sector, looking out this decade, is this shift from coal to natural gas. And the reason we see that, of course, is what's happened with the price of natural gas.

And this is our forecast. Other forecasts can differ, but what is pretty interesting is, this only goes out to 2020. If I were to show you the longer term outlook, it remains pretty much where you see it, somewhere between the $4-5 price at Henry Hub, which is sort of the national indicator for natural gas. You see the pretty significant dip, of course, this year, where we've seen gas come down in some cases under $2.00, which is just extraordinary when you think about where gas was just a few years ago, particularly during the hurricanes, when gas flow was interrupted, and we saw gas prices over $10. So a big change. We obviously don't expect $2.00 gas to be sustainable, and in fact it's not, because if you look at the producer cost, it makes no sense to continue to produce gas at $2.00. It continues to do so right now for a variety of reasons regarding the associated gas, as you do oil drilling. There's a lot of fairly complicated reasons. But we certainly expect the price of natural gas to come back up, but be fairly stable and relatively, on a historical sense, fairly low, looking somewhere between $4-5, at least to the end of the decade, if not longer.

So as I said, this has pretty significant implications for the coal fleet, and in part because coal has been the dominant source in the US, mainly because of price and availability, the domestic supply of coal. And although coal is not a uniform product (there are a number of different coal types that are being used by power generators) it's certainly true that for some of the basins, as you start to see the natural gas price falls below $5.00, below four dollars, and this year, in this case, below two, coal is not economic. And that's not to say that any time gas falls to $2.00 or less, you're going to see coal plants shut down, because there's obviously a lot of complications about why coal units might continue to run, even though they're running uneconomically at the moment. But it is certainly true that we see natural gas, because of

the price, and because of the availability in the US, starting to put really significant pressure on the coal fleet.

And so, as I said, we, along with I think every other consulting shop in the world, have tried to do an analysis of how much of the coal fleet will actually retire in the US as the result of not only the natural gas prices, but the EPA conventional pollutant rules. And I'm not going to go through those rules, but they have made a very significant dent in the operating costs of many coal assets, particularly those assets that are smaller in scale and that have not invested, to date, in significant retrofits. And so our expectation, looking at this chart, the period that we're forecasting out to 2020, we would expect about 40 gigawatts of the 300 gigawatts in total of the US coal fleet to retire, most of that in the 2014/2015 period, when the EPA rules, particularly, come into effect. Also, just as a side note, there was the recent EPA action on carbon that affects new coal. Frankly, new coal is already dead, and so the EPA carbon action, I think, just puts the stake through the heart of it. It technically allows new coal, if you combine it with carbon capture and sequestration, but that, as far as we can tell, just cannot be done economically, other than there are still a couple of pilot projects going on, but we frankly don't see new coal being a part of the energy future.

But that said, 40 gigawatts is significant, particularly for those asset owners who have to retire those, and we need to replace that generation. But it's not as if the coal fleet is disappearing. So, coal will continue to remain a significant part of the total US power supply.

So what's being added, as we see it, you can see on the right, in our pie chart, a lot of renewables and a lot of natural gas. This pie chart shows you what's being added specifically over the end of this decade. And you can see that wind and solar make up a very significant portion of the new adds, driven mainly by renewable portfolio standards. And what we have here is not all of the renewables that might be built under the renewable portfolio standard. We look at each state carefully and make an independent assessment of how much of the target will be met. And in many states, we do not believe that the the target can be met, mainly because of economic reasons. And so some of the RPS rules have sort of rate payer cost triggers. Those will take effect. And for others, we think the targets are simply too aggressive, and there will be political backlash, especially closer to 2020, when some of the renewable targets really ramp up. But in any case, there still is significant solar and wind being developed.

But what's left, really, is that the other significant portion of new additions is natural gas, and again, because the outlook for the cost of the underlying fuel is so optimistic. A little bit of coal--that's for the coal that was still under construction--and then some nuclear uptick, as well (we think only two new nuclear facilities in the US will be built).

And of course, the implications of natural gas and its inroads into the power sector are certainly significant on a number of dimensions. One of them is the carbon challenge. And when you look at, again, historically, where carbon emissions have been coming from, from the power sector (there are obviously carbon emissions coming from other sectors as well, but looking at just power exclusively), you can see that certainly coal was the principle driver of the emissions, and you see the fairly dramatic impact of what's happened with the economic recession. So from that perspective, bad economic news was actually good news for carbon emissions, and helped flatten the curve from where we otherwise were headed. But still, as you look out now, and this is, again, our own projection of where we think emissions will go on the carbon side, even with reduction in the amount of reliance on coal, natural gas is not carbon free. It has about half the carbon emission of coal. But as you increase it, we are

still on a trajectory in the US where the carbon emissions are going up.

So the bottom line there is, and certainly from my perspective, the carbon challenge is not solved, fundamentally, by switching to natural gas. It's clearly a bridge fuel. Helps reduce the overall emissions, but it certainly is not going to get us to where the scientists suggest we need to end up.

And then finally, I just want to touch on price. So the good news/bad news is that for those regions that are particularly reliant on natural gas for the underlying fuel source for power, it's certainly good news to see that natural gas prices are likely to remain quite low for the end of the decade. But overall, we do expect retail prices to continue to climb. And so, from my perspective, particularly as a former regulator, I do think this is one of the more significant strategic challenges facing the industry. We're projecting another roughly $950 billion in new investment will be needed by 2020, so close to a trillion dollars for the sector as a whole. That includes T&D investments. It includes the cost of those renewable additions, certainly some of that new capacity, replacement of those coal assets. Retrofitting the coal fleet is roughly ,maybe 4-5% of that total cost. So it's not actually being driven by some of these policy considerations, but overall, for example, the T&D system continues to age, and so we see about a third of the cost of that investment will have to go to the T&D system, just to keep reliability standards in check.

And so we're expecting something on the order of a 10% real price increase. And so, again, this chart is real numbers, so, nominally, significantly higher. And of course, some regions will vary significantly more than that. Those regions that were, for example, coal dependent, and were used to very low generation costs, some of those regions will start to experience some generation cost increases. But for other regions, for example, California, we see really significant price increases. And so we've done some modeling on a subregional basis to take a look, and certainly some of the policy commitments that California has made will drive costs significantly higher than the national average.

So I think this is an important consideration that I hear from a lot of stakeholders in both the gas and the power sectors saying, "This natural gas news is terrific," and depending on your perspective, it may or may not be, but we can't lose sight of the fact that overall rates are likely to go up, and that will continue to create the challenges of making those investments, particularly those policy-related investments, for decisions that will just continue to keep prices going up.

Question: What part of the bill is driving the retail rates going up? Is it the cost of distribution infrastructure? Is it the cost of capacity for new generation that is being built? Exactly how is that broken out?

Speaker 1: I didn't provide the pie chart that shows you. Roughly 40% of that is capacity, of which a significant portion is the renewable build. So even though the renewables are less than half of the total new capacity, they're more than half of the cost for new capacity. So roughly 40% for generation. Another 28-30% is the transmission distribution system. Some of that is related to reliability. Some of that transmission, we tried to break out, is related to the renewable build. So some of that is economic transmission. Most of it is reliability-related transmission. We actually have modeled things like the smart grid commitments. A very small portion, or just a couple of percentage of the rates, go to the smart grid.

We do have some somewhat strange costs that we have a hard time charting. For example, many utilities, at least a significant number of them, have unfunded pension liabilities related to their workers. We see, first, some utilities

would expect significant rate increases because of that. But overall, it really is in some sense the traditional mix of what we've seen investments in in the past. It just sort of continues. And so what we're trying to do is counter this argument that the power sector is in fine shape because natural gas prices are so low, and you're going to be more dependent on natural gas, and isn't that good news. And it's like, "Well, the issue, though, is you have to look at the total amount of expenses," and particularly infrastructure investment needs to be made, and it is significant.

Question: Have just broken this out as if you didn't have the other renewable policy stuff in here? Just out of curiosity.

Speaker 1: We've had some clients actually ask, "What would the cost be if you weren't complying with renewable policy, and were building, for example, natural gas instead?" We're doing that analysis right now. But it's a significant amount, those renewables, and I'm interested to see what Speaker 2 has to say. There are fairly expensive renewable costs that we're assuming.

Question: In recent dialog with people from Germany and Denmark, I learned to my surprise that the emphasis on wind in those countries is being borne almost exclusively by retail customers and not by commercial customers or industrial customers. Have you seen any tendency to lay on the doorstep of the retail customer the burden of dealing with renewables as a component of power delivered?

Speaker 1: Yeah, for the most part, the RPSes are fairly explicit about how those costs get played out to consumers. We've certainly seen, in many states, the industrial class as a whole tends to have better luck at negotiating special contracts that often include exemptions for some of those costs. So this chart is the overall average cost for all the classes. We actually have broken it out by class. And we do see the proportion of residential and consumer usage going up relative to industrial, so the sort of shift is somewhat changing in terms of how much of the proportion of the energy use is changing by class. And that's having some implications for who ultimately bears those costs, as well.

Question: You have a slide on CO2 emission growth. Did you ever do one on greenhouse gas growth? Because the methane issue has become hotly debated, and there's a lot of different opinions on it, and I wondered if you had an opinion on that.

Speaker 1: We do. This is sort of our generic carbon emissions. This is CO2. We have done fairly extensive work looking at the methane issue, particularly regarding natural gas, because it's become such an issue. We've done our own study. I'm trying to remember what's public and what's not. I think at least one study that we've done is publicly available now, called "Mismeasuring Methane," in which we argue that, particularly the Cornell study that suggests that the amount of emissions that's related to natural gas drilling is very high and perhaps exceeds coal…We disagree with that, and we provide our analysis to show why we think the Cornell study is flawed, and what the methane release is. Yes, methane is certainly very significant. It's a greenhouse gas that's roughly 20 times as potent at carbon dioxide, so it's a very important issue in terms of looking at overall greenhouse gas, and we do measure that as well. I'm happy to provide that if you're interested.

Question: I just wanted to follow up. We've seen in Eastern Interconnection Planning Collaborative a very large bill associated with these RPS standards. But the question is, did you assume that all the RPS standards are met fully? In some cases they're goals. They're not binding. So when you did this projection are you just assuming they're all binding, and everybody builds to the max of each state's standard?

Speaker 1: No, we did not. We think that's an unfair assumption, that all of those RPSes will be met. So we take it state by state, and we do our own geopolitical assessment. So we try and assess what the policy support is behind those. We're redoing our analysis now to make sure we fully understand. A number of those RPSes have triggers by which if the rates go above a certain level, it notches down those RPSes. We want to make sure we've modeled those correctly. But I'd say, and unfortunately I don't have it in my head, but roughly half of the RPSes, we think, will not be met. And particularly we suspect California will not make theirs. It's the most aggressive one, 33% by 2020. Roughly 25% of the total RPS demand is represented solely by California. But we've also looked at across the Midwest, New England, and a number of states will have difficulty in making their RPSes.

Question: Just to clarify, so your retail rate assumption does include this sort of discounting, if you will?

Speaker 1: It does.

Question: Very interesting data, thank you. Quick questions. What did you assume for load growth and GNP or GDP growth for that forecast period of 2012 to 2020? And second, do you assume any sort of uneconomic coal plant running because of coal inventories stacked up to unsustainable levels? And then third, do you assume that the federal tax credits for wind will continue, going forward?

Speaker 1: In regard to load growth and GDP growth, we use Global Insight, so that's our macroeconomic forecast, so if you've seen those, you'll know what our forecast basis is. It's roughly around 2% on average, US GDP growth, and that translates into roughly 1 ½ to 1.7% power demand growth, power consumption. We do include estimates of energy efficiency, and we actually looked at the energy efficiency standards, as well, state by state, and made our own assessment. Those efficiency measures moderate that growth but do not flatten it completely. So we do disagree with a number of forecasts, including EIA's, which I think has fairly aggressive energy efficiency assumptions. So we have energy efficiency built in, but we still see, again, electric demand growth of about 1.7%, on average, by the end of the decade.

We see uneconomic coal continuing, and again, the coal market is very complicated. We've actually seen forced burns continue to go on right now--coal units having to run, because they've got to get rid of the coal, because more coal is coming in, and they have no place to put it. So that will continue for probably another year. But we do see, then, again, some coal will run with probably fairly poor margins because of other commitments that have been made.

And then finally, in terms of the tax credit, we assume the production tax credit for wind, which expires the end of this year, will get renewed, not this year, sometime in 2013, as part of a political compromise. We expect this, so the PTC for wind that's in our assumption goes for another couple of years, I think to 2015, and then it is no longer available. And the ITC for solar continues to its conclusion, to 2016. So that's what's built into our assessment there.

Speaker 2.

Good morning, and thanks for having me. I appreciate the opportunity to be here today and to talk about this topic, which actually is one of the hottest issues in renewables policy. So although we're really talking about gas, it's definitely affecting the conversation we have in renewables. Typically, however, the gas dialog is framed as competition for renewables. And to some extent it is. But really, it isn't the meat or the crux of the issue right now. We actually see gas as being complementary to the goals, and in some cases, it can help new renewables get built.

I've certainly acknowledged the positive impact of declining gas prices and the impact on generation, but we need to talk about the risks that are associated with putting all our eggs in one basket, and that's what I plan to do today a little bit.

Just as we can't ignore the impact of gas prices, we can't avoid the growth in renewables, as Speaker 1 just pointed out. I'm going to talk a little bit about solar for a minute, and then move and talk about the dynamic between gas and solar.

The number and geographic diversity of solar has grown significantly. There's been significant decline in cost and accessibility, which means we have to think about these things in combination, the growth of gas and the growth of renewables. Both have pros and cons. We have to think about how our policymakers, our ISOs, RTOs, and all of us folks sitting in the room will really deal with these issues in combination.

I'm going to talk about a couple of things, more specifically growth in solar, some of the issues I see with focusing on gas, and I'm going to review two examples of where gas and renewables will come into play together, and how they've being teed up by the folks thinking about them.

This year we expect growth of renewables to reach 2.8 gigawatts, and you can see the chart here. And this only goes out to 2016, so it probably does not take into account some of the things Speaker 1 talked about, discounting, meeting the RPSes, because the shorter the view, the more likely you are that you are going to be meeting those. But generally speaking, I think this is an accurate representation of where we're going to get to with solar. In addition, I just wanted to show the growing geographic diversity. If you look back on maps a few years ago, most solar growth was in California, a little bit in the Northeast and in Arizona. Over the past few years, that has spread to other states. Clearly there are some states that are the drivers, such as California and New Jersey, but geographic diversity has continued, and we expect it to continue over the next few years, particularly because of the policies in place, but in some instances because of declining costs as well.

Let's talk a little bit about gas. Speaker 1 did a great overview, obviously, with the data, but I want to talk a little bit about the benefits that I see and that we see. Obviously gas, from an electricity standpoint, has steep ramp up and ramp down characteristics. It's lower cost than coal and nuclear. It's the cleanest fossil fuel. It can be located in optimal locations across the grid. And we're having this conversation because there is current ample supply, the operative word being "current," there. So obviously it provides a good solution for utilities looking ahead in terms of building new generation and for other independent power producers.

I won't review this too much, but really this is how gas is spent, with 31% of it really focused right now on the electricity market alone. But there are other areas where gas is used, obviously, in transportation, potentially, for industrial use, etc., so there are competing demands.

Some of the challenges we see with gas--there is historic price volatility. So while right now we're in a low-price scenario, and looking out, according to Speaker 1's data, it does look relatively flat, there is a history of volatility in this space, and we need to remember that. There are unknown environmental issues. The fracking issue continues to be hotly debated in many states, and the potential price impacts and supply impacts of those outcomes. Pipeline capacity and leaks, the threat to portfolio diversity, meaning, do people push back on using too much gas, because if you focus too much on one resource… And as I referenced a little bit earlier,

there's competition and demand among gas customers, electric utilities, to some extent, perhaps transportation, tension between residential, commercial, industrial use for gas users. And then exports. If prices continue to decline or stay flat, will there be international demand growth? And what does that mean for US prices and supply?

So I know we've all seen these before, but just a reminder of the volatility of gas prices—this chart shows gas relative to oil, or 1994 to 2009, and this one gas relative to coal, with gas being the red. Again, lots of volatility over time. Now, perhaps new supply would mitigate potential volatility in the future, but I think we need to be mindful that dependence on thinking that the price is going to be flat in perpetuity is risky for regulators and policymakers and industry as a whole.

Also, there is some variability on volatility across regions. This chart just shows a range, in January, 2012, of different prices, both the monthly and the yearly range.

I'm going to shift gears a little bit and give two examples of where the dynamic between gas and renewables may come into play, and we have some folks in the room that are more deeply involved in some of the things I'm going to talk about today. But I think it gives us a structure for the conversation. One is in Texas. Texas right now is thinking about what to do about the reserve margin and their scarcity pricing issues. Some studies done last year by ERCOT, NERC and FERC identified some gaps in this area, and now ERCOT and the PUC in Texas are considering what to do next. ERCOT's reserve margin is declining, and as I said, that is a noted issue right now that's trying to be addressed in Texas through some policies. That presents an opportunity for new natural gas growth, but as well, potentially, for new renewables.

One of the challenges in Texas right now, in addition to identifying the fact that there's a lower reserve margin than they would like, is that it's really hard for new entrants to come into the market, given current prices. So what's going on? ERCOT is reviewing the issue, and ERCOT and the Brattle Group are releasing a study on this issue sometime this week, if not today. So pay close attention to that. In addition, the PUC has several dockets open, in particular project 40268, which is reviewing scarcity pricing and how that impacts the market, and changing it to encourage more generation being built. In addition, there's a legislative hearing scheduled on this issue for July 10th. So I raise this simply because it presents an opportunity, not only for natural gas to come into play, but we're thinking about how can renewables (not wind, because wind has significant opportunity and has already been built in Texas) but how can solar be a participant in this dialog, and not necessarily compete with gas, but how can they actually maybe be complementary? Solar provides power at peak. Texas is probably one of the best markets in the country, if not the world, to build new solar. It could be cost effective. If you take into consideration all the impacts of new generation, both gas and solar, what are the cost impacts, environmental impacts, all those things? It's not listed here, but Texas also has a water issue, and that will hopefully come into play as folks think about new generation. How much water does new generation use? Do you have to value that impact on water use? So I wanted to tee that up.

Now, I'm going to move to Arizona a little bit. Arizona does not have the same issue as Texas right now. My understanding is that they currently don't see a gap in generation going forward. However, Arizona, like most utilities, is thinking ahead about what they need to do next in terms of their load and new generation out into the future. And I use this slide--this is an APS slide. I'm not sure if anyone from APS is here. I have two slides that I stole from APS. They were presented publicly last month in March. They were talking about their future plans. And I use this slide because it

demonstrates that APS is thinking about, and I think all the utilities are starting to think this way, and hopefully our policymakers, too. What are all the things and potential costs when we evaluate generation? It's not just startup, and it's not just fuel, but what are the other risks that come into play? And as we think about our revenue requirements, what are the risks that we have to value in those revenue requirements?

So let me try to be a little bit more specific. Yes, gas is cheap now. There's a forecast that it will remain relatively cheap into the future. But there are risks that it will not. And as utilities think about their revenue forecasts going forward, they have to evaluate that risk of fuel price variability and volatility. With renewables, there is no fuel volatility. With solar, I should be clear, with solar you pay an upfront cost. There is no fuel volatility or future volatility in pricing. So there's a benefit on the risk side and the risk calculation to that. And as APS recently explained in this presentation that they gave, and what they're talking about in the policy dialog there is how they include that value going forward, and think about their revenue requirements. Likewise, they're thinking about including all delivered costs, transmission and firming costs and benefits, not just fuel prices and construction. So it's not just risk, but the full value of various generation resources. And as you can see here, they're looking at energy efficiency, gas, solar, wind, etc. Solar starts to get competitive with some of the more traditional resources. Now, I should be clear, I did not do this analysis. But if one of our leading utilities in the country is starting to think about this more, I think in a more sophisticated way, and into the future…

One point that I wanted to make sure I made, particularly as it relates to solar in the Texas situation, and a little bit in other markets as well, is that the lead time for new construction for solar is 18 months. You can decide you're going to build a plant, and depending on the permitting issues, mostly, you can have that plant up and operational in 18 months. And I think that's particularly helpful as we think about places out in the future where we may have gaps in generation, and need new resources quickly.

Solar also has some variability issues, not unlike other resources.

Finally, I think we need to, again, think about solutions for gas and solar together, and in the conversations yesterday, I looked around the room, and I thought, this is a smart group, and many of you in the room have thought up solutions in the past. We talked about financial transmission rights yesterday. We talked about the creation of governance structures for the ISOs and the RTOs 15 years ago, spinning reserve, operating reserve, all these services that have been created to really aid the development of competitive wholesale and retail markets over the past 20 years. There's no reason why the folks in this room can't think really hard about what are the policy structures we've put in place really to accommodate growth in gas and renewables, to accommodate some of the issues that we see from a technical and a policy standpoint, as we start to see more penetration of renewables in certain markets.

So think about fast ramping issues, quick start services. How do we deal with cost recovery? And let's not forget development, hopefully, and storage capability, and how that can aid renewables coming online and be cost effective.

I do have some slides in here in the appendix on the declining cost of solar. I mention it simply because in the last conversation, there was a lot of reference made to the high cost of renewables. I'll generally say that over the past few years, the cost of solar has declined 50%. The trajectory is expected to continue, not in perpetuity, but for a little while longer. That declining cost is predominantly related to declining commodity cost. The panels, just very generally, the panels themselves and other component parts--labor and installation costs

continue to be a significant portion, 40% of the overall cost. But they have declined over time, and the expectation is they will continue to do so, probably with not quite the same steep decline, but certainly with some aggressive declines over the next few years.

Speaker 3.

Good morning everybody. I'm going to do this in two parts. I'm going to talk about the policy implications when we do the roundtable at the end and walk through the questions. What I want to do is ground you in some analytics, at least how we see the PJM world, and some of the conclusions are similar to what Speaker 1 talked about and some of the thoughts that Speaker 2 had, and some are not, and I'll try to point those differences out.

Hopefully you all have a deck that you received yesterday. I know there's always questions about the assumptions that underlie the analytics. They're in the appendix of that deck. Take a look at that. If you don't see your question, I'll answer it later. I did not provide fundamental power price assumptions here, coal or gas assumptions. I'll tell you that they're not much different than what Speaker 1 talked about, but for obviously competitively sensitive reasons, I'm not going to do that.

So here's what we did. We tried to build supply and demand curves for renewables within PJM, taking a look at the state mandates. And Speaker 1 said that there are kind of a hodge podge of different ideas in these state mandates, and I'll walk through what we did with that.

The demand is essentially the RPS standards themselves. The supply is based on the fundamental assumptions of the cost of wind and the fuel price assumptions. One thing we did is, we assumed current law. PTC expires at the end of this year. ITC expires in '16. And that is a driver.

Getting to page two, what we did is broke up PJM into different regions. On the upper left hand corner, we took a look at wind supply in Illinois. And again, I've taken out the REC prices. But you can see in here, we have about 25 terawatt hours of potential in Illinois. Illinois is the best wind site, generally speaking, within PJM, so all things being equal, if you could build a windmill anywhere in PJM, we think that that happens in Illinois. But you'll see there's a vertical line in our supply chart. And that vertical line represents transmission constraints. We simply can't get more into the system there.

If I move down into the middle slot, we did the same thing for eastern PJM. We call it "bad wind." I don't mean to be pejorative. It just means that the capacity factors for wind as we get further east in PJM are not so hot. And then we see utility-scale solar, and the REC costs are significantly higher, given the higher cost of solar.

We wanted to do one additional thing, which is, take a look at Iowa wind, because Illinois' statute allows compliance to be achieved by buying Iowa wind, and it's cheaper than Illinois wind. So we took a look at that, and kind of maxed out Iowa wind. We then constructed a supply curve for all of PJM, which is shown on the right hand side.

And I'll move on. I talked about this at the outset, but I want to give you just an example of how complicated this analysis could be. This is the Ohio standard. It's 25% by 2025. Everybody talks about it that way. But if you look at it, within that 25%, 0.5% is solar. There is 5% for energy efficiency. There are things like nuclear upgrades, new nuclear, that's put in all that. When you peel it back, and I'm looking at the box at the bottom of the chart, when you peel it back, what you really see is the amount of that 25% that's dedicated to wind and solar is the 18%. Does everybody see that in the box? And then solar carve out is there. There is an in-state requirement. In other words, half of this stuff

has got to be built within Ohio. So we've got to take a look at that. This is, as I said, a very complicated statute. It has both an alternative compliance payment mechanism and a cost cap similar to the Illinois cost cap. So it's got two different consumer protection devices that are implied within the statute. And then we just took a look at total demand growth, and you'll see the assumptions.

I'm going to jump over slide four, which, if you want to take a look at it later, just simply illustrates that as you move year to year, your demand is ratcheting up coincident with the ratchet that we're seeing in the RPS standards. On the supply side, everything that you've built before is sunk cost. So it's bidding in at zero into the REC market, and we're just trying to do that analysis.

The other thing that's going on here is that there is a price depression effect associated with the wind--with any generation build out there's a price depression as we inject more supply. And if we're injecting more supply because of a state mandate, as opposed to actual supply and demand economics, what we're seeing is uneconomic price depression that affects every entrant in the market, including the renewables, and as they get bigger, it becomes bigger.

Page five, I just want you to take a look at. You'll see from a supply curve standpoint the significance of the PTC. The dotted blue line represents the PTC. The PTC provides a $22 benefit on an after-tax basis. That means that it's about 32 bucks per megawatt hour to us. All things being equal, when we run our wind farms, and we have a growing wind business, we could tolerate prices at negative $30 a megawatt hour, even assuming we don't collect a penny on a REC. If RECs start trading at the levels that we see in these state statutes, at the ACP (alternative compliance payment) levels, we could see a resource within PJM that is trading, on a consistent basis, or willing to dispatch, at negative $60 and negative $70 an hour. That has an implication on everything else we build. It's frustrating sometimes for all of us, I think, when we see analyses done on the value of this price depression effect, as if everybody continues to invest the same way, and the existing plants remain, despite this price depression effect. In fact, what we're seeing is, it's changing investment signals. I would argue that some of the impacts we've seen in the Texas market is driven by some of the negative pricing effect brought about by subsidies and mandates by the government. I will tell you that at our Quad Cities plant in Illinois last year, 15% of the off peak hours traded at less than zero. Yet when we've compared wind output in Illinois to coincident peak demand at Commonwealth Edison, what we see is that all of the Illinois wind is running over the last three years between 6-9% of capacity at a time when Commonwealth Edison experiences its 20 hours of peak demand. We're seeing enormous production in evening hours and shoulder months driving negative pricing effects in those hours. We're seeing this resource not show up when we need it the most. That's the reality. That's what we're seeing.

We could expand that look to Iowa, and we have. We've done that sensitivity. It's not much better. The notion that geographically the wind may be producing energy in one state, but not the other, and we're going to diversify geographically--at least with respect to the Midwest assets, we're seeing the weather patterns are big enough that when it's not windy in Chicago, it's not windy in Iowa either. OK?

So let me move on here, and this is where I'm going to be a little different than what Speaker 1 is saying. As we put these pieces together, what we see is the state mandates not being met. But we effectively see, around the middle of the decade (again, assuming PTC doesn't get extended) that we have unmet demand. And the component parts of the buildup here, the red line, represents REC pricing. What we're seeing is that people will pay ACPs. Consumer caps will be reached. We will not see a build out. And

that's coincident, I think, with what we're seeing on the ground. We're not seeing a material build out right now of wind within PJM with these current fundamentals. And what we're thinking is that policymakers are going to have to brace themselves, and this is going to be the dilemma, because people are going to be paying alternative compliance payments in those states that have them. Yet things aren't going to be built. We're going to see an increasing amount of unmet demand, and the boxes grow bigger and bigger.

What's happening (and this I think is in agreement with what Speaker 2 was talking about) is if you imply a significant improvement in solar over time, what we see is that solar starts to catch up to wind in the next decade. And that compliance starts to be achieved not by new wind, but by new solar. And that has some of the benefits that Speaker 2 talked about. It is more coincident with peak load. And it can be brought upon.

So that's where we see the world, and this discussion we have to have with policymakers. And of course, the narrative of the question here kind of begs, do we need further intervention in the markets? Because we're going to have all this stuff that's unmet, all these unfulfilled expectations. What happens? And people are going to come back, and they're going to say, "Well, we need more incentives. We need to drive additional mandates into the business to makes sure we get here, because we clearly have not done enough." And that's going to be the significant debate that I think all of us will join in.

The thing I would leave you with is this. There was a time, and I worked on the development of both the RPS standards in Pennsylvania and Illinois when both of those things were passed, and I think the sense at that time was that there was significant growth in the electric industry, and that the pie was going to get a lot bigger. We haven't really seen that in PJM. Load growth has stagnated. In large measure, I would say, [thanks] to very good efforts on the energy efficiency side. So we're seeing the same sized pie, more or less, but a growing wedge that is dedicated to these renewables. That is necessarily going to compete with conventional gas development. I don't think these things work together. I think there is a technology choice to be had here. I think we could talk about them working together, and in some ways they do.

But the reality is, our models are telling us to build gas, that that's the most economic thing for the shareholder and consumer equally, but more and more we're going to be confronted with arguments that we're not doing enough on this side. If we keep interfering with this market, then we are going to lose the market. And some in my business would say we already basically have, and the challenges that we're facing in terms of new investment are attributed to these problems, and that's a geographic issue. If I look at CCGTs (combined cycle gas turbines) in California, we're seeing dozens of ten year old machines that are uneconomic as soon as their bilateral capacity agreements start running out. We have a problem, folks. And this low gas price may be the thing that curbs the problem, because we have not figured out how to integrate all these resources and still preserve the market. And no one is making money in this market. No one likes $2.00 gas. It's killing everybody. And if we intervene in these markets in the middle of the decade with additional subsidies to realize these unfulfillable, I would argue, mandates, we're going to have some problems.

Speaker 4.

Thank you very much. It's great to be here. …On May the 16th, USA Today, in their above the fold edition, said, "US energy independence not just a pipe dream." Now, you know when it's in the USA Today, that it must be the gospel. And so the good news is, we have a lot of gas. And I'm going to review a little bit some of the

information that you heard from Speaker 1 earlier. But I also want to then dive deeply into what's going on in Texas, because the natural gas picture in particular, though I'll also talk a little bit about crude oil, is quite extraordinary.

You've seen this particular map before. It gets updated about once a year. This particular version is about a year old. But as you can see, the shale plays are almost ubiquitous throughout the United States. We think there are 31 or 32 states that have some form of shale resource under their soil, which is completely changing the dynamics of the energy industry. In the past, of course, states like Texas, Oklahoma, Louisiana, Colorado, Wyoming had a lot of oil and gas under their soil, and so as a result, the citizens were familiar with that industry and what it means and what the job creating capability is. Now we're seeing this spread throughout the United States, and fortunately a lot of this is in the Lone Star State.

Speaker 1 touched on this earlier, but I just want to give you a little bit of a different perspective. If you look going forward, I think almost everyone agrees, and everyone on this panel would agree, that natural gas will play a more significant role in electric power generation throughout the United States, with renewables also increasing, coal going down, and nuclear staying about the same. As we think about natural gas production, the production just begins to go vertical. This is all because of what's historically been called "unconventional plays." Now they're really conventional, because we're getting more gas from shale than we are from other areas in the past, and the number goes from 23% to 49%, and I think if I drew that line out to 2050 or even longer, it would continue to go up.

I think either Speaker 1 or Speaker 2 mentioned that natural gas was a bridge fuel to something else. I'm going to tell you, it's a long bridge. I don't know what is at the end of the bridge. Maybe it's storage with renewables. But the amount of natural gas that we have, the technology that we have refined and continue to refine in order to find and unlock and bring to the surface at cheaper and cheaper cap ex and operating cost on natural gas is really quite extraordinary.

Here's a picture of how we made electricity in 2010 and 2011. Again, just to reiterate the story, coal's historical predominance in generating electricity is eroding as natural gas is taking more and more of that away from coal, and I see no reason for this trend to reverse.

Here's a little bit different picture, courtesy of my friends at BENTEK. If you look at the vertical black line, the way this works is, the cheaper the price of gas, the more coal that is displaced. And so at about today's market price, you're seeing Appalachian coal being significantly displaced in power generation, and as you move further to the left, cheaper gas, you begin to get into Powder River Basin coal as well. Now, the price has been moving around a little bit. I think it's about $2.65 spot today, but it got down to $1.99 per MMBTU not long ago. Just to put that into perspective, in 2008, we had $13 ½ gas. That translates into about 27 cent power. So now in ERCOT, you can buy power for seven cents a kilowatt hour. Some of the large industrial customers are purchasing it for five cents. And that's almost exclusively tied to the price of natural gas.

Now, it is great to be from the Lone Star State. These red and green dots, and they are dots, represent historical and active oil and gas wells. The green is oil. The red is gas. And just about every county in the state has had drilling activity over the last almost 100 years that we've been in this business, predominantly focused in the Barnett shale, which is up in the Dallas-Ft. Worth area. That's gas. The Permian Basin out west, where Midland is, is primarily oil. The Haynesville Shale is in the upper right hand Northeast Texas part, and the green that you see going from the Mexican border in a

northeasterly fashion represents the Eagleford Shale, which I'll talk a little bit more about, which is a relatively new discovery.

On the subject of peak oil theory, you can see that there is no such thing, at least not in Texas. In 2012, we're estimating that we're going to produce about 1.3 million barrels a day of crude. That is up from about 900,000 and change not too long ago. And I've said publicly in a couple of forums that we could double this number by 2016. So we could be at about 2.7 million barrels of crude a day, [I've said] that we could be at four million barrels by 2020, which essentially meets the delta between where we are today and four million is the amount that we import presently from Saudi Arabia, Russia and Venezuela combined. So it sounds crazy, but the numbers are there, and the activity continues to go up.

The bottom graph here is natural gas. The only reason that the natural gas bar is lower in the last couple of years is because of the price. If the price were higher, this would continue to be an ascending set of bar graphs. Just to give you some flavor for that, this is historical production out of the Barnet shale, which is in the Dallas-Ft. Worth area. This is sort of the grandfather, grandmother of the shale plays. We've been at this now for 20 years. The total recovery has been almost 11 TCF. The University of Texas Bureau of Economic Geology, which I sit on the visiting committee of, has been doing a study with the Sloan School that will be released later this summer, that estimates, depending upon your price assumption, how much additional gas is available in the Barnett. At $2.50, it's about another ten TCF. At $6.00, it's another 80 TCF. So the resource is there. It's just a question of price. It's not a question of supply.

This is the Eagleford Shale. It is basically this red area that runs from the Rio Grande. (By the way, it goes into Mexico. It doesn't start at the river.) And also goes all the way up to Victoria, skirting by the Corpus Christi area. To put this into perspective, three years ago there was zero crude area and condensate production in Buford. Now we're up to about 100,000 barrels a day in crude and liquids. There's also associated gas. But this 2011 number is just going to continue to go vertical. One of the CEOs of an oil and gas company headquartered in Houston told me not too long ago that he thought the crude opportunity in the Eagleford shale was perhaps the biggest in the history of North America. Now, let's put that into perspective. We're talking about Alaska. We're' talking about the East Texas oil fields. We're talking about Wyoming and North Dakota. So it's really quite extraordinary what we could see going on with the shale plays.

Drilling permits in Texas are just going through the roof. We're on pace this year to issue more drilling permits than we have since 1985. Most of those are going to be not in the gas part of the play. They're going to be in the liquids and crude. But particular in the Eagleford, which is in that South Texas area, it has three layers of opportunity. It has dry gas on the south, liquids in the middle and crude oil on the north. And so it's relatively easy for operators to move their rigs in and out of the different plays. So if the price of gas goes up a little bit, they can move back into the dry gas. Right now most of the action, at $100 crude, though that has dropped recently, is where most of the drilling is happening. Half of the land-based rigs in North America are working in Texas today, and we see no reason why that number is going to change.

I'll conclude with this last page, where I put my electricity hat back on, and I go back to the world of ERCOT. You can see from the top graph that for a long time, and you could extend this back further into the past beyond 2007, we were predominantly a natural gas-run market. Gas was always on the margin. When we economically dispatched, it was nuclear, and then we got wind, and it's wind, nuclear, and coal, and then gas filling in all the way up to the peak demand of about 65,000. And in the last

couple of years, coal began to be the predominant resource in response, to some degree, to high natural gas prices and market signals. In the last four to six months, as you can see on the material on the bottom, gas is once again assuming its predominant role. And in fact, there are many periods or intervals, including during the winter and now in the spring, where gas is being dispatched before coal. And so what is ironic to me is that the reductions in CO2 or SO2 or other pollutants that you may be concerned about, which were attempted to be controlled by federal regulation, is actually being accomplished by the market. And we're going to have less CO2 issued in Texas this year than we have in a long time, not because any government told us to do it, but because the price of gas in an economic dispatch model is causing gas plants to run more. We do have some resource adequacy issues. But the reality is, gas is really stepping up and providing a lot of the resource going forward. And just to put a point on one of the things that Speaker 2 said, I think, last year, renewables provided 13% of the energy in the ERCOT market. That's probably up from 9% last year and 5% the year before that. So thank you for having me.

Question: Could you elaborate on the liquids of the Eagleford and the boost in manufacturing that has resulted from that?

Speaker 4: Yeah, I'm not a chemist, but I've tried to get my arms around this. You know, when you pull up a natural gas stream, it has dry gas or methane, and then it has the other associated gases, all of which have value, which can be stripped out of the sequence and used to make ethylenes and propanes and butanes, and all of these that are priced closer to the price of crude than they are to the price of methane. Dry gas, of course, is cleaned up and used for power generation. But what we are seeing is industry returning back to Texas, whether it's making fertilizer, whether it's making plastics, or making other petrochemicals. For example, Dow recently announced that they're building a billion dollar plant in Freeport. We're in the process of building a couple more refineries along the Texas Gulf Coast between Port Arthur and Houston. I don't think we've built a new refinery down there in 35 years. New crackers to separate these gases into their value added components. So the manufacturing side of this is also of tremendous benefit. We have several steel plants in Texas, and they will tell you that the price of electricity for them today is cheaper than any of their other steel plants in other states, because of the price of natural gas.

Question: To what extent does transportation capacity for crude and liquids, and even natural gas, impact those kind of vertical production bars that you see continuing to go up?

Speaker 4: The dynamics of it are, of course, you can drill a well a lot faster than you can build pipe. So the pipe is trying to catch up with the production. And it is happening at pretty good speed. It's relatively easy to build new pipe in Texas, because you don't have to get a CCN. And if you come in and asset that you're a common carrier, you get the power of eminent domain. There's an interesting Supreme Court case that I'd be happy to talk to anybody offline about, which is going to make it more challenging to become a common carrier in Texas. We're going to have to have a more robust process. And of course, we always want to respect property rights. We're in the process of doing this. But the pipe is getting built. And it will catch up. And that will solve a lot of problems, including the fugitive emissions of methane and some of the pricing issues. For example, crude production in the Panhandle flows primarily into Cushing, where there's a surplus. And so that's one of the reasons why the spread between WTI and Brent has been wide. But now, if we can either build the southern leg of the Keystone, or the, I think it's called the Seaway pipeline, w

hich has been reversed, we'll get that production down into the Gulf Coast to be refined into gasoline.

General Discussion.

Question 1: I'd like to start with a question for all of the panelists. One of the interesting issues that we've struggled with here in New England is that you have the ISO, which essentially has structured the electricity market, and then you have our gas pipeline system, which is regulated in a completely different way, not by ISO, etc. And yet you have these really interesting interactions and potential challenges, especially when you think about winter peak times here, with heavy demand on gas for thermal load and increasingly heavy demand on gas for generation. And so my question to the panelists is, especially given all of your experience, what kind of institutional solutions to that kind of problem would you envision or have you experienced? In other words, these two very different energy systems that are regulated in different ways, different infrastructure, etc.--how should we be thinking? How should regulators that work at a regional level, and how should the federal agencies be thinking about institutional solutions to those kinds of challenges?

Speaker 1: I'll start, because I probably have the broadest comment. If we look at what Speaker 4 said, there won't be any conflicts, because there's tons of gas. So I think we should not accept that as the premise to go on and we should really think about your question that there will be competing demands, and there are different bodies in the policy arena that address those right now. I know I've been asked about this issue. This is probably the fifth time this year, specifically, and this summer there are probably four conferences when people want to talk about the nexus between gas and other things. And I haven't found, honestly, a good form to really think about that in a structured way. So I don't have a great answer, but it's likely to be an issue, and I don't know, if you go back to the Public Utilities Commissions or the states that still have energy offices (some of them don't) and try to get them to think about it…but right now they work in silos, the way I see it.

Speaker 4: In Texas we have a fairly comprehensive working group that's comprised of representatives of the Railroad Commission, the PUC, ERCOT, TCEQ, and the pipeline stakeholders and the generation stakeholders. They meet twice a year to talk about these kind of issues. They do tabletop exercises on reliability.

Last winter we did have a cold weather event where we lost power for most of a day. The initial reports placed a lot of the blame on the inability to move gas to generation. Upon further reflection, that was really not the case. Some of these generators did not have firm supply contracts for a number of reasons. For example, up in North Texas, the gas distribution pipeline network was originally built primarily for residential service, and then the generation came after that. And in the hierarchy of dispatch, you certainly don't want to eliminate gas deliveries to the pilots and the home heating systems, because going back in and turning on everyone's pilot light in a neighborhood is a very labor intensive and dangerous thing to do. And, as it turned out, some of the generators just didn't want to pay the additional price to have firm delivery. So when we began to run tight, they did not get gas delivered to them, even though one of them was screaming at me to try to get them more gas. I found out later on they had the wrong kind of contract. So as a result, I think we're communicating and we're doing a lot better job just by talking about these issues in advance.

Moderator: In addition to that kind of talking, are there legislative fixes, is that part of what the group is exploring? Or do you not have the authorizing legislation to do some of those fixes?

Speaker 4: I think that we should try to fix it without legislation, because legislation generally would be a broad axe that would not be fine-tuned to their particular needs--so if we can do this as stakeholders working together… For example, we're probably going to revisit at some point our hierarchy of curtailment, because right now power generation is at the bottom, and hospitals and nursing homes and fire stations are at the top. That was probably put in place at a time when we had much more capacity margin than we have now, and no one ever thought that curtailing a gas-fired power plant would endanger the lights being on. So we're probably going to revisit that. Fortunately, we had a very mild winter, so it wasn't an issue.

Speaker 3: I think it is an issue. I think recently, if I remember correctly, in Massachusetts, folks are getting around the table and starting to try to figure this out. That work, and Speaker 4 mentioned the work in Texas, it's an issue we need to continue to talk about. I think of it as an infrastructure development issue. FERC has got an open docket on a number of these things, where a lot of companies…we've provided comments as well. Firm transportation is a piece of it, but firm by itself isn't enough. Firm just gives you access to the pipeline. It doesn't necessarily give you access to the gas. So those sorts of things still need to be worked through. I think they will be worked through. The circumstances where we've had problems have been, as you know, very infrequent, but nonetheless as we grow more dependent on gas as a nation, it's going to be something that we're going to have to reinvest in, some of the gas infrastructure. We've already done that to a large degree, and we're going to have to do a lot more of it.

Speaker 1: Just picking up on that last point. You know, building out the natural gas infrastructure is a pretty key part of it. I appreciate the ongoing efforts by the voluntary organizations, and I do think that's important, to get the state and federal level--the FERC docket, on harmonization is important. But, really, I think there will be a market response in terms of building out the gas pipelines, and pipelines are generally quicker than transmission, at least in my experience. And so I think some of those concerns about just not having delivery of gas are probably overstated. I think there will be a price response there, but, you know, it is certainly an issue of ongoing concern.

Speaker 2: Can I just ask a quick question to follow up?

Moderator: Of course.

Speaker 2: In your price scenarios, does that include the build out of the infrastructure?

Speaker 1: That chart that I show, that final chart, is only the electric sector, so it includes the build out of the transmission system, but not the gas pipeline system.

Speaker 4: I have one more thing. You know, in an investment environment where you're getting, what, 1% on your CDs and 1% on the three-year treasury, a 10% ROE to a pipeline company is worth investing capital, whether it's domestic capital or international capital. So I believe that this will continue to be a preferred place to put assets to work.

Question 2: I was interested in the impact of the renewables on rates, and one of the things that

the charts always show are projections of the average rates, but what they teach you is that a lot of the economic decision making ought to be made based on the marginal cost impact and doing the cost benefit analysis. And one of the concerns, I guess, is to what extent do we end up building in more and more renewables, resulting in the costs kind of creeping up, and then resulting in some backlash, and get some comment on what is the implication of this notion of cheap natural gas as a bridge fuel, in terms of changing energy policy at all? Because it seems like we have the same RPS standards. You know, we have a lot of the same policies in place, and, you know, should we be looking to develop new technologies and looking longer term, or is the issue that we just need to get off carbon as quickly as possible, and anything that we can do as soon as possible is the right policy?

Speaker 1: Well, there's a lot there, but, I mean, there's no denying that the commitment to building renewables, for the most part, in this current environment with a very low natural gas price means that a lot of that renewable build is out-of-market, relatively. And that's why, when we've done our modeling, looking out to the end of the decade, we don't see how those state commitments to renewables can continue, and so that's why we project about half the states failing to build out fully, because as those price increases…and you're right, there will be significant price increases in certain areas because of those commitments, and the public will recognize that, and politicians will recognize that. So we do expect a certain amount of backlash, and indeed, as I suggested, maybe one of those strategic challenges for policymakers and the utilities is to manage that backlash and make some hard decisions, particularly in the second half of the decade where we see some of those commitments really ramp up to very high levels.

At my company, we also do scenario analysis, and we look broadly at a range of futures, and one of them that's sort of not in our base case, is to what extent is the pace of change of technology development impacting what we end up building, and what the prices will be, and certainly we have done scenarios that would suggest that there are opportunities to develop much lower-cost renewables and carbon-free… But in part you actually need the price trigger to do that, and the problem we see right now is with the low natural gas price expectations, we don't see the necessary high electricity costs that would help drive some of those technology changes, other than a commitment from the government to do so despite that, and we don't see that commitment coming any time soon. So it is a real challenge, but the bottom line in terms of our rate increase analysis suggests that, renewables play a part in that, but it's unfair to sort of ascribe too much of those renewable costs, because there are a lot of other costs that will be borne by rate payers this decade, new investments that are needed just to keep the reliability in check and commitments that they've made in other areas, such as smart grid and retrofits and all the rest.

Speaker 4: I don't recall who authored this study, but I saw one recently that said that because of the recession, that CO_2 emissions globally would not return to 2005 levels at, say, 2% global growth, until 2035. So I don't know if that is consistent with your work, but it occurs to me that if that's even close to being right, if you're motivated primarily as a policymaker on reducing CO_2, that gives you some period of time to work through before you really have to worry about exceeding 2005 levels.

Speaker 2: I just have a few comments. One is that in a few states, I don't have the number off the top of my head, there are rate caps in place. And a lot of the dialog now on refinements to

RPSs and things like that involve rate caps. So just keep that in mind, that they are in place in a number of places. And when you reach those, there won't be additional development.

Second, while this crowd predominantly is focused on utility-scale installations and larger generation units, there is quite a bit of distributed generation, behind the meter activity going on as well in some states. And that in itself has some impact, and that's happening, yes, because there are RPSs and there are tax benefits to doing so, but increasingly, honestly, people want to do that. Residential consumers do want to install their own system, so while this is kind of a separate issue from the gas versus renewables price difference, there will be an impact in some markets where there's high penetration of distributed generation in a physical sense and in a price sense. And we talked a little bit about California yesterday, with many customers getting net metering, and what does that mean to the remaining rate payers? So there are other implications to some of these policies beyond the larger scale stuff.

Questioner: Just a follow up for Speaker 4 and Speaker 1. You made me think of this, Speaker 4, when you were talking about the relatively low carbon emissions. That gives us a kind of a window of opportunity in a way. I think the flipside, Speaker 1, of what you were saying, that we don't see high prices so those might not drive renewable development is that another way to think about that is we are at very low prices, so there's a lot of consumer saving on energy costs right now. So does that also add a window of opportunity to make the investments in renewables now in such a way so that when price goes back up, more of these facilities are installed? How would you both kind of think about that?

Speaker 4: Well, I can tell you, from the pipeline infrastructure perspective, all of the pipe companies are thinking about making infrastructure enhancements, whether it's digging up old steel and putting in state-of-the-art plastic for reliability--because the commodity is so low that the average bill will stay the same after you make the infrastructure improvements. And I think that's the theory that you're operating under with your question.

You know, I would point out something that I think gets lost in the conversation a lot, which is that while renewable cap ex goes down over time because of technology enhancement, so does fossil fuel development cap ex. I mean, right now we are taking less time to drill a gas well than we did six months ago. We're using less water, less of all the materials, and we're paying lower lease payments. So one of the things that I think we've got to be careful of when we talk about getting to grid parity with renewables, is the other technologies aren't standing still either.

Moderator: I'm sorry, just let me push a little further. So, your example of pipe replacement, to meet another goal, not a cost goal, but a safety goal, for example. So do you see that analogously? Could you use your same argument to say, solar panels, too? Prices are down, let's keep bills equal and we'll use that difference to increase, you know, installation of solar, wind and whatever?

Speaker 4: You know, I'm probably not the best person to talk about this, because I had solar panels on my house at one point in Austin, and I calculated that my payback period was 42 years. Now, I realize that that was probably an older technology, but again, you know, I think you've got to be careful on this, because at least in my personal experience--and maybe my array was bigger than it needed to be or--you know, I was

trying to be an early adopter, being the chairman of the PUC at the time, but, again, I would just come back to the fact that other technologies don't stand still either. Plus, you're going to have to basically rebalance the rate schedule for all the customers, particularly if you go to net metering, because then somebody's paying zero, theoretically, but yet the wires and poles are still out in front of the house, and somebody else is now picking up that cap ex, which is what Austin Energy is basically going through today as they're attempting to rebalance their rate schedule and put in a bigger fixed component and a lower variable component of the bill.

Speaker 1: Just to your original point, I think the fact that we are seeing lower natural gas prices and its impact on the power sector, it means that it's helping to mask certain other price increases. So in that sense, I think people, utilities and policymakers, to a certain extent, are taking advantage of that, whether they realize it or not, by being able to continue to roll out policies that would otherwise add more to rates.

So in some sense, you're right, it's a good time to be doing these things, but nonetheless we expect prices to go up, even in this low natural gas price environment. And I think Speaker 4's point, you know, is just that what we've done is just sort of the overall retail price analysis. Rate design, of course, is another issue, and as commissioners know, there's hardly anything uglier than a rate design case when you have customers fighting each other about who shares those costs, and things like the feed-in tariffs, and we've seen that in global markets. We see this in Ontario, we see it in Europe--some of the tremendous fights going on about passing on costs like, you know, the cost of distributed generation, through the rate base, can be very expensive, and that's a whole other issue.

Question 3: I have two questions. One would be for Speaker 1 and anyone who actually would want to answer it. You mentioned that you are predicting that California will not meet its 33% goals. We are oversubscribed by four and a half times, as you're probably aware, so I'm curious as to what factors you have determined will contribute to that failure on the part of my state at the bleeding edge of this great nation [LAUGHTER].

Speaker 1: And my apologies if I've insulted in you any way, but --

Questioner: It's common, when I'm at conferences, so I'm beyond insults at this stage [LAUGHTER].

Speaker 1: Well, I appreciate that, but we're looking at a number of issues. Transmission is probably the biggest problem that we see, the build out of transmission, as well as the structure of the California RPS itself, in terms of the split between in-state and out-of-state. We think there would be sufficient out-of-state resources if you could bring them in, if you would change the overall cap that's allowed. And we do recognize that there's going to be this mid-period review in 2016, which might allow for some reassessment of where it's going, and we certainly see that, you know, for now, things are going well. You are oversubscribed, but we're looking to 2020, and that's where we see some significant problems, that and the overall price impact. We have factored in our analysis of California's RPS along with all the other costs that are going on in California, and we suspect that the RPS may fall victim to overall price concerns as you get towards the end of the decade.

Questioner: Ironically, I wrote an essay for the National Regulatory Research Institute, I believe others here have also authored, "What Keeps Me Up at Night?" and your concerns about the

buckets that we have under the RPS and our restrictions on out-of-state power or renewable power is a concern of mine as well, so I appreciate that.

The other question I had is, I've been approached by various entities regarding leveraging the lower price of PV and natural gas in some combined products. I mean, they're combined anyway, from a firming standpoint, but I was curious if both Speaker 4 and Speaker 3 or anyone else is seeing a growing trend in this technology of actually bundling in the generation structure itself?

Speaker 3: I think the products we could offer that are connected to solar RECS we could firm up. We don't need to do that from a physical standpoint. We could firm up the product, essentially by buying generation in the market to provide a virtual product that is essentially what you just described, which has the renewable attributes but also has the firm qualities that customers look for.

Man: As long as you don't speculate [LAUGHTER].

Speaker 4: Don't speculate. I read a piece the other day that said if you want to understand Germany's attitude toward Greece, think about Texas and California [LAUGHTER]. Because we're such good friends, I could share that with you.

You know, Doyle Beneby, the CEO at San Antonio CPS, is basically doing what you just talked about. CPS is actively retiring coal, buying new combined cycle, and then adding utility-scale solar. Now, they're an integrated muni, but I think he's got an interesting take on this.

Speaker 3: Speaker 4, you made a comment on how your all-green product, as I understand, is the number one product in the Texas restructured market?

Speaker 4: Yes, I haven't looked at this lately. What I would say is interesting is you can sell a retail product called "clean," not "green," "clean," if it's sourced from Texas natural gas. So, you know, I think in a retail market, giving the consumer choice to make those selections, whether it's green, clean, dirty, whatever you want, is absolutely the way to go because the customer will express, "Hey, I'm willing to pay a little bit more," or, "I'm not willing to pay a little bit more." I mean, you know, the electrons all comingle themselves. They're not brown and blue and green. They're what they are, so at the end of the day it's just a matter of what you're willing to pay for.

Moderator: A follow up on the thread of this question, because I think Speaker 3 and Speaker 2 said two things that were interesting, but I wonder how to reconcile them. One, I think, Speaker 2, you were saying how natural gas and solar were complementary of one another. It sounds like that's part of what the questioner is suggesting in terms of bundling something, and Speaker 3, you had talked about the kind of inherent competition between them, especially in those out years as you showed on your graph. How do we reconcile those what seem like opposite viewpoints?

Speaker 3: I don't reconcile them. I think they're just two different views. You know, I think we've all heard these phrases: "America needs to rely on the basket of resources" or the "all of the above" strategy that I think the President's talked about lately, where we have to have all the different generation products in the mix or, you know, some of the scare things you hear about gas, "the best way to get high gas prices is

to bet on low gas prices," and all that sort of stuff. I think all those phrases are a call for government intervention to diversify the product mix against where economics would take it otherwise, and what I'm suggesting to you is the economics in the market are going to pick gas unless there is government intervention requiring them to pick something else. And that is the competition, and it's based on a belief that we have to hedge risks that gas is going to take off or be unreliable or have hidden environmental hazards that we can't see right now, so therefore, because of these parades of horribles, governments need to intervene and force us to buy a product that otherwise is not economic and not the right product to purchase.

There is also, you know, the undercurrent here, quite obviously, of people not agreeing on a carbon policy. They don't agree as to whether or not carbon is a risk, or in some cases whether or not we could do anything about it. So, in the absence of a real carbon policy, they seek to have government intervene and pick a favorite technology, and solar and wind are the favorite technologies.

Sometimes you would hear the Republican Party talk about, "We need to build a hundred new nuclear plants by [whatever]." You know, every time you hear somebody talk about a technology or talk about a basket of resources or the rainbow in all of this stuff, it's a cry for government intervention. I think it's a competition. On the economics, gas wins. Solar is going to get better. Solar's going to get cheaper. God bless. If they get cheap enough to compete with gas, then they'll beat gas, but it's a competition, unless all of you direct us otherwise, and we're supplicants in the process. So if you direct us to build solar or wind, we're going to do that, but it's in the playing field that we designed when we restructured these states, and we said that best-price head-to-head competition is what we're after and it produces the best results for the customer, then I'm telling you that's gas right now, and for the foreseeable future.

Speaker 2: So just a couple comments. One is, I think an electricity policy isn't just about price. It's about many things, and that's why you hear the arguments for the basket. You know, you have to think long term, and what are the different goals we're trying to get to? And frankly, people don't even talk about the environment benefits right now. We don't, to be quite honest. That's not part of our policy pitch at the moment. It's about energy independence, customer--not choice, I don't like to use that word anymore--but, you know, customers being able to control their electricity cost. So I think the reality is that price is 90% of the equation when it's low, which is where it is right now. So there are other things policymakers need to think about.

Second, and again it's not clearly on the table here today, but at least for solar, it is very much a distributed generation resource. It's not just utility-scaled. There are very few states that will have significant utility-scaled resources. So they don't compete in that regard. If you're talking about DG and customer installation, it's different.

And then the third thing is, I think it very much depends on where you are in the country. If you're in Texas, it's a much harder argument to make the comparison. If you're in Arizona, or Massachusetts, or even New York, it's a different scenario and a different history. Price may overcome that in some aspects, but you have to take into account the other things that are at play.

Speaker 3: Speaker 2, just a clarifying point. I know you're not making the environmental

argument directly, but you said things, if I recall your remarks correctly, about leakage from gas pipelines. You described hidden, as yet not understood environment impacts from shale drilling, and what I'm saying is that this is an argument based on things, you know, in one case we haven't really seen, but we cast this fear around it, and it argues in favor of intervening in the markets. To my mind, if these policymakers were alive in the early 1900s, they would be subsidizing the Stanley Steamer for fear that the internal combustion engine might not be all that it was cracked up to be. That's what we're looking at here, and if we see real risks develop with shale gas, then we need to make different choices, but we've got to be exceedingly careful not to make choices based on uncertain and unquantifiable risks that may just be ghosts. Because the consequence here is real, and it's a consequence that it undermines the very market that I thought we got our heads around really embracing some 10 years ago, and that's what we're seeing in the marketplace. That is the point I'm making.

Speaker 2: Fair point that I did mention those things, and I don't violently disagree. I just think we can't think about gas and shale and not think that there might be some implications, and if I'm a policymaker that's going to stick around for a little while, or a utility that's making a long-term investment in any one of these, you have to assume there's some risk. And these are being discussed in a very open way, and I'm not going to say there's likely to be a big disaster or anything, but there are risks with any investment, and they have to be part of it. We can't ignore that there are some environmental risks. There are environmental risks with solar. You know, after 30 years of using panels, what do you do with them? Right? So that's being talked about, too.

Question 4: I think a consideration of the incremental gas infrastructure costs are really a key part of modeling what happens next, because I think everybody is thinking, really cheap gas, and that's really great, but there are, you know, some big costs coming down the line on these.

But the other thing that occurs to me that's also important is the world gas situation and I don't know to what extent any of the projections that we've seen factor that in. I don't follow this very closely, but I hear the gas is trading at 20 bucks per million BTU in Asia, 10 bucks in Europe, and so I'm not thinking that the U.S. is going to be the next Trinidad, where they're pumping it out of the ground for two and shipping it to these places, but I think they got approval to build a liquefaction facility in Louisiana. So I'm just wondering, to what extent do all of the sort of projections that you're talking about factor in the whole world gas situation which is, I think, an important part of this as well?

Speaker 1: Well, certainly we do forecast globally, so we have taken it in account. And you're right, the cost of natural gas in other regions is significantly higher than what it is in North America. That said, there are vast resources of shale gas worldwide. You know, we see that in China. There's actually even some in Europe, although it can be very difficult to access because of environmental rules there, but there's a lot of gas worldwide. And you're right, I think one of the more interesting policy questions for the U.S. in the next few years is to what extent we want to support exporting natural gas, because there's clearly an opportunity there to take advantage of the relatively low cost gas here. And we see any number of facilities that have applied for licensing, U.S. and Canada.

Our expectation is we do see some LNG exports from the U.S. We think the political concerns

will be overcome. It's not a huge amount, but it is significant. It does help put a bit of a price floor under natural gas, and it's certainly an area that many natural gas producers in North America are keenly interested in, because of that very significant price difference. But it's not going to drive the price of U.S. gas to that worldwide average. You know, we just see that disconnected, and the gas markets are just very different from the oil markets. You know, they're just, it's not fungible in quite the same way. There's different products involved. There's different costs in terms of shipping and export. We do see some shrinking in the difference in the prices. We are not going to see a global average gas price, where the U.S. price goes way up to meet those others, but we do see the opportunity for export because of it.

Speaker 4: These drilling techniques can be done in Europe and Asia and other places, and many of our U.S. service companies are over there participating, whether it's in Poland or China or other places. So the possibility of this drilling technique, and using these new technologies to change the balance of power on who supplies natural gas in Europe, is really quite dramatic. When you think about the prospect of parts of Europe not having to buy from Russia, for example, and giving them some optionality on their gas supplies, it's really quite a game-changing technology.

Now, I believe that by 2019, 2020, we will begin to see LNG exports from the U.S. The Shaneer Project isn't one you referred to. It's been approved. There are three others along the Texas Gulf Coast, they're seeking application. Having said that, the last time I talked to the DOE, they were expecting maybe three BCF a day, maybe five, tops, of export. Well, we're producing 17 a day in Texas alone. I think nationally we're producing sixty or 70. I haven't heard anyone say that within the next 10 years that exportation will have any significant effect on domestic price. But you got to figure it's going to happen, because if it's $15 delivered in Tokyo, and they're not going back to using as much nuclear, same with Germany, I suspect France is next to move away from nuclear, that natural gas will be the choice to make electricity. And we've got a lot of it , so...

Question 5: My question is mainly to Speaker 3 and possibly Speaker 4. Given the increased relationship and dependency on natural gas, is it time that we start to look at establishing some sort of RTO-like integration between the gas and the electricity markets? Larry Ruff was a bit ahead of his time down in Australia. And what would be the gains, what would be the efficiency gains, and what would be kind of the obstacles to doing that?

Speaker 3: I think the idea of coordinating these things is obviously something folks are implementing and --

Questioner: But the formal coordination from, like, an RTO?

Speaker 3: All right, I understand. I think that would be preferable to the trend line that I see right now. The trend line I see right now is the ISOs are going to do something around electric reliability, right? So they're going to say, "OK, if you're going to get your full capacity payment, then you need firm transmission," or whatever it is, right? And I think in the ISO New England there were like 10 or 11 suggestions that came out of that workshop. Firm being one of those things, but certainly not exclusively that. And those recommendations are then going to drive what happens on the gas infrastructure side.

I think your point begs a broader question. Would it be better to do it all in one house? And

I think so. I mean, I think that's better than one part of the government or the nation's infrastructure responding to reliability needs that are placed on the electric sector. I think these collaboratives are getting at that. I don't know if we have to go so far as to formalize it--and there are probably some demons in doing that, in combining them that I don't fully understand. But certainly the collaboration has to be to a far greater extent than what I'm seeing right now.

Questioner: But what about day to day, hour to hour, five minute to five minute operation?

Speaker 3: That's a great question. It's very intriguing. It'd be interesting to hear some of the ISOs weigh in on that idea. It's a little bit outside my depth.

Question 6: Wow, you just teed that up for me perfectly. To kind of just address that last issue with the gas-electric coordination, I think that there are a couple issues. We don't require today firm delivery of fuel for any fuel type, whether it's coal, whether it's natural gas, or anything else. We don't require firm railroad contracts for coal. We don't require firm transportation for natural gas, at least in the PJM construct, and I think if you take a look at the markets and the way they're working today, what's really driving the new infrastructure build out? Who's driving it? Historically, obviously, it's been heating load, it's been LDCs, sort of a demand-pull story on building transportation infrastructure from the well head to the burner tip. Now we're actually seeing, starting with the REX Pipeline that Kinder Morgan built, and now we're seeing it in the Marcellus Shale region, that it's really the producers that are driving that infrastructure build out, because they want to get that gas to market, and what we're hearing from a lot of the pipeline folks ourselves is that while they obviously would desire to have generation by firm transportation at all times, the reality is they're in competition with one another, because gas pipelines have their own open seasons. They have to submit to FERC that they've got enough buyers on the pipeline to go forward and build that capacity and get that nice rate of return that Speaker 4 is talking about. You know, 10% ROE, or even less than that, looks really good considering where we've been in the last 15 years with equity markets in general. You know, they're probably loathe to cut off generation, even if they believe there's a pipeline imbalance. So we keep hearing stories about reliability, but yet the pipelines have been unwilling to cut off the generation. So by revealed preference argument, as an economist, I have to believe that the whole reliability issue's overblown, at least to date, on the gas pipeline system.

But with respect to the question that I had in talking about RPSs, I think that there's a clear conflict here. One is, why are we even doing RPSs? As Speaker 2 just mentioned in one of your comments, we're not even talking about environmental issues now, but I think the real question is why are we doing RPSs? And I think the elephant in the room is either climate policy or other emissions trading policies. And if that's the reason we're pushing renewables, then let's let price do that. Let's set the price, and then that solves a lot of the problems that Speaker 3 is talking about, the problem about not having sufficient revenues for other conventional generation resources, which by the way we're going to discuss at the IEEE general meeting in July, the impact of renewables on the value of conventional resources. And so then the question becomes, why not a capacity market in the places that we've talked about? I mean, whether it's California or Texas and I'm going to duck when I say that, Speaker 4[LAUGHTER].

But, you know, I think it's a valid question, and so why are we insisting that we know better than the market? I mean there's a real option value to

actually waiting to let price make some decisions, and waiting to see how the world turns out. Five years ago, could we have predicted natural gas prices where they were? Not a chance, but here we are. There's a significant value to that real option to wait, and so, you know, why are we choosing these winners and losers? Why is it that price doesn't suffice? I mean, that just goes against everything I am as an economist, all of my training and my intuition.

The last point I would make, and that I'd like to hear some reaction to, is that if we think about this experiment in restructuring--and I think this was actually brought up in the comments on the panel. Well, think about PURPA. We have PURPA today. It's called an RPS, but it's PURPA with a smiley face [LAUGHTER], and it's a smiley face in the sense, and I say that a bit flip, but it's a smiley face in the sense that at least with an RPS we can choose the least-cost set of renewable resources to make that, whereas, with PURPA, State Commissions simply just mandated, "This is what we're going to do going forward." So it's a marginal improvement on that, and that's directly led to restructuring, which is where we are today. So now we've got the solution for PURPA, and yet we want to reimpose something that looks like PURPA again in this environment, and does that even make any sense? And so there's a whole lot there, and I'd like to hear some reactions.

Speaker 2: I'm just going to start by saying that it's not, from my perspective anyway, which is not just from a solar perspective, it's not just about the price, right? The environment does matter to some consumers and rate payers, over the long term. It does matter to some policymakers. Economic growth is being talked about as being part of the RPS. I mean, if you look at the materials that are used in a number of places--people talk about the jobs that have been brought by the development of renewables. So there are other reasons, and maybe they're different than when they were first created 15 years ago, where there are additional reasons now, but that's in part why they exist.

And let me say two other things. One is that renewables was, 15 years ago, nascent, right? There weren't commercialized products. Without RPSs, we wouldn't be in the place that we are in terms of the technology and the price declines. So, yes, they supported the effort that went into R&D and manufacturing development and all those other things, which by the way other countries are doing, and we can decide to be part of that equation or not.

And then finally, I think that we have to continue to think long term, and I personally believe that having a portfolio--does it need to be, you know, 50% renewable? Maybe not--but I think smart thinking is long-term planning. There are environmental impacts, there are price impacts of depending on one supply over the long term. There are differences of opinion across the country, just based on where you are, the geographic and other economic conditions that exist. So I think that's why we have RPSs, and why we'll continue to have them, and there are forces at play to tweak them and to move them up or down or sideways or include other things in them. And while some people may think about it just as an economic issue, it's not.

Speaker 4: You know, professional race car drivers have a saying, "What is behind me is of no concern," and I don't want us to beat ourselves too badly about decisions that have been made in the past. For example, the Texas RPS was put in as part of the negotiations in 1999 for Senate Bill 7 which restructured our market. So, we had 880 megawatts of wind on the grid. The environmental community and some West Texas legislators who had a lot of

wind wanted to increase that, so we added 5,000, and went to 5,880. That's why we got that strange number. And so, as a result, we ended up with this RPS, and then in 2005, when it was increased to 10,000, that was a period when it looked like we were going to be capacity constrained going forward. It was the beginning of the end of building new coal. No one thought we could build new nuclear. Yeah, wind is variable but gee, you know, at least it blows some of the time, and so the negotiation was, "Well, let's add this in and maybe it'll help on the margin." And gas prices were rising, so if you look at all the facts (and I'll just speak from the Texas perspective), you can construct a logical argument that it was decisions well-made, and from that flowed the CREZ plan to build a bunch of transmission, ostensibly for wind, but it's open access transmission, so you can build anything on the end of it. If you want to put a gas plant on a CREZ line, you can do that, if you can get the water and the supply. And those are long-lived assets so, you know, they're 30, 40, 50 year assets.

Having said that, you know, let's look forward from here and try to make an assessment of what we think the future looks like, and the crystal ball is clear, I think, for five or 10 years on gas. I'm absolutely convinced that we've got 100 years' worth of gas, maybe more. The technology doesn't stand still. So would we repeat the RPS in my state? I doubt it. But at the time it seemed to make sense, and it was a political compromise to go to restructuring, which has absolutely benefited customers to the tune of hundreds of millions of dollars over the last 10 years.

Moderator: I'd actually like to respond as well, having previously worked with the development of all the clean energy programs in the state with now Chair Berwick. She was the Undersecretary of Energy at the time. I mean, I think the obvious answer is that the market doesn't internalize a lot of externalities that are related to our energy production, whether it's environmental, local air pollution, climate change, etc. That's all been extremely well documented, and you add on to that reliability concerns, security concerns, etc. So while the market has been an extraordinarily powerful tool to get prices right, it doesn't internalize all of the externalities, and RPS is not the perfect way to do that, perhaps, and each state is somewhat different, etc., but that's essentially what it's done, and in this state it's been very successful at doing that. Our emissions have been declining, both on the criteria pollutants and greenhouse gases. We've seen robust growth of industry. We've tackled some of the other benefits of job growth, etc., in a pretty dramatic way. So, you know, granted, a flawed tool, but a tool to internalize externalities of a variety of different types. I think that's the basic answer.

Speaker 4: But let me--I'm going to challenge you politely.

Moderator: Well, you could do it not politely, too, if you like [LAUGHTER].

Speaker 4: Here's the reality of natural gas. It has no particulate matter, no mercury. It has a fraction of the NOx and SO_2, and 40% of the carbon. So is it perfect? No, it's not perfect, but, man, it's pretty darn good. I mean, when you burn natural gas to make electricity, about the only thing going up the smokestack is a little bit of carbon. So --

Moderator: I'm not going to disagree with you at all. I totally agree with you. In fact, that's why natural gas has increased in this region from 20% to 50%, because we started internalizing externalities of fossil fuel in general and put in place a variety of different regulations in Massachusetts and through EPA, and we started

switching from coal to natural gas, exactly because natural gas has those benefits, and on the spectrum of externalities, causes less of them than other fossil fuels. So I completely agree with you.

Speaker 4: Well, then perhaps you're more enlightened than I thought [LAUGHTER], but let me for a second talk about the federal government, because I've had these discussions with DOE and EPA till I'm blue in the face. And they'll say, "Oh yeah, you're right, natural gas is wonderful, but it still has a carbon atom, it still contributes to global warming, and therefore we can't embrace it." You know, I think so long as that is the touchstone of our federal energy policy, we're always going to have this kind of conflict that's going to result in uneconomic decisions.

Moderator: Speaker 4 is lucky I can't vote in Texas. That's all I'm saying [LAUGHTER].

Question: May I make one suggestion? Why don't we simply put a price on emissions like we started doing with the Sulfur Dioxide Program and then the NOx Budget Program, and extend that to CO_2? And I mean in a meaningful way, unlike with RGGI, and I apologize for attacking something that's somewhat sacrosanct, but the pricing of RGGI allowances doesn't, you know, feed the bulldog at this point, in terms of changing those types of decisions.

Moderator: Very good point. Let's have another panel at some point about pricing carbon, and that would be a pretty interesting conversation.
Oh, we did that?

You know, for state legislatures and Congress to make those kinds of decisions about pricing carbon and cap and trade, it's all mixed in with lots of very difficult political decisions. So we end up with things that aren't perfect.

Question 6: I just wanted to comment briefly. You know, global CO_2 emissions did actually reach a record high last year, so, surpassing 2005 levels. [How does this relate to what you have been saying about natural gas and coal?]

Speaker 3: I think EEI has done some analyses here that we don't always agree with, but along with PSEG and other companies, we're part of the clean energy group that has done some separate analyses, but I think what we saw in the analytics was about right. EEI had 54 gigawatts of retirements. If you take a look at base environmental statutes unrelated to the toxics or transport rules that preexisted this kind of transition period, you would take out about 24 gigawatts, and that also includes economic retirements due to low gas prices. And the balance of it was driven by some EPA regulations. I don't think we could ever deny that the EPA regulations have an impact. Clearly low gas prices have an impact.

The analytics I've seen that put it at about 50-50 seem about right to me. What we're seeing is, you know, when we first started this and gas prices were fairly robust, you were thinking about 200 megawatt machines and below that were really in jeopardy of retiring because you couldn't justify the economics of putting on a scrubber. I think, as gas prices have come down, that megawatt threshold has come up. So you're now dragging 300-400 megawatt machines up to the edge, and look, we saw some of these economics here with, if you're burning North Ap coal, and your gas prices (at least in our model) are lower than $3.40, you're going to lose some dough. And that may be a longer term thing. It may not be happening right now, because you might have coal contracts, but at the end of the day you can't sustain that at that low a gas price. If you're burning PRB, you could live a lot longer. So clearly gas is driving a ton of

these retirements, and you have to look no further than the public statements made by the AEPs of the world and others. It's gas that's hurting them just as much as EPA regulations.

Speaker 1: I'd agree. In the coal retirement study that we did, we looked at every U.S. coal asset to sort of determine, what have they already done, and what are their likely margins, and what could they support? And so, the EPA conventional pollutant rules were a very significant driver, but it's now combined with this issue of how, as the gas price fell over the last couple of years, it made more of those units less profitable. And to a certain extent, it sort of pushed the scale up for what made sense in term of retrofitting a plant versus retiring it. So it's hard to separate.

50-50 is probably a fair estimate in terms of the impact of natural gas price versus the EPA conventional rules themselves. But then getting to your question about the future of coal, I mean if there was a significant carbon policy in the U.S., then the rest of the coal fleet would be at risk. And I want to echo something that Speaker 2 has pointed out a couple times this morning. Fuel diversity still matters, and maybe my view is colored somewhat, because I started my electricity career as a supply planner at Central Maine Power. I was doing the Integrated Resource Plan, and you hardly even hear about IRPs anymore, but we cared a lot, because we didn't know what the future was going to be back in 1985 or 1990 when I first started. We didn't know what the price of gas was going to be. We didn't know whether there'd be a carbon policy ever, and so making investments in uneconomic resources like solar and wind made a certain amount of sense, because you were trying to kind of capture that. And if you're genuinely concerned about carbon, and I think we should be, then the risk that a carbon policy ultimately gets put in place at the federal level is real, and that's why you have to think seriously about the coal fleet, but also the natural gas fleet, because under our scenario analysis, we look out 35 years, and a couple cases go out to the 20-50 mark to try and understand where the carbon picture goes. And even if you convert all the coal plants to natural gas, you don't achieve the 450 PPM scenario that the U.N. scientists require, so we don't get to that point where we probably want to be in terms of our carbon emissions, so you have to think about these alternatives. You have to think about renewables. You have to think about nuclear. So I think the old arguments, the old IRP days of looking at fuel diversity, I think it still matters even today.

Speaker 4: Two points on this. One, almost all the increase in CO_2 emissions globally are going to come from the developing world, not from the developed world. So we can put any carbon policy we want into effect in the United States, and it's not going to affect China and Vietnam and South Korea. Number two, I know this is an electric policy discussion, but Greece will leave the Euro. Spain and Italy are in trouble. The United States has a balance sheet that's unsustainable. I don't even know why the federal government would be talking about a CO_2 policy now, when the reality is we could be looking at sub 1% economic development for a long time to come. I mean, we have a hierarchy of needs in terms of things we need to focus on, and in my mind this is way down the list.

***Question 7*:** I had a question which related to whether or not the lower price of gas actually facilitates RPS implementation, and Speaker 1 responded to that. I have some anecdotal evidence on that. We just finished a rate proceeding. Now, we aren't a restructured state, so we have vertically integrated utilities, but we just finished a rate proceeding with a major utility. And they added a significant amount of

rate base because of a wind plant to meet their 2016 deadline for RPS. That was more than offset by lower power costs because of the lower gas costs, so there's still a decent, or an imposing rate increase, if you take the customer's point of view, but they haven't tumbled to the fact that that was driven in substantial part by renewable portfolio standards. So this makes that first next stage implementation, in my view, for that utility somewhat easier, but I think down the road, the next implementation, 20-20, for that utility and others, where you aren't going to have offsetting decreases in natural gas, that's where the rubber's going to hit the road. So it was a question, now it's just a comment.

Question 8: Both Speaker 2 and Speaker 4 mentioned a desire for energy independence, which I equate to reduction in imports of foreign oil. And Speaker 4 talked directly about Texas's expansion of extraction of oil, but for the most part, when people these days talk about energy independence, they seem to be talking about it in the context of electricity policy, such as renewables and natural gas. The increase in renewables and natural gas is clearly reducing both marginal energy costs and marginal emission costs, but it seems to me the only nexus between this energy independence desire and those expansions could really come significantly from the expansion of transportation electrification. So is that part of the plan for this, or are people really just kind of misrepresenting the energy independence with the exception of the oil extraction in Texas?

Speaker 2: Two things. One is, we have talked about it from a national perspective, probably absent from thinking about the gas situation, putting solar means you're not importing something. So that's one thing. The second is…

Questioner: Well, maybe I wasn't clear on my question, so let me just clarify. When we generate electricity with solar, we're not changing anything that we import, because we don't generate electricity with oil.

Speaker 2: OK. The second thing is, we talk about energy independence as it relates to the actual consumer—so, the consumer having control over their fuel cost if you install distribute generation. For example, I have a system. I pretty much know what my electricity rates are going to be now in perpetuity, because I don't pay fuel costs at all, right? I just pay my fixed charges.

Speaker 4: When I talk about energy independence, it's liquids. So it's transportation fuel, but rather than thinking about electricity, what I think about most is using natural gas in transportation. So we're seeing that with fleets now--UPS, FedEx, AT&T, any place where you begin and end at the same place every day, you can put a fueling infrastructure there. And 18 wheelers, brand new, are beginning to be retrofitted to run on natural gas, because that's really the only alternative to diesel that allows the kind of performance that they're demanding. And at least two of the automobile manufacturers are going to begin making dual-fueled pickup trucks so that you can run on either compressed natural gas or gasoline with a full factory warranty. That'll happen in the next couple of years.

Question 9: I think this is a very important panel and a very important set of problems, and I want to call your attention to something which we're trying to get posted on the Harvard Electricity Policy Group's webpage, which is a paper by Alex Henney. It echoes a conversation we had in our last meeting, which was about what's going on in Europe, and particularly what's going on in the U.K,. looking ahead of where we are, and

it's very much along the lines of Speaker 3's presentation here today, which is that things which can't go on forever, won't, and the description Speaker 1 gave about what's happening with these RPS standards. You can do anything for a small amount. You can have the craziest program in the world, as long as it isn't too much, but when you start getting a lot of stuff that you want to have, you've got to get the economics to somehow come together in what's going on. And the problem with a lot of the things we've been doing--and I think it's embedded in the sales pitch for renewables in general, which is always that it was going to be too cheap to meter and it would improve your sex life at the same time [LAUGHTER]…

And if you want to do it on a large scale and you want to have it sustained for a long time, barring a miracle--I mean a Bill Gates miracle is one option, and a tremendous cost breakthrough--but barring that, the story's going to have to be that it's expensive, but it's worth is, which is my own view. And that's going to be getting the prices and the structure right, and I think the policy implication is that this is coming to a head, and the system is going to break, and now we're going to have to think about what we're going to do after that. And I think a lot of that has to do with working on the problems we were talking about yesterday, and making sure these market designs are improved and made better so that they can be more resilient when that problem actually comes along, so we can start internalizing these costs.

What's happening in the U.K.--when you read about this in the paper from Henney, I mean, it's just on steroids what Speaker 3's talking about. So we have subsidies which take expensive things and turn the cost into peanut butter and spread it across to everything, which lowers the price, which then makes them even more uncompetitive, so we need new subsidies for more things, because we're not getting enough of it, and we have carbon caps and trading in Europe, but the prices are too low, so we need a minimum price for the carbon cap, and they're putting…. and where they're heading, I believe, is this whole thing is going to unravel, and Henney's view of it, as you'll see in his paper, I don't agree with it, but his view is that we'll just have to give up on all this market stuff. We're going have to have the government run the electricity sector, and that's what we're going to have to do. And I just think that's unsustainable. I don't think the fiscal story allows for that in this country. I don't think the growth problems that we're talking about allow that…

So I think we're going to have to come back more to the market story and the part of the U.K. story which is that they're going to a carbon tax. That's what they're doing, and heading in that direction, and I haven't given up on that. And I do think it is a topic we've talked about before, and we could come back to here again, but I do think the basic point here is extremely important, and the experience in Europe is just evidence of the problems that we're heading into, because they're ahead of us on this, with all their feed-in tariffs and subsidies and everything like that, and it's all unraveling in various places in Europe in various ways.

And I think the same problem that we see here forecasted is just unavoidable. So I do think it's a hard problem. I don't think there's an easy transition, but I do think that the policy implication, at least one of them, is that a lot of effort is needed in trying to improve the quality of these market designs, so we aren't socializing the cost of everything. Because when you socialize the cost of everything, it makes the problem worse, and then you say, "We don't get the demand response." So then we have to socialize the cost of the demand response to undo the effects of not getting the price signal.

So I think the design of electricity markets are made even more important, and that we should be paying more attention to that.

Speaker 2: I know that there's a very small group of folks inside the beltway talking about this, talking about getting rid of all subsidies. Not just the ones for renewables, but the other ones that exist, and wiping the slate clean. So it's intriguing. The problem is, seeing your way to the end of that debate is politically really hard, because if you're the little guy at the table, somebody's going to cut a deal, and you won't be part of the deal.

Questioner: Right, that's a real problem, but the other side of the story is that spending has to come down and revenues have to go up in the federal government, and this would be compatible with that.

Speaker 4: You know, after hearing you, I'm ready for Speaker 4 from yesterday to come back. [LAUGHTER].

Speaker 3: The point of the presentation I gave on the timing of this [has to do with how, right now, we seem oversupplied with renewables.] In PJM, you look at the REC prices, they're down in the toilet, right? So you're led to believe, "Oh my God, we must have so much of this," but when you hit the wall, you hit it hard. And what I'm suggesting to you is that we are going to have this debate with policymakers very quickly here, by the middle of the decade, and don't be lulled into thinking that the low REC prices we have today suggest, you know, some gradual supply curve here. It doesn't work that way. It's going to come steep, and we're going to have people lining up at the state houses saying, "We need more subsidies, we need something more." And let me just be clear.

You need a lot, and I don't disagree that externalities have to be brought into the equation. I don't think anybody else does. We make electricity clean, and the EPA rules and the state legislatures are taking care of that. They're doing the same thing on the shale gas. They're regulating this stuff. What we need is one entity setting the rules. We can't have, on the energy side people saying, "Damn, those folks at EPA just aren't doing a good enough job, so let me start picking some winners and losers," or, "Because Congress can't get it done, I've got to figure it out." And this energy independence stuff that we talk about, my goodness, we're now hearing energy independence as it pertains to neighboring states--you know, "I'm in Massachusetts. I want to have my renewables built in Massachusetts, because God forbid I have to important it from the People's Republic of Connecticut or something like that." [LAUGHTER] I mean, come on, this is silliness, and you know, I hear Speaker 2 saying, and she's right, it can't all be about price, but we can't have everybody jumping in this thing trying to pick winners and losers because they don't believe the other team is doing their job. That's what's happening here, and we can't explain that on Wall Street, folks. I can't go up to Wall Street and ask for capital in a market where people are putting their fingers in it all the time. It's going to break.

Question 10: I'm going to be sort of little like the skunk at the party. I have no question that the gas resources are substantial, I'd be willing to buy into the 100 year scenario, but you have to have two things, also. You have to have demand for the gas, and you also have to be able to access the gas.

So let me just give you a few sort of elements which give you a little bit different scenario. Let's say that the European situation continues to muddle along and get slightly worse. Let's

say that Speaker 4's idea of less than 1% GDP ends up being an impact of that, because we can't export to Europe. Let's say banks become even less liquid, and are not actually giving a lot of loans. Let's say that the environmental problems in those areas that have not had a tradition of oil and gas developments, such as Marcellus, become more intense. I'm not claiming that they're correct or not correct, I'm just basically saying that I've seen a lot of things in the environment movement over 30 years where emotion takes over from facts. But let's say this begins to escalate, or it continues. Let's say a lot of the gas companies now in a lot of these areas, which bought their leases when gas was $9 and basically went out and borrowed a lot of money, become now under intense strain in a world of $2.50 gas. And let's say they can't all merge, and a number of them begin to falter, and let's say that Speaker 3's idea that it's tough to build new electricity facilities when you're looking at negative prices applies.

Say all of that comes to pass, and I realize that's probably impossible, but let me just throw that on the table. That may say that this sort of gas boom is going to be slightly less, a boomlet for a while, rather than a big boom, because you're not having the demand. Access becomes more limited, harder to get capital. And then on the renewable side, I think that the idea that Question 9 raised is connected with the problems with the budget in Washington. The notion that you're going to have more and more government-funded energy seems to me to be a little bit of a stretch over the next five years. So that begins to disappear, and I come to the conclusion, which might be because I'm a little crazy, that the real solution, if you're in the gas business is get the highest carbon tax you can possibly get, because otherwise you're basically not going to see this going up to 28 TCF and scenarios that I see in the newspapers all the time.

So I just want to throw that scenario on the table, because things don't always work out the way we think or like those baseline cases you see up on the screen.

Speaker 4: Well, there's this great website. It's called zerohedge.com. I don't know if any of you subscribe to it, but it takes a fairly pessimistic view of the future of the world. So I haven't seen your piece on there, but I think it's deserving of a place. (My website is not linked to zerohedge.com.)

I think you raised some really interesting questions. You know, part of the problem that we've always said in Texas, of course, with any kind of carbon tax or cap and trade, is that we're convinced that when the government gets that money, it'll just squander it. Pardon my French, it'll just piss it away, and it's a huge amount of money. So, you know, if you're going to do that just because you want to prop up the gas markets or prop up the gas companies, and you don't think about where the revenue stream is going to end up, then it's just another indirect subsidy. It's just another transfer payment from gas companies to who knows whom. So I'm not sure that's the solution. I think you've identified some pretty interesting problems which I think have a 15% chance of materializing.

Moderator: Just a quick comment on that. In Massachusetts the funds that are raised through the RGGI auctions--well over 90% of them have been invested in energy efficiency, which I know the Analysis Group has just shown has a return of I forget what it is, one to three, or something like that, in terms of the savings, depending on what sector you're in. So there's an example where government hasn't pissed it away, but I understand the fear, and it's a very valid fear, and we had a bunch of belts and

suspenders to exactly avoid that problem, because we knew that could be a concern.

Question 11: In trying to understand the role of natural gas going forward, there are some key elements that I don't think are being very well covered today. One is that at these price levels with the curve being what it is, many of the dry gas wells are not profitable. I think that's true in Haynesville and it's true in parts of the Marcellus that are relatively dry. So that opens up the question of what is the panel's view related to these factors in terms of the future of natural gas, in terms of profitability?

Speaker 1: Well, that certainly is something that my company is studying, and I'm not the natural gas expert so I'm not going to comment in any great detail, but, you know, it is a complicated market and we see natural gas being produced in some cases at essentially negative cost as associated gas with other drilling. You know, it is certainly complicated, because there are liquid plays and it's pretty clear that the natural gas producers very much need to see a higher price, because it doesn't make a lot of sense to produce it when the price is $2 or even $2.50, but there is an astounding amount of domestic shale play available that could be produced at less than $4. Probably, you know, at least 30 TCF. That is a lot of supply, and so I think the low price environment is here to stay, but I certainly agree that what complicates it is all the related markets around it, and certainly complicating it is the oil production that is going up significantly in the U.S. and Canada as well, and the associated gas around that.

And so it's not even just the natural gas market. It is the interplay between the oil and natural gas, but the fact remains that there's a lot of gas that could be developed very cheaply, even if you have fairly significant environmental costs added to it at the state level, and I think we will see some of those state level costs being imposed, and appropriately so. You know, concerns about the fracking water and all I think are legitimate and can be addressed at reasonably low cost. So that's not going to drive the price of gas up significantly. I think it can be dealt with, and I think the fact is that many states can't afford not to have that gas developed, because of the revenue associated with those states and particularly, you know, more focused on the East Coast states. And clearly there's billions of dollars of revenue at stake, and so with the appropriate environmental costs added in, you're still going to see a massive amount of natural gas developed.

Speaker 4: Let me just add to that. While you hear about some of the developments at the majors, a lot of the drilling activity is done by private independents, many of which own their own trucks, frack crews--they're completely vertically integrated, and they continue to say that they can make money at $2.50 gas. So they'll continue to drill. The dynamic I don't fully appreciate but I think I have an idea of where this is going to go, is when Exxon buys XTO for 30 plus billion, and BHP buys someone else, you know, suddenly they've got a lot of money invested in continued drilling. And I can just see the conversation back at the home office, "We're not going to drill, and you paid $30 billion for these assets?" I think the drilling continues, and I think if you talk to Exxon, for example, they'll say, "Well, you know, we have a 50-year time horizon, so we can get our money back over a long, long period of time. We're going to keep drilling."

Question 12: I wanted to follow up on Speaker 3's comment, because I think every governor in the United States thinks the renewable world begins and ends in their state, and there are all kinds of local preferences which may or may not be constitutional that are built in. And so one of

the things I was wondering, with the effect of the natural gas prices and the price pressure, is whether states are going to start abandoning that sort of parochial perspective and promote renewables on much more of a market basis, irrespective of state boundaries. I mean, the notion that producing wind is a tool of economic development is really absurd, and I don't think there's a state in the country that doesn't have these local preferences in one way or another. So low gas prices create a big pressure to use more market mechanisms to get the price of renewables down.

Speaker 2: I think some of the state folks should comment, but absent the gas price, there's pressure on what I would call local content or local requirement rules anyway because of the legal issues. There was a case in Massachusetts, or currently a case in Colorado. So because of the Interstate Commerce Clause there are legal challenges anyway, and they are being addressed slowly, but being addressed.

Moderator: Can I just ask a quick question? Is it legitimate in Pennsylvania for them to be saying that the expansion of natural gas has an economic benefit in terms of jobs, etc., but not say that in Massachusetts development of offshore wind has economic development and the state should be pursuing those kinds of benefits?

Questioner: Well, the question isn't whether you can pursue it. I mean, what you have to look at is how labor intensive is it, how much does it produce locally, and there are going to be variances from one industry to another. I'm not saying all local development isn't necessarily good for the local economy, but I think when you start picking out generators of any kind and claim those are economic development tools, there's hardly any evidence for that other than short-term construction jobs.

Speaker 3: Those are fundamentally different things. Government isn't paying extra money to develop gas in Pennsylvania.

Moderator: I understand, I understand.

Speaker 3: It's done privately. What you're talking about is sucking money out of the consumer's pocket to pay for a product that is more expensive than the product that they could otherwise buy, reinvesting that, and saying that's job development. But you don't measure what the economic impact is of taking the money out of the consumer's pocket in the first place. It's like saying, "Look, we're going to force everybody to buy $10 a gallon milk produced at Massachusetts dairies because we want to increase the dairy farm business," and then saying, "Hey, look at all these dairy farms, all the people we're employing." The analogy is completely broken.

Moderator: Well, I disagree, but I know we don't have a huge amount of time. Again, part of this relates to externality issues, part of it relates to states that have always used a variety of different tools to enhance economic development in their states, which often entails the taking of taxpayer funds from a general area and devoting them to something that the state wants to develop, and that always happens. It does happen. That's a role that the state plays, and it's a legitimate role that the state plays.

Question 13: This is real quick. I guess it's to Speaker 1, but does it make a difference, when you're looking at coal units and whether they retire, with the environmental regulations and lower gas prices, does it make a difference whether they're in a competitive market or if they're in a regulated market as a vertically integrated utility, or are those decisions structured equally well in terms of the units

we're making investment decisions about whether to retrofit and keep the units online?

Speaker 1: It does make a difference what the ownership structure of those assets is and whether they're in a vertically integrated utility, where they may have any number of reasons to keep it going and make those investments even though they might not be as economic. And certainly for those merchant coal, it's a much more difficult decision, so we do see some difference.

Questioner: So you assume that in utilities that are not in a competitive market, they may be making uneconomic decisions to keep coal plants open?

Speaker 1: It's possible, and we've seen a couple instances where there's local support essentially for a coal plant, yeah.

Speaker 4: Well, in vertically integrated markets, it's not always economics, it's reliability and margins. I mean, the PUC will have some sort of long-term integrated resource plan and they'll tell them to go build it, and then they'll pass it through to the rate payers.

Moderator: OK, we are coming up on noon, but what I want to do, if each panelist can give us a 30-second take-home message, that would be great, and then we'll end the panel.

Speaker 4: You know, gas is great and we have a lot of it, and so we need to use it and use as much as we can, and we'll solve a bunch of problems doing it.

Speaker 1: There's definitely a lot of natural gas. That's sort of the good news, but the bad news is you need to keep in mind there's a lot else that goes on in the power sector, and it doesn't necessarily solve our carbon problem, and it helps mask but it's not ultimately going to hide the rate increases that we see coming.

Speaker 2: I would ask people to think that we need a smart, balanced portfolio over the long term and not just run to the short-term solutions.

Speaker 3: We put our fingers on the scale a lot. We're at a point where we may have broken this thing already, but if we haven't, it could break if we keep putting our fingers on the scale. Resist the urge. We're going to have this question put to us in the next few years, and we're going to have to confront this again.