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**“Examining the Role of Financial Trading  
in the Electricity Markets”**

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My name is Vincent Duane, and I serve as a Senior Vice President at PJM Interconnection, L.L.C. (“PJM”). I have worked in competitive wholesale electricity markets regulated by the Federal Energy Regulatory Commission (“FERC”) since their inception over 20 years ago, including over five years on the floor of a major energy trading firm active in PJM and the other FERC-regulated electricity markets. PJM is a Regional Transmission Organization (“RTO”) responsible for ensuring the reliable and non-discriminatory planning and operation of the transmission grid and the fair and efficient administration of wholesale electric markets. The PJM region encompasses over 65 million people in an area that includes all or parts of New Jersey, Pennsylvania, Delaware, Maryland, the District of Columbia, Virginia, North Carolina, West Virginia, Kentucky, Ohio, Michigan, Indiana, Illinois and Tennessee.

Thank you, Chairman Upton and the Subcommittee on Energy, for inviting PJM to address this subject. The “bottom line” of my testimony today is that financial trading in the wholesale electricity markets can enhance liquidity, aid in price discovery and provide hedging opportunities for those that generate and sell electricity into these markets and those, such as traditional distribution utilities, competitive retail providers and large customers, that buy directly from those markets. But, like most things in life, one can have too much of a good thing or a good thing but at the wrong time and place. Financial trading in the PJM markets is a “good thing.” But financial trading in PJM’s markets cannot be presumed beneficial in *all* circumstances. Unique design aspects attendant to RTO electricity markets can work to prevent realizing the theoretical efficiency expected from trading. In these instances, RTOs and the FERC must work to preclude those trades which, if allowed to continue, would only leak revenue from sellers or savings from buyers of physical electricity – offering no commensurate efficiency benefit to the system.

PJM recently filed certain reforms with the FERC for just this purpose: to preserve the value that financial trading can offer to PJM markets while minimizing situations where trading siphons off revenues with no corresponding system benefit. Additionally, these reforms should help to reduce those instances, as noted in the Staff Memorandum prepared for today’s hearing, where FERC’s enforcement arm is forced to step in to curtail trading that simply exploits market rules offering no real benefit to the overall market.

## **1. RTO Markets Uniquely Blend Physical and Financial Transactions**

Like other commodities, wholesale electricity is transacted both physically and traded financially. And like other financially traded commodities, specialized environments, such as exchanges and electronic trading platforms, have evolved to facilitate financial trading. For instance, financial electricity is traded on the New York Mercantile Exchange (“NYMEX”), the Intercontinental Exchange (“ICE”) and Nodal Exchange. These exchanges offer futures, options and swaps to trade electricity specific to PJM and at multiple locations (or nodes) on the PJM system. These

so-called “secondary markets” in PJM electricity are not regulated by the FERC. They are separate from PJM’s FERC-regulated markets and affect PJM’s markets only very indirectly.

While these secondary financial markets are not the subject of today’s hearing, I raise them only to clarify that highly-developed, highly liquid and specialized forums exist for those that wish to hedge or speculate on PJM electricity prices outside of the PJM market itself. PJM’s markets are fundamentally designed to facilitate the dispatch, purchase, sale and delivery of *physical* electricity from power plants to wholesale electricity buyers, who in turn sell retail electricity to homes and businesses.

In this sense, the auction-based day-ahead and real-time electricity markets administered by PJM are not unlike a livestock auction – but one where wholesale buyers and sellers meet to transact physical electricity instead of, say, live cattle. And just as is the case with financial electricity, separate secondary markets offered by exchanges (like the Chicago Mercantile) provide a place to trade agricultural commodities (like feeder cattle futures and options) quite distinct from the physical buying and selling that takes place at the livestock auction.

Wholesale electricity markets, such as PJM’s, have one feature not shared by the livestock auction in this example and one that uniquely distinguishes RTOs from markets in other physical commodities. Central to the commitment and dispatch operations of RTOs is a market designed to allow *both* physical and financial bids and offers. While banks, Wall Street trading houses and speculators do not show up alongside farmers, feedlot owners and large food companies at a livestock auction, these types of entities can and do show up alongside merchant and regulated power plant owners seeking to sell the output of their plants through PJM to municipal, cooperative and private utility companies that buy this output to sell retail electricity to homes and businesses. In short, RTO markets provide a unique platform that accommodates both physical and financial transactions in an integrated fashion.

This distinction is important for two reasons.

First, the voluntary participation of financial traders in PJM’s fundamentally physical market is premised on an assumption that financial transactions alongside physical transactions in the same market (as opposed to just in a secondary market) help the efficiency of the predominantly physical market. Some question the validity of this assumption arguing financial trading of electricity should take place only in secondary over-the-counter, exchange and electronic trading markets and not in RTOs. With some caveat discussed below, PJM disagrees and believes the construct allowing financial participation in its markets is both theoretically sound and its value borne out from actual experience.

Second, the metric for financial traders in PJM is whether in fact their participation facilitates and brings efficiency in meeting the market’s prime objective – the commitment, dispatch and delivery of physical electrons from generation to load. PJM, unlike a secondary market platform, at its core does not exist to support financial trading. As noted, other forums such as ICE, Nodal Exchange and NYMEX, perform this function and provide extensive opportunity for parties to hedge, speculate on and arbitrage PJM-specific prices and prices from other RTOs.

## 2. The Value Financial Trading Brings to PJM

Financial trading can add liquidity and contribute to efficient price formation in PJM electricity markets. Financial traders participate in PJM's day-ahead energy market through so called "virtual" offers and bids for electricity (known in PJM parlance as "incs" and "decs" respectively) and through an instrument known as an Up-To-Congestion ("UTC") transaction. Traders also participate in buying and selling an FTR or financial transmission right, which offers the opportunity to hedge or speculate on price differentials between two points (or nodes) on the PJM system.

The theoretical basis to support "inc" and "decs" and FTRs is sound, and the liquidity and convergence efficiency noted in the Committee Staff's Hearing Memo can be demonstrated empirically through analysis of historical price outcomes in PJM. The case to support the efficiency proposition of UTC transactions, which to my understanding are found only in PJM, is less clear.

"Incs" and "decs" and FTRs are integral components – not merely optional design features – to PJM's day-ahead and real-time energy markets. While true that traders can realize some of their trading and risk management objectives on secondary market platforms, such as Nodal Exchange, ICE and NYMEX, their presence in PJM as virtual or FTR traders:

- (i) provides these participants opportunities simply not available or not easily duplicated elsewhere,
- (ii) improves the efficiency and price discovery aspects of PJM's energy markets, and
- (iii) provides value to other PJM participants in the form of efficient prices and tools to build more structured risk management arrangements.

## 3. Recognizing Limits to the Value That Financial Trading Can Bring

RTO electricity markets are characterized by a high degree of rule and regulation; indeed the term "market design" is familiar to those involved in these markets. This term describes an elaborate set of rules, which are translated into models and algorithms and incorporated into software used by RTOs, to execute complex mathematical optimizations. These outcomes work to clear markets and to price a host of energy and energy-related products (known as "ancillary services") in order to produce the most economic commitment of generating units consistent with the physical/operational constraints of the transmission and generation network.

But, for today's hearings, the important takeaway is to appreciate that the rules, models and algorithms that make up "market design" bear significantly on how prices are formed. In other commodity markets, recalling the examples both of live cattle sold at the livestock auction and the feeder-cattle-futures contract sold on the Chicago Mercantile Exchange, prices form more or less where supply meets demand. And, while true that offers and bids similarly form RTO prices, RTO prices *additionally* depend highly on market design and the rules, models and algorithms underling this design.

The design structure of these electricity markets means that RTOs and the FERC cannot accept categorically the proposition that financial trading *per se* improves efficiency by bringing convergence and the benefits of liquidity. Occasionally, structural aspects of the market design will cause price dislocations, both locational (between one node/price point and another) and temporal (between day ahead and real time). Theory might lead one to believe that trading would help arbitrage these price dislocations to bring convergence and price discovery. And, indeed, where electricity is “mis-priced” in one place or time relative to another due to a lack of information in the market or inaccurate forecasts or assumptions by the RTO or market participants, trading to “arb out” these price differences is valuable. But, where, instead, these price differences result from structural market design features (rules, models, etc.), no amount of trading will “arb out” the price difference. Why? Because in these cases prices will converge only with a change to the market design – either a rule change or redesigning the models and software clearing the market. Trading this pricing inefficiency does not eliminate the inefficiency, it merely profits from it.

Financial trading itself cannot change rules or models; at best such trading highlights a consequence that might not have been understood by market designers. In this sense, false arbitrage trading is akin to taking advantage of a broken ATM. But, more often, market designers cannot correct modeling discrepancies or align the differences in rules that lead to price dislocations because they exist for other purposes necessary to operation of the physical grid. While FERC has alleged market manipulation in certain cases where trading has exploited either design deficiencies or necessary design features, the onus in the first instance is on the RTO charged with market design to identify and anticipate structurally occurring price dislocations and either (i) reform the market design to eliminate the dislocation or (ii) preserve the design for other reasons but then eliminate the opportunity to trade around this design feature.

## 4. Recent PJM Reforms Relating to Financial Trading

PJM has pending before the FERC two dockets that offer examples of steps that RTOs can and should take to right size financial trading and eliminate trading where structural or particular market design features work such that trading inherently cannot offer the efficiency benefits that might theoretically be presumed. Revenues in PJM are highly contested, both by suppliers questioning the adequacy of PJM prices to preserve the physical infrastructure needed for reliable operations and by consumers wary of paying more for wholesale electricity than is necessary. Financial trading that siphons revenues from PJM markets without offering commensurate efficiency benefits should be eliminated. This type of trading represents a “hole in the bucket” that PJM must plug by filing rule changes for the FERC to approve.

PJM’s pending reform proposals will affect UTC transactions most, “incing” and “decing” to a lesser degree, and FTRs not at all. In Docket ER18-86, PJM seeks to impose charges on UTC transactions commensurate to charges it already levies on other virtual transactions (“incs” and “decs”). The objective is to restore levels of traditional virtual trading with a demonstrated record of efficiency benefit and to reduce what in the past decade has been a dramatic increase in UTC transactions, whose benefits are more questionable. In Docket ER18-88, PJM seeks to eliminate financial trading from certain nodes that exist for other market operation purposes, but, for idiosyncratic reasons, offer financial traders no opportunity to provide added efficiency to the system. Trading at these nodes simply taps a hole to siphon revenue out of the bucket.

As noted, some question altogether the unusual presence of financial trading in what otherwise is an overwhelmingly physical marketplace – having a Wall Street hedge-fund manager attend the livestock auction, as it were. Again, as is often the case in life, there can be too much of a good thing or a good thing but at the wrong time and place. Financial trading in the PJM markets is a “good thing.” But, it must be right sized and prevented in those limited situations where the market design is such that financial trading cannot deliver the efficiency benefit it might theoretically promise. Reforms of this sort will preserve the value that financial trading provides to PJM’s markets and minimize situations where trading is parasitic and where it attracts the attention of FERC enforcement.

## **5. Conclusion**

Once again, PJM thanks this Subcommittee for the opportunity today to share our thoughts on the role of financial trading in the FERC-regulated wholesale electricity markets. We stand ready to assist this Subcommittee as it examines this topic going forward.