ENERGY BAR ASSOCIATION PANEL
REGARDING SPECULATION IN ENERGY MARKETS

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S P E A K E R S

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Dr. David B. Patton
President
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Executive Director
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P R O C E E D I N G S

MR. CAPLAN:

Good afternoon. We recognize that speculation in the energy markets is a potentially volatile subject. We were just at the legislation panel discussion and somebody talked about speculation like it was a dirty word.

I'm Stuart Caplan. I'm from White & Case and I have the privilege of moderating this panel. We're going to talk about whether speculators are good or bad. Some regulators and consumers think there's something wrong when speculators consistently take profits out of the market. We're going to examine critically the role of financial transactions in the energy market. We have a panel which will represent four diverse perspectives. We're first going to hear

from Dr. Andrew Stevens, managing director of D.C. Energy, and he will speak about electric market speculation and financial trading.

Then following Dr. Stevens, Ron Oppenheimer will discuss natural gas basis swaps and speculation in the natural gas market, followed by a discussion of the status of the current proposals in the nature of antispeculation legislation. After that we're going to go into a series of questions where the panelists will have a dialogue and we'll hear from Dr. David Patton, who is at Potomac Economics, which is the market monitor for ISO New England, the New York ISO, the Midwest ISO and ERCOT.

At that point we'll hear from Bill Smith, who is the executive director of the Organization of MISO States, so we'll hear from the state commission's perspective. I think that Dr. Patton's perspective is really as a guardian of competitive and efficient markets, at least from that vantage point, and the state commission perspective will also cover the consumer interest.

To begin with, I'll introduce our first two speakers who will provide background on electric and gas speculation. Dr. Andrew Stevens is the managing director with D.C. Energy where he helped launch all of the power and market activity in which D.C. Energy engages. It manages one of the larger portfolios of Financial Transmission Rights, or FTRs, and also is active in the virtual energy markets. Dr. Stevens also helped to create the Nodal Exchange for cleared power contracts, a new development, and I'm sure he can tell us about that. Prior to his current role, Dr. Stevens was a vice-president with the consulting firm Dean & Company, a strategy consulting firm, and there he worked on developing the tools that resulted in D.C. Energy's trading activities. Dr. Stevens received a Ph.D. in Chemical Physics from Harvard and a B.S. in Chemistry from the California Institute of Technology, and has received several awards including graduate fellowships and from the National Science Foundation.

Following Dr. Stevens, Ron Oppenheimer will discuss natural gas products, and Ron is the general counsel at Bank of America Merrill Lynch Global Commodities. Ron is responsible for the oversight of all of the legal and regulatory affairs of this commodities business. Previously Ron was the executive vice-president and general counsel at Entergy, Koch Trading and worked in several capacities at Merrill Lynch before then. He was also the executive vice-president and general counsel of the New York Mercantile Exchange, and prior to that was an associate at Skadden, Arps, and also was a senior litigator for the Commodity Futures Trading Commission. Ron is a member of the Energy Markets Advisory Committee of the CFTC. Ron has a B.S. and MBA in Finance from the State University of New York at Buffalo and a J.D. from the American University here in Washington.

These gentlemen are imminently qualified to educate us, and I'll turn it over to our first two speakers for this segment of the program.

DR. STEVENS:

Thank you very much. First of all, my task is to explain the wholesale power market.

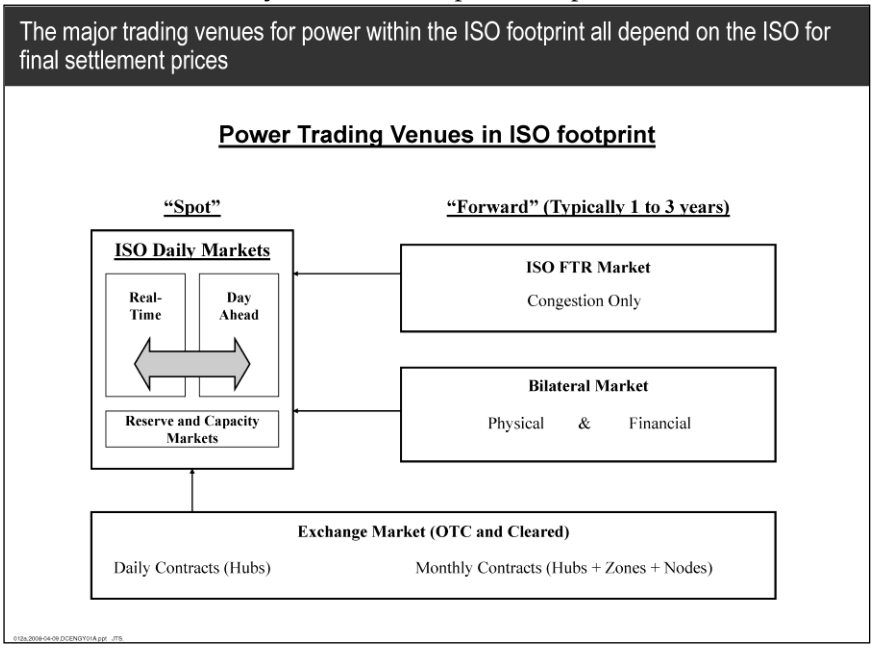
This market is complicated enough without getting into the details. In addition, there is no one place one can go to understand all of the workings of

these things. I'll try to give a quick overview of what the markets look like, but each market is slightly different. I'll spend all the time talking about the generic Independent System Operator or Regional Transmission Organization (ISO/RTO) framework. From there, you know, the details are really what become problematic; but the overview is simple.

The power market is segmented into three areas: generation, transmission, and distribution. The Generation and Transmission segments make up the wholesale market and are managed by the ISO/RTO; the distribution segment is largely managed by load serving entities and represents the load that is served by the wholesale market. In the wholesale market' generation is scattered about interconnected with transmission.

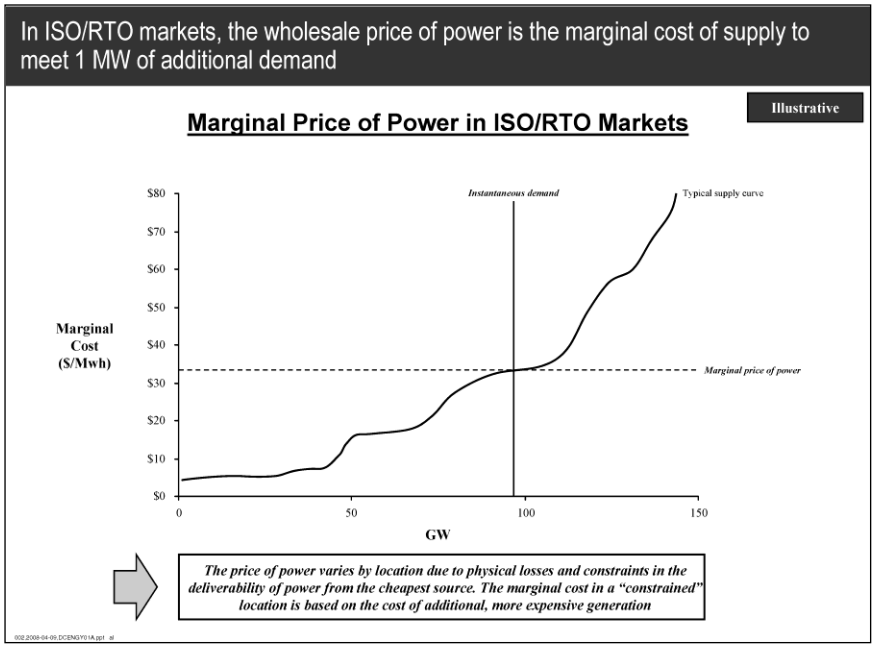
The ISO/RTO role in the market is to optimize the generation and transmission assets to meet load; in doing so it typically employs two markets: the Day-Ahead Market and the Real-Time Market. The day-ahead market is one in which entities participate using a forecast or a perception of what the next day will look like. Generation will bid in according to its perception of its fuel cost and load serving entities will bid according to their projections.

The ISO deploys the generation assets in the Day-Ahead Market using all available transmission to meet projected load. The real-time market is one in which the same process occurs, except that the real-time load is used by operators to instantaneously solve for the optimal dispatch.



Stevens Slide #3

One of the critical features of the RTO/ISO market is the complicated unit commitment and power flow model which uses all markets bids, in conjunction with the physical constraints and contingencies associated with the potential loss of any feature or any component of the system, to arrive at an optimal solution.



Stevens Slide #4

This is a process that is so computationally demanding that it could never have been done in real-time prior to the late 1990s because of the computational difficulty and the database structure environment that would have been precluded by technology until roughly the end of the 1990s. The outcome of the RTO/ISO models is a locational marginal price, termed LMP, that reflect the price of power needed at every location to support adequate supply at the location to meet load. I don't have time to describe that in more detail, but the price is solved for every single location and the RTO/ISO takes the role of a central market administrator or counterparty and essentially sends a bill out to every market participant and settles all participant's obligations under the both the Day-Ahead and Real-Time markets. So that's I think an important role and the ISOs form the basis of a robust spot market.

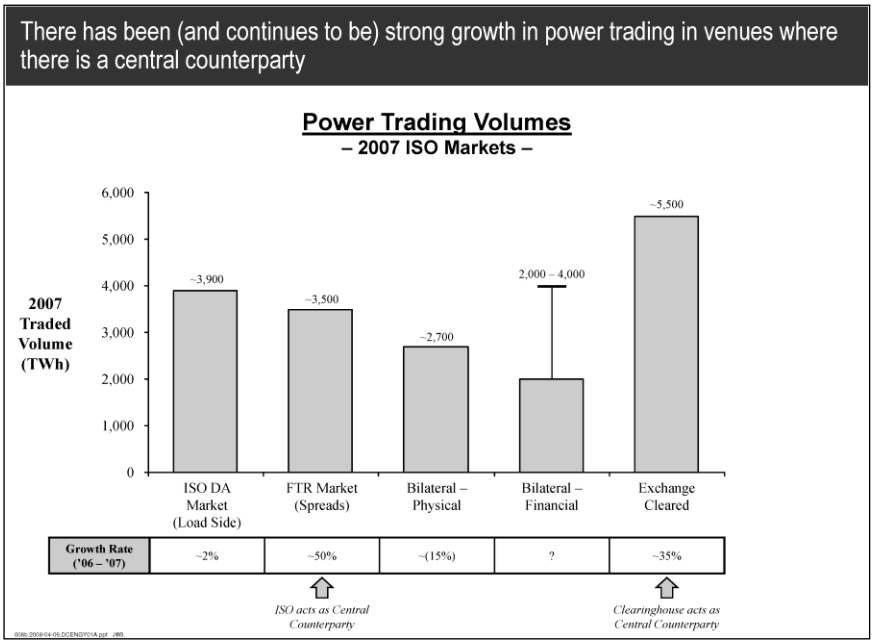
The ISO markets that I have described briefly (the real-time and the day-ahead markets) are shown here on the upper left of Slide 3 under the heading "Spot", reflecting the spot market. There are also other markets that the ISO administers. First is the Financial Transmission Rights (FTR) market, which is also known by the acronyms TTC or CRR ion some of the markets. All of these are equivalent and represent the trading of a Financial Transmission Right that the ISO administers and which settles financially on day-ahead prices. The ISO also manages reserve and capacity markets. There are also bilateral markets, both physical and financial, which also typically settle on the day-ahead prices; as well as exchange-exchanging cleared markets that settle on these.

Today's discussion I think will tend to focus a bit on the ISO sponsored markets, the real-time and day-ahead markets, as well as the FTR market. Those are the markets where a specific role has been cast for financial participants. There is obviously ongoing discussion about how that role should change or how

the rules should change in order to either promote or to address concerns about their participation.

Financial parties also play a critical role in the bilateral and exchange markets, but the exchange markets aren't necessarily jurisdictional transactions, and so the rules aren't necessarily in the same paradigm as in the ISO sponsored markets. I'm going to talk briefly about the markets, but I wanted to mention that the markets do have a very simple paradigm to set price at the marginal cost based on bid power as shown in Slide 4. This is where the simplicity ends. Complexity comes in because, in fact, you don't just have one marginal or one cheap resource setting the price for every single location. Due to constraints in the transmission system and the need to account for contingencies, such as the loss of a large generator, ISO/RTOs typically dispatch multiple resources simultaneously, producing with different marginal bid costs, which creates a much more complicated solution.

Basically you have marginal costs solution that vary instantaneously at any point in time across the footprint of the ISO, and this was what creates the complexity of this market. These markets are probably more complicated (from a commodity perspective and for traders like me) than any other market today that you could imagine trading on. The next slide is a quick illustration of where the trading occurs. On Slide 5, you can see that the ISO day-ahead market comprises for the major ISOs in the country roughly 4,000 Terawatt hours.



Stevens Slide #5

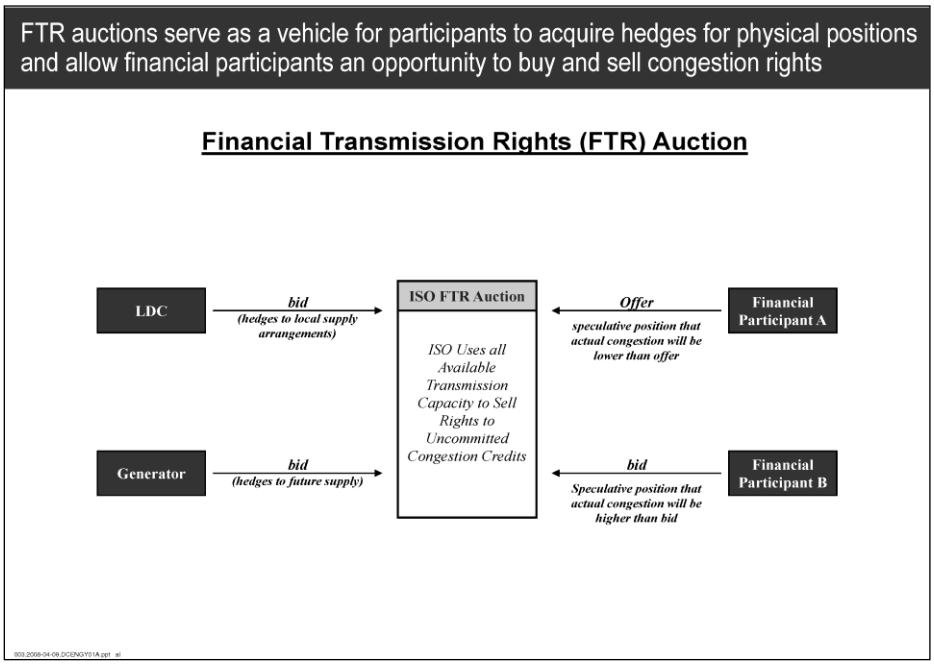
Slide 4 has a comparison of that to other venues where trading occurs; the FTR markets typically trade a similar amount, or 3500 Terawatt hours but with a growth has been very fast, about a 50 percent annual growth rate. So the trading environment around the FTR markets have been very dynamic and suffering from growth-related problems.

For example, credit and collateral rules never envisioned this growth and were antiquated after the initial years leading to a rushed and dramatic overall

may impede growth going forward. Bilateral markets on the physical side have been typically declining for various reasons. The bilateral market is somewhat of a dark market, meaning that it is "over the counter" or "off-exchange 'not reported. So it's unclear exactly how big that market is, but the physical market is at least partially reported in FERC reporting schedules (where it is seen as declining) and the financial volume can be estimated by the size and profitability of the brokers that facilitate the trading; based on estimates from these sources, the total physical bilateral market is about 2700 Terawatt hours and the financial bilateral market ranges between 2000 and 4000 Terawatt hours. Both roughly on the order of the same size as the day-ahead markets.

Finally, there are cleared contract exchange markets. These are the New York Mercantile Exchange, the Chicago Mercantile Exchange, which now owns the New York Mercantile Exchange, the Intercontinental Exchange (ICE), and now, most recent, the Nodal Exchange, markets. Here it is essential to point out that where there's a central counter-party, either the ISO or clearinghouse, the growth rates have been rather tremendous. The growth rates have been steadily elevated from about 2003 on when the market emerged from its Enron-related funk.

I wanted to just briefly talk about the FTR auction because this is a critical market that the ISO administers and I just wanted to introduce it very simply as the following: When the ISO settles the market, it obviously has to bill the Local Distribution Company (LDC) the spot price of where the power is withdrawn. It only pays the Genco entity where the power is produced, and by and large the price at the load is higher than at the generation, due to congestion and losses. So when the ISO goes through the settlement process, it actually over collects on the difference. It over collects on two major components; on congestion and on losses. The congestion that it over collects it holds and pays out in the form of credits, congestion credits, to entities that hold financial transmission rights. In order to allocate those credits 'the ISO holds an auction, typically an annual auction, to auction off all the system capabilities for these credits.



Stevens Slide #8

The value of these credits is unknowable beforehand so you have to predict or estimate or you have to just pay the auction price for the differential between the source and the sink, and essentially hedge physical exposure to congestion.

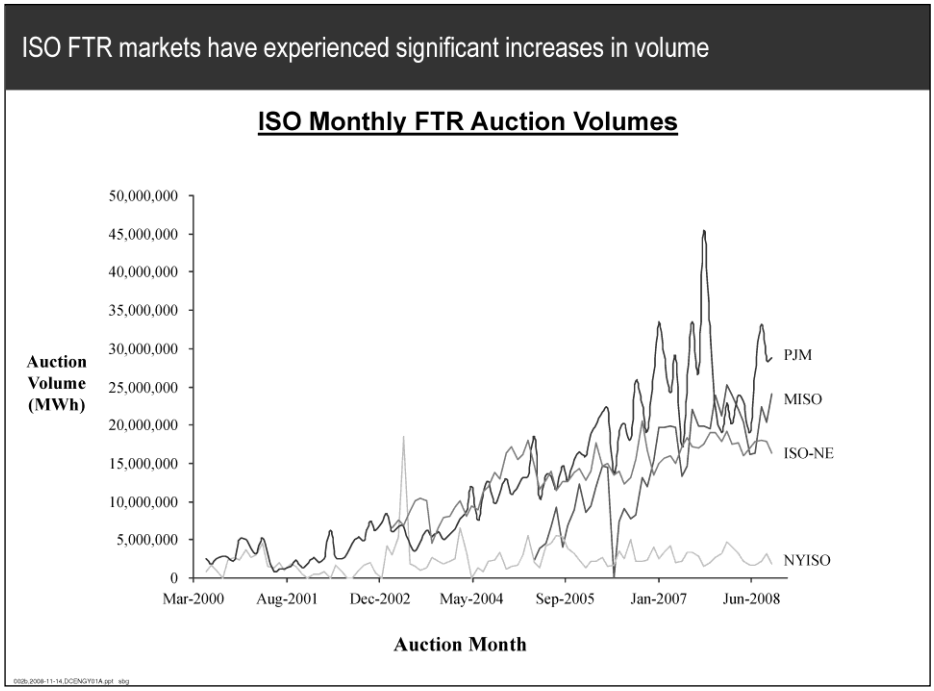
The ISOs also charge for transmission losses on a marginal basis. The sum of the charges for marginal losses exceeds the actual system losses. These charges are typically allocated first to pay for the actual physical losses and then the excess is returned to load. There's no auction format for that and no easy hedge vehicle for that process.

The congestion settlement thus is independent from the losses settlement. Given that there's a source of congestion credits in the settlement process of the spot market, the auction works in a fairly straightforward way as seen in the slide 8. Basically in an auction the ISO uses all its transmission capacity to sell rights to congestion credits and local distribution companies, generators, and financial participants can all participate and bid for any available capacity.

There's a feature to these auctions that I think offers a fairly flexible platform because any entity can offer counter flow. Participants can offer additional capacity into the auction in the opposite direction of the transmission constraints which result in congestion. In such counterflow FTR bids, the participant effectively offers to pay the congestion component across the interface over the term of the FTR in exchange for a lump sum payment which the counterflow FTR holder receives. Counterflow participants might do this under the premise that the offer price it receives will be greater than the congestion it will actually have to pay over the term, the auction price that so they will make a profit. By creating counterflow FTRs participants increase the amount of capacity that the ISO auction can sell to people who want to hedge. Simultaneously, a financial participant may bid to buy a position on a speculative basis with the perspective that congestion will be higher than the bid

price. So in some sense that second half here, the financial offer and bid, is what creates most of the growth in volumes in the FTR auctions, because in reality the transmission capacity is not changing much year to year, and the needs for hedging are not likely to be that different from year to year for physical participants. But the desire for financial participants to offer and bid additional capacities is what creates a tremendous amount of growth on the FTR auctions.

Over the last three to four years these auctions have ballooned in terms of the volume traded on these auctions as shown in Slide 9.



Stevens Slide #9

I think to some extent this is a very healthy environment because the prices of FTR contracts have converged to a market forecast—a fairly reasonable estimate of what actual congestion will end up being; however, this growth of trading has stressed collateral rules, and this is something that I think many of you are aware of, to the extent that these have been overhauled quite a bit as of late.

MR. CAPLAN:

Before you go on, can you just provide an example of, you know, a coal unit in Western VA being on the margin and an inefficient gas unit in Philadelphia being on the margin and discuss how that would relate to an FTR or something like that.

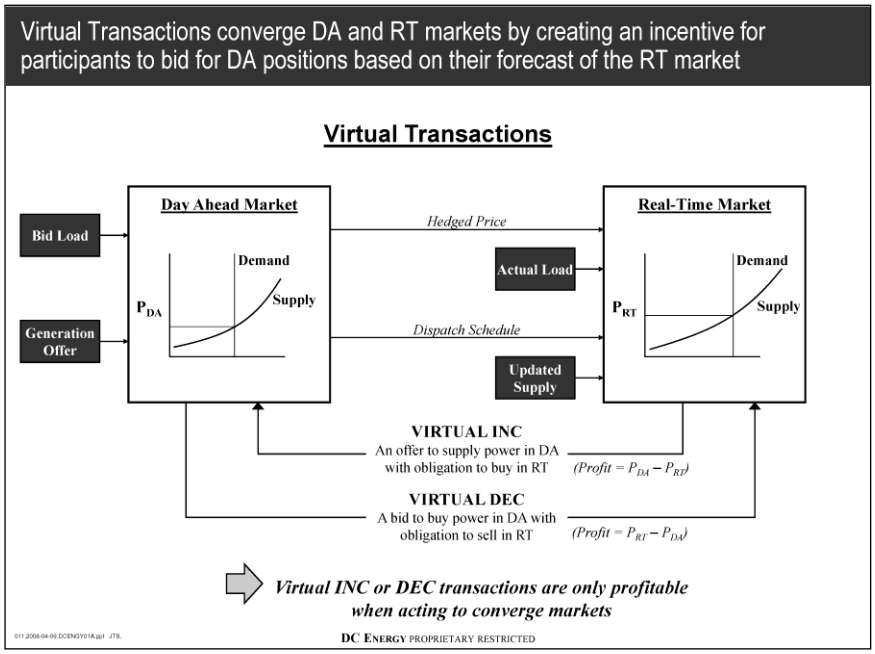
DR. STEVENS:

Certainly. One of the aspects of the market is that the volatility of the spot market is fairly extensive. So say at one point in time a coal unit in PJM say in AP zone may be setting the price for the whole region. Another time a gas unit might be on the margin and may set price for the whole region or may set price

for just a portion of the market. As a result, everyone's settlement with the ISO may actually not reflect price expectations. Prices may be substantially different today than a price that was in the market just a day ago or hours ago. Accordingly, some customers would want to hedge out that risk through buying a transmission congestion contract, and these transmission congestion contracts are specific to actual locations. So if you're an owner of a coal plant, you could buy the contract that goes from the coal plant to a zone or to a hub, and you can imagine there's a contract for every generator out there. There's a contract for every combination of zones which essentially covers the congestion difference between these two zones.

So the FTR markets are fairly complicated and trade millions of different kinds of combinations trade in the auction simultaneously. So these auctions are fairly robust and also complicated and slide 9 shows just how much the growth of volumes has been in the last few years. These are monthly auctions, and you can see that starting from the early 2000s where PJM first introduced its monthly auctions, through today the growth in terms of total volume traded has been extensive.

And finally, slide 11 is an attempt to explain what virtual transactions are in one slide.



Stevens Slide #11

Look at the two boxes, one corresponding to the day-ahead market and one corresponding to the real-time market, these markets are fairly independent. Bids go into each market. You know, for example, on the day-ahead market entities that serve load might bid into that market with a specific quantity. Generation offers go in there as well and a price is set based on exactly where the supply and demand intersect, respecting all the constraints and all the potential issues with contingencies. Then the ISO determines the dispatch for that, an optimal dispatch for the market. The real-time market then is solved

again the next day with actual load and with actual updated supply. There may have been some changes between the two in, say, a generator going offline or a fuel price is changed.

In some markets generators can actually alter their bids, so there can be a different bid set for generation supply. In an effort to keep these markets as closely aligned as possible, virtual transactions were added in to help converge these two markets. Now, the reason why it's called virtual, or in some markets convergence bidding, is because there's no title to or delivery of energy associated with virtual transactions. There are two types of bids in the virtual market. There's a virtual inc., or incremental bid. This is an offer to financially supply energy in the day-ahead market but with the obligation to financially buy that back an equivalent amount of energy in the real-time market. A virtual supplier receives the day-ahead clearing price at one location less the real-time price at the same location. So all that does is it tends to offset supply in the day-ahead market by increasing load in the real-time market, essentially bringing those two markets together; the bid lowers prices in the Day-Ahead market, and increases prices in the Real-time market.

The decremental offer, the virtual "dec", is a bid to do the financial equivalent of:buying energy in the day-ahead market with an obligation to sell in the real-time market. That is, a virtual load pays the day-ahead price and receives the real-time price at one location. Now, these virtual transactions can occur at any location in the market, at least for PJM, New England, and MISO, and so you can see how it can be fairly complicated. You can offer to put in "dec" bids at any zone, any load bus. You can offer to put in an inc at any generation node and so forth. So it can be a fairly rich set of options that are opened up, but the point is these transactions are only profitable when they're actually converging the markets. I've written down here equation for the profit on the payout of these transactions, and if a virtual transaction makes a profit, it's because 'the transaction is converging on market closer to the other.

The net result of all virtual transactions acting together has been to bring these markets into tighter correlation so that, in fact, one market can be a proxy for the other. The day-ahead market can be essentially a secure market that is as closely aligned to the real-time market as possible. And Slide 12 contains a chart that shows typically how much volume is actually occurring in the markets today. Well, for a typical commodity market, say natural gas, Henry Hub or the metals contracts on COMEX or others, the traded volume runs from 25 times the actual delivery, such as what happens with corn or soymeal before actual delivery, to upwards of 140 times, such as what happens with silver and gold before any physical delivery on a contract is established. Compare that to power. The most liquid contract today for power is the PJM Western Hub Contract, and you can see from its progression in the second bar on slide 12 that from 2005, 2006, 2007, and 2008, it has consistently increased its liquidity from a low of one point four times load to trading four times the overall power associated with physical deliveries in PJM. This trading takes place with contracts that settle financially on the PJM Western hub. The FTR auctions have been growing too, although not quite as fast. Well, actually it's growth has been fairly fast-paced increasing from roughly 65 percent to roughly 100 percent of total volume; by contrast, the virtual transactions are rather anemic in comparison, trading only a small percentage of actual load, from 5 to 12 percent

depending on the ISO market; this anemic performance, is something I will delve into more once the panel discusses this.

MR. CAPLAN:

Thank you. Before Ron goes I would just sum up in leading into Ron's talk by saying that, in my more simplistic mind I think of FTRs as arbitraging the price in the day-ahead market, the difference in price between two locations but both in the day-ahead market. In contrast to that I think of virtual transactions as arbitraging the real-time price versus the day-ahead price at one single location in the market. In some respects, the FTRs are similar to gas basis swaps, and that's a good lead in for Ron to come up and talk about those.

MR. OPPENHEIMER:

Thank you. Before I start, a couple caveats. I'll probably talk a little bit less about the markets than Andrew did and talk a little bit more about the law. I'm going to try to really collapse a lot of activity in the law into a very short discussion. I think about Mel Brooks getting the History of the World, Part One, in 92 minutes, so I think I can try to get about 11 years of legislative and regulatory developments in about 10.

The other thing is I'll be talking primarily about the derivatives markets. I'm not sure how many people here are actively involved in those, so I may be using phrases, terminology, acronyms that you're not familiar with. Please, you know, stick your hand up, throw something at me if you want. If you want me to explain something in a little more detail than I've done, I'm happy to do that. Stu asked me to talk a little bit about basis swaps and I will.

A basis swap, as Stu just said, it's a trade price. There's a differential between prices at two different delivery locations. How are they used. They're used principally by producers to hedge their production in a location other than the liquid market, for example, Henry Hub, which is really the principal market for natural gas. They're used by consumers who are going to consume in locations away from Henry Hub who also want to hedge their price risk and do so in a market that's available to them that wouldn't be sufficiently liquid if you were only trying to trade that discreet delivery location. You can find market makers, people willing to take a price and make a price when you do it on a basis differential against the Henry Hub.

And finally, transporters who own transportation might use a basis swap to lock in and monetize the value of their transportation. As I was sitting there listening to all the discussions this morning, there's really a fourth category, and the fourth category is very important, particularly in this economic climate, and that is that a basis swap can really provide important price signals for where there is a need for infrastructure projects to be done because they'll show you not only the absolute basis between two different locations, but it'll show you the changing basis and where there's either a decreasing or increasing need for infrastructure and additional transportation.

This slide is probably unreadable. I don't know whether we passed out the materials, but if not, if anyone wants a copy, see me afterwards. I just put out some volume data here. Well, actually this first one is from NYMEX. This is their cleared basis swap. This is the list of contracts they have and basically the open interest in each of the different NYMEX basis contracts that are cleared

through the clear port system, and as you can see, it's substantial volume in a lot of different specific delivery locations. Then here by contrast unfortunately this is volume data, so it's a little bit of apples and oranges, but this shows you volume data for about a two and-a-half month period on the ICE in the basis swaps that they trade on their system.

So now we switch over, switch gears a little bit and talk about the law. How is it that basis swaps legally were able to come into existence, and the answer is the Commodity Futures Modernization Act of 2000 known as the CFMA. Now, what the CFMA did was it took a market that was constrained because of uncertainty in the law, and by making the law more certain allowed these markets to flourish, and the uncertainty was very, very significant and that was that basically the Commodity Exchange Act, which governs futures contracts and things that look like futures contracts because the term is not defined in the law, if a contract were to be deemed by a court-ordered regulator to be a futures contract and not traded on a designated futures exchange, it was basically an illegal off-exchange contract and could suffer what we called the death penalty. In other words, a losing counter-party could come in and demand rescission, and of course that kind of result made it very difficult for some participants to make markets and be available as counter-parties.

So the CFMA, with respect to energy contracts anyway, deemed them to be exempt commodities and significantly not only exempted transactions and exempt commodities between two parties bilaterally, but also exempted transactions on what had become known as exempt commercial markets like ICE. So that really fostered the development, not only of the basis swap market, but really the entire derivatives market, and again not just in energy and other commodities, but also in the financial market.

So it was a very important significant piece of legislation and allowed these markets to develop. So what was the result? Was the result excessive speculation? Well, the first question you have to—well, I guess what you want to do is you want to look at these price charts, right, which we've all seen, and they show the price of oil and the price of natural gas reaching peaks in some cases, exceptional highs in other cases, and raised quite a bit of concern around the country as people were paying $4 for a gallon of gasoline or heating their homes or cooling their homes using electricity generated with natural gas. So the question was who's at fault or is anybody at fault.

The Commodity Exchange Act has a phrase in it excessive speculation, and it basically says in talking about why certain regulations are important it says excessive speculation causing sudden or unreasonable fluctuations or unwarranted changes in the price of a commodity is a burden on interstate commerce, but nowhere is excessive speculation defined, and it's never been defined by the CFTC in any of its pronouncements. It's never been defined in any case law. So you have this open-ended question what is excessive speculation and last year quite a few Congressmen, Senators and others jumped on that bandwagon and made their own definition of what excessive speculation was. It's important, and there are a lot of sort of definitional things I want to get into, but the first thing is, and let me backup so you're not looking at that slide while I do it, who are the alleged excessive speculators.

It really boiled down to sort of two categories of market participants. One was the swap dealer. And what is a swap dealer? A swap dealer is generally a

financial institution available to make markets in some of these instruments that I just described before that have become permissible as a result of the CFMA. What do they do? They provide liquidity to a market, and they do what other speculators do, and that is they take a position whereby they take a risk away from a party who's looking to shed that risk on the hope of taking that risk and making a profit. So they perform that function in the marketplace and they do it in swaps contrasted with futures where you have market makers, locals on exchange floors and now electronic market makers. The other category of potential speculators that received a lot of scrutiny last summer were index traders. The basic financialization of the commodities markets, whereby parties looking to take generally a long position in commodities as an asset class to diversify a portfolio that was previously maybe just stocks, bonds, or stocks, bonds and cash, take a position in the commodities market as a hedge against inflation and a diversification of their portfolios, and it's important to lay that ground work as you'll see.

There were a lot of studies that were done last summer, and most of what I will call the empirical studies that were done, that came to the conclusion that there really was not excessive speculation in the market, that market fundamentals drove the prices that we saw, whether it was the weak dollar, the increase in demand from what are known as the bread countries and other market fundamentals. So I have a few of them in these slides and I'll breeze through them kind of quickly.

The CFTC put together an interagency task force, which as you can see has included the Department of Agriculture, Treasury, the Fed, the Federal Trade Commission, the FCC, and they said, and this was a preliminary study, the result does not support the hypothesis that the activities of these groups is driving prices higher, that the presence of participants, often described as speculators, has not resulted in systematic changes in price over the last period of time.

The treasury in the UK reached a similar conclusion that the impact, if any, was only likely to be small and transitory. The IMF, little discernable evidence that the build-up of related financial positions has systematically driven either prices for individual commodities or price formation more broadly. The USGAO looked at most of the studies that were out there and concluded that the studies didn't find statistical evidence of a relationship driving prices, and appears to suggest that such trading is not significantly affecting commodity prices at the weekly or daily frequency, but, of course, not everybody agrees.

Last week FERC staff, in a report to the commission, reached an opposite conclusion. Basically they looked at fundamentals and decided that the market fundamentals didn't support the price rise to $13 last year and said basically, ultimately we believe that financial fundamentals, along with a modest tightening in supply and demand, explained the natural gas price rises during the year. So they thought that the index participants played a big role in the drive of prices. What's come clear through all of this, and I'm skipping through quite a bit, is that it may not be entirely clear what impact speculators are having, and the reason is that not all information is available to the regulators. I think when it is, my own view is that all of the evidence will still support the notion that speculators are not driving prices, but it's impossible to prove that negative until you get more information.

I think we're at the stage of progression of regulation legislation that you are going to have additional demands for information into the markets. IOSCO, which is an agglomeration of different securities regulators from around the world, they reached that same conclusion in a report last month. So what are the responses? Let me also define some terms here and sort of categorize the types of problems that people identified in the system where there was a lack of information.

The first one is called the Enron loophole, and you'll notice that all of these have the pejorative of loophole attached to them, and it made it very difficult in certain cases to debate them because once they took on that pejorative, you know, sort of the debate was over. But the Enron loophole is basically the notion of trading on an exempt commercial market, an electronic market, with basically contracts of standardized terms that look very much like futures contracts, but in any exempt capacity outside the view of the regulators.

So this has now been addressed.

The farm bill, which was passed in the middle of last year, had a provision requiring the CFTC to come up with rules with respect to significant price discovery contracts, and the CFTC has now done that. The important thing here is that the exceptions, and basically the underpinning of the CFMA, was that these markets didn't need the same level of regulation as futures markets. They were principally markets between sophisticated individuals, so there wasn't the customer protection need for regulation. On top of that the contracts that were being traded didn't provide price discovery. They were private commercial dealings and therefore there was no public interest to serve by regulating, and that was the underpinning.

Again, as things developed, ICE became a very liquid market in trading some of the products that they trade. They started pricing some of their contracts off of the NYMEX prices, and so the argument that there's no price discovery function here did fall away quite a bit, and that's why we have now regulation over what are called significant price discovery contracts. I'm not going to go into the details of all of the requirements for ICE after the CFTC goes through the analysis of which contracts fall into that category, but the principal one is that ICE will have to set position limits for the size of the number of contracts that anybody participating in that market can hold, and they'll have to have an exercise authority to instruct people to reduce those positions if they find that, by virtue of the size of somebody's position, they are having an undue influence on the market.

The next one is the London loophole. That's basically trading U.S. commodities on exchanges located outside the U.S.

MR. CAPLAN:

You got about two minutes.

MR. OPPENHEIMER:

About two minutes, okay. So that's about 2000 years now in two minutes, okay. The London loophole. Basically trading U.S. commodities on exchanges located abroad. So what happened here was the International Petroleum Exchange wanted to place electronic trading terminals in the U.S. and there was a question under the law did that make them a U.S. exchange and should they be

regulated like a U.S. exchange, and the CFTC I think rightfully granted them no action relief and said you can have your trading terminals here provided you meet a couple of conditions.

Well, again, markets evolved, things changed. The International Petroleum Exchange was bought by ICE, a U.S. legal entity, so now a U.S. legal entity owns this foreign exchange. Does that make it a U.S. exchange? Don't know. Then the International Petroleum Exchange under ICE's ownership started trading NYMEX look-alikes, so now you're trading a WTI futures contract in London on an exchange owned by the U.S. but by virtue of terminals that sit in the U.S. So there was a concern that, again, that should be subject to the same level of regulation and information disclosure as in the U.S., and the CFTC has now fixed that one too and I will skip ahead.

The last one is the swaps loophole.

Swaps loophole is the one I think that gives people the greatest pause, even today, and the swaps loophole is basically the potential for a trader to take on positions in the swap market of a greater size than they would be permitted to do than if they took on those positions in the futures market.

And that's true in its absolute sense, but it's also a concern in the sense of trading through swap dealers.

So what happens quite often is that an individual market participant will take on exposure in the swaps market or take on exposure against a swap dealer in the swaps market and then the swap dealer will go hedge that risk in the futures market. In doing so, they might take on a size that is greater than the speculated position limits, but they can apply for and get and have gotten exemptions called hedge exemptions to take on greater positions on the basis that they are hedging a risk that they really have in the marketplace, and they should be allowed to use futures contracts for that and they have and it frankly is a good thing, but we'll get into that maybe a little bit more later.

People were concerned last summer that by virtue of the opaqueness that the intermediation of the swap dealer put into that marketplace and the lack of the CFTC or the exchanges to limit the size of positions was creating market power and or other anomalies and position sizes by people not regulated. They did their own study and it turned out to be I think virtually not true. They found in a study they did of a couple of months of trading, I don't remember exactly how many it was, but out of 550 clients and 30 markets really only 18 had ever exceeded the position limits if you added their futures positions to their swaps positions, and so they determined again that it probably wasn't having an influence on the market.

Its frequency of occurrence was rather limited, and frankly they also said that in those instances where they did find it, the amount by which the limit was exceeded was really rather small. The CFTC in their staff report came out with a number of recommendations. A very important one was to potentially remove that bona fide hedge exemption for swap dealers that I just described. The CFTC just put out a concept rule just a couple weeks ago to talk about that. It feels like they have a predisposition to go that way. I think that it's probably a bad idea, but embedded in it is further information collection, which I think is not a bad idea, and if they take it in stages and set up a structure to get the information first before they decide what they're going to do about it, that might not be a bad way to go.

Again, very, very quickly, last year there was something like 30 bills introduced in Congress to combat excessive speculation. This year there are a number, it's substantially smaller, but the key ones are listed here. Congressman Peterson, the Chairman of the House Ag. Committee, has a bill. It goes pretty far in addressing each of the loopholes that I identified before. It does some other things, some other things, for example, that might be of interest to this group; requiring admissions allowances and related products to be traded on a CFTC designated contract market. It does some things in the space of credit default swaps that are probably over the top.

The Harkin Bill basically says repeal the Commodity Futures Modernization Act, which would throw this entire industry into a tailspin if you ask me. Levins got a bill on the Senate side. It looks very much like the Peterson bill. There's a bill introduced by Senator Nelson recently, which is interesting and it takes a slightly different view of the same issue of information, and it says any futures trader holding a position of a certain size will have to report their physical oil positions to the Department of Energy. So it's another way of giving insight and transparency to the physical market activities of the financial players.

And the last one is the Energy Market Transparency Act of 2009, and that's just circulating in the Senate right now. It's not been proposed yet.

MR. CAPLAN:

Thanks, Ron. One of the things we try to do here is to provide sectoral and geographic diversity. So we've now heard from a trading company general counsel from Houston, we've heard from an energy derivatives or financial products trading trader himself, who has helped set up trading companies. Now let's turn a bit to a guardian of the markets and to a representative from the Midwest ISO states, all the state commissions.

I mentioned Dr. Patton as a guardian of four markets. He's the President of Potomac Economics. Dr. Patton provides expert advice and has testified on a variety of energy economic issues in all sorts of contexts, including market power, market based rates, mergers, and quite a few others. Prior to becoming a consultant, he actually worked at FERC as a senior economists and advised on such matters as open access transmission and pricing policy, merger policy, market power issues and the like. He's published extensively. He holds a Ph.D. in Economics from George Mason University.

Following Dr. Patton we'll hear from Bill Smith, of course, the executive director to the Organization of MISO States. Previously Bill was the government relations manager for the Iowa Utilities Board. He's also, before '86, he served as a legal adviser to two FERC commissioners, so he brings a vantage point from both federal regulatory perspective and state commissions. He holds a B.A. Degree in Economics from Yale and a J.D. from Cornell University.

Now I'm going to ask these gentlemen first to address the following question. Some regulators are concerned that speculators and arbitragers are raising energy prices for consumers, are causing costs that consumers must bear and some speculators are taking profits out of the market. Are speculators a consumer's friend or enemy? Where do you come out on this issue? With that, David.

DR. PATTON:

Good afternoon. This panel has really run the gamut, so in order to try to put these things in context. You know, what we deal with at Potomac Economics is the RTO markets and those are, as you heard Andrew explain, those largely constitute the spot markets. So the RTO markets set very short-term prices, day-ahead and real-time prices for electricity and for transmission that become the basis for futures trades that are largely bilateral.

Now, there's a great deal of difference between speculation and arbitrage where essentially. If you think about the electric markets, if you're looking at the spot markets and somebody sees that prices are a hundred dollars in New England and $80 in New York and schedules an export (this could be a financial entity), that's an arbitrage activity. I think there's a fair amount of imprecision about what a speculator is. That entity, if it's trading relatively close to the real-time, is not really speculating in the same way that an entity taking a position a year out or six months out on oil is, and that's an important distinction in these markets.

If you talk about virtuals, for example, somebody's taking a position day-ahead based on their expectations of real-time. Certainly, you can imagine that there's a speculative aspect to that, but largely that's an arbitrage activity. An entity that believes that the real-time price is going to clear in a certain range, and if the price in the day-ahead varies from that range, they can either buy or sell and make an arbitrage profit between the day ahead and the real-time. While you can call that entity a speculator, I think it's hard to think about what excess speculation would be in that context, but we can talk about that in our discussion time.

Basically in here I hit three areas where financial entities play a key role in the ISO markets. The virtual trading that we've talked about a little bit and the Transmission Congestion Contract market, and they are actually buying forward a fair length. And lastly, in the scheduling of transactions between areas, those schedules cause physical power to flow, but financial entities can schedule those transactions by buying in the spot market in one ISO and selling in the neighboring ISO. So they don't actually have to have generation or load that they're serving physically in order to serve in those transactions, even though those transactions ultimately result in a physical flow of electricity between areas. So they play an important role in that context as well.

As I said, largely in most of these areas they're playing an arbitrage role where they're bringing prices together, either prices between the day-ahead and real-time markets or geographically between one market and another. Interestingly, they don't bring prices together inside of an ISO because the dispatch in the ISO determines the generation that's going to run, where it's going to run, and the load it's going to consume and at other locations. The financial players have no impact on the internal flows of electricity in the real-time spot market where generation is dispatched physically, although they do between markets. Now, they obviously also play a key role in forward markets facilitating longer term bilateral trades of energy capacity, and those markets are largely markets that we don't monitor and that are outside the scope of the ISOs, although I think the ISO markets are important facilitators of that trade because if the spot markets are competitive and efficient, then that will facilitate efficient trading in the forward markets.

So the first area that I want to talk about is virtual trading. We've heard what virtual trading is. It's basically allows one to sell power in the day-ahead if you believe that the day-ahead price is higher than what it's going to be in real-time, and then you buy back that power in the real-time market and you make the difference in the price between those two trades and we call that a virtual seller. Virtual demand is exactly the opposite where you're buying in the real-time, hopefully at a lower price than you're going to settle out in real-time. Now, what do these things accomplish? It's interesting this debate has gone on because virtual trading didn't exist in New York when they first started up in 2000, and notwithstanding the fact that I think there was a fairly good consensus that virtual trading leads to economic efficiency in ways that I'll describe.

California has just started up their market without virtual trading based, based in large part, on the concern that financial entities may manipulate the market by engaging in these virtual trades, but would look at the virtual trading activity day in and day out, and it really serves a relatively important role in our market. One is it converges the day-ahead in real-time and why is that important? It's important because most of the generators that are starting or stopping and that have to make field procurement decisions and the decision whether to come on or not, that is generally governed by the day-ahead market. So if we have a situation where the prices in the day-ahead are not converging with real-time, the real-time market where physically the supply and demand is being served, then you're going to have very real and potentially large inefficiencies in the market because you're not going to be turning on the most efficient generators to serve that real-time demand. That may not sound important, but when you actually get to real-time and you haven't turned on a couple of baseload coal units you needed or combined cycle gas units that would have been economic, what happens is the only thing you have left at that point is very expensive peaking generation generally, and those generators cost roughly double what the lower cost generators cost.

So it has a relatively large price impact if you don't get an efficient commitment coming out of the day-ahead, and the only way you get an efficient commitment coming out of the day-ahead is for day-ahead prices to reflect real-time accurately, and the virtual traders are really the key when it comes to that because they're the risk neutral party that's in there trying to arbitrage those prices. Other people who are on the day-ahead, like the utilities that are serving a load, generally just come in and dump their load at any price, and without somebody who's price sensitive in the market, you can have what we saw in New York in the early days before we had virtuals, which in the very first year of operation we saw a day with prices over $1200 in New York, largely because some supply had not been offered in and because you had no virtual supplier who was willing to sell on the day-ahead to prevent prices from rising and you got this enormous price spike. I think we estimated it cost consumers in New York in that one day $150 million. So they serve an important role in stabilizing prices and mitigating potential market power in the day-ahead because they can jump in if the physical suppliers raise their bids or withdraw from that market. They provide liquidity in that market, so one thing that you look at with the virtuals is how profitable are they.

In well-functioning liquid markets the virtuals, as they increase in effectiveness of bringing the prices together, they become less and less and less

profitable and that's what we've seen over time in the ISO markets, although there's been a drop off in virtual activity in the Midwest for reasons that maybe we can talk about in the discussion time frame. So we're a little bit worried that we're going in the other direction there, but the one thing that you'd worry about in terms of can these be a foe to the market is can people use virtual trades to manipulate the prices in the day-ahead market.

Maybe I have a transmission congestion contract that terminates in Chicago so I put a large quantity of virtual load in Chicago in the day-ahead market to cause congestion and make the price spike, which pays off my transmission congestion contract. That certainly is possible, and there's at least one market monitor that thinks that he's seen it, but it's extraordinarily rare in our experience. It's also easy to monitor for because what you're looking for is a virtual trade that's losing a lot of money in a way that's inexplicable.

If I were to engage in this trade in Chicago, what I'd have to do is come in and say I'm willing to buy in Chicago in the day-ahead market for $800. Well, if I have no reason to believe that the real-time price is going to approach $800, that's a pretty suspicious looking preference that I've just entered as a bid in that market, and that trade will lose a lot of money.

So, as a market monitor, we screen for virtuals that lose a lot of money that are bid in ways that are insensitive so we can detect that sort of activity, but it certainly is something that you worry about if the liquidity is not high, but there aren't other participants that are trading in Chicago that are willing to take that entity's money. If the market is illiquid, it's possible that they could succeed at that sort of strategy, if for a very short period of time.

Secondly, transmission congestion contracts, we've talked about these. They're generally bought and sold in auctions where they're buying either a year's worth of rights or a month's worth, so these are forward contracts for the basis differential, and there is some speculation built into this market because you're speculating that the value of the congestion, which is essentially what's paid out to these rights over time, is going to be at or above the price that you're willing to offer, and here again these markets have grown in liquidity.

We track the profitability of the FTR purchases because in an illiquid FTR market you can end up with the profits being very large, which essentially means a financial trader has come in and bought a right at a value that is a fraction of what it's really worth. Now, there's been a lot of noise about that's a bad thing, they're taking money out of the consumer's pockets because they're taking this money, and look, they're headquartered in a neighboring state and that makes us even madder. But the problem with that is that when they make money, they're bringing the prices in the FTR markets into better alignment with the actual value of the FTRs, and the people who are upset by this, the transmission owners that are getting the revenue, there's nothing stopping them in most cases from participating in this market as well. So if they believe the value of the transmission right into a certain area are higher than the selling price, it's a wonder why they're not in there buying, but I think largely the concern over this has decreased.

I'll show you a quick chart. This is the Midwest ISO and the average profitability per megawatt hour of the FTRs, as is shown in the green. You can see that when the markets started up in 2005 the profits were substantially larger. But over time, as the participation grew, the profitability has dropped off to the

point now where the average profitability is in the I'd say 20 to 30 cent of megawatt hour range, which is relatively low. So that's an indication that the markets have become more liquid and that as those profits dropped, the reason to be concerned also drops.

And lastly, interregional trading. Here again, when a trader profits, he's done everybody a favor. In that example, where the price in New England was 100 and the price in New York was 80 and somebody exported power from New York to New England, what that export allows you to do is to replace the hundred dollar generator that's on the margin in New England with an $80 generator in New York. So there's $20 of benefit that's being obtained by doing that in terms of production cost. It also brings the prices into better alignment with what the supply and demand conditions really are.

One of the big benefits of RTO markets is that they've captured a lot of those benefits, but where it hasn't been captured is between the market areas. So sometimes we frequently see periods where the price may be a hundred dollars higher in one ISO market than the other, and the only means to catch those efficiencies is for traders to be trading in between, or at least right now, is for traders to be scheduling power between those areas to arbitrage those price differences. So, again, there they are facilitating efficiency improvements that in my mind make them a friend of the market.

So while I don't rule out the notion that financial entities might engage in strategies in some of these areas to achieve manipulative ends, it is something we monitor for on an ongoing basis. I think largely they've brought about significant efficiency improvements to these markets. And with that I will conclude and I can address questions in the discussion period.

MR. SMITH: Let me start off with the disclaimer that these are my views, not those of the organization and not those of my member states, which are 13 states from Pennsylvania to Montana, so you can believe that they probably have a different opinion about almost everything. This may align with some of them, but you could never tell until we have a formal document for my Board to decide on and this has not been submitted to that kind of scrutiny.

I think a regulator starts off with the question that this is a pretty complex set of processes to put in place, why do we need to go there? Well, you know, there really are some benefits. My colleagues on the panel have described them in far better terms than I am prepared to. I boil them down this way: It creates a more efficient market. The day-ahead and the real-time gap is closed in the energy market. The locational variations in the FTR market are closed. That's a slightly more amorphous benefit to having the day-ahead and the real-time, and, you know, anybody can see that as an advantage.

Another is reduced market power. There are ways that physical participants can bid into the market in excess of their physical assets, which would not be apparent to the person running the transmission system, without having them tagged as virtual trades. Trades are also being done by entities that really are virtual traders instead of physical participants masquerading as virtuals. The system operator can more accurately predict what's really there and schedule the system based on real assets that can deliver if they are tagged. I'm sorry, I described them backwards.

That's the reliability benefit. The market power disciplines physical participants too in their bidding behavior by the fact of others bidding in a competing way.

Anytime you get benefits, regulators know that those benefits have costs associated with them. So here we're going to start looking at what some of the costs are. Obviously these traders anticipate profits, that's why they do this. If they don't see profits after a reasonable period of time, they shouldn't be back again. In fact, as David said, if you see a pattern of sustained losses with no other explanation for it, that's a real red flag. So, the first block of cost you have to look for is the cost of the cheese to get these folks to come to the party.

It may introduce the need for more sophisticated monitoring systems. David has to watch out for more stuff than if we were dealing with actual physical participants. Although, as he says, maybe there are some things that self-disciplines them in exchange for that.

Do these benefits exceed the cost? Now these benefits are pretty hard to estimate. You talk about efficient markets and so forth. We don't have dollar numbers for that. The costs are sometimes a little easier to see, not real easy to see, but sometimes you can do some work like the ad hoc group, listen to one estimate by one analyst or a group of people suggesting that over an 18 month period of time maybe the profit level that was achieved in the FTR MISO market was in the range of $200 million. Well, the first question you have to ask is compared to what, and you can't answer the 'compared to what' question in terms of the benefits that came into the FTR market from those traders assuming that there were some. So the trade off, probably yes for the day-ahead and real-time market transactions. There doesn't seem to be much controversy among any of the people in MISO that that's a good trade off, that those benefits exceed those costs.

For the FTR market I think it's a little less clear. I'll just leave it at that. There are some issues that come up and I'm just going to race through this, Stu, and leave a few minutes for discussion. In all these MISO markets there are strict credit rules that explain everybody's potential exposure. They're in the tariff; it's attachment L so you can go look it up if you like reading tariffs. Each participant has a limit of exposure to which it can go. If it exceeds that, just like a margin account at the brokerage firm, if you go above that, you've got to post additional collateral. That's to protect customers because if anybody goes out on a limb and can't cover their cost or what's billed to them, those defaulted costs get uplifted to all market participants. So careful application of the credit terms is issue one. We expect as customers of the RTO markets to see that careful application, and we have people from the Midwest ISO here that are involved in doing that. The second thing I want to mention here is that resettlement. When FERC goes back to markets that have already occurred, and in its wisdom detects that there's been a problem and tells participants in last year's market to pay up, if they get a check, you don't hear from them, but if they're asked to send money in, you have a problem. If a participant sends the check, that's fine, but if it doesn't have the check to send, you run up into the first issue because, again, now it has exceeded its exposure terms and it goes into a process of default induced not because the participant has conducted its affairs badly or because it lacks its own credit support, but because it has been sent a bill for

something that isn't there or wasn't there at the time. So these resettlements can increase risk if it creates defaults and causes uplift of money back to the markets.

The last point is my extension of all that. For markets to be effective and to keep these players in the markets, (again assuming that it is beneficial to have more players in the market and improve the liquidity of the markets), the process needs to be fixed. FERC's refund process does not encourage the participation of financial traders. It undercuts the market in that way. I see some serious problems brewing if FERC's refund practices continue to go back and resettle markets for extended periods of time in the past and at levels that create credit default problems.

To look at the credit default problem, here's a history of one docket. I won't name the company because, again, I think they got stuck here, not that they caused the problem, but they just got stuck by it. FERC said to go back and resettle the markets, so on January 6th the market for a day in September was resettled. This company got a bill, they didn't pay it, and they got a notice to cure the next day, which is a margin call. Two days later when they didn't pay that, they're declared in default. The next business day a notice comes to FERC that they're in default and requesting that their trading rights be suspended on business day five and then some more filings happen here. What does FERC do about this? It says, oh, let's suspend this filing for five months. So does this firm have trading rights or doesn't it? Well, they are not participating knowing that they're now in excess of the credit limits and are not willing to post the additional collateral or are unable to, as the case may be. That would take the dispute from being a 30-day dispute to being a 90-day dispute. Thank you very much, FERC.

In any event, I will leave it at that and raise that issue for you all to think about and for our FERC colleagues to not think about because I didn't say anything because it's a matter pending.

MR. CAPLAN:

Thank you very much, Bill. I think we'll jump right in to a Q and A. I had some additional questions, but we are running out of time. So I see Margie Phillips has her hand up.

MS. PHILLIPS:

I have a question to David about something I didn't understand and then a general question. I got a little confused by your slide because virtuals can't play in real-time and your slide said they buy in real-time. That's not what you meant.

DR. PATTON:

They get settled.

MS. PHILLIPS:

They get settled. Your slide—I just want to make sure I didn't miss anything.

DR. PATTON:

Well, yeah, you settle in real-time against what your day-ahead position was, so, yeah, they're buying out their position that they took in day-ahead.

MS. PHILLIPS:

They're settling?

DR. PATTON:

Yeah.

MS. PHILLIPS:

Okay, just wanted to make sure. My question to you is I don't think many people dispute the actual value that virtual trading brings, and I think Bill hit the question, which is how far do we go to accommodate it. So one of the things I'd like to ask you is there's a number of players in the RTO markets who are looking for special rules, typically not D.C. Energy, but there are some others who don't want to pay operating reserve charges or they don't want to pay marginal loss charges or they don't want to get, you know, uplift or things like that, and I guess my question to you, particularly as the monitor, at what point do you support, from a structural perspective, making all these exemptions to let these players in versus many of us who say you're welcome to play in our markets but you play on equal footing with all of us, and Andrew I'd like your thoughts too.

DR. PATTON:

Well, let me disagree with the assertion that most people agree with the benefits. I mean, California has just gone in completely the other direction, so there is a lot of debate on whether the virtual players are valuable or not. Obviously I think, you know, we have a fairly clear opinion on that. I think that the principal that I always try to apply is that entities should bear the cost that they're causing. So, you know, a good example of that is this explosion of wind is creating all sorts of operating costs that if we don't attribute that to the wind, we're going to end up with just bad incentives to overinvest in wind, and, you know, that may be attractive right now, but, you know, it's something you always regret later that you didn't set up efficient incentives so that people saw the cost they were imposing, and the same thing with virtuals.

I think, you know, there's certain aspects of the virtual trading activity that causes costs, but I think in general the costs that they cause are relatively limited. So I am for minimizing the cost that you allocate them to just those costs that you can actually show that they cause. In large part because if you're imagining like a lot of arbitrage activity, that this is high volume low profit activity, if you start sticking in administrative charges, it significantly reduces the effectiveness of their arbitrage. So if I throw a dollar or megawatt hour charge on the virtuals now, they're not going to be trading at locations unless they expect two or three dollars, right, because of the risks that they can be wrong and they're going to lose money and some hours. So you want that charge to be as low as possible, but I do think if you can show that they're causing the cost, then it's good to allocate it to them.

And one last thing I would say is you almost have to do that because physical entities can trade virtually, so if you start carving out separate rules for virtual load, then you'll end up with your physical loads saying ah, well, I get different charges if I buy virtually, and so you just create bad incentives in that regard if you create too big a disparity.

DR. STEVENS:

Margie, I was going to answer this question with the slide and I'll just go up to the podium. I created this slide and actually passed it around internally at D.C. Energy, and there was a little heartburn. I think it's because it shows the naked truth a little too much. Let me just go down to this and expand a little bit. You mentioned insightfully D.C. Energy doesn't necessarily oppose the fee.

MS. PHILLIPS:

The marginal losses I don't believe —

DR. STEVENS:

That's correct, no, we don't necessarily, and let me tell you what happens. If you look at the slide you will see that the left-hand side shows total profits to financial participants. This is from a presentation and it's available here, but I didn't go into it, but in reality that is at zero if there's no financial participation by definition. It grows as there's some penetration of the financial participants in the market, but at some point, when you have a robust market, that just starts shrinking because the markets are converging, and the more trading that occurs is just one financial participant offsetting another and it's just a net zero sum game, right, so there's no profit benefit to increasing participation way out into the tails.

So if your objective, whether you're a physical participant or you're a regulator or something, is to minimize total profits to financial participants, there are two ways of doing it. You can drive them to zero volume, drive them out of the market, or you can actually increase competition to an extent where you actually create a competitive environment where their profits go to zero.

And there are three regimes here that I've shown; a low fee scenario, a mid level fee scenario, and a high fee scenario. In reality, the low fee scenario is problematic. After a couple maybe three to four years markets will tend to converge to a point where participants aren't making very much money. This is true in PJM FTRs and the New York ISO and ISO New England FTR markets. When you add up all the aggregated profits, it's very close to zero; in fact, it goes in the negative sometimes where the aggregate is generally kind of close to zero. That's actually a pretty good outcome for most people I think. For most people who are thinking I want a good market, I want the financial participants there, but I don't necessarily want them taking too much money out of the market, suggestive of what Bill Smith was saying of that concern of them making too much money.

But look at the mid scenario and the high scenario. Those aren't really where you want to go. Now, for potentially selfish reasons we might be willing to go there. D.C. Energy will say fine, if you put a fee in, the equilibrium is going to be much higher and in fact those that can forecast better, like we think we can, will do better in that environment. So in some sense they're saying well,

you know, it's probably not the most beneficial outcome, from a policy perspective, e.g., what you would really want to have for market efficiency, but it's certainly workable for financial participants.

These mid fee scenario examples would be I would say the PJM FTR environment, the ISO New England FTR environment, where the OR or these charges that are charged to virtual transactions are reasonably high. They're not so high that it drives them out of the market, but they're high enough that it tends to, you know, make it somewhat unattractive for a lot of participants. There's not a lot of competition.

The same thing with MISO FTR with significant underfunding is that way too. The underfunding acts like a big fee. It's like 15 percent of total credits that just don't get paid out. So it's a very large equilibrium problem which will probably mean profits will persist in that market longer than they would otherwise.

Now, there's an interesting example of a very high fee scenario. This is the MISO RSG case. This is one where sort of like the FDA, FERC has put in this interesting test case, let's see what happens when there is a high fee, and in fact you go from a position where you drive volume out, the spreads get larger, it's more, you know, divergent, and in fact it's not necessarily an optimal point to be in. As if the FERC were conducting an experiment in market sensitivity to fees, they ordered time periods when there was a low fee, then reversed themselves and created a high fee, then changed back again to a low fee and then once more to a high fee again; so a market economist can actually study the price elasticity of financial participation to the fees applied on this participation. Basically, you have this situation which is sort of like an FDA experiment, which is hard to set up otherwise in real markets. So at this point the virtual energy market in MISO shows this relationship, and we are actually on the very low volume perspective right now; the relationship on this slide, so provides an answer to your question.

MR. CAPLAN:

Thank you. Yes, Natara, do you want to go up to the mike?

MS. FELLER:

Hi. Thank you for the presentation on a complicated topic, but I think it was stated very clearly. I'm curious to hear your opinion on what roles these financial instruments and virtual trading could play as the country moves towards maximizing transmission to increase renewables and increase energy efficiency and increase the actual efficiency of the grid itself.

DR. STEVENS:

I'm certainly happy to talk to that. The transactions that occur between counter-parties, so bilaterally or on the ISO or on exchanges, dealing with the future of prices reflect I think the aggregate information that everyone has about the future, which I guess maybe we step back a bit. If my company does a deal for say 2010 through 2012 with another company, we put in our perspective what carbon's going to look like or might look like at some of those time periods, we may not have anything by then, but that sends a price signal of perhaps elevated prices and exactly where it's going to be or whatever. That then helps whoever is using on the other side of the contract to have certainty in

their investment decision. So in some sense with all this uncertainty out there the only way to get out of that uncertainty box that was talked about this morning is someone to come in and give essentially a contract for you saying I will, essentially using my financial wherewithal, give you a contract to specify price.

Today that market's not very liquid because of perhaps two reasons. One, the uncertainty itself. It's just so uncertain. But the second one is the structural inefficiency of how the market's set up. As Ron mentioned, the uncertainty surrounded the swap arrangement, because these would always be typically OTC swap arrangement. The legal uncertainty around that and its credit implications make it so we're not sure we want to trade because, well, what happens if that trade no longer becomes legal or no longer has the same status we thought it had when we go into it. So I think the structure needs to be resolved quickly or at least the environment in which these trades can occur, and then the trades I think can help alleviate the uncertainty. That's sort of how I see it.

MR. CAPLAN:

Would you say that if you had a more liquid longterm FTR market that you would be sending price signals that would show when transmission investment might be warranted to reduce congestion?

DR. PATTON:

Yeah, I think that's right. Also, it's not widely used, but when you bill transmission, most of the RTOs will grant new FTRs related to the capability, the new capability, and that provides sufficient incentives to build. Also, the prices of those FTRs help you see where the transmission's really needed.

MR. SMITH:

I want to go to the other end of your question and pick up on Andrew's remark about uncertainty. My comment about uncertain prices, refundable prices, goes through to the far end of the system. If you want demand response, if you want smart grid anywhere along the way, those need very certain prices to get customers to respond to them. You know, if you change the deal - after I turn my factory off some afternoon or turn my dryer off some night - and take that price away, I probably won't play a second time.

MR. CAPLAN:

Okay, Walter.

MR. HALL:

Hi, my name is Walter Hall. Three quick questions. One, I did not follow Bill Smith's discussion that virtual trading can assist in improving reliability and I was wondering if he would expand upon that. Secondly, I think I follow, but I'm not sure that I do therefore I'd like to see if the panel could expand on that, the benefit that you get from virtual trading in terms of converging the prices within the two markets. I can see where that may create some efficiency, but not quite. My understanding had been that the two markets, each of them would use the blocking to get the most efficient units to operate within those two markets,

so how does the convergence make a difference? Finally, what is the percentage of total market transactions as a range in these markets that's made up of virtual trading? Thank you.

MR. CAPLAN:

Gentlemen?

MR. SMITH:

Let me just try to touch very quickly the reliability point. Without explicit virtual transactions participants may engage in implicit virtual transactions, pseudo-virtual transactions, through use of physical transactions. These are things that in other markets have been called fat boy and slim man; I'll let other people describe where those names come from. The problem is that the grid operator is not certain how much of the bid generation is real.I'll let people answer the other questions.

DR. PATTON:

Okay, I'll hit your other ones really quickly. It's important to recognize day-ahead is a financial market where basically the supply is being cleared against the bid in demand, okay, and people often get confused about this.

There's no explicit attempts to serve the demand you actually think is going to be there in the real-time. So, in other words, if the load at 3:00 o'clock in the afternoon in the Midwest ISO is going to be 90 gigawatts, there's nothing stopping the day-ahead market from clearing 75 gigawatts.

Now, what would happen if that happened without virtuals? Well, what would happen is the demand is sharply reduced. The day-ahead price should be very, very low relative to the real-time price and we should be turning on scheduling far too little generation. So then what happens? Well, so then, you know, in all likelihood we have some call unit in the day-ahead market and their call supplier setting the price at $30. Okay, then we get to real-time. Oh my God, we don't have enough generation on so the ISO in its reliability function is going to turn on a whole bunch of peeking resources and the price in the real-time is going to be $120. Now that's as an efficient a price as you can set given the inefficient set of supply that you have on in the real-time, but had you had the virtual suppliers in the day-ahead what they would have done is said okay, at 90 gigawatts I think the price should be somewhere in the neighborhood of $75 so I'm going to put in virtual supply offers to sell at 60, 65, 70. So if the physical load doesn't come in and schedule itself, the arbitragers will say, okay, this looks like a cheap price, I'm going to buy at that cheap price. So basically they are replacing the physical load.

Same thing can happen in reverse. That brings the day-ahead price up and it gets more of your cheap generation scheduled in the day-ahead market, which most of that generation needs, you know, 12 hours or longer to start. So if you don't schedule on the day-ahead, it's basically gone by the time you get to real-time and figure out that you're insufficient. So that's how you get the efficiency. It's largely through the improvement and the commitment of the generation.

MR. SMITH:

When that 70 is cleared, the operator knows whether it's all real or 50 real or 50 real and 20 virtual, which answers the first question.

DR. PATTON:

Yeah. Now, in your percentages that you're asking for we had been running at 10 to 12 percent of the load was virtual supply or demand. With the credit crisis we saw the participation drop pretty much everywhere down to about 7 percent. It's rebounded a little bit in MISO because of the FERC actions to basically go back a year and-a-half and start invoicing people for very large uplift related costs. The percentages now it went down to something like 4 or 4 and-a-half percent is where it stands now.

DR. STEVENS:

I just wanted to add one quick answer about the convergence and exactly how that happens. A colleague of mine actually discussed this in detail at a New York ISO meeting on Tuesday this week because New York ISO is going to disaggregate virtual bidding, so they're trying to make the virtual bidding more optimized, but there are many places where D.C. Energy analyzes the markets and realizes that the load's not bidding in and we actually bid the load because if they're not bidding in, the day-ahead price is going to be lower than the real-time so we're motivated to bid in a virtual bid there. Sometimes that happens because maybe the entity that's bidding will be bidding with a large block bid at a zone, and that may not be disaggregated appropriately by the ISO. So we may put in bids at the specific load nodes that tend to be lower than we should expect them to be and so we bidded that up, and that's more reflective of what the real-time will look like. That's important especially when you want to manage congestion appropriately so you want to manage every load pocket to have the right type of bidding, and New York City has a particularly big problem with that. So that's why, you know, my colleague discussed that in extensive detail really on that kind of environment.

The other element that is also true, and this is somewhat unusual, but many ISO rules allow generators to change their bids from day-ahead to real-time, so they may not have the same bids in there. But virtual traders over time they said, well, the generator may get dispatched and it's likely to be in the price range of $50. We don't know that, but we can deduce that from the pricing, but if the day-ahead doesn't come out that way because the generator has a higher price for whatever reason, then the virtual bidder can put in a price that approximates the $50 better, and in fact sets the price there, and then, you know, the generator will eventually decide they'll just stop their game.

Here is an anecdote that is happening in some cases: A physical participant complains about a time period where they do not get dispatched in day-ahead, but instead get dispatched in real-time. Eventually they realize that there are likely virtual transactions in the market that ensure that the power plant is bidding accurately in the day-ahead market what it will end up bidding in the real-time market.

MR. CAPLAN:

In closing, this is a very complicated subject matter obviously and we've heard today from more Ph.D.s than I can recall at any EBA meeting and it's remindful of a phrase Mark Twain once said, you know, if those so-called experts with all those initials after their names keep illuminating us, pretty soon we'll know absolutely nothing about the subject matter. And if anybody thinks that they're clear on this subject, talk to me and I'm sure I'll confuse you again. I'd like to mention the housekeeping items. There are handouts concerning today's presentation in the back if they're not in the book already. Please fill out your evaluation forms. We need your feedback. The business meeting is immediately following right out here in the hall and the reception this evening, alcohol and meals, in the same room we had lunch. Now please join me in thanking this very fine panel.

(Whereupon, the proceedings were concluded)