

**BEFORE THE PENNSYLVANIA PUBLIC UTILITY COMMISSION**

**Pennsylvania Public Utility Commission :  
Motion concerning Policies to Mitigate : Docket No. Docket No. M-00061957  
Potential Electricity Price Increases :**

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**Reply Comments of PJM Interconnection, LLC**

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In PJM’s initial comments in this inquiry, PJM indicated the several ways in which the wholesale market serving Pennsylvania provides both a sound platform for retail electricity structures and the tools, such as demand side response, that can play an important role in any effort to ensure reasonable prices for Pennsylvania consumers. Many of the comments submitted by others support PJM’s view. Some, on the other hand, suggest that the PJM market is the “problem,” or itself contributes to price increases that may flow to retail customers; when viewed critically, however, those comments are revealed to be flawed.<sup>1</sup>

The Comments Provide Persuasive Evidence for the Value of Wholesale Markets

Former Commissioner Hanger aptly articulated one of the important intersections between the wholesale and retail markets in his discussion of the value that the nondiscriminatory and transparent market brings to the provider of last resort (POLR) auction.<sup>2</sup> As Commissioner Hanger noted, the PJM market allows bidders to assemble resources from throughout the region, and not depend upon owning sufficient resources

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<sup>1</sup> Once again, in light of PJM’s role, which is focused on ensuring open, transparent and competitive wholesale markets and reliability of the bulk transmission system, PJM takes no position as to the “correct” retail approach, but instead confines its comments to the wholesale market issues.

<sup>2</sup> See Citizens for Pennsylvania’s Future (PennFuture) Comments at 3.

by themselves, and at the same time provides (through the transparent market price) a reference against which bids can be evaluated.

PJM also agrees with UGI that the PJM market enhances the opportunities for demand side response (DSR).<sup>3</sup> PJM has endeavored to structure the appropriate portal for demand response to engage in the wholesale market. The wholesale market, by showing the cost of electricity consumption and allowing customers (or entrepreneurs) to focus and “monetize” their DSR activities, provides a key element in helping DSR reach its full potential.<sup>4</sup> PJM believes, along with Strategic Energy and PPL, that PJM programs to facilitate DSR are working effectively.<sup>5</sup> We note that the Pennsylvania Department of Environmental Protection (DEP) suggests that PJM should undertake a study to ascertain the effect DSR has on price. PJM has, in fact, already undertaken that work in a joint effort with the states in the Mid-Atlantic Distributed Resource Initiative (MADRI), and should have the results available by the end of the year. PJM expects, based on earlier less detailed work, that even modest increases in demand response can have significant impacts on LMP; the results of the study will provide a firm basis for market participants and policy makers to evaluate how to make the best use of their resources in advancing this market tool.

PJM further agrees with Reliant Energy (Reliant), Constellation Energy Group (Constellation) and the Office of Consumer Advocate (OCA) that the recent efforts of PJM to improve the wholesale market through its enhancement of the “Regional Transmission Expansion Plan” (RTEP) will significantly relieve congestion and allow for the more efficient flow of less expensive electricity.<sup>6</sup>

While PJM is heartened by the comments made in support of the usefulness of the transparency in PJM’s wholesale market, it is important to not mislabel what the

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<sup>3</sup> See UGI Comments at 3.

<sup>4</sup> In fact, while some parties are anxious for “efficiency” to be reflected in markets such as PJM, it is worth noting that without exposure to prices it is unlikely that increases in energy efficiency would have any lasting effect on customers. It is prices for fuel which have given a market to an initially expensive technology like hybrid cars.

<sup>5</sup> See Strategic Energy Comments at 6-7; and PPL Electric Comments at 29.

<sup>6</sup> See Reliant Comments at 21; Constellation Comments at 11-12; and OCA Comments at 30.

wholesale market does. In the comments of Reliant the market is characterized as “driving” prices.<sup>7</sup> This choice of words may be misleading. A transparent market “reveals” (rather than “drives”) the price at which a large number of buyers and sellers are willing to contract, which in turn helps guide market participants in their behavior and assists regulators, who are concerned with ensuring that prices paid or charged are not excessive. Prices respond to competition, to the inputs into production, and to the methods by which efficiencies can be gained. In a competitive market, the transparent price provides incentives for suppliers to be as efficient as possible in order to obtain buyers in a bilateral market or to be selected to run in an organized market.

The Commission Should Not Accept the Invitation by Some Commenters to Attribute Price Increases to the Wholesale Market Structure

A few comments point to PJM’s Wholesale Market as the cause, or at least contributing factor, to the prospect of sharply increasing retail rates. As shown below, however, these comments rely on overly simplistic analyses or unsupported assertions.

Neither “deregulation” nor the existence of the wholesale market has been responsible for recent increases in the cost of power, contrary to the allegations of Allegheny County or the Industrial Customers.<sup>8</sup> As indicated in the paper written by Dr. Peter Cramton of the University of Maryland and Dr. Steven Stoft (provided in our original comments), recent price increases are predominantly driven by higher fuel costs. The same conclusion was reached by PJM’s market monitor in his 2005 State of the Market Report, and by the Edison Electric Institute, a trade association of utilities that operate in both traditionally regulated and “restructured” markets.

In traditionally regulated markets, these increases are often not reflected in prices immediately as they must go through a rate case (or a fuel adjustment case), while in restructured markets the market price provides a rapid reflection of inputs costs such as

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<sup>7</sup> See Reliant Comments at 16-17.

<sup>8</sup> See Allegheny County Comments at 3; and Industrial Customers (IC) Comments at 13, 18.

fuel. To say, as the DEP does, that power prices are “double” what was anticipated is to suggest that there was a clear understanding in the late 1990s, when restructuring was being considered, that the price of the various fuel inputs to power production could be predicted with confidence.<sup>9</sup> Such predictions are, however, necessarily speculative: how well would any of us have predicted the price of oil or natural gas in 1999 for the year 2005? As anyone who drives a car or heats a home knows, all commodity prices have risen considerably of late. Significantly, wholesale power costs in PJM are up less than prices for other sources of energy, as noted in Constellation’s comments and demonstrated in recent studies.<sup>10</sup>

Another unsustainable assertion was made by Carl Wood, who claimed that prices in the wholesale market have been distorted by strategic pricing or gaming. In support, Mr. Wood cites a paper produced by Mr. Howard Spinner, a member of the staff of the Virginia State Commerce Commission. A similar assertion is made by the Industrial group. The PJM Market Monitoring Unit (MMU) investigated this allegation both in its 2005 State of the Market Report and after the release of Mr. Spinner’s paper. The MMU concluded that Mr. Spinner’s allegations are the result of incorrect assumptions regarding the types of generation units that might be on the “margin” (the last unit needed to meet demand), the frequency with which certain units set the marginal price, and the relative efficiency of the units. Using more accurate data, the MMU demonstrated that the increase in wholesale power prices correlated to an increase in fuel inputs.<sup>11</sup> In fact, using fuel cost data and the units dispatched in each 5 minute increment in 2005, the MMU concluded that the price of power in PJM in 2005, when adjusted for fuel increases, rose a mere 1.5% over 2004.<sup>12</sup>

Some parties allege that the use of “locational marginal prices” (LMP) raises prices to consumers. The allegation seems to be centered on the fact that the LMP reflects the price of the last unit needed to satisfy demand or “load.” For example, the DEP suggests

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<sup>9</sup> See DEP Comments at 3.

<sup>10</sup> See Constellation Comments at 10.

<sup>11</sup> See Attachment A for a more extensive articulation of the MMU response.

<sup>12</sup> See PJM MMU “2005 State of the Market Report” at page 28 (found at <http://www.pjm.com/markets/market-monitor/som.html>).

that high gas prices distorted the market price under the LMP system.<sup>13</sup> In fact, however, as demonstrated in the data on market results attached to our original comments, LMP had the effect of reducing the proportion of time that natural gas units were used as the marginal unit to meet demand. This is an expected result when prices are produced in a transparent market – bids reflect the suppliers’ variable costs (such as fuel) and lower priced units are selected more often when natural gas units increase in price. This experience also reflects the benefit of PJM’s large market footprint, which allows customers to benefit from a broader array of resources and minimizes the dependence of PJM on any one fuel.

Some industrial customers assert that they are having difficulty obtaining what they would view as a “competitive” price in the bilateral market and blame the LMP price. Ample evidence from a wide variety of suppliers and financial institutions, however, suggests instead that the difficulty that some customers may have is not the result of the market structure, but rather the natural termination of certain multi-year “special deals” negotiated prior to the significant increase in commodity prices such as the fuel input for power. Additionally, it is true that price transparency in markets such as PJM makes deals that would formerly be negotiated between a utility and a large customer, which may have depended upon dedicating particular resources to the customer, difficult to justify. As others have observed, these formerly available deals may have resulted in rate shifts to other customer classes. The existence of a transparent wholesale market would make such “cost – shifting” deals very difficult to replicate.

Wholesale markets such as the one administered by PJM provide customers information as to the best option for meeting their needs. When price is revealed in a market with multiple buyers and sellers (i.e., competitive), and made known to all (transparent), it allows large customers and those supplying other customers to decide whether to meet their needs through contract, self-build, conservation, or other products. The suggestion by Industrial Customers that electricity should be provided on a “cost plus” basis is inconsistent with how commodity prices work and, indeed, with the business model in

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<sup>13</sup> See DEP Comments at 14-16.

which many of these companies operate.<sup>14</sup> Should an aluminum producer sell its product at a cost plus some agreed upon amount of additional revenue, or should it sell at the prevailing market price? Selling at the prevailing market price allows the aluminum producer to know what the market demands are and therefore increase or decrease production, and provides the consumer with similar information about input costs. The same principles apply in the power market.

Some have indicated that the market using LMP will not lead to sufficient investment and cite the PJM proposed “Reliability Pricing Model” (RPM) as indicating the failure of the LMP market. The introduction of RPM represents no such indication. RPM is a response to a variety of factors, including the need for greater revenue predictability and stability to encourage new investment, and the political constraints on energy price volatility which reduce the prospect of “scarcity” prices which are available in other commodity markets. LMP and RPM work together to establish the economic foundation upon which sound investment decisions can be made.<sup>15</sup>

Comments suggesting that pricing based on the “marginal” unit setting the price (“uniform price auction”) yields higher prices than a “pay as bid” are similarly flawed. As noted in the Cramton/Stoft paper attached to our original comments, only one such market exists and it is one that is far more open to “strategic bidding” rather than providing for bids that reflect suppliers’ marginal costs. In a “pay as bid” market, the suppliers are left to “guess” what price the market will bear and what level of demand will drive that calculation. This results in suppliers bidding all resources up to what they believe is the correct price and, in the course of doing this, drives prices of all units bid well beyond marginal costs. A uniform price auction, on the other hand, removes the incentive to engage in this sort of speculation, because the marginal unit will set the price and there is no reason to increase the bid of a low cost unit. Additionally, in the only

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<sup>14</sup> See IC Comments at 9.

<sup>15</sup> Some parties suggest that RPM itself will increase costs to consumers. (See Customized Energy Solutions Comments at 4; and OCA at 25-27.) As shown in the extensive analysis presented by PJM now under review at the FERC, however, RPM will in fact both increase reliability and decrease costs over time.

organized market where this approach was applied (England & Wales), the “pay as bid” method is being considered for replacement, as the regulators are concerned that it will fail to adequately value supply in times of shortage and thus further undermine investment incentives.<sup>16</sup>

PJM disagrees with the suggestion made by the DEP that the PJM market does not allow Pennsylvania to take advantage of its own fuel diversity. As indicated in the second attachment to these reply comments, the consulting firm ESAI demonstrated that locational prices in PJM fell in response to integration of service territories to the West of the traditional area of PJM.<sup>17</sup> If markets are made smaller, they necessarily become less competitive, cannot take advantage of existing load, weather and generation diversity, and will likely result in investment in more power plants than would be needed if the power were drawn from a larger area. Modeling in the ESAI study to simulate the difference in prices from what would have been the case without integration of new systems with the actual prices after integration reveal an estimated \$500 million savings from integration over the course of 2005.

Additionally, using an “average” of an area like Pennsylvania for setting price would put new technologies that may be initially more expensive at a disadvantage in relation to traditional technologies. It is the ability of new technologies to occasionally capture a high price that meets its initially high input costs that leads to market driven innovation. Consequently, the “average price” advocated by the DEP could have the perverse affect of undermining new, more environmentally efficient, technologies.

Finally, the comparison made by the Industrial Customers between prices in Maryland and West Virginia is entirely misleading.<sup>18</sup> Maryland has access to little, if any, indigenous coal, which is currently the lowest priced fossil fuel to produce power. Further, due to its relative population concentration and other costs such as labor and

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<sup>16</sup> These concerns were addressed in a report prepared by NERA. See NERA Energy Regulation Insights, Issue No. 20 April 2004. The report also sights a reference from the “Journal of Industrial Economics,” vol. 51.

<sup>17</sup> Refer to Attachment B for contour maps showing the price impact of integration.

<sup>18</sup> See IC Comments at 9, 14.

land, the costs of similar plants in each state are not comparable. However, because of the depth of the PJM market, some of the cost advantages West Virginia enjoys can be used to ameliorate prices in states such as Maryland.

Conclusion

PJM applauds the Pennsylvania Public Service Commission for undertaking this inquiry and in developing a record that will help shape its decisions. PJM looks forward to working with the Commission and other parties to this proceeding to ensure that the Commission has all the information it requires to address the possibility of retail price changes going forward.

Respectfully submitted,

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Vice President, External Affairs  
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Dated: July 19, 2006

## ATTACHMENT A

### **PRICE INCREASES IN PJM – 2005**

#### **Joseph Bowring – PJM Market Monitor**

Prices in the PJM energy market increased significantly in the latter half of 2005. The PJM Market Monitor examined the causes of these increases, and determined that they were due to the increased cost of the fuels used to generate electric energy and increases in demand. In an article in the June 2006 edition of Public Utilities Fortnightly by Howard Spinner of the Virginia State Corporation Commission, however, the VA SCC staff raises the question of whether the observed increase in PJM average system prices in the second half of 2005 was instead the result of market power. The Spinner article suggests that the increase in prices in PJM was not the result of higher loads or fuel prices but was the result of the exercise of market power. It also suggests that the result of this asserted market power was an increase in net revenues to generators.

The suggestion that market power and not fuel costs caused the increase in prices in the PJM market is wrong. Mr. Spinner's assertions are based on a series of incorrect assumptions about the types of units on the margin, the frequency of unit types on the margin and the efficiency of the units on the margin. There is no evidence of market power in 2005 or of increased market power in the latter half of 2005. The increase in PJM prices in 2005, particularly in the latter half of 2005, was the result of increased fuel prices and increased demand.

In the PJM energy market, prices are set by the marginal unit or units. Under economic dispatch, the lowest cost available units are dispatched in ascending order of cost to meet the load in real time. The last unit dispatched, the highest cost unit of the dispatched units, is the marginal unit. When there are binding transmission constraints, multiple marginal units and multiple prices result. Thus, the behavior of marginal units is critical in evaluating the competitiveness of the PJM market.

Mr. Spinner attempts to estimate the hourly system marginal cost of energy by estimating the costs of marginal units. His estimates are based on a combination of hourly data on the type of fuel on the margin in the Real-Time Market, posted by PJM, and his own assumptions regarding unit type and heat rate. The simple monthly average of the resultant hourly marginal cost is compared to the simple monthly average of PJM hourly prices in the Day-Ahead Market and the difference between the two is the basis for the assertions regarding market power.

PJM currently posts the time-weighted hourly fuel type for each hour of the year for the Real-Time Market. In order to translate the hourly fuel type into information about marginal costs, Mr. Spinner had to make assumptions about the type of unit burning the fuel. The three fuel types that are primarily on the margin in PJM are coal, oil and natural gas.

While it is generally reasonable to assume that coal is burned in a base load steam unit, gas and oil may be burned in units with very different characteristics and corresponding costs. For gas-fired units, the two primary unit types are combustion turbine units (CT) and combined cycle units (CC). CTs are peaking units that are relatively inefficient and CCs are more efficient “midmerit” units. For oil-fired units, the two primary unit types are CTs and steam units. The efficiency of fuel-burning generating units is generally measured by the heat rate, in BTU of fuel input per KWh of output. A higher heat rate means that a unit is less efficient and a lower heat rate means that a unit is more efficient. As a result of the differences in fuel efficiency across unit types, the assumptions made about the marginal unit type in the Spinner article have a significant impact on the conclusions of the paper. The incorrect conclusions drawn in the Spinner article stem largely from these faulty assumptions.

The Spinner article incorrectly assumes that when gas is the marginal fuel, more efficient gas-fired combined cycle units are on the margin most of the time. The article assumes that gas-fired combustion turbine units are on the margin only in the months of January, December, June, July and August, and only when hourly load is greater than or equal to 95 percent of the maximum monthly load for the two winter months and 90 percent for the three summer months. In fact, however, gas-fired CTs were on the margin in 25,499 five-minute intervals in 2005 (24 percent of all intervals) while the Spinner article assumes that gas-fired CTs were on the margin in only 1,357 intervals (1 percent of all intervals).<sup>19</sup>

Assuming that CCs are on the margin whenever gas is the marginal fuel is equivalent to assuming that costs are lower than they are. Similarly, assuming that oil-fired steam units are on the margin when oil is the marginal fuel is also equivalent to assuming that costs are lower than they are. The fuel component of marginal cost of the CT is 60 percent higher than that of a CC. In addition, the Spinner article incorrectly assumes that when oil is the marginal fuel, an oil-fired unit with a heat rate of 11,000 is on the margin. In fact, the heat rate for oil-fired steam units is about 12,600 and for oil-fired CTs about 14,100.

Mr. Spinner suggests that his assumptions are less significant because the observed relationship between estimated costs and prices is stable for 18 months and changes only during the latter half of 2005. Here, too, Mr. Spinner’s analysis is flawed. The apparent difference between cost and price during the latter half of 2005 is the direct result of the erroneous assumptions. The fact that gas prices increased significantly in the latter half of 2005 made the results for that period more sensitive to assumptions about the type of unit setting the marginal price.

The spot market price of natural gas in the second half of 2005 was 69 percent higher than over the prior 18 months, the spot market price of light oil in the second half of 2005 was 41 percent higher than over the prior 18 months while the spot market price of coal increased less than 1 percent over the same period. The result of the increase in gas prices

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<sup>19</sup> This information was published in the State of the Market Report.

was an increase of 69 percent in the difference between the costs of a gas-fired CC and a gas-fired CT.

The interaction of heat rate assumptions in the Spinner article and fuel price increases explains why Spinner underestimates costs and overestimates the difference between prices and marginal costs for the latter half of 2005. There was, in fact, no increase in the markup and no increase in market power in the latter half of 2005.

Prices increased in PJM in 2005 as the result of increased fuel prices and increased demand rather than from an increase in market power. In a competitive market, it is expected that increased input prices will result in increased marginal costs and increased prices. The 2005 State of the Market Report concluded that, on a fuel-cost adjusted basis, prices in PJM increased by 1.5 percent.

The MMU found that PJM energy market results were competitive in 2005 based on detailed analyses of market structure, participant behavior and market results. There is no evidence of increased market power in the latter half of 2005.



# Post-Integration Price Pattern

