

# Impacts of Electricity Restructuring



## in Rural Pennsylvania



# **Impacts of Electricity Restructuring in Rural Pennsylvania**

**By:**

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## Executive Summary

Electricity restructuring was mandated in Pennsylvania in 1996, and introduced a number of significant changes in the commonwealth's electricity industry. Wholesale markets for electric generation were almost completely deregulated, and utilities in Pennsylvania were encouraged to sell their generation assets and purchase power from the market, either through bilateral contracts or regional wholesale markets, such as the Pennsylvania-New Jersey-Maryland (PJM) market.

By January 1, 2011 all electricity consumers in Pennsylvania served by state-regulated utilities were to pay electricity prices determined by market forces.

The purpose of this study, conducted in 2009 and 2010, was to examine the likely impacts of restructuring on rural Pennsylvania ratepayers, since expectations for the transition to market-based retail electricity pricing in Pennsylvania had been unpredictable.

In 2005 in rural Pike County, rates climbed 50 percent overnight when a utility's rate caps expired.

In 2008, the PUC projected that retail electricity rates would increase dramatically if price caps had been lifted at that time.

Since July 2008, however, electricity prices have fallen by more than one-third, driven largely by natural gas price decreases. In addition, utilities have prepared for the post-cap era by participating in a number of power procurement auctions. By holding a series of staggered competitive auctions, utilities could reduce the risk that electric rates would be determined entirely by market conditions at a specific point in time.

This research examined the results of more recent procurement auctions and found that utilities in western Pennsylvania were able to obtain lower prices than utilities in eastern Pennsylvania. The difference in prices between eastern and western Pennsylvania appeared persistent, pointing towards fundamental differences in the generation mix and cost structures for eastern utilities. The price differences also suggest that one cannot think of Pennsylvania as having a unified electricity market as transmission constraints have separated the state into a generation-rich "west" versus a high-priced "east."

To uncover how the rate cap expiration may affect rural Pennsylvanians, the researchers examined events in the PPL Electric territory, located in eastern Pennsylvania, where caps expired on January 1, 2010. The PPL experience shows that competition for retail business will be robust. A large number of providers are offering products with a variety of different characteristics. In the first three months following the rate cap expiration, close to 30 percent of PPL retail customers moved to alternative suppliers.

The research also examined several issues dealing with electricity prices in a restructured Pennsylvania market. It found that coal is more likely to be the marginal supply fuel in western Pennsylvania, while natural gas is more likely to be the marginal fuel in eastern Pennsylvania. The research results indicate that Pennsylvania electricity prices, especially in the eastern part of the state, are prone to variations in the price of natural gas and oil. These fuel prices are likely to remain volatile into the future, even if development of the Marcellus Shale continues at a robust pace.

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## Introduction

Electricity restructuring came to Pennsylvania in the late 1990s, with the promise that competitive markets would bring lower electricity prices, better service and more choices for all consumers.

The restructuring, mandated by the Pennsylvania Electric Generation Customer Choice and Competition Act of 1996, introduced a number of significant changes in the state's electricity industry. Wholesale markets for electric power and generation were almost completely deregulated, and utilities in Pennsylvania were encouraged to sell their generation assets and purchase power from the market, either through bilateral contracts or regional wholesale markets, such as the Pennsylvania-New Jersey-Maryland (PJM) market.

The act also mandated some form of market-based pricing for all consumers. Prior to full adoption of market-based electricity pricing, Pennsylvania's retail rates were capped for a "transition period" that was scheduled to expire for all Pennsylvania utilities by the end of 2010.

Following large increases in fuel prices in 2008, and from the experiences of other states, many believed that Pennsylvania's 14 rural electric cooperatives and 35 publicly-owned electric distribution companies would face significant challenges following the expiration of rate caps since these entities would not own significant generation or transmission assets and would be dependent on the market to serve their customers.

While the recent recession has dampened energy prices in Pennsylvania, electricity and fuel prices in the future are likely to be volatile, with increased competition for traditional energy sources, increasing difficulty in siting and financing new infrastructure, and increased environmental regulations.

The future of Marcellus Shale natural gas development in Pennsylvania may depress fuel prices in portions of Pennsylvania, but the magnitude of the Marcellus Shale build-out is not yet known.

Volatile and potentially rising energy costs may have a significant impact on residential customers in rural Pennsylvania, since wages and incomes are lower and economies tend to be less diverse than those in urban areas.

## Research Goals and Methodology

This research, conducted in 2009 and 2010, examined the likely impacts of electricity restructuring on rural rate-payers in Pennsylvania.

Rural Pennsylvanians are served by a variety of different electric utility companies. Approximately 85 percent of rural Pennsylvanians (2.9 million residents) are served by state-regulated electric distribution companies, such as Allegheny Power, Citizens Electric, Penelec, Penn Power,

Pike County Power and Light, PPL Electric and Wellsboro Electric. These companies have undergone electricity restructuring and participate in state and regional wholesale markets for electricity.

The remaining 15 percent of rural Pennsylvanians (approximately 500,000 residents) are served by rural electric co-operatives. These utility co-ops are not directly regulated by the Pennsylvania Public Utility Commission (PUC) and have generally not engaged in the restructuring process to the same extent as state-regulated utilities. Therefore, they were not included in the research.

To estimate a likely range of market price increases for the state-regulated electric distribution companies serving rural Pennsylvania consumers, the researchers:

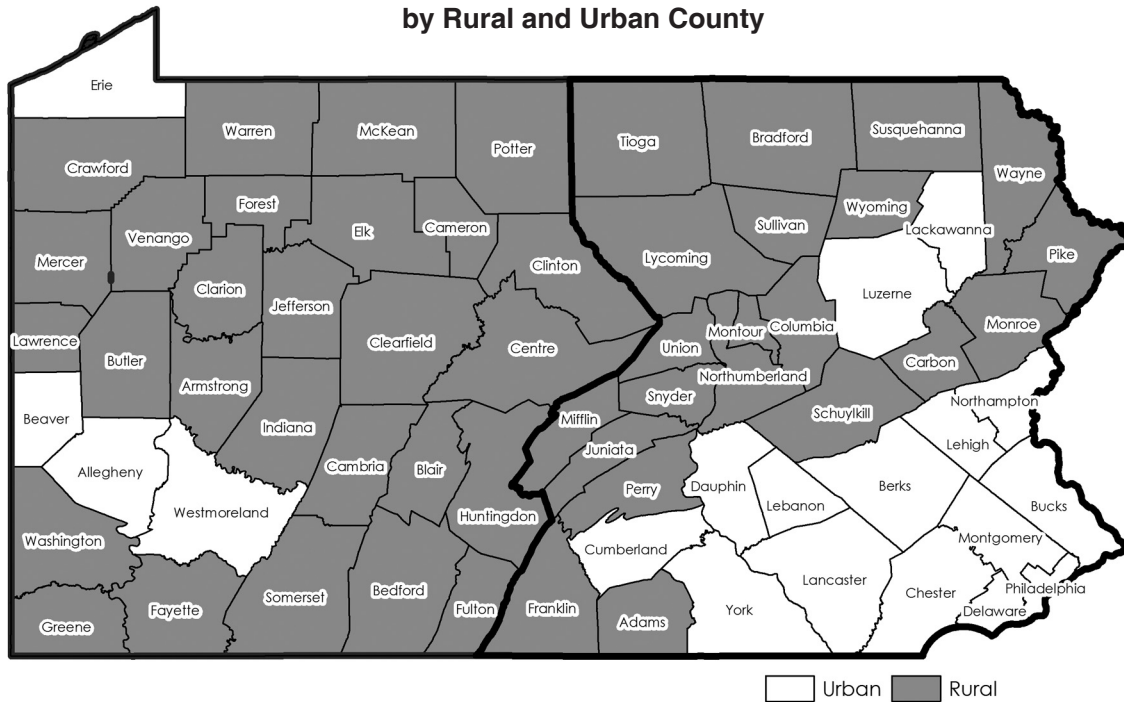
- Gathered hourly price and electricity demand data for locations corresponding to utilities serving rural Pennsylvania. The data is publicly available from PJM Interconnection ([www.pjm.com](http://www.pjm.com)). The researchers used the Center for Rural Pennsylvania's definition of rural to identify rural counties as follows: a county is rural when the number of persons per square mile within the county is less than 274. All other counties are urban.
- Estimated the type of fuel, such as coal or natural gas, that sets the price in each hour and each location. The researchers used publicly available data on power plants in the PJM territory from the U.S. Environmental Protection Agency E-GRID database ([www.epa.gov/cleanenergy/energyresources/egrid/index.html](http://www.epa.gov/cleanenergy/energyresources/egrid/index.html)).
- Built a statistical model of electricity prices in rural Pennsylvania incorporating various scenarios regarding fuel prices and environmental regulations.

## Default Power Auctions and Retail Markets for Power

The Electric Generation Customer Choice and Competition Act of 1996 allowed all Pennsylvania electric consumers to choose the company that generates their electricity (PUC, 2007). The PUC designated each major electric utility company as a Provider of Last Resort (POLR), or Default Supplier, to distribute electricity generation to customers who do not choose an alternative supplier. When customers choose an alternative supplier, they receive generation from this supplier, but their POLR continues to provide the transmission and distribution aspects of their electricity service.

In addition to the opportunity customers have to choose their electricity supplier, the act implemented price caps throughout Pennsylvania, all of which were removed at the end of 2010. Retail electric rates would then reflect wholesale prices from the Pennsylvania-New Jersey-Maryland (PJM) Interconnection market or other competitive markets for bulk electricity. The removal of price caps

**Figure 1: Western and Eastern Regions of Pennsylvania, by Rural and Urban County**



was viewed as a necessary step to encourage competition at the retail level, since generation suppliers could not effectively compete if rates for the electric distribution company were capped at below-market levels.

Expectations for the transition to market-based electricity pricing in Pennsylvania had been variable. Some consumers in the Pike County Power and Light territory, in rural northeastern Pennsylvania, saw their electricity bills double at the end of 2005 when rate caps in that utility’s territory expired.

In 2008, the PUC projected that electricity rates would increase dramatically for both rural and urban consumers if the price caps had been lifted at that time (PUC, 2008-2010).

Since July 2008, however, electricity prices have fallen by more than one-third, driven largely by decreases in the price of natural gas. In addition to widespread consumer education plans, pre-payment options, and bill deferrals to mitigate price spikes, the utilities prepared for the post-cap era by participating in a number of power procurement auctions.

In a series of competitive auctions staggered over time, utilities purchase wholesale electricity from winning bidders. These procurement auctions represent supply contracts that the POLR providers can draw upon to serve default customers that do not sign up with an alternative supplier.

The post-July 2008 trend in pricing estimates for post-cap removal showed a steady decrease in expected rate

change almost uniformly across the state, corresponding with a downward trend in wholesale prices.

To explain these forecasted results, the researchers decided to focus the study on five major utilities in Pennsylvania, namely Allegheny and Penelec, which serve a majority of western Pennsylvania consumers, and Met-Ed, PECO, and PPL Electric, which serve a majority of eastern Pennsylvania consumers.

The researchers first examined the results from the procurement auctions that took place, particularly in the Allegheny and PPL service areas. To better understand expected auction outcomes for Met-Ed, Penelec, and PECO, where, at the time of the research, the procurement periods were just beginning, the researchers examined prices already captured by neighboring service areas.

In addition, the researchers examined regional trends and differences between the five utilities serving the western and eastern regions of Pennsylvania. Figure 1 illustrates how the researchers delineated the state into western and eastern regions.

## Results

### Pennsylvania Public Utility Price Estimates

Since June 2008, the PUC has been releasing quarterly price estimates comparing current market generation prices and existing capped utility rates. It is important to note that the capped rates in each service area were quite different from one another, which made it difficult to

**Table 1: Capped Generation Rates and Expiration Date**

|                           | ALLEGHENY  | MET-ED     | PENELEC    | PECO       | PPL        |
|---------------------------|------------|------------|------------|------------|------------|
| Rate Cap Expiration       | 12/31/2010 | 12/31/2010 | 12/31/2010 | 12/31/2010 | 12/31/2009 |
| Capped Gen. Rate (\$/MWh) | 62.46*     | 51.60      | 50.12      | 61.00      | 52.88      |

(Source: Pennsylvania Utility Electric Tariffs, PUC) \*Allegheny’s generation rate cap had been increasing since 2006; the rate listed was the most current at the time of the research, effective Jan. 2010.

**Table 2: 2009 PUC Electric Price Estimates**

| RESIDENTIAL SECTOR |            |        |         |       |       |
|--------------------|------------|--------|---------|-------|-------|
|                    | ALLEGHENY* | MET-ED | PENELEC | PECO  | PPL*  |
| 6/27/08            | 104.0%     | 81.0%  | 78.7%   | 34.5% | 67.4% |
| 9/29/08            | 51.4%      | 48.8%  | 41.4%   | 9.3%  | 33.8% |
| 12/30/08           | 36.0%      | 36.9%  | 29.3%   | 1.0%  | 22.8% |
| 3/30/09            | 7.3%       | 22.7%  | 15.9%   | -7.4% | 11.0% |
| 6/30/09            | 14.2%      | 26.4%  | 22.0%   | -4.6% | 17.0% |
| 9/30/09            | 17.0%      | 28.5%  | 24.4%   | -2.9% | 29.7% |
| 12/31/09           | 21.0%      | 31.5%  | 27.5%   | -0.6% | 29.7% |
| 3/31/2010          | 4.70%      | 26.4%  | 16.0%   | -8.2% | N/A   |

(Source: Pennsylvania PUC Electric Price Estimates) \*PPL and Allegheny had already completed a number of auctions and purchased significant portions of loads.

compare the price changes across all utilities without a standardized “base-point.” Table 1 shows the expiration dates for the utilities included in the study.

Table 2 provides estimates of retail generation rates if rate caps were lifted on the specified date and the electric utility generation price rose to current market prices for the following 12 months. The PUC emphasizes the disclaimer that “the prices are not a projection of market prices or the rates customers will pay when

the rate caps expire.” Actual default service prices may have been higher or lower, depending on market prices when default service supply was actually acquired. Default service prices also would be less volatile than the prices on the table, since the state’s default service regulations and policy statement required default service supply to be acquired over a number of months and years, instead of on one day.

According to the estimates, if Allegheny Power’s rate cap had expired

on June 27, 2008, its rates would have risen approximately 104 percent to \$127.42/MWh. If the caps had expired on March 31, 2010, Allegheny’s rates would have risen approximately 4.7 percent to \$65.40/MWh.

Although there has been a dramatic decrease since the first estimates were released in 2008, this leveling-off could be due, in part, to a change in the price of wholesale electricity, which seemed to be rising steadily again at the time of the research.

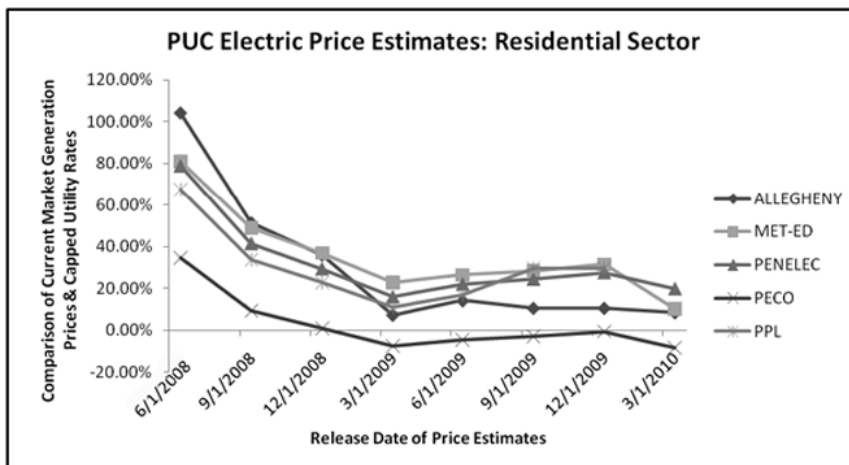
Figure 2 illustrates the trends and changes of the PUC price estimates. Although there had been a dramatic decrease since the first estimates were released in 2008, the leveling off in 2009 and 2010 could be due, in part, to a change in the price of wholesale electricity.

Figures 3 and 4 on Page 8 show the previous electric price estimates for the two western utilities (Allegheny and Penelec) and three eastern utilities (Met-Ed, PECO, and PPL) to illustrate the price differences between the western and eastern regions of Pennsylvania.

The decline in the expected increase from the December 2009 to the March 2010 estimates for Allegheny Power is due, in part, to a January 2010 rate increase of approximately 3 percent for its residential customers; this rate increase was part of a PUC-approved plan that began in 2006 for Allegheny to charge phased-in annual rate increases to allow for a transition from the capped rates.

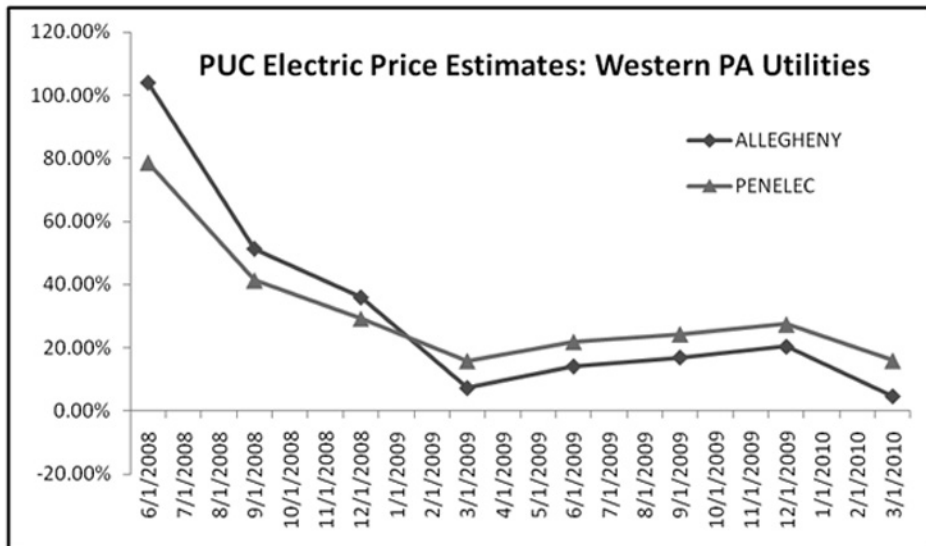
The capped generation rates can help explain some of the forecasted percentage increases published by the PUC. For example, Allegheny’s projected increase did not decrease over time, which may have been due, in part, to the fact that Allegheny has been slowly increasing its generation rate in its service area, to such an

**Figure 2: PUC Electric Price Percentage Estimates for the Residential Sector**



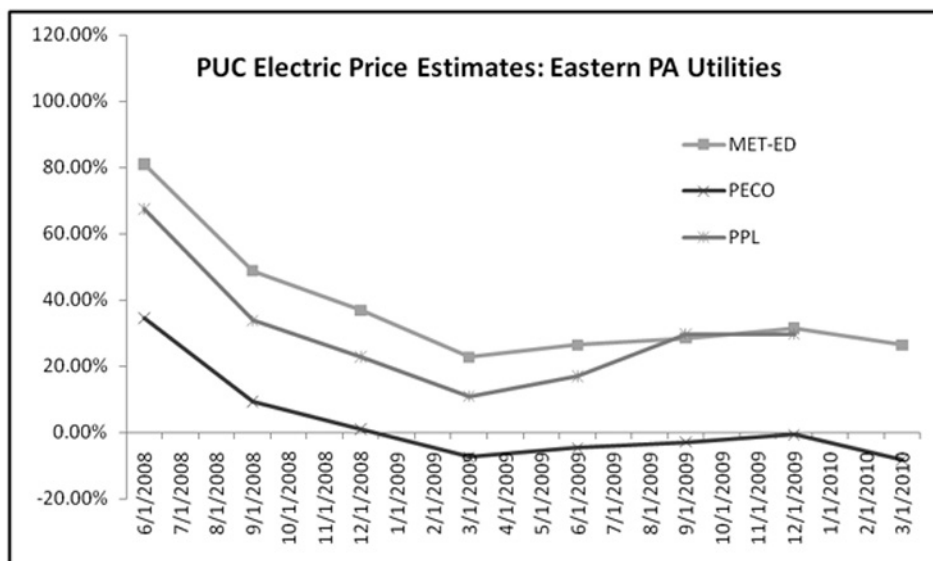
(Source: Pennsylvania PUC Electric Price Estimates)

**Figure 3: PUC Electric Price Percentage Estimates, Western PA Utilities**



(Source: Pennsylvania PUC Electric Price Estimates)

**Figure 4: PUC Electric Price Percentage Estimates, Eastern PA Utilities**



(Source: Pennsylvania PUC Electric Price Estimates)

extent that it had the highest capped generation rate out of all five utilities studied.

In June 2008, when wholesale electricity prices were peaking well over \$120 per MWh, the forecasted price estimates in each service area showed large increases (See Figure 5). More recently, expected rate increases fell drastically throughout Pennsylvania. At the time of the research, the most recent price estimate, released in March 2010, showed a continued decrease in the expected percentage change.

In the competitive PJM wholesale electricity market, prices are set by the last generating unit dispatched. More

than 70 percent of the time, this “marginal generator” is fueled by natural gas. Thus, natural gas prices and electricity prices in PJM are closely linked, though the strength of this link varies regionally within Pennsylvania. Market prices for natural gas have been highly volatile over the period of electricity restructuring.

In July 2008, the price of natural gas spiked to a peak price of around \$12/mmBTU. This spike corresponded directly with the electric price estimates that were released in June 2008, which showed price increases at alarming rates if the caps had been taken off at that point in time. The electric price estimates were decreasing, likely because the futures market price for natural gas remained low, lingering between a market price of \$4 - \$5/mmBTU as of March 2010.

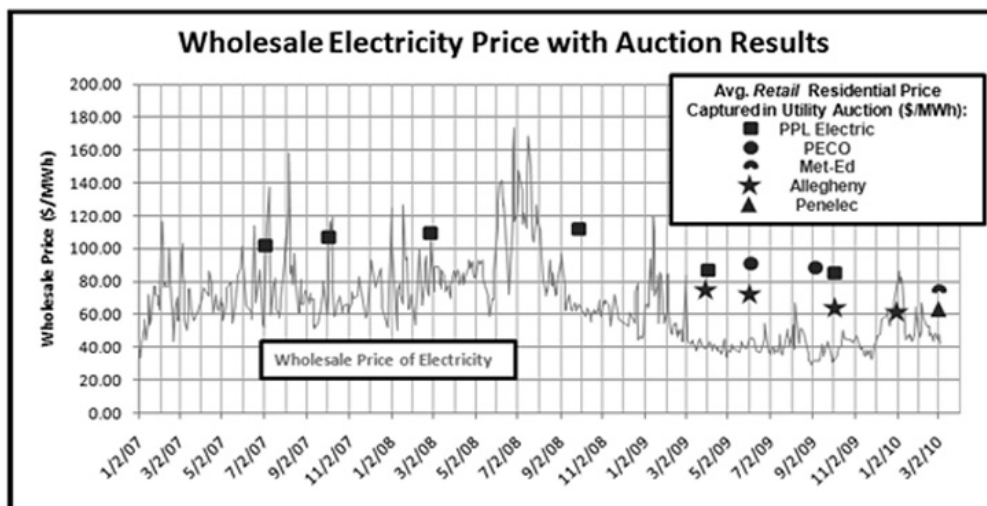
### Utility Procurement Auctions

All five of the major utilities examined in this research had engaged in competitive auctions to obtain default power for the post-rate-cap period. In the PPL territory, where caps expired in December 2009, the utility had completed its procurement auction process during 2010. PPL was likely to continue power

procurement to serve customers in the following years as well. For the remaining four utilities, where rate caps were set to expire at the end of 2010, the power procurement process had not been entirely completed. Figure 6 shows the bidding periods for each utility.

Figure 6 shows the time period in which each utility had participated in power procurement auctions, as well as when future auctions were planned. As the figure shows, PPL has already participated in a long period of auction series, and announced its entry into a new series of auctions in the beginning of 2011. All of the utilities planned

**Figure 5: Average Wholesale Price of Electricity with Average Retail Price Captured in Auctions**



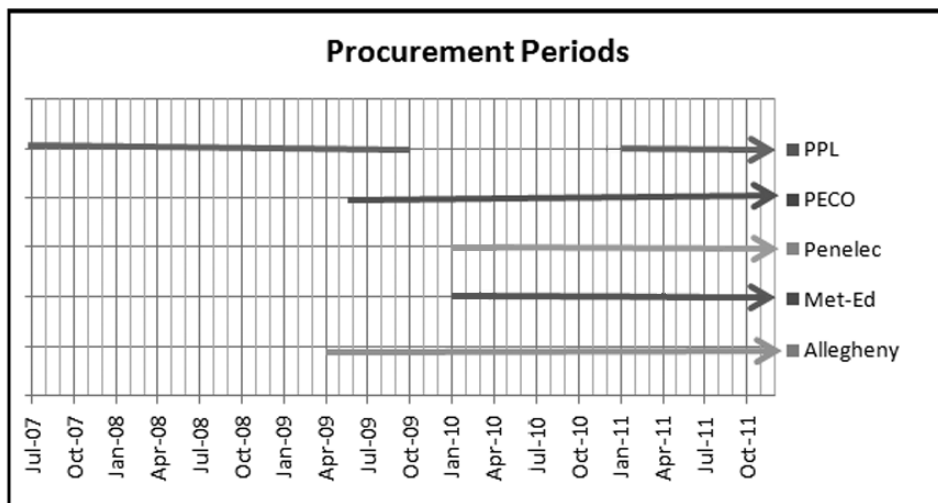
(Source: EIA PJM Market Data) \*The shapes here represent the price captured by the corresponding utility at that moment in time; the continuous line shows the wholesale market price of electricity as a source of comparison.

for auctions well after December 2011 (indicated by the continuing arrow), leading into 2012.

PECO began the auction process in June 2009, whereas Met-Ed and Penelec did not participate in their first power solicitations until January 2010. All three of their bidding periods, which involved a number of auc-

tions over the span of several months, were scheduled to last until the end of 2012. To ensure stable prices for customers, default providers were encouraged by the PUC to maintain a diversified power contract portfolio, procuring short-term, long-term, and spot-market contracts during these auctions.

**Figure 6: Power Procurement Auction Periods**



(Source: Allegheny - PA PUC Power Obtainment Press Release #s: 2262, 2213, 1943, 1969, 2183, 2458; PECO - PECO Procurement Schedule and Auction Results, [www.PECOProcurement.com](http://www.PECOProcurement.com); Met-Ed and Penelec - FirstEnergy Auctions, [www.firstenergycorp.com/utilitypowerprocurements/pa/mepn/auction/index.html](http://www.firstenergycorp.com/utilitypowerprocurements/pa/mepn/auction/index.html); PPL - TradingMarkets.com, [www.tradingmarkets.com/.site/news/Stock%20News/2255106/](http://www.tradingmarkets.com/.site/news/Stock%20News/2255106/))

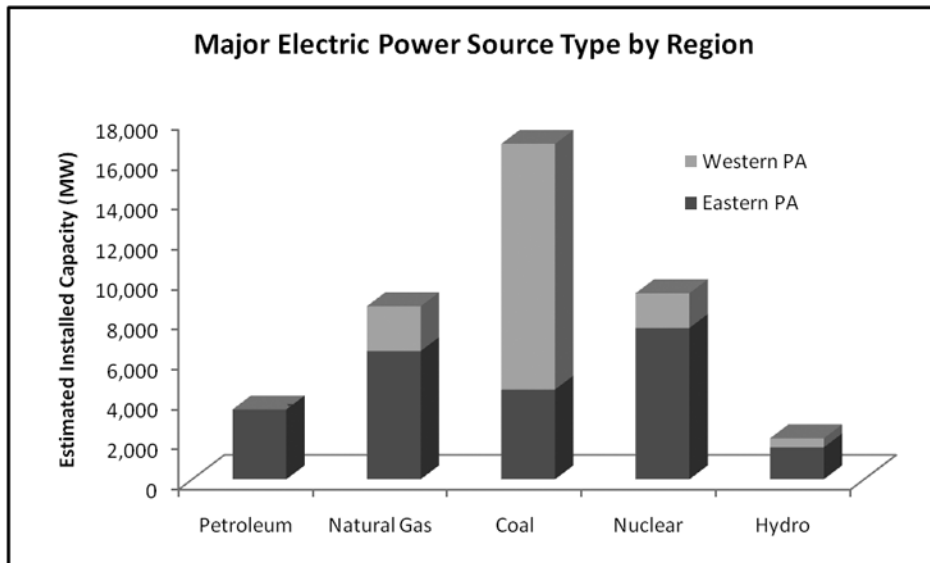
The outcomes of the utility default supply auctions reflect the prices found in the wholesale electricity market. Again, Figure 5 shows the average monthly wholesale price of electricity, with matching shaped indicators corresponding to the average weighted retail price captured by each utility at that point in time. As wholesale prices have fallen, the prices for default generation service have also fallen.

PPL was the first to begin its power procurement bidding process in July 2007, almost two years before Allegheny and PECO held

their first auctions. PPL's procurement process coincided with a period of high and volatile electricity prices, reflecting volatility in the natural gas market. Because of the procurement auction timing, default generation service in PPL territory had been priced higher than default service in the other utilities territories. However, PPL's auction in April 2009 yielded a price that was 20 percent lower than

the previous auction in October 2008, Allegheny's auction results were less than the PPL result at almost the same point in time. Further, during PPL's October 2009 auction, prices obtained seemed far higher in comparison to prices that the four other utilities were capturing during the last quarter of 2009. There is not much discrepancy, however, between the prices PPL obtained during the entire year of 2009 and those captured by the other eastern utilities of Met-Ed and PECO; all three of these utilities seem to see higher prices than the western utilities, Allegheny and Penelec, during the same procurement period. These differences in default sup-

**Figure 7: Major Electric Power Source by Type and Region**



(Source: U.S. Energy Information Administration State Energy Profile)

ply costs likely reflected differences in locational prices in the PJM market and differences in the mix of fuels used to supply customers in these territories.

Since March 2009, wholesale prices have remained fairly stagnant, around \$40 per MWh, with the exception of a price spike during January 2010, where prices reached \$80/MWh. If prices continued to decrease or remain at their current levels for the remainder of the auctions, then Pennsylvania residents would not see large increases in their electric bills as previously believed.

### Regional Differences: Power Source Type and Transmission Congestion

One significant factor contributing to the differences in electricity prices between eastern (PPL, PECO, and Met-Ed) and western (Penelec and Allegheny) Pennsylvania utilities is the primary types of resources used to generate electricity in those areas (See Figure 7).

The eastern region of Pennsylvania is dominated by electricity generation from petroleum, natural gas, and nuclear power sources, in comparison to western Pennsylvania, where one-half of the net electricity generation is produced by coal (U.S. Energy Information Administration, 2010). Western Pennsylvania has a great deal of coal power. The marginal cost of producing electricity from coal-fired power plants is generally low, and coal prices are not subject to the wide fluctuations in price that occur in the natural gas and oil markets. Increasingly stringent environmental regulations are likely to increase the cost of coal-fired power in the future, but considerable uncertainty

exists surrounding the timing and magnitude of these regulations.

After taking the fuel cost production costs into account, it is understandable that the power generating sources in eastern Pennsylvania are relatively more expensive than those in the coal-rich western region.

One crucial characteristic of the Pennsylvania electricity market is that the southeastern counties between Harrisburg and Philadelphia represent the largest collective share of electricity demand in Pennsylvania, with 20 percent of all kilowatt-hours sold in Pennsylvania in 2008 (U.S. Energy Informa-

tion Administration, 2008). Western Pennsylvania, on the other hand, has a surplus of low-cost generation capacity and lower levels of electricity demand.

Table 3 illustrates the population differences between eastern and western Pennsylvania, and the total generation capacity in each half of the state.

The table reveals an additional east-west divide in Pennsylvania's electricity supply/demand balance: although the total generation capacity is higher in eastern Pennsylvania, western Pennsylvania maintains a higher percentage of generation capacity per person.

Higher population densities in eastern Pennsylvania (particularly the Harrisburg-Philadelphia corridor) create stress on the supply of electricity in those regions. During constrained transmission periods, the cost of generation is higher in the east than the west, driving up the wholesale spot market price of electricity in the constrained area, which in this case includes many parts of eastern Pennsylvania. In turn, higher cost sources of generation have to be used in eastern Pennsylvania because there is a limit on the amount of lower-cost power that can be imported from western Pennsylvania's abundant coal generating sources. For rural electricity consumers in eastern Pennsylvania, the combination of urban electricity demand in the Harrisburg-Philadelphia corridor (which bids up the price of generation resources in eastern Pennsylvania) and east-west transmission constraints implies that electricity prices in the east (even in rural areas) are expected to be higher than those in the west.

**Table 3: Regional Population, Capacity, & MW Ratio**

|            | Population<br>(as of 7/1/08) | Total Capacity<br>(MW) | Ratio<br>(MW per person) |
|------------|------------------------------|------------------------|--------------------------|
| Eastern PA | 8,389,038                    | 24,118 MW              | 0.287                    |
| Western PA | 4,059,251                    | 17,123 MW              | 0.422                    |

(Source: U.S. Census and EIA State Energy Profile)

### Retail Choice

An important aspect of electricity restructuring in Pennsylvania was giving end-use consumers the opportunity to choose their retail suppliers. In Pennsylvania, consumers who “choose not to choose” a retail supplier will obtain power from the default supplier; in all cases in Pennsylvania, this default supplier has been the regulated distribution utility.

At the onset of electricity restructuring in 1998, electric rates in Pennsylvania were frozen and capped for a transition period that was originally scheduled to end in 2005. Alternative suppliers were permitted to compete with the utilities so the rate caps effectively set the default price for electricity during this transition period. While retail rates in Pennsylvania were frozen and capped, market prices for electricity rose substantially.

As market prices for electricity climbed above the rate caps, alternative suppliers could not compete. The result was that retail choice was almost non-existent in Pennsylvania through 2005. Therefore, viable retail choice could only be determined with the end of the initial rate caps.

The transition period to retail price deregulation in Pennsylvania was originally scheduled to end in 2005.

Only two utilities actually saw their price caps expire in 2005 – Duquesne Light in the Pittsburgh area and Pike County Power and Light in rural northeastern Pennsylvania. The transition period for the rest of Pennsylvania’s utilities was extended to the end of 2010. Price caps for Penn Power in rural western Pennsylvania expired in 2007, and caps for PPL, which serves a mix of urban and rural customers in eastern Pennsylvania, expired in 2009.

Three years after the Duquesne territory became effectively open to retail competition, more than 100,000 residential customers switched to alternative suppliers. This accounted for approximately 20 percent of the Duquesne residential load. However, more than 50 percent of the industrial load in the Duquesne territory chose an alternate supplier. It is not surprising that more of the industrial share would switch suppliers. Since industrial customers may have extremely large demands for power, even small differences in price could make a switch to an alternative retail supplier worthwhile.

Table 4 shows switching statistics for Pennsylvania’s investor-owned utilities as of April 2010.

As Table 4 indicates, there had been

effectively little to no switching in the Allegheny, Met Ed, Penelec and PECO territories. The reason for this is the rate caps in these territories were not set to expire until the end of 2010.

The most important test so far of retail competition in Pennsylvania has come in the PPL territory, where rate caps expired at the end of 2009. In the first three months after the PPL rate caps expired, more than 330,000 residential customers switched to competitive suppliers, constituting more than 27 percent of the PPL load. (Note: As of January 1, 2011, 429,994 PPL residential customers were being served by competitive suppliers, according to the Pennsylvania Office of Consumer Advocate.)

PPL customers have a number of retail electricity choices. They could remain with their default supplier or they could select from at least 20 product offerings made by 11 companies. These products varied over several dimensions, the most obvious of which was price. At the time, the lowest price offered was 9.299 cents/kWh, which was an 11 percent discount off the default price. The highest price offered was 12.100 cents/kWh, which was almost 16 percent above the default price, but it consisted entirely of wind power.

Products also differed by other factors, including month-to-month pricing, fixed rates for nine months to 3 years, no cancellation fees and substantial cancellation fees.

Previously, the research discussed how the price of electricity is greatly affected by the prices of natural gas and oil. Given this, it may be advisable for rural Pennsylvania electricity consumers to purchase fixed rate contracts to protect themselves against price spikes.

Perhaps most interestingly, many products offer electricity tied to the price of renewable

**Table 4: Customers and Load Served by Alternative Suppliers, April 1, 2010**

| Utility Territory | Residential Number | Residential Load Percentage | Commercial Load Percentage | Industrial Load Percentage |
|-------------------|--------------------|-----------------------------|----------------------------|----------------------------|
| Allegheny         | 0                  | 0.0%                        | 0.0%                       | 0.0%                       |
| Duquesne          | 106,745            | 20.3%                       | 19.9%                      | 53.4%                      |
| MetEd/Penelec     | 0                  | 0.0%                        | 0.0%                       | 0.1%                       |
| PECO              | 2,480              | 0.2%                        | 12.0%                      | 0.4%                       |
| PPL               | 330,902            | 27.1%                       | 36.7%                      | 78.4%                      |

(Source: Office of the Pennsylvania Consumer Advocate)

sources (mostly wind power). It is important to understand that these supply contracts do not imply delivery of renewable energy specifically to customers who have signed up. Consumers who sign up for renewable-energy supply contracts use the same mix of generation resources as any other customer. However, paying a higher price for a renewable-energy supply contract helps offset the cost of renewable energy investments and contributes to the growth of the renewable energy industry. The renewable share of power contracts available in PPL's territory ranges from 5 to 100 percent, with 100 percent renewable products being the most expensive in the market. There appears to be a substantial demand from residential customers to pay more to make the environment cleaner.

## Conclusion

Although only one bidding process had been entirely completed at the time of the research, four of the other major distribution utilities examined as part of the research had started the procurement process, so these results can be used to determine what types of costs may be expected for residential customers once the Pennsylvania retail electricity market is fully restructured in 2011.

Overall, the estimated price increases published by the Pennsylvania PUC declined rapidly due to recent declines in wholesale electricity market prices; if prices stay low, the rate-cap expiration may not be as threatening as originally presumed back in 2008. Nearly every utility has offered numerous options to customers to alleviate any price spikes that may occur once the generation caps were removed: some utilities have offered payment deferral plans as well as pre-payment plans, which collected 6 percent interest prior to cap expiration. In addition, all of the major Pennsylvania utilities are required by the PUC to implement and administer consumer education plans within their service area.

When examining the actual prices captured by the distribution utilities throughout these procurement processes, there is a noticeable trend in regional differences, which may help to understand and predict the rate increases customers will face once all caps are removed. Western utilities, such as Allegheny Power and Penelec, were able to obtain lower prices than the eastern utilities, in particular PPL, PECO, and Met-Ed. Price differences between regions can be explained by the energy generation source types available and used in each area, as well as the transmission constraints in the PJM market.

While the rate caps have expired, there is still a great deal to look out for in the post rate-cap expiration period. The market prices of wholesale electricity and natural gas are constantly changing and remain important indicators in the price of electricity that is delivered to residential customers. These factors will affect the prices captured in

the remaining auctions, as most of the distribution utilities have not yet obtained enough power to deliver to customers following the rate cap expiration.

In addition, newly acquired sources of electricity generation or new PJM transmission projects that would alleviate congestion and help decrease the price of electricity may be long-term factors that could change the regional trends that have occurred throughout the procurement process thus far.

For those consumers who will choose to choose, the PPL experience so far shows that competition for their business will be robust. A large number of providers are offering diverse products with a variety of different characteristics.

For the majority of rural Pennsylvanians, the research determined that electricity rates would rise following the expiration of rate caps, but the magnitude of these rate increases were likely to be smaller than originally expected, and significantly smaller than the 50 percent rate hike experienced by consumers in Pike County in 2007. Rate increases are not anticipated to be uniform in all parts of rural Pennsylvania, due to differences in fuels used to generate electricity, and constraints in the transmission network within Pennsylvania and the broader PJM footprint.

Natural gas prices, in particular, drive electricity prices in most areas of Pennsylvania, with the exception of the Allegheny Power territory. These prices have come down dramatically since the middle of 2008, as reflected in the outcomes of recent default supply auctions.

Thus, the electricity price risks to rural Pennsylvanians vary by geographic location. Electricity prices within the Penelec and PPL territories are highly dependent on natural gas prices. PJM's latest regional planning reports from 2009 (PJM, 2008 and 2009) suggest that Pennsylvania will become more dependent on natural gas generation for electricity supplies; more than 20 gigawatts of new gas-fired generation has been planned for the state, representing a 200 percent increase in the stock of gas-fired generation. The previous gas build-out in the U.S. in the early 2000s contributed to a significant increase in natural gas prices, and new gas-fired generation investment planned for Pennsylvania will reinforce the coupling of natural gas prices and electricity prices.

Another issue that may impact electricity prices in the future is the development in the Marcellus Shale. As Pennsylvania's natural gas resources in the Marcellus Shale are developed, natural gas prices may fall, along with electricity prices. If development of the Marcellus Shale stops, or if there is significant regulatory uncertainty (regarding environmental regulations or taxation, for example), then prices of natural gas may rise. Prices of these fuels are likely to remain volatile in the future, implying

residential customers may wish to choose the fixed price contracts offered by some utilities.

Electricity prices within the Allegheny Power territory, on the other hand, are more dependent on the cost of coal. Relative to natural gas or oil, coal prices have been relatively stable, and coal supplies are abundant

in Pennsylvania and the rest of the U.S. The primary risk associated with the cost of coal-fired generation is environmental regulations. In 2011, the U.S. Environmental Protection Agency is expected to finalize the Clean Air Interstate Rule (CAIR), which will tighten caps on emissions of oxides of sulfur and nitrogen from

coal-fired power plants.<sup>1</sup> Similar regulations on mercury and fine particulate matter are also expected to be introduced.<sup>2</sup> Pennsylvania's power generation sector also produces a significant amount of greenhouse-gases, future regulations of which are also uncertain.<sup>3</sup>

<sup>1</sup> CAIR was originally issued in 2005, but implementation has been delayed due to a number of legal challenges. See <http://www.epa.gov/CAIR/>.

<sup>2</sup> The second Bush administration introduced the Clean Air Mercury Rule (CAMR) in 2005, but the rule was struck down in 2008. The EPA planned to reissue a revised version of CAMR in 2011. See <http://www.epa.gov/oar/mercuryrule/>.

<sup>3</sup> S. Blumsack, P. Jaramillo, M.W. Griffin and H.S. Matthews, 2009. "A Life-Cycle Greenhouse-Gas Inventory for Electricity Production in Pennsylvania," report prepared for the Pennsylvania Department of Environmental Protection. See also Environmental Protection Agency, Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, Final Rule, May 13, 2010. <http://www.epa.gov/nsr/documents/20100413final.pdf>.

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