Organized Electricity Markets

Providing Benefits to Customers

Testimony before the Pennsylvania Public Utility Commission en banc hearings on "Current and Future Wholesale Electricity Markets"

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DC Energy appreciates the opportunity to provide the following testimony for the Pennsylvania Public Utility Commission's (Commission) *en banc* public hearing regarding "Current and Future Wholesale Electricity Markets." I am Bruce Bleiweis, DC Energy's Director – Market Affairs.

DC Energy (www.dc-energy.com) is a proprietary investment firm that uses a rigorous quantitative analytical approach to identify and transact on attractive investment opportunities in the energy markets.

DC Energy was founded in 2002 and has quickly become a leading financial participant in organized electricity markets in the Eastern Interconnection of the U.S. DC Energy began activity in PJM in '02, ISO-NE and NYISO in '03, MISO in '05 and CAISO in '07. DC Energy is preparing to participate in ERCOT as it moves to nodal LMP markets in late '10.

DC Energy actively supports the development of reliable and efficient competitive energy markets. We work collaboratively with the ISO/RTO staffs, all stakeholders and regulatory bodies. Through these and our investment activities we enhance market liquidity, foster market efficiency, and create more affordable energy for consumers.[1]

Through our involvement in the ISO/RTO markets and interaction with all its stakeholders, participants and regulatory bodies alike, it has become very clear that the benefits financial products and financial participants provide consumers are, at the very least undervalued and in some cases misunderstood. We provide the Commission the following information to enhance your knowledge of this critical element of the ISO/RTO electricity markets.

Unfortunately some refer to financial participants as speculators, which carries a negative connotation. David Peniket, President and Chief Operating Officer, Intercontinental Exchange Futures Europe, before a hearing of the Committee on Agriculture for the 110th Congress, July 11, 2008 said: "We prefer the term "financial participation" to "speculation". Such participation helps to increase liquidity, which, in fact, makes it more difficult for any one participant to manipulate the market by creating an artificial price. Financial participants are the counterparties to the commercial entities who hedge their production or consumption. Such participants can take either 'long' or 'short' positions depending on their expectations of the way in which prices will change." Further in 1953 Milton Friedman, a world renowned economist said: "People who argue that speculation is generally destabilizing seldom realize that this is largely equivalent to saying the speculators lose money, since speculation can be destabilizing in general only if speculators on the average sell when the currency is low in price and buy when it is high."

[1] For more information contact: Bruce Bleiweis, Director – Market Affairs, (o) 914-509-2693 -- (c) 914-953-8753, bleiweis@dc-energy.com

I. Introduction: The Fundamental Role Played by Financial Participants in ISO/RTO Markets

In all commodity markets liquidity and depth are essential elements to foster market efficiency. This is also true of electricity markets. In all commodity markets today, financial participants play a key role in providing liquidity to standard contracts and in providing customized contracts to address individual participant needs. We often hear the term market efficiency and assume everyone understands this fundamental economic term. One could use any search engine and common themes will emerge. Some of those include prices 'already reflect all known information', 'are unbiased in the sense that they reflect the collective beliefs of all investors about future prospects', and 'it is not possible to consistently outperform the market'. We are trying to portray through this term that as the markets move to efficiency, customers benefit over the long-term through the lowest price possible. Many of the examples provided herein demonstrate this efficiency.

In ISO/RTO markets with Locational Marginal Pricing (LMP), a more fundamental role is played by financial participants in providing a service to help match supply and demand on an instantaneous and locational basis. Unlike other commodities, the inability to store electricity means that one cannot hedge an exposure of one hour from power purchased in a preceding hour that has been held in physical storage. In addition, since electricity markets must balance on an instantaneous basis, every seller must find a buyer and every buyer must find a seller for each time period. This matching of buyers and sellers for electricity contracts is particularly challenging since power in the LMP market is priced on a geographical basis; locations of natural (physical) sellers do not always coincide with locations of natural (physical) buyers. As a result, natural buyers need to be matched with natural sellers through a market where financial transactions act to provide greater efficiency in bridging the potential liquidity gaps implicit in the physical world.

This testimony deals with two general groups of examples of how financial transactions provide benefits to the efficiency of the physical electricity markets administered by the ISO/RTO (i.e., benefits to customers -- or those that own or serve the physical assets -- load and generation). The first set of examples shows how the participation of financial in the financial transmission right (FTR) auction markets acts to improve the efficiency of the FTR auction markets. The second set of examples shows how virtual energy transactions act to improve the efficiency of the day-ahead and real-time markets. We will explain how this will lower the cost to consumers over the long-term. However, it does not and should not eliminate very high prices when and where they are necessary (extreme events) nor does it totally eliminate all volatility.

Another set of examples (not covered in this testimony) could be drawn from the benefits to the electricity markets from bilateral financial power contracts (such as those made between creditworthy companies) and from cleared financial power contracts (such as those transacted on the cleared over-the-counter (OTC) markets such as the Intercontinental Exchange (ICE) or those transacted on the designated futures markets such as the New York Mercantile Exchange (NYMEX)). This latter set of examples acts completely outside of the RTO/ISO markets but provides significant levels of liquidity, transparency and hedging opportunities for market participants.

In the early inception of the ISO/RTO markets, specific and deliberate attention was placed in ensuring the availability of financial contracts to facilitate the efficiency of the physical market. At first, participation in the financial contracts was conducted mainly by traditional utility companies, their recently deregulated subsidiaries, or independent power producers and marketers whose primary focus was that of participating in the physical ISO/RTO market. As time has evolved, a new type of participant has emerged within the ISO/RTO markets – the "financial" participant, whose main focus is that of participating in financial instruments available (e.g., CRR/FTR/TCC, Convergence Bidding, Virtual Energy, etc) in the ISO/RTO market. Financial participants are a diverse set of companies that include FERC approved power marketers, ISO market "Specialists", retail/wholesale aggregators, hedge funds, banks and brokers. One can just look at PJM to see how their membership has exploded from eight companies a little more than a decade ago to over 500 members today. As a result, these markets have increased liquidity and depth resulting in prices that customers can rely on being an accurate reflection of market conditions. The financial instruments of the ISO/RTO markets represent the fastest growing component of the ISO/RTO markets. As seen in Figure 1, the monthly auction volume of FTR auctions has dramatically increased year over year for most ISO/RTO markets.

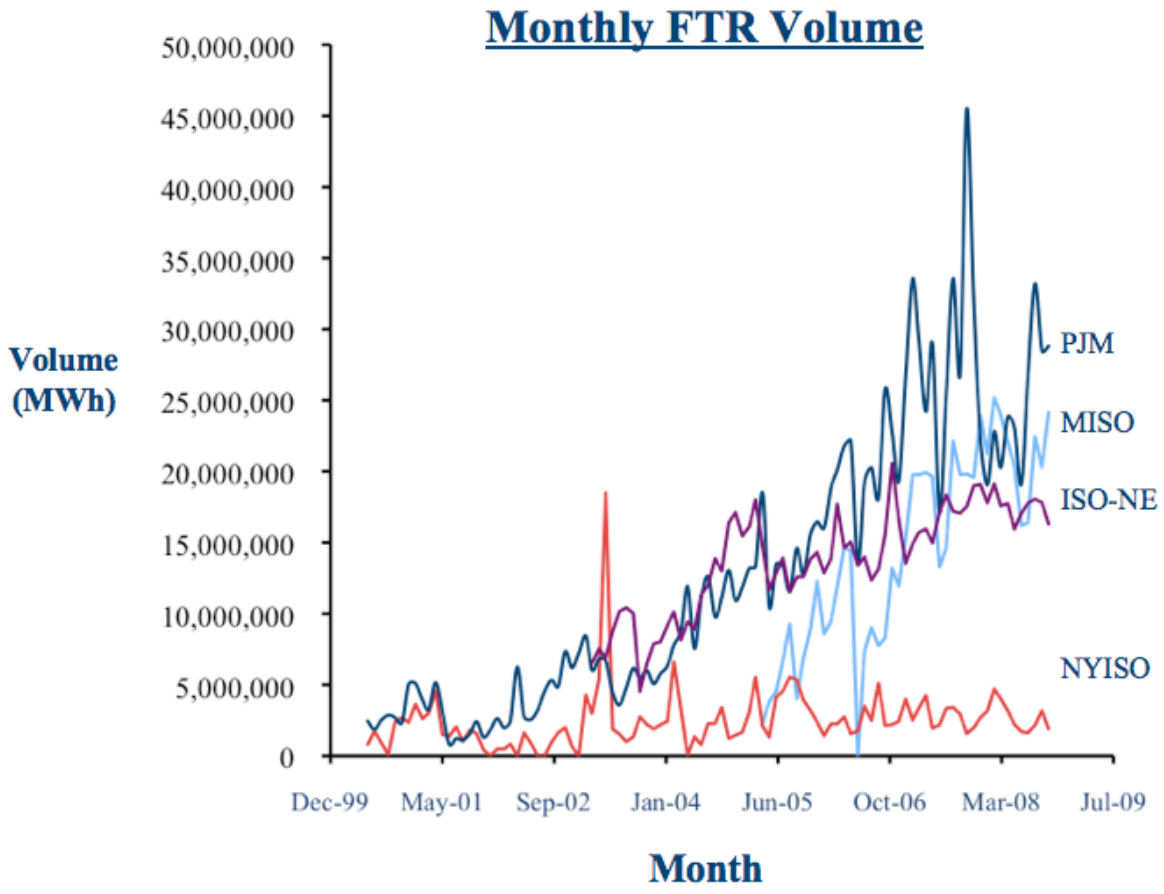

Figure 1: FTR awarded auction volumes by ISO for next month ("Prompt Month")

In addition, the increase in participation has driven increased innovation in contract types and availability resulting in a better market for participants seeking to hedge their future obligations[2]. One example of innovation fostered by the increased liquidity of financial participation is the Balance of Planning Period (BOPP) FTR auctions implemented in PJM. This has resulted in a fundamental increase in the usefulness of FTR auctions wherein each monthly auction covers each and all future monthly periods left in the annual planning period. This innovation has provided an additional hedging tool for load and overall a more efficient market result. In general, this has allowed those serving load to better hedge their congestion risk as their load requirements change. This will be explained in more detail later in this testimony.

II. Financial Participants in the FTR auction markets

As noted above, the increase in participation by financial participants in FTR auctions has resulted in a dramatic increase in overall auction liquidity resulting in better predictions of future congestion in the ISO/RTO markets. In addition to providing for better pricing (i.e., more predictive of future congestion), the other key benefits of financial participation in FTR auctions are: (a) an increase of supply for valuable FTR paths; (b) appropriate price signals to drive investment; and (c) innovation is spurred which results in more hedging tools. This will be explained and illustrated in more detail below.

A. Increasing the Ability to Hedge Congestion Risk at Lower Prices

Financial participants with experience in the markets can efficiently value the future potential for congestion along FTR paths and can therefore provide additional supply (i.e., more than the physical capability) of these FTR paths at competitive prices. Such practice involves the purchase of FTR paths that provide counterflow to significantly constrained elements in the network. Since the FTR auction is a purely financial market, the addition of counterflow paths at competitive prices lowers the premium of valuable FTR paths and increases the ability for participants to acquire their needed congestion hedges.

Typically, there is a larger desire for prevailing flow congestion hedges (i.e., FTR) than the transmission network physically can provide. Therefore when financial participants participate in the FTR auction providing counterflow along congested network elements at competitive prices, they provide liquidity for participants to acquire the needed prevailing flow hedge contracts at competitive prices. Physical market participants benefit through lower prices and increased availability. This is illustrated below in Figure 2 where the benefit to the market is shown as the increase in consumer surplus.

[2] A hedge is a contract entered into or asset held as a protection against financial loss

In Figure 2, the graph on the left side of the slide shows an example without counterflow from financial participants. The demand curve illustrates the price that load is willing to pay for FTRs on a specific path. The actual price for all FTRs on that path is determined by the intersection of the supply and demand curves (at the point the supply is vertical). Prices bid by certain participants indicate that some demand was willing to pay a price greater than the actual cleared price (the portion of the demand curve to the left of the supply and demand curves intersection) **and saved money**. This area under the demand curve above the clearing price is called the 'Consumer Surplus'. The graph on the right side of the slide shows an example with counterflow being offered and cleared. As the supply-demand intersection shifts to the right because of the counter flow supply offered, the price paid for all FTRs on that same path **decreases**, thereby creating savings for all customers who purchase FTRs and increasing the 'Consumer Surplus'.

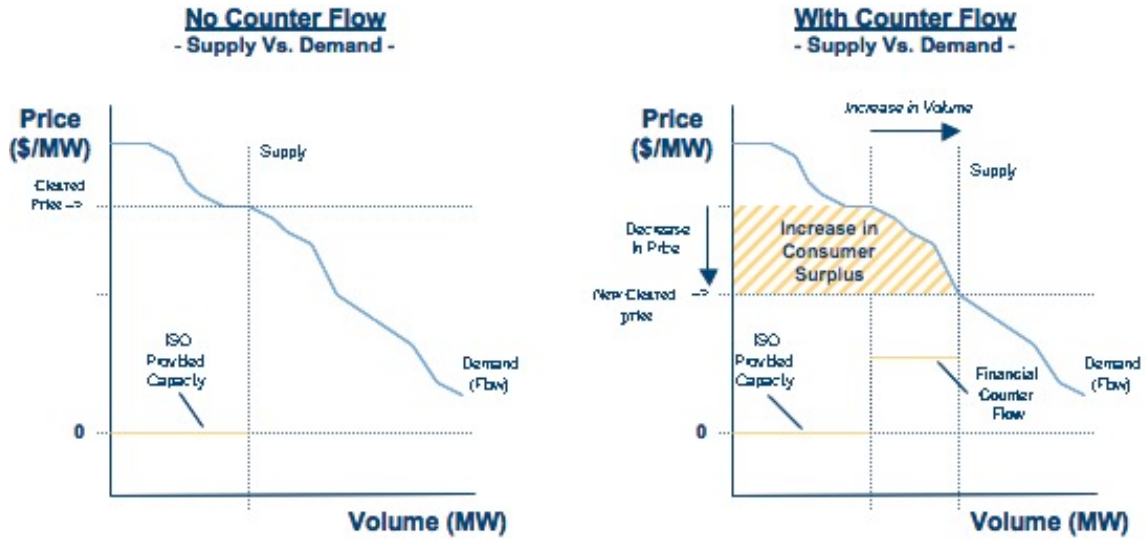

Figure 2: The increase in supply from counterflow offered at competitive prices on congested network elements increases the consumer surplus

Illustrative Example

Some participants choose to buy FTRs that flow from a typically higher price node or zone to a typically lower priced node or zone. For example, there is frequently congestion that causes prices in eastern PJM (e.g., Philadelphia and Newark, NJ) to be higher than prices in Western PJM. When one bids to buy an FTR from say Philadelphia to Western Hub one expects to pay back congestion for the period of ownership of the FTR.

A winning investment strategy would be to bid low enough (i.e., negative) to buy such path at a negative price, which results in a payment high enough so that the congestion paid back will be less than the payment received for taking the path in the first instance. This transaction also benefits load that is trying to hedge congestion in the primary flow path direction by creating additional FTR capability, as outlined above.

A specific example of this can be drawn from PJM's annual FTR auctions that include several rounds to maximize price transparency. Let's, for argument sake, say there are 200 MW of FTRs available from Western Hub to Philadelphia (purely illustrative as the actual system capability is greater). If market participants buy 50 MW of FTRs in one round from Philadelphia to Western Hub (counterflow), in that round 50 MW of additional capability will be available for purchase in the Western Hub to Philadelphia direction. The additional counterflow results in 250 MW of 'financial' flow capability, 50 MW greater than the path can physically (in this example) accommodate.

B. Benefits of A Better Forecast of Future Congestion

To complete the picture on market structure, robust participation in the FTR markets by financial participants can also result in higher prices for certain FTRs that would have been undervalued otherwise either because the market is undersubscribed (e.g., all capacity is not being purchased) or inappropriately valued (e.g., participants are not considering all factors that contribute to congestion). Despite the higher prices in the auction, customers benefit in two ways from a market that places fair value on FTRs.

First, the Transmission Customers (typically load) receive the higher revenues resulting from the FTR auction. As the transmission capacity is offered by the ISO on behalf of the transmission owners, the ultimate price is determined solely by the marginal demand. Financial participants will compete for this capacity and be willing to pay up to their expected value and ensure that transmission owners receive a fair value for their assets.

Second, the appropriate price signal that directs investment in transmission infrastructure will in turn lower congestion (after investment) ultimately benefiting customers. This is illustrated in the following table. Table 1 shows four specific instances starting with high amounts of congestion that occurred historically, resulting in investment in transmission infrastructure that led to a considerable lowering of congestion. The congestion value (historic and forecast) is useful in weighing the trade-offs between expensive and uncertain investment in transmission against the benefits. The total cost of congestion is a fraction of the total costs of transmission and generation investment necessary to relieve all congestion. Although not completely yet realized in today's market structure (i.e., transmission investment has been accomplished largely through regulated rates of return), one can imagine a structure in which transmission investment could be financed through the sale of multi-year FTRs[3] (or similar hedges). The merchant transmission investor would balance the tradeoff of the revenue from the FTR sale less the cost of the transmission infrastructure against the potential reduction in congestion. To enable this, market prices for FTRs must reflect the fair value of congestion.

[3] The Federal Energy Regulatory Commission's initiative on Long-term Transmission Rights are the beginning of this process

Table 1: Examples of how market transparency has enabled specific and timely upgrades to relieve congestion in PJM

Congestion Element	Congestion ($)	Period	Upgrade	Post Upgrade Congestion ($)	Period
DPL	$125MM	4/99-9/02	Replace Transformers/Rebuild Circuits	$51MM	9/02-6/07
Erie	$4MM	8/02-5/03	Install Second Transformer	$400K	6/03-6/07
Branchburg	$88MM	3/04-4/05	Replace and Add New Transformers	$18MM	5/05-6/07
Cedar	$12.6MM	6/03-8/05	Install Oyster Creek-Cardiff 230 kV Line	$0	9/05-6/07

C. How Financial Participants Motivate Innovation, Which in Turn Creates Additional Benefits for Customers

The purpose of the FTR market is to provide a congestion cost hedging mechanism for load. Prior to June 1, 2006 the PJM FTR process included only an annual FTR auction (for the Planning Year spanning June 1 through May 30 of following year) and monthly FTR reconfiguration auctions. As load switches from one supplier to another sporadically throughout the year (which for the vast majority would not be aligned with the annual auction), DC Energy thought that more flexible auctions held each month for the remainder of the Planning Year would benefit customers.

In August 2004, DC Energy proposed changes to the PJM FTR market to PJM and its stakeholders. This became known in PJM as the Balance of Planning Period (BOPP) auction. By early 2005, PJM and participants alike agreed to the changes proposed. Following tariff language changes filed and approved by FERC, PJM implemented the BOPP auction format beginning in June 2006. As Figure 3 illustrates, traded volume has significantly increased since the inception of BOPP. This additional liquidity and efficient/transparent pricing provided by the BOPP auction format allows customers the ability to buy or sell FTRs as their requirements change while being confident the price represents the true value of the product.

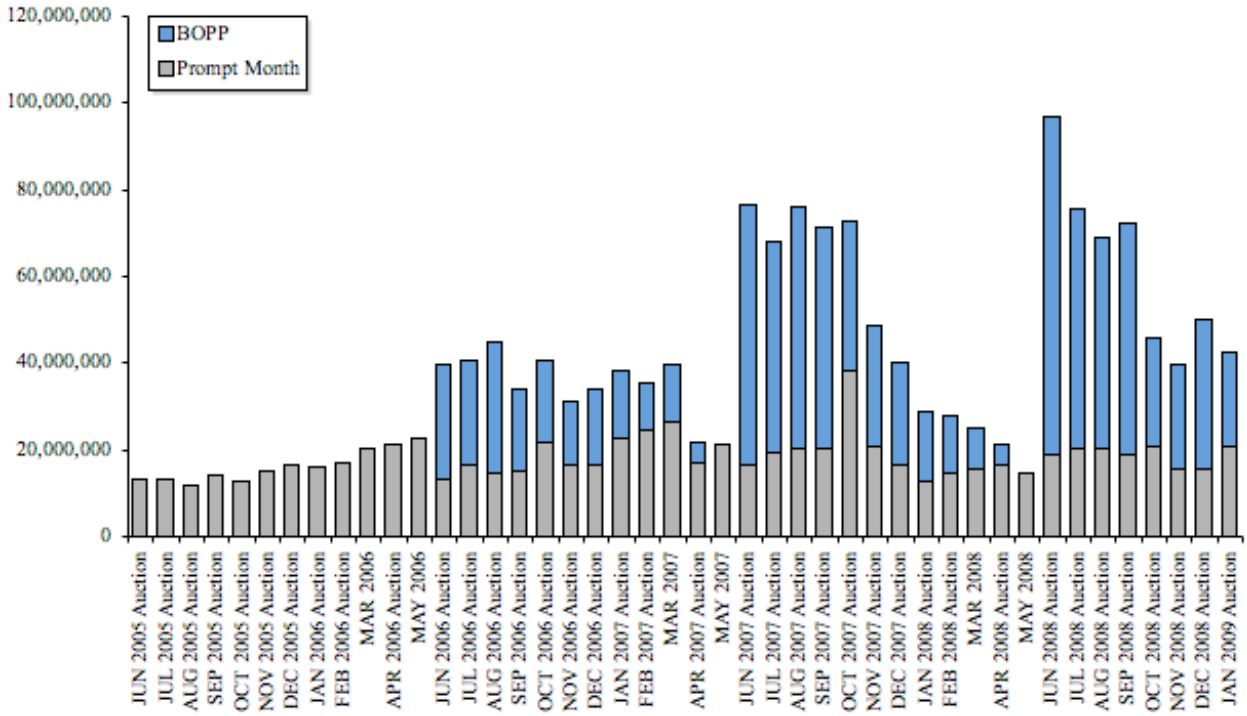

Figure 3: FTR MWh Awarded in PJM FTR Auctions

D. APPA November 6, 2008 Testimony

Sue Kelly, APPA's General Counsel, stated in her testimony (referring to financial participants in the FTR markets): "These entities often do not participate in these auctions to purchase power or to hedge a transmission or power supply transaction. Rather, they participate in the hopes of extracting dollars from these complex markets."
The oft-cited rationale for allowing such activities is that these financial players "add liquidity" to the RTO markets. APPA, however, is concerned that the profits these players are making from RTO markets come from the pockets of retail consumers, in the form of higher power supply prices and transmission service charges." As we have tried to explain and illustrate with facts and figures above, this is simply not true. First, financial participants do use FTR markets to hedge power supply transactions. Second, we have shown above how liquidity in FTR markets have reduced the cost of the hedge through lower prices and/or greater availability of FTRs where the physical system is limited. Third, the 'pockets of retail consumers, in the form of higher…transmission charges' benefit from such liquidity as the revenue of FTR auctions are allocated to load thus lowering transmission charges. Finally, without financial participants the prices paid for FTRs would be even lower with lower resulting revenue streams that support the transmission asset base.

III. Financial Participation in Virtual Energy Market Transactions

Virtual energy transactions seek to capture the difference between Day-ahead and Real-time market pricing, are integral to LMP markets and provide several benefits. The most well known benefit is perhaps price convergence. As financial participants use virtual energy bids to arbitrage price differences between the Day-ahead and Real-time markets, they converge these prices – and when prices converge, the risk premium inherent in the market is reduced, sometimes considerably. In addition, when prices are converged, generators have the appropriate incentive to bid efficiently in the DA market with the knowledge they will receive a fair price. When generators bid DA (and lock in their schedules ahead of time) the ISO is able to perform a more efficient dispatch of the system, thereby reducing the need for last-minute RT dispatch, benefiting everyone through the improved reliability of the grid. An example of how price convergence occurs is provided in the next section.

Other benefits include liquidity, market power reduction, and improved risk management capabilities. With respect to liquidity, although LMPs are produced at all nodes in the system, most locations do not have both physical load and generation – which means nodal liquidity is limited. Because virtual transactions are typically allowed at all locations, they ensure that the market clears at a fair price even in the absence of physical participants at specific locations. With respect to market power reduction, as discussed in comments by the ISO/RTO reports later in this paper, virtual participation means increased overall participation (and hence competition) in the market. Lastly, virtual energy is a risk mitigation tool as it enables participants to hedge physical positions (e.g., generators can submit DECs to hedge the risk in the case of a unit trip). An example of this is provided later in the testimony.

A. Virtual Energy Fosters DA/RT Price Convergence

As discussed in ISO-NE's Market Monitoring Department November 2004 Report (Impact of Virtual Transactions on New England's Energy Market) "…a premium placed on the price of selling or buying electricity (positive or negative) may reflect the relative value of locking in the day-ahead price to both producers and consumers. For example, if supply conditions are tight, producers may require and consumers may be willing to pay a day-ahead premium to avoid exposure to real-time price spikes due to unforeseen outages or higher than expected demand. Alternatively, if supply is robust, producers may want to lock-in a day-ahead price and thus be willing to transact at a discount to expected real-time prices. Financial virtual transactions are presumed to exploit such premiums. If the real-time price is consistently below the day-ahead price, that would encourage the placement of financial Incremental Offers (INCs) so that participants sell in the expensive day-ahead market and buy back in the real-time market. Increased supply in day-ahead market would drive the day-ahead price down towards the realized real-time price, thus decreasing the price divergence. If the real-time price is consistently above the day-ahead price, that would attract financial Decremental Bids (DECs). Increased demand in day-ahead market will drive the day-ahead price up towards the realized real-time price, thus again decreasing the divergence."

The following is an example where supply is assumed to be tight resulting in a high Day-ahead price. Virtual energy transactions however can **lower** that high day-ahead price, thereby benefiting customers.

No Virtual Energy Market Activity	Robust Virtual Energy Market Activity
DA Market Price = $40/mwh	Virtual Supply Offer =$35/mwh
RT Market Price = $30/mwh	RT Market Price = $30/mwh
DA Load Bid = 100 Mw	DA Load Bid = 100 Mw
Actual Load = 120 Mw	Actual Load = 120 Mw
Load Payment = $4,600	Load Payment = $4,100, Saves 12%

The following graph (Figure 4), while dated, illustrates in the NYISO market the effect of virtual energy on price convergence. While the Locational Based Marginal Price (LBMP, LMP equivalent in NYISO) market began in November 1999, virtual energy transactions were not allowed until two years later. The change is very dramatic. Figure 5 is more up-to-date and again illustrates how convergence has been attained through participation in the Day-Ahead financial market.

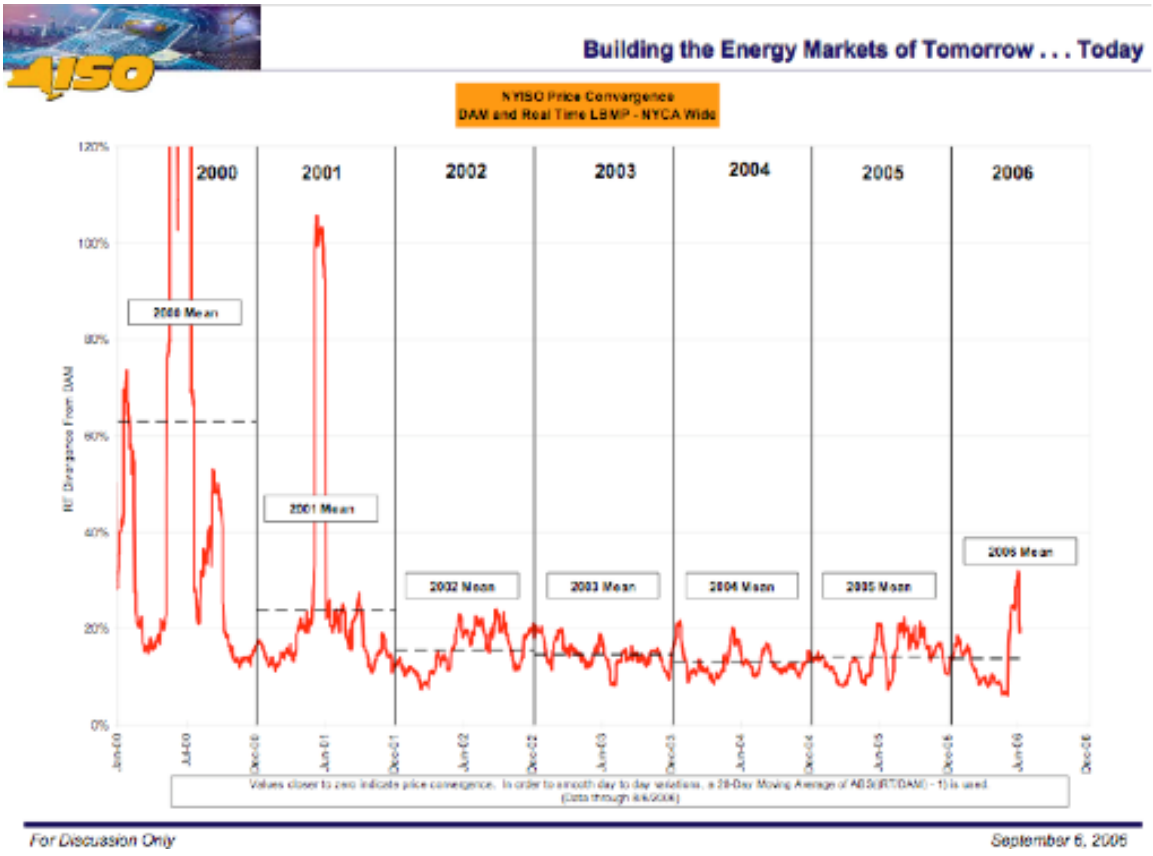

Figure 4: Price convergence over time in the NYISO market

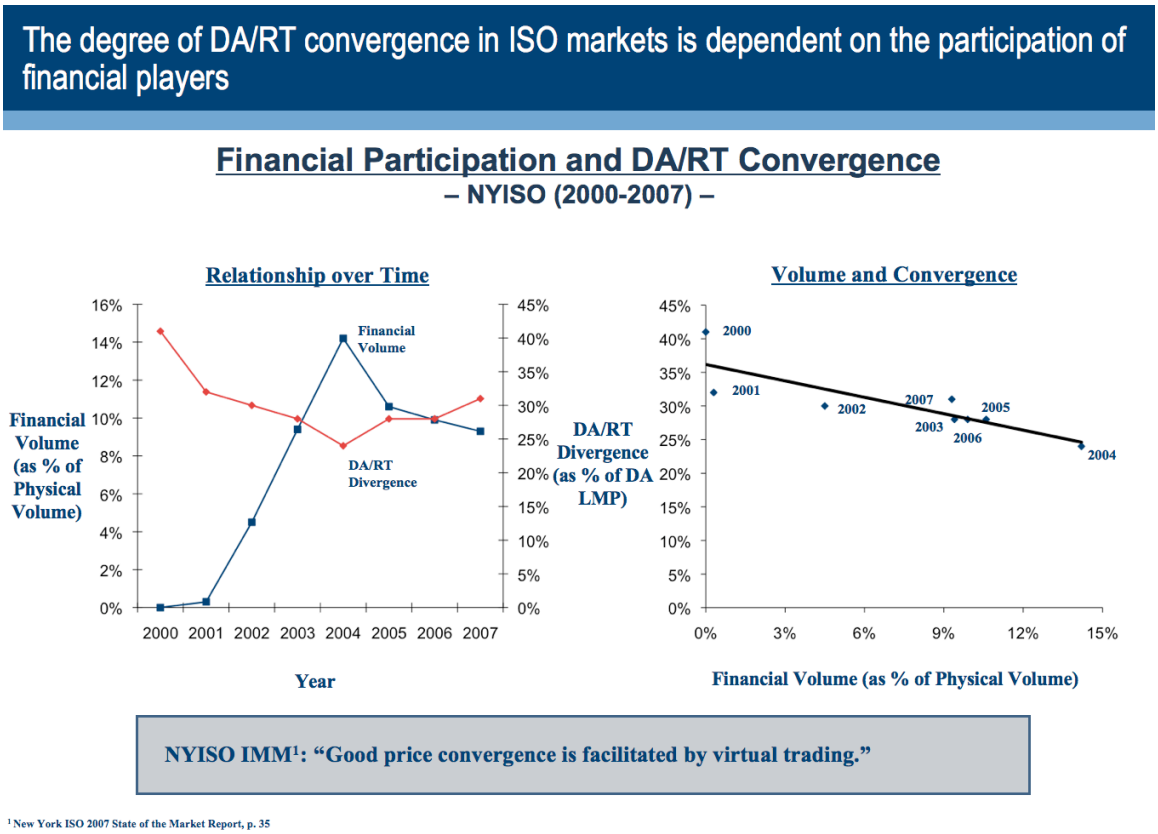

Figure 5: Financial Participation and DA/RT Convergence

B. Generator Hedges Risk of Unit Trip

The following is an example of how a generator can use a virtual energy bidding strategy to mitigate some of the risk inherent in a unit tripping off-line after it is bid into the Day-ahead market. When a generator trips the LMP at such location can rise considerably.

No Virtual Energy Transaction	Virtual Energy Used to Mitigate Risk
Gen DA Unit Offer = $50/mwh	Gen DA Unit Offer = $50/mwh
Unit Trips and Gen Pays RT Price	Gen Submits DA DEC and Pays $50/mwh
RT = $100/mwh	Unit Trips w/RT Price = $100/mwh
	Gen Yield = $50 - $100 = -$50/mwh
Gen Loss = $50/mwh ($50 - $100)	DEC Yield = -$50 + $100 = $50
	Gen Loss = $0

IV. Additional Information – Data Transparency

At the November 6th hearing Sue Kelly, APPA submitted some testimony. We'd like to agree with the portion of her testimony concerning data availability. She stated: "APPA has long been disturbed by the difficulties of analyzing price formation in RTO markets." She is correct that market participant capability to analyze price formation is a critical element to efficient markets. As cited by the May 24, 2006 Joint Board Report[4] "…public access to bid data,…would strengthen public monitoring of market behavior and help ensure confidence in the competitiveness of the markets; it would also enhance the ability of market participants to quickly identify inefficiencies." Removing inefficiency from markets, simply lowers prices to consumers. The Joint Board included then FERC Commissioner Nora Brownell[5] as well as Commissioners (or Chairs) of all Northeast States (i.e., New York and New England). APPA's consultant simply focused on generator data. While additional transparency on such data is necessary, additional load, outage, transmission flow and network data should also be posted with the appropriate lag as well.

V. Conclusion and Commentary from ISO/RTO Reports and Academics

A. Conclusion

The robust participation of "financial participants" in ISO/RTOs has led to a dramatic increase in liquidity and efficiency to the Day-Ahead and FTR auction markets. Such participation has allowed greater flexibility to physical participants in the form of lower, more converged prices and in the form of greater availability of hedging opportunities. In addition to the benefits felt within the ISO/RTO administered markets, there has been significant maturation of markets operating alongside of these including the bilateral financial power contracts and the cleared financial power contracts. Transaction volumes and the narrowing of bid-ask spreads have been consistently improving over the last five years. With appropriate and fair market structures, these markets will continue to experience significant improvements over the next five years.

[4] Joint Boards on Security Constrained Economic Dispatch, 112 FERC ¶ 51,353 (2005)

[5] Former Commissioner, Pennsylvania Public Utility Commission

B. Commentary

The following represent some commentary from market monitors of the various ISO/ RTOs and some academics about the benefits and impact of financial transactions on the physical markets:

> "Once participants learned the price dynamics in the market and the divergence pattern became stable, financial virtual trades systematically decreased the market price of risk." "Virtual transactions helped to decrease the divergence between real-time and day-ahead prices." ***2004 Impact of Virtual Transactions on New England's Energy Market by ISO New England Inc. -- Market Monitoring Department (Conclusions Section)***
>
> "Virtual demand bids can be used to arbitrage differences between day-ahead and real-time prices at a node. They may also hedge a participant load such as a factory that has elected to receive the nodal LMP." "The increase in virtual transaction offers is an indication of a more mature market." ***ISO-NE 2006 Annual Markets Report,*** *p.23* and 25
>
> "Virtual trades in the day-ahead market serve to: (a) Help ensure day-ahead market results are efficient; (b) Facilitate convergence between the day-ahead and real-time prices; and (c) Mitigate market power in the day-ahead market." "This trading will tend to cause day-ahead prices to converge with real-time prices, contributing to increased efficiency in the day-ahead market." "...loads can insure against volatility in the real-time market by using FTRs to hedge against congestion and purchasing in the day-ahead market." ***2006 State of the Market Report: Midwest ISO,*** *Presented June 20, 2007 to MISO Advisory Committee, Slides 61, 25 and 38.*
>
> "Liquid virtual supply and demand is an important component of the Midwest ISO market because it: (a) Facilitates convergence between the day-ahead and real-time markets; (b) Mitigates market power in the day-ahead market; and (c) Reduces day-ahead price volatility." ***Report of the Midwest ISO Independent Market Monitor: July 2007****, Presented 08/15/07 to the Markets Committee of the Board of Directors, Slide 11.*
>
> Celeste Saravia - **University of California Energy Institute** Nov 2003
> paper: Speculative Trading and Market Performance: The Effect of Arbitrageurs on Efficiency and Market Power in the New York Electricity Market -- "I begin by demonstrating that since the implementation of the virtual bidding policy, the absolute value of the forward premium (difference between the forward and expected spot prices) in the New York market has decreased significantly."

Appendix

I. Financial Transmission Rights Basics

Financial Transmission Rights are financial instruments that entitle the holder to a stream of revenues (or charges) based on the hourly Day Ahead energy price differences across a path. The reason for the product is that LMP exposes PJM Market Participants to price uncertainty for congestion cost charges across points as they serve load or provide generation. FTRs provide the ability to have price certainty in advance of the spot market. FTRs provide hedging mechanism that can be traded separately from transmission service.

FTR Characteristics

- FTRs must be simultaneously feasible
- Defined from source to sink
- Financially binding
- Financial entitlement, *not* physical right
- Independent of energy delivery

[Source: PJM posted training material.]

II. Virtual Energy Basics

Virtual energy (VE) markets are an integral part of each of the eastern ISO/RTOs. Similar products will be included in the next generation of market design in CAISO (i.e., Convergence Bidding) and ERCOT.

Market participants may (*but are not required to)* submit financial load and/or supply bids in the Day-Ahead market. The Day-Ahead market aids the ISO commitment of resources required to meet load in the real-time, which provides a reliability benefit. The purpose of virtual energy markets is to: (a) provide load with the ability to limit their exposure in the DA market if prices are unduly high; (b) provide companies that own generation the opportunity to hedge the risk of unplanned outages in their generating plants; and (c) provide an opportunity for financial participants to address any pricing inefficiencies between the DA and RT markets.

Those who submit and clear inc/decs DA, by definition, then purchase/sell in the RT market to balance their position. It should be stressed that these are purely financial transactions and no physical injection or withdrawal occur.

Definitions:

- Inc (a.k.a. Incremental Offer/Virtual Supply Offer) - Offer to sell energy in Day Ahead Market at a defined price;
- Dec (a.k.a. Decremental Bid/Virtual Demand Bid) - Bid to buy energy in Day Ahead Market at a defined price;
- DA – Day-Ahead Market;
- RT – Real-Time Market