

Pennsylvania House
Environmental Resources and Energy Committee

Testimony of Andrew Ott, Senior Vice President

PJM Interconnection
September 9, 2008



Good Afternoon, Chairman George, Chairman Hutchinson, and members of the Committee. Thank you for the opportunity to participate in this important hearing on the potential increases to Pennsylvania's retail electricity rates that are anticipated after the Commonwealth's remaining retail rate caps expire in 2009 and 2010. My name is Andrew Ott, and I am Senior Vice President of Markets at PJM. My goal today is to convey a sense of how PJM employs its competitive wholesale market to accomplish its core mission – maintain electric system reliability for consumers in Pennsylvania and throughout the region we serve. I will explain how rising wholesale electricity prices are being caused by changes in wholesale market fundamentals, including the rise in the costs of fuel, and not because PJM's market is dysfunctional or incapable of containing prices to reasonable levels. PJM's wholesale market is competitive, and the prices established in the market are fair and reasonable. Additionally, I will offer my opinion on what can be done today in Pennsylvania to help mitigate the increases in wholesale and retail electricity costs.

PJM, a Regional Transmission Organization (RTO), is one of the seven ISOs and RTOs located throughout the country, with approximately two-thirds of America living in an area served by either an ISO or RTO. PJM is responsible for 'keeping the lights on' for 51 million Americans in thirteen states and Washington DC, including almost all of Pennsylvania's 12.5 million residents. Because all of the transactions involving PJM are wholesale transactions and are necessarily part of interstate commerce, the PJM market does not encompass retail transactions or the retail market. As an RTO, PJM does not own transmission or generation facilities; we do not generate electricity; we do not buy energy for resale; we do not have retail customers; we do not operate long-term forward bilateral markets; and we do not profit from the markets we operate. PJM, as the independent system operator, coordinates the operation of transmission and generation facilities so that all market participants have equal access to the benefits of the regional grid operation. The regional scope of the wholesale market provides benefits to consumers by providing access to a large portfolio of less expensive power resources through coordinated regional grid operations. In a broader regional market, customers have access to a larger number of resources because of the market's size and because barriers to trade are eliminated. Market participants also benefit from the large-scale regional market because it is competitive. As an independent system operator, PJM is free from undue influence by market participants. The PJM Market Monitor acts as the market watchdog, to ensure the marketplace is competitive and is free from the exercise of market power.

Chairman George, at the last hearing of this committee you characterized electricity as a necessity. PJM could not agree more with this statement. It is precisely because electricity is a necessity that PJM looks at electricity through the lens of reliability, always making sure to the best of our abilities, that power is

available in the quantity and quality demanded by consumers, and that it is generated by the most economical mix of generating resources.

'To keep the lights on', PJM must perform the real-time balancing of the electrical grid - every second of every minute of every day, PJM matches electricity demand with the 'least-cost group' of electricity generation and demand response resources, while working within the constraints of the electric transmission system and being prepared for the loss of generation or transmission at any moment. This challenging balancing of the grid is complicated by the unique physics of electricity. Electricity is not like oil which can be refined and stored easily and for long periods until the time it is needed. Electricity must be generated at the near moment that it is required, and it travels at the speed of light through the grid and for all practical purposes, can not be stored in significant quantities. If for any reason, electricity generation does not match the demand, within a small tolerance, the electrical grid can crash, which can cause the loss of electricity to cascade from region to region. Last month was the fifth anniversary of the 2003 North East blackout that affected 40 million Americans. That situation developed in Ohio, and within a period of only nine seconds, the grid collapsed in areas of eight states. It took nine seconds to occur, four days to fix, and had an economic cost estimated at \$6 Billion. That is only the estimated economic costs and does not include the social or human costs, which were undoubtedly much higher.

I have just outlined the importance of PJM balancing the grid on a continual basis – but just how does PJM go about performing this complex and vital task? We do that through the operation of our open and non-discriminatory wholesale electricity markets. The PJM wholesale market pricing system, Locational Marginal Pricing (LMP), ensures that PJM is able to operate the bulk power system consistent with regional grid reliability standards. The PJM pricing system is tightly integrated with the real-time generation dispatch function and is a critical element to assure that the transmission system can handle all requested energy deliveries which are scheduled to maximize electricity transfers for the benefit of all customers in the region. The LMP system makes all market participants partners with the RTO in maintaining grid reliability through price signals. PJM's goal is to be sure, to the extent possible within reliability constraints, that at any moment in time, the least expensive set of generating resources is operating to serve the regional electricity demand. To assure this outcome, PJM's market rules price energy from the spot market in a way that both ensures generators come on line and follow dispatch signals, and ensures loads will pay enough to cover this cost while paying no more than the loads were willing to pay as indicated by their bids. Spot market prices provide the correct incentives for all market participants to do what the RTO needs them to do to keep the lights on. Spot market participation in PJM is voluntary: market participants may self-schedule to

meet their native load obligations, engage in bilateral transactions, curtail demand during high price periods or may choose to transact in PJM's wholesale energy market. PJM's market pricing system enables its system operators to re-dispatch generation facilities to avoid reliability violations, rather than rely on inefficient power curtailments resulting from Transmission Loading Relief (TLR) procedures. In the late 1990's, the electricity industry's dependence on TLRs to maintain system reliability led to significant power disruptions in the Midwest and elsewhere. These disruptions spurred the development of the LMP market design, with the desire to assure reliable bulk power system operations.

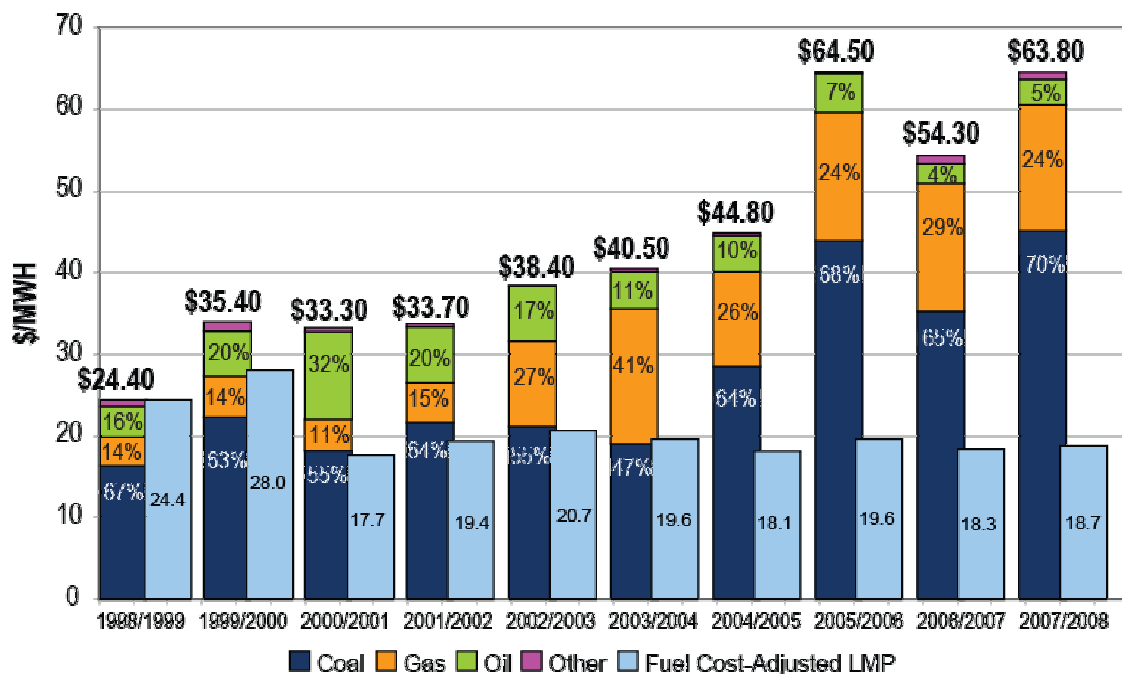
PJM's spot market design – an open, single clearing price auction establishing Locational Marginal Prices – not only plays a fundamental role in maintaining the short-term reliability of the high-voltage electricity transmission system, it also facilitates innovation, such as renewable resources, demand response solutions, energy efficiency and other advanced technology resources. It is also important to note, that every ISO or RTO in the country is using or implementing a Locational Marginal Pricing mechanism to price electricity. I am going to say this again so that everyone understands that LMP is not just a tool used by PJM to ensure electricity reliability and to run efficient markets in Pennsylvania and thirteen other states – it is a tool that is being used or implemented in every single ISO and RTO in the country. Even California, which experienced monumental problems with reliability and prices in 2000 and 2001 that included massive losses of electricity in large service areas, is implementing an LMP-based energy pricing methodology this year, after trying and rejecting various pricing methods including a system using only bilateral contracts, in response to their problems.

This Committee has heard testimony that LMP causes unjustly high wholesale electricity prices by paying unnecessary payments to generators, such as base-load coal plants. You have heard how a base-load coal plant is being paid far above its bid, because a natural gas plant provided part of the electricity generation at the same time. It has been stated that this situation is not fair and that generators should only be paid their 'bid price' for electricity. This is a seemingly logical thought; however, it makes the assumption that under other wholesale pricing mechanisms, the same base-load plant would continue to bid into the market at its short-term marginal cost of generation, which they do currently in PJM's LMP-driven market. Experience has borne out that pricing mechanisms, such as 'pay as bid', cause generators to bid into the market at the level they expect power to be worth, not at what it costs them to generate electricity in the short run. This results in generators guessing what the demand for power will be, what the available supply will be, and what the ultimate clearing price will be to determine their bid into the market. This mentality would, at best, result in the same pricing outcome as LMP, but more likely would result in higher prices to consumers. More

importantly, a 'pay as bid' system would result in increased operational uncertainty because of fluctuating bid patterns that can jeopardize reliable and efficient grid operation.

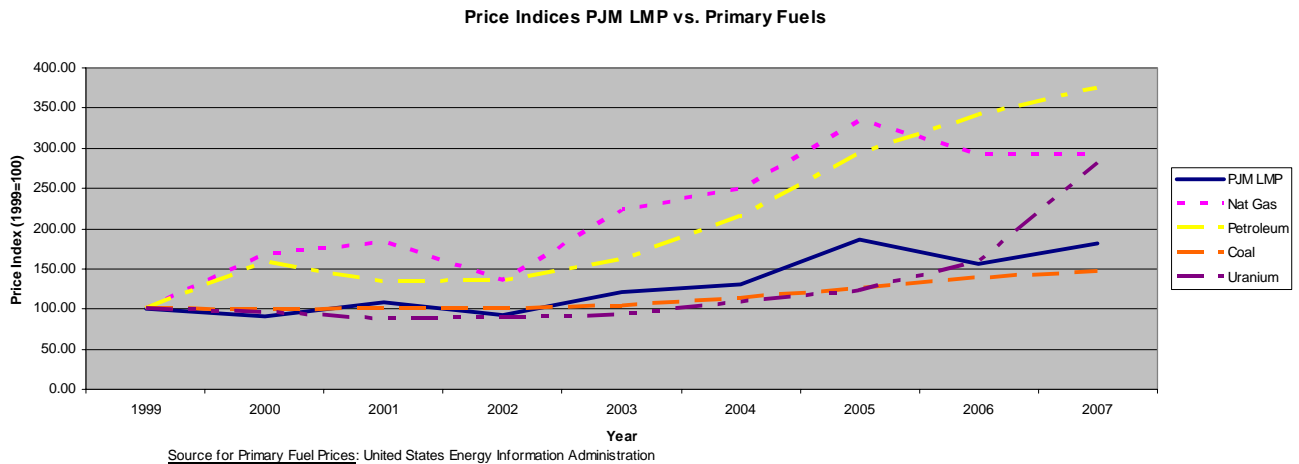
This Committee is focusing on retail electricity prices and their anticipated increases. Currently there are multiple factors that are influencing the rising price of wholesale electricity. Let's look at one of these influences, the rise in fuel costs, and see what its impact has been on the price of wholesale electricity. Please take a look at Exhibit 1 of my testimony.

Exhibit 1. PJM Load-Weighted and Fuel-Cost-Adjusted LMP by Fuel Factors
 April 1 - March 31 Reporting Periods



This is a graph that provides various data relevant in the evaluation of electricity prices over the last decade. First, from the height of the column on the left each year we can see that the average LMP price within PJM has increased, year-over-year, except for a price spike up in 2005/2006 and then down afterwards. We can also see from the light blue column on the right each year, that when we account for the rising price of fuel (such as coal, oil, and natural gas), the fuel-price adjusted LMP has actually gone down, more than 23% over the last 10 years. This comparison shows not only the influence of fuel on the price of wholesale electricity, but also the benefits of the increasing efficiencies of PJM's wholesale electricity markets. The efficiencies that have resulted in lower fuel-adjusted LMPs over the last ten years are a function of the shared resources of the regional market and the coordination of regional grid operations. Please see Exhibit 2 for a comparison between LMP indices and fuel indices since 1999.

Exhibit 2



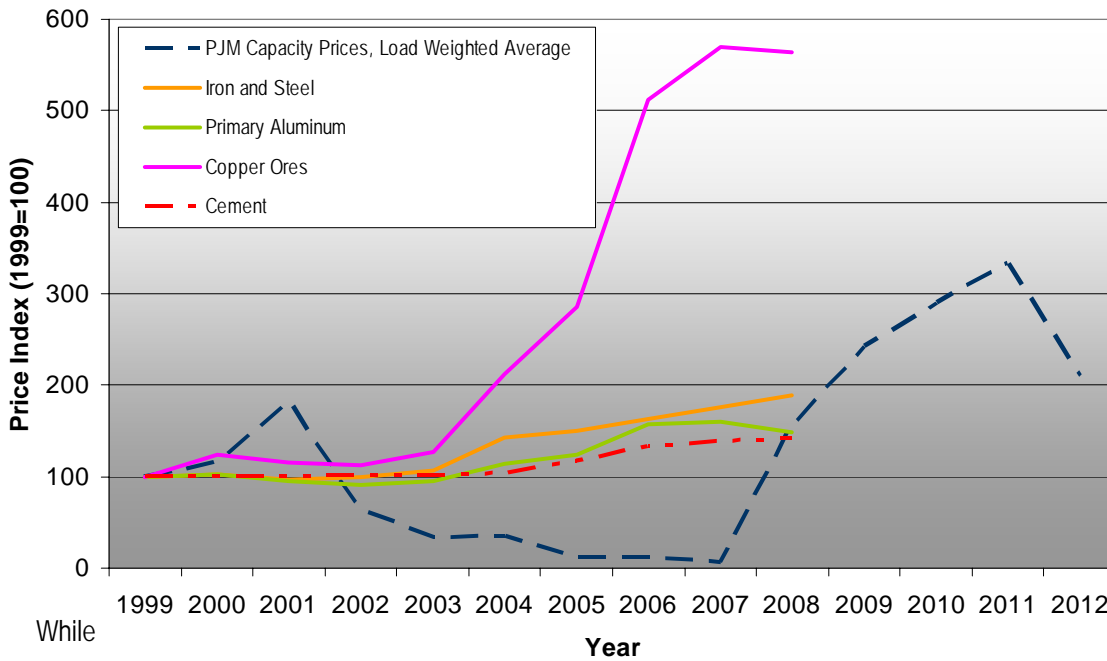
As a Pennsylvania resident, I too am concerned about the prospect of rising electricity prices. As far as what can be done today to help the Commonwealth's electric consumers with rising rates, there are definitely efforts that can be initiated that would help limit increases to electricity costs. Many of these actions are contained in HB 2200 and include Smart Meter technology coupled with 'time of use' or 'real-time' retail tariffs, conservation, and demand response efforts. All of these actions can help limit electricity consumption at times when the most expensive generation resources are required; and moreover these efforts have the potential to help lower costs for all electricity consumers, not just those who participate in the specific programs. There are also mechanisms, such as multi-year retail auctions and balanced supply portfolio approaches that Pennsylvania can deploy to help to protect consumers from large price increases that can occur during a single year. I encourage the committee to look at successful retail auctions like the one deployed in New Jersey to address these issues.

Because time is short, I will touch briefly on some of the other influences on the rise in wholesale electricity costs, including: the increases in electricity demand, regulatory uncertainty, and the resistance to siting new generation or new transmission. As electricity demand rises, which it has in PJM's service territory and is expected to continue on average of 1.5 to 2% per year, the need for new generation and transmission resources grows. Without new generation and transmission resources to handle increasing electricity demand, not only will reliability suffer because of lower reserve margins, but prices will rise due to increased transmission congestion and the need to utilize higher-priced generation resources to meet demand. Please look again at Exhibit 1, the columns on the left show the contribution percentage to total electricity costs by different types of generation. As you can see, the PJM market continues to rely heavily on coal-fired generation for economical electric supply. As we look toward the future, the uncertainty in environmental regulations has inhibited new coal plant development which puts this economical source of electricity at risk.

Both coal and nuclear plants have large hurdles inhibiting their construction – for coal, the hurdles include the regulatory uncertainty of potential carbon legislation, environmental concerns about using coal generation, and siting issues. For nuclear generation, the hurdles include long lead times in licensing approvals and in materials acquisition which continue to drive increases in the tremendous capital required to build a nuclear power plant.

I want to spend my last moments discussing one of PJM's markets that had its genesis in the above mentioned scenario of increasing electricity demand and tightening reserve margins. This market is PJM's capacity market, or Reliability Pricing Model, instituted in the last two years and designed to ensure that enough installed capacity exists to meet electricity demand. This Committee has heard testimony that PJM's capacity market is essentially making utility companies (and ultimately their customers) 'pay for nothing'. This statement assumes that the capacity product was free in the past which is not true. Please see Exhibit 3, a graphical comparison between PJM capacity prices and the cost of various commodities associated with building power generating facilities.

Exhibit 3. Capacity, Metals, Materials Prices



While

capacity prices were artificially low in 2004 through 2006, in 2001, the annual price of capacity was \$100.43 per MW day which is comparable to the price result of \$111.10 from the recent RPM auction for 2011/2012. In 2005, when PJM studied anticipated electricity demand growth and observed a significant lack in projected new generation investment, we saw a situation that would result in an unsafe gap between electricity demand and installed capacity – threatening electric reliability. In essence, a situation was



developing where without definitive action, an electricity shortage would have occurred that could result in widespread blackouts. Therefore, PJM asked for permission to reform its capacity market to help ensure grid reliability. The results of the first five RPM auctions have delivered investment to supply 9,981 MW of new resources, including a base-load coal plant and over 2,000 MW of Demand Response resources. Additionally, the PJM Market Monitor and an independent consultant have reported that existing generators have invested \$5.1 billion for environmental compliance and performance upgrades to allow over 10,000 MW of existing resources to remain operational. Therefore, the facts indicate that RPM has benefited the regional grid and the Commonwealth of Pennsylvania by ensuring sufficient reliable supply for the five year period covered by the RPM auctions.

Mr. Chairman, distinguished members of the Committee, I respectfully request that as you formulate a retail electricity market policy for Pennsylvania, you keep in mind the system reliability imperative with which PJM's operations and markets are aligned.

I would be happy to answer any questions you may have. Thank you.