Exelon/PSEG Merger Analysis

PJM Market Monitoring Unit

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Introduction

This report was prepared by PJM's Market Monitoring Unit (MMU) in response to a request from the New Jersey Board of Public Utilities. The report addresses the impact of the proposed merger between PSEG and Exelon on PJM wholesale markets. In particular, the report addresses the impact of the proposed merger on the Energy Market, the Capacity Market, the Regulation Market and the Spinning Reserve Market. The report also provides a calculation, for specific markets, of the level of mitigation in the form of divestiture that would be required in order to return the market structure measures to pre-merger levels and to levels consistent with Department of Justice (DOJ) Guidelines as well as an evaluation of the current mitigation proposal by the merging companies. The MMU has balanced the need for detailed review with the short time (30 days) provided for the preparation of this report.

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1. Executive Summary

The analysis presented in this report covers the impact of the proposed merger on the structure of the PJM Energy Market, the PJM Capacity Market, the PJM Regulation Market and the PJM Spinning Reserves Market. The analysis examines market structure metrics in order to quantify the expected impact of the proposed merger on the market structure of the defined markets. The conclusions about the expected impact are based on the Department of Justice Horizontal Merger Guidelines and the Federal Energy Regulatory Commission's Merger Guidelines. The conclusion of the analysis is that the proposed merger would significantly increase concentration in the Energy, Capacity and Regulation markets and therefore raises concerns about potential adverse competitive effects, absent mitigation. The merging companies have proposed a mitigation strategy that is intended to address the increases in concentration.

Evaluation of the levels of mitigation proposed by the companies is a complex task. The impact of the proposed divestitures depends on the identification of the units to be divested, on the characteristics of the entities purchasing the divested units and on the nature of the divestiture.

For the aggregate Energy Market, the MMU defined the required level of divestiture in terms in MWh, based on the way in which the market actually clears. However, in order to translate the MWh of divestiture into MW of capacity, it is necessary to know the units that are to be divested, their MW of capacity and their corresponding MWh output. For the locational Energy Markets, the MMU determined that there is sufficient capacity in the proposed list of generating units available for divestiture to mitigate the identified market structure issues but that it is not possible to determine whether divestiture will in fact mitigate the issues without knowing the exact units and their distribution factor impacts on the identified constraints. This conclusion is based on the assumption that the sale of divested units is made to an entity that currently has no position in the identified locational energy markets.

The conclusions about the required level of divestiture in the Energy Market depend on the nature of the entities purchasing the divested assets. The initial analysis assumed that the purchasing party had no capacity ownership in the relevant market. If the divested assets are sold to an entity with a market share of from 16 percent to 35 percent, the proposed divestiture results in increased HHI levels that exceed the levels reached when the divested assets are sold to an entity with a market share closer to five percent. This is the case for the aggregate energy market and for the locational energy markets.

For the aggregate Capacity Market, the MMU analysis shows that the companies' proposed divestiture would be adequate to meet the criterion specified in the Guidelines. For the total capacity measure, the MMU analysis shows that the companies' proposed divestiture would not be adequate to meet the criterion specified in the Guidelines. For the incremental Capacity Markets in PJM East, the proposed mitigation would be adequate to meet the criteria specified in the Guidelines. The companies' proposal to offer capacity to the market at a zero price would be adequate mitigation for any otherwise unmitigated Capacity Market issue, as long as the definition of the capacity for sale is appropriate. This conclusion is based on the assumption that the sale of divested units is made to an entity that currently has no position in the identified Capacity Markets.

The conclusions about the required level of divestiture depend on the nature of the entities purchasing the divested capacity. The initial analysis assumed that the purchasing party had no capacity ownership in the relevant market. If the divested capacity is sold to a party with a market share close to 20 percent, the proposed divestiture results in increased HHI levels that exceed the criterion specified in the Guidelines by nearly much as the pre-divestiture case. If the divested capacity is sold to five parties whose market shares averaged 5 percent, the proposed divestiture results in HHIs much closer to the criterion specified in the Guidelines.

For the regulation market, the MMU analysis shows that the companies' proposed divestiture could be adequate to meet the criteria specified in the Guidelines. In order to determine the impact of the proposed divestiture on the regulation market, it is necessary to know the units that are to be divested and their regulation capability. This conclusion is based on the assumption that the sale of divested units is made to an entity that currently has no position in the regulation market.

The conclusions about the required level of divestiture depend on the nature of the entities purchasing the divested capacity. The initial analysis assumed that the purchasing party had no regulation ownership. If the divested regulation is sold to a party with a market share close to 20 percent, the proposed divestiture results in increased HHI levels that exceed the criterion specified in the Guidelines by more than the pre-divestiture case. If the divested capacity is sold to an entity whose market share is five percent, the proposed divestiture results in HHIs that meet the criterion specified in the Guidelines.

No attempt was made to evaluate the virtual divestiture portion of the divestiture. Divestitures were treated in an undifferentiated manner in the MMU analysis. To the extent that virtual divestiture results in different incentives than does actual divestiture, the conclusions drawn in this analysis would need to be modified in a consistent manner.

The proposed merger is large and the potential impacts on the PJM markets are significant. It appears that appropriate mitigation, if structured in ways to address the issues identified in this report, can resolve the concerns about competitive impacts. The size of the current PJM footprint and the corresponding PJM markets makes it possible for a merger of this size to be considered and potentially to proceed with appropriate mitigation.

2. Methods of Analysis

The U.S. Department of Justice and the Federal Trade Commission Horizontal Merger Guidelines (Guidelines) outline the enforcement policy of the Department of Justice and the Federal Trade Commission concerning horizontal mergers subject to section 7 of the Clayton Act, section 1 of the Sherman Act, and Section 5 of the FTC Act. As noted in the Guidelines, "the unifying theme of the Guidelines is that mergers should not be permitted to create or enhance market power or facilitate its exercise."[1]

The Guidelines use market concentration, measured by the HHI, as a basic metric of the structural competitiveness of a market. The Guidelines define three basic levels of market concentration while recognizing that "other things being equal, cases falling just above and just below a threshold present comparable competitive issues."[2] A market with an HHI of less than 1000 is considered to be unconcentrated. Mergers resulting in HHI level less than a 1000 are not considered to have adverse competitive effects. A market with an HHI between 1000 and 1800 is considered to be moderately concentrated. A merger in or resulting in a moderately concentrated market is not considered to have an adverse effect on competition if it increases the market's HHI by less than 100 points. A merger in or resulting in a moderately concentrated market is considered to "potentially raise significant competitive concerns" if it increases the market's HHI by 100 points or more.[3] A market with an HHI of 1800 or above is considered to be highly concentrated. A merger in or resulting in a highly concentrated market is not considered to have an adverse effect on competition if it increases the market's HHI by less than 50 points. A merger producing an increase in the market HHI of 50 points or more in a highly concentrated market "potentially raises significant competitive concerns."[4] The DOJ uses these HHI measures as a guideline, and the importance of a specific range is dependent on a number of other factors, such as the amount of demand response that exists in a given market.[5] "In determining whether a hypothetical monopolist would be in a position to exercise market power, it is necessary to evaluate the likely demand responses of consumers to a price increase."[6] All else held equal, where a lack of potential demand response might allow prices to be raised by more than a "small but significant and non-transitory" amount, "more market power is at stake in the relevant market than in a market in which a hypothetical monopolist would raise price by exactly five percent."[7]

The Federal Energy Regulatory Commission (FERC) "takes into account three factors in analyzing proposed mergers: the effect on competition, the effect on rates, and the effect on regulation."[8] In this report, the MMU will focus on the first factor used by FERC in analyzing mergers, as the other two factors are outside the scope of the request to the MMU.

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1 The U.S. Department of Justice and the Federal Trade Commission Horizontal Merger Guidelines (1997) p. 2.
2 Ibid, p. 15.
3 Ibid, p. 16.
4 Ibid, p. 16.
5 Ibid, p. 17.
6 Ibid, p. 4.
7 Ibid, p. 17.
8 77 FERC ¶ 61,263 (1996) Appendix A, p. 3.

For the evaluation of the effect of a merger on competition, FERC has adopted the "Department of Justice/Federal Trade Commission Merger Guidelines as the analytical framework for analyzing the effect on competition," of mergers as described in the Commission's Appendix A Merger analysis.[9]

In making the determination with respect to post-merger market power, the Commission's analytic screen focuses primarily on the market concentration analysis as detailed in the Guidelines. The concentration analysis requires the definition of product and geographic markets that are likely to be affected by a proposed merger and the measurement of concentration in those markets. The product and geographic market definitions used in the Commission analysis are designed to identify the pool of feasible alternative suppliers to the merged firm from a buyer's perspective, taking into account the costs of delivering the product and various measures of transmission capacity between potential suppliers and potential buyers, under varying market conditions (load levels).

The FERC defines two approaches to the ownership of capacity in a defined market, economic capacity and available economic capacity. The FERC has indicated that economic capacity" is the most important of the measures because it determines which suppliers may be included in the geographic market."[10] Economic capacity includes all the capacity from generating units whose variable costs are such that they could deliver energy to a relevant market, after paying all necessary transmission and ancillary service costs, at a price close to the competitive price in the relevant market. Available economic capacity is economic capacity net of native load (or contractually committed) obligations. The available economic capacity measure presumes that the lowest cost units are used to serve native load and other firm contractual obligations and would therefore not be available for other sales. The Commission notes that in markets with full retail access and a bid-based power exchange, this presumption, and measure of relevant capacity, may not be valid.[11]

The Commission approach requires analysis at a range of load and price levels given the effect of the combination of load levels and seasons on the competitive price.

Once the relevant markets and potential suppliers are identified, FERC's "Merger Policy Statement" indicates that a market can be characterized as unconcentrated when the market HHI is below 1000, equivalent to 10 firms with equal market shares; as moderately concentrated when market HHI is between 1000 and 1800; and highly concentrated when market HHI is greater than 1800, equivalent to between five and six firms with equal market shares.[12]

Where the analysis indicates that a proposed merger may significantly increase concentration in any of the relevant markets, the FERC then examines the merger in the context of the remaining four analytic steps from the Guidelines. This process involves an "examination of other factors that either address the potential for adverse competitive effect or that could mitigate or counterbalance the potential competitive harm."[13] FERC notes that "(s)uch factors include the ease of entry in the market or any efficiencies stemming from the merger."[14] Where such "additional factors examined do not mitigate or counterbalance the adverse competitive effects of the merger," remedial, mitigative conditions can be explored

9 77 FERC ¶ 61,263 (1996) pp. 3-4.
10 77 FERC ¶ 61,263 (1996) Appendix A.
11 77 FERC ¶ 61,263 (1996) Appendix A.
12 77 FERC ¶ 61,263 (1996) pp. 64-70.
13 77 FERC ¶ 61,263 (1996) Appendix A, p. 62.
14 77 FERC ¶ 61,263 (1996) Appendix A, p. 62.

by FERC.[15] Such remedial, mitigative conditions or actions can include, but are not limited to transmission expansion and/or generation divestiture.[16]

The FERC's AEP Order defines the market structure characteristics that must be met for a market participant to be granted market based rates for three years. The AEP Order indicates that an individual seller market share in excess of 20 percent is an indicator of market power and that an HHI of 2500 is an indicator of market power.

In the MMU analysis, the basic metrics used for each market include market share, the Herfindahl-Hirschman Index (HHI) and the Residual Supply Index (RSI). Market share measures the proportion of market output contributed by a supplier. Market share is calculated by dividing the output of a supplier by total supply in a market. Concentration ratios are a summary measure of market share. The concentration ratio used here is the Herfindahl-Hirschman Index (HHI), calculated by summing the squares of the market shares of all firms in a market.

Higher concentration ratios indicate that comparatively small numbers of sellers dominate a market while lower concentration ratios mean larger numbers of sellers split market sales more equally. Lower aggregate market concentration ratios establish neither that a market is competitive nor that participants are unable to exercise market power. Higher concentration ratios do, however, indicate an increased potential for participants to exercise market power. Despite their significant limitations, concentration ratios provide useful information on market structure.[17]

The residual supply index (RSI) is a measure of the extent to which one or more generation owners are pivotal suppliers in a market. A single generation owner is pivotal if the output of the owner's generation facilities is needed to meet demand. Multiple generation owners are jointly pivotal when the output of the owners' generation facilities, taken together, is needed to meet demand. When a generation owner is pivotal, it has the ability to affect market price. For a given level of market demand, the RSI compares the market supply, net of the supply controlled by one or more generation owners, to the market demand. The RSI for generation owner "*i*" is $[(\text{Supply}_m - \text{Supply}_i)/(\text{Demand}_m)]$, where Supply_m is total supply in the Energy Market including net imports.[18] Supply_i is the supply owned by the individual generation owner "*i*" and Demand_m is total market demand. If the RSI is greater than 1.00, the supply of the specific generation owner is not needed to meet market demand and that generation owner has a reduced ability to influence market price. If the RSI is less than 1.00, the supply owned by the specific generation owner is needed to meet market demand and the generation owner is a pivotal supplier with a greater ability to influence price. When the RSI is reported for a market, the reported RSI is for the largest supplier or identified number of the largest suppliers. As with concentration ratios, the RSI is not a bright line test. While a single owner RSI less than 1.0 clearly indicates market power, a single supplier RSI greater

15 77 FERC ¶ 61,263 (1996) Appendix A, p. 62.

16 77 FERC ¶ 61,263 (1996) Appendix A, p. 82-85.

17 The best tests of market competitiveness are direct tests of the conduct of individual participants and their impact on price. The price-cost markup index is one such test and direct examination of offer behavior by individual market participants is another. However such tests of behavior are primarily relevant for the analysis of existing markets rather than of expected market structures.

18 Total supply in the Energy Market is the sum of all offers to provide energy. In the event the net imports are negative (exports), they are treated as additional demand.

than 1.0 does not guarantee that there is no market power. As an example, suppliers can be jointly pivotal.

FERC's AEP Order indicates that a single supplier RSI of less than 1.0 is an indicator of market power.[19] PJM has argued that a three pivotal supplier RSI of greater than 1.0 is an indicator of a competitive market structure, even in the presence of market share and concentration results that exceed FERC guidelines for a competitive market structure.[20]

In the MMU analysis, the definition of the relevant market is based on substitutability which in turn is based on the physical facts of the system. The relevant markets include the entire RTO, locational energy and Capacity Markets defined by transmission constraints, regulation markets defined by the ability to provide regulation within a defined area as reflected in PJM operations and spinning markets defined by the ability to provide spinning reserves within a defined area as reflected in PJM operations. Exports and imports are included in the analysis where they are a potential source of competition.

The analysis presented in this report is based on actual PJM market data for various representative periods. The principal complicating factor in relying on actual market data is that PJM has integrated substantial new areas into its markets since May 1, 2004. The appropriate time period for analysis depends in part on the market. The periods for which data was analyzed in this report were selected based on the nature of the markets and the relevance of data from those periods to evaluating the ongoing structure of the markets. The relevant regulation market and the spinning reserve market are in the Mid-Atlantic region and are thus unaffected by the integrations. The full Energy and Capacity markets are affected the integrations. Locational Energy and Capacity markets are not affected by the integrations.

The MMU analysis relies on what FERC terms economic capacity, or total capacity without netting out of load obligations, also termed gross position. The merger filing also focuses on economic capacity.[21] Net positions would be calculated by subtracting the load obligation from the supply of the relevant product for all participants that have both an obligation to purchase a product or to sell a product at a defined price and the ability to supply a product. Such entities, in this analysis, would be primarily integrated utility companies that have not yet been exposed to significant retail competition and that therefore retain most of their native load. A net position analysis would show the market results when the integrated utility companies retain their dominant position in the market. The gross position analysis shows the market results when the integrated utility companies either no longer have the load obligation or have separated their generation companies from the integrated company so that their financial incentives no longer correspond to those of a fully integrated company. While the net position analysis illustrates the current incentives to increase prices based on

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19 107 FERC ¶ 61,018 (2004) ("AEP Order").

20 107 FERC ¶ 61,018 (2004), at P 111 ("AEP Order").

21 "In any event, Available Economic Capacity is a questionable metric for defining market share in PJM. All capacity must be bid into the PJM market and selected to run before it can generate. Hence, irrespective of retail load commitments, all of a supplier's Economic Capacity is relevant to setting market prices. Thus, while I have presented an Available Economic Capacity analysis as required by the Commission's regulations, I have focused primarily on the Economic Capacity analysis in determining the effects of the merger on competition and in assessing the efficacy of mitigation." (Exhibit No. J-1 p. 51, Lines 20-26).

current load obligations, another impact of higher prices that is not explicitly considered is the fact that high prices for the relevant product could serve as a barrier to entry by competitive retail suppliers who would have to pay the high price in order to compete with the incumbent utility. The gross position, or economic capacity, analysis seems more appropriate to the evaluation of the long-term impacts of a merger and is the approach taken here.

3. Energy Market

Methods of Analysis

The merger analysis of the Energy Market includes the aggregate Energy Market and defined locational markets. The aggregate Energy Market is analyzed based on actual market data for two periods and based on a representative aggregate supply curve.

In evaluating actual Energy Market results on a pre-merger and on a post-merger basis, the actual market configuration is a critical factor. There have been significant changes in the aggregate PJM markets resulting from the integration of ComEd, AEP, Dayton, Duquesne and Dominion. In each case the market has become larger and one or more significant participants have joined the PJM Energy Markets. While the use of actual market results is an advantage available to the MMU, actual market results must be interpreted carefully when evaluating the merger. In particular, there is a tradeoff between using historical data for the period prior to the integration of Dominion on May 1, 2005 and the need to reflect a full range of seasonal and demand conditions in the analysis. In interpreting the results of the historical analysis for the pre-Dominion integration period, it should be recognized that those market conditions no longer exist. In interpreting the results of the post-Dominion integration period, it should be recognized that these market conditions are not representative of the full range of load conditions that occur on the PJM system.

In addition to the historical analysis of actual Energy Market results, an analysis of a representative post-Dominion aggregate supply curve is included. The use of an aggregate Energy Market supply curve permits an analysis of expected market shares for Exelon and PSEG and for the combined company over a full range of potential seasonal and demand conditions in the aggregate Energy Market.

The MMU examined locational Energy Markets, created by transmission constraints, that are affected by the proposed merger. These include the relatively broad markets created when the Western, Central and Eastern interfaces are constrained as well as the smaller market created when the Keeney Transformer is constrained.

Aggregate Energy Market- Market Structure Metrics

In order to evaluate the impact of the proposed merger on the Energy Market using actual historical market data, several time periods were analyzed in order to ensure that the impacts of the integrations are reflected. The MMU defined three phases in 2004, corresponding to market integration dates.[22] The analysis of the hourly Energy Market here is done for two periods, also linked to market integration dates. The first period includes October 1, 2004 through April 30, 2005, incorporating the integration of AEP, Dayton and Duquesne. The second period includes the very short time from May 1, 2005 through May 8, the most current data available at the time of analysis, in order to ensure that the impact of the May 1 integration of Dominion is at least partially included. The basic structure of the PJM markets changed significantly during these historical periods. This fact makes it impossible to analyze a full twelve months of historical data that reflects the current market structure. This, in turn, means that peak season impacts are not included in hourly data current enough to include all integrations. Other approaches to market analysis are also employed in this report in an effort to address this issue.

[22] 2004 State of the Market Report, page 45.

Market concentration levels were calculated on a pre-merger and a post-merger basis. Actual imports are explicitly accounted for in this analysis. HHIs were calculated for each hour using historical market data for the designated time periods with Exelon and PSEG as separate companies and with the two companies combined. On average, the hourly Energy Market was moderately concentrated, both pre- and post-merger during both periods (Table 3-1 and Table 3-2). The post-merger increase in average HHIs ranged from 290 to 301 points.

Table 3-1 Pre-Merger Hourly Energy Market HHI Results

	Minimum	Average	Maximum	Number of Hours HHI > 1800	Number of Hours HHI > 2500
Period One	1023	1342	1693	0	0
Period Two	1106	1247	1393	0	0

Table 3-2 Post-Merger Hourly Energy Market HHI Results

	Minimum	Average	Maximum	Number of Hours HHI > 1800	Number of Hours HHI > 2500
Period One	1263	1643	2072	661	0
Period Two	1375	1537	1724	0	0

Table 3-3 Hourly Energy Market HHI Differences

	Minimum	Average	Maximum	Number of Hours HHI > 1800	Number of Hours HHI > 2500
Period One	240	301	379	661	0
Period Two	269	290	331	0	0

Market shares were calculated for the hourly Energy Market pre- and post-merger for all participants. In the pre-merger Energy Market, there are two participants with market shares in excess of 20 percent, [redacted]. The proposed merger would create a new company with a [redacted] percent market share in the aggregate Energy Market and continue to result in two participants with market shares in excess of 20 percent.

Table 3-4 Pre-Merger Hourly Energy Market Shares

Company	Period 1	Period 2
[redacted]	23%	22%
	23%	22%
	8%	6%
	N/A	6%
	7%	6%
	7%	6%

Table 3-5 Post-Merger Hourly Energy Market Shares

Company	Period 1	Period 2
[redacted]	29%	29%
	23%	22%
	8%	6%
	N/A	6%
	7%	6%

RSI levels were calculated for each hour in the aggregate Energy Market to determine the extent to which one supplier was pivotal and the extent to which three suppliers were jointly pivotal. The RSI results are reported using thresholds of 1.0 and 1.1 in order to show the sensitivity of the results to the choice of threshold and in recognition of the fact that the RSI is not a bright line test.

The pre-merger RSI results show that there were no occurrences of a single pivotal participant during period one or two and the post-merger RSI results show that a single participant was pivotal for 2 hours during period one and for zero hours during period two (Table 3-6 and Table 3-7). The period one RSI results must be interpreted carefully because they are based on the pre-Dominion market. The period two RSI results must be interpreted carefully because they cover only a short time during an off-peak period. The results for period one also show that there are more hours during which the RSI exceeded 1.10 than 1.00, illustrating the sensitivity of the conclusions to the use of a specific RSI cutoff.

Table 3-6 Pre-Merger Hourly Single Pivotal Supplier RSI Results

	Number of Hours RSI < 1.10	Number of Hours RSI < 1.00	Percent of Hours RSI < 1.00	Average RSI	Minimum RSI
Period One	0	0	0%	1.63	1.12
Period Two	0	0	0%	1.80	1.52

Table 3-7 Post-Merger Hourly Single Pivotal Supplier RSI Results

	Number of Hours RSI < 1.10	Number of Hours RSI < 1.00	Percent of Hours RSI < 1.00	Average RSI	Minimum RSI
Period One	22	2	< 1%	1.47	0.97
Period Two	0	0	0%	1.65	1.38

Table 3-8 Hourly Single Pivotal Supplier RSI Differences

	Number of Hours RSI < 1.10	Number of Hours RSI < 1.00	Percent of Hours RSI < 1.00	Average RSI	Minimum RSI
Period One	22	2	< 1%	-0.16	-0.15
Period Two	0	0	0%	-0.15	-0.14

The pre-merger RSI results for three pivotal suppliers show that the three largest participants, when grouped together, are pivotal in period one for 618 hours and for zero hours during period two. (See Table 3-9.)

Table 3-9 Pre-Merger Hourly Three Pivotal Supplier RSI Results

	Number of Hours RSI < 1.10	Number of Hours RSI < 1.00	Percent of Hours RSI < 1.00	Average RSI	Minimum RSI
Period One	1948	618	12%	1.16	0.80
Period Two	7	0	0%	1.30	1.08

The post-merger RSI results for three pivotal suppliers show the three largest participants, when grouped together, are pivotal in period one for 2,602 hours and for 17 hours in period two. (See Table 3-10.)

Table 3-10 Post-Merger Hourly Three Pivotal Supplier RSI Results

	Number of Hours RSI < 1.10	Number of Hours RSI < 1.00	Percent of Hours RSI < 1.00	Average RSI	Minimum RSI
Period One	3816	2602	51%	1.02	0.70
Period Two	99	17	8%	1.15	0.95

Table 3-11 Hourly Three Pivotal Supplier RSI Differences

	Number of Hours RSI < 1.10	Number of Hours RSI < 1.00	Percent of Hours RSI < 1.00	Average RSI	Minimum RSI
Period One	1868	1984	39%	-0.14	-0.10
Period Two	92	17	8%	-0.15	-0.13

The results of the analysis of market structure indicators for the actual historical market data show that the proposed merger would increase HHI levels by about 300 points, regardless of the time period analyzed; would increase the market share of the second largest supplier enough to make the combined company [redacted] The impact on the number of hours in which one supplier is pivotal as well as the number of hours in which three suppliers are jointly pivotal is less clear due to the identified issues of interpreting the historical data. These increases occur in the context where the average HHI in the post-merger market is between 1537 and 1643 and the number of hours in which the HHI exceeds 1800 is 661 and the HHI does not exceed 2500.

Conclusion

The analysis shows that the proposed merger results in an increase in HHI that exceeds the increase specified in the Guidelines. The proposed merger would significantly increase concentration in the Energy Market as defined by these metrics and the standards of the Guidelines and therefore raises concerns about potential adverse competitive effects, absent mitigation. These results should be interpreted based on those standards and Guidelines.

Mitigation

Mitigation in the form of divestiture could address the identified increase in market power as reflected in these metrics. For the aggregate Energy Market the MMU results show that the divestiture of 4,500 MWh of generation would reduce the post-merger HHI levels to pre-merger levels. For the aggregate Energy Market the MMU results show that the divestiture of

2,600 MWh of generation would reduce the post-merger HHI levels such that the increase is less than 100 points. This is consistent with the DOJ Guidelines when overall HHI levels are less than 1800. In each case, the divestiture analysis assumes that the divested generation is sold to an entity with no generation ownership prior to the sale.

It is also critical to understand the relationship between MWh and MW. The MWh identified are produced by generating units with identifiable capacity in MW. The proposed divestiture of units cannot be evaluated with respect to the required MWh divestiture without identifying the exact units to be divested, their MW of capacity and their corresponding MWh outputs.

Aggregate Energy Market - Supply Curve

Market structure measures were calculated for sequential segments of the aggregate supply curve. The results provide a guide to ownership concentration both for cleared offers at various demand levels and for the incremental supply at these demand levels.

The PJM aggregate Energy Market supply curve was developed utilizing all generator market based offers including imports and including those in the expanded Dominion zone for May 1, 2005.[23] Thus, this analysis includes the impact of all the market integrations on the PJM aggregate Energy Market supply curve. Market shares were calculated for Exelon and PSEG separately and for the combined company for each 25,000 MW block of energy in the supply curve. The aggregate supply curve and the ownership percentages are shown in Figure 3-1.

Figure 3-1 PJM RTO Aggregate Supply Curve for May 1, 2005

[23] While time did not permit the analysis of the supply curve for every day, the PJM aggregate supply curves are relatively stable.

The data on market shares for Exelon and PSEG individually and combined for each portion of the supply curve are also shown in Table 3-12. The table also shows the cumulative market share for the combined company for each successive level of demand. The data show that the combined company would own [redacted] of all generation in the first 25,000 MW section of the aggregate supply curve, about [redacted] of all generation in the first 50,000 MW section of the aggregate supply curve and a declining share of subsequent 25,000 MW sections of the aggregate supply curve.

Table 3-12 PJM RTO May 1, 2005 Aggregate Supply Curve Ownership by Demand MW Block

RTO Supply Greater Than MW	RTO Supply Less Than MW	[redacted]
0	25,000	
25,000	50,000	
50,000	75,000	
75,000	100,000	
100,000	125,000	
125,000	150,000	
150,000		

The aggregate supply curve analysis shows the market shares of the individual companies and combined company under various demand conditions. The analysis demonstrates that the combined company would have a cumulative market share in excess of [redacted] for the first 50,000 MW of demand and a cumulative market share in excess of [redacted] for the entire supply curve, while showing generally lower incremental market shares by supply curve segment above 50,000 MW.

In order to determine the relevance of the concentration levels, a frequency distribution of PJM total demand was developed based on historical data for all areas included in the current PJM footprint (Table 3-13). The table shows the percentage of annual hours that historical demand fell in each 25,000 MW block. In 2004, demand fell in the 25,000 to 50,000 MW block for 0.08 percent of the hours (7 hours), in the 50,000 to 75,000 MW block for 40.27 percent of the hours (3,537 hours), in the 75,000 to 100,000 MW block for 52.99 percent of the hours (4,655 hours) and in the 100,000 to 125,000 MW block for 6.66 percent of the hours (580 hours). In addition, the table breaks out the components of the 50,000 to 75,000 block. The frequency distribution is a function of weather and other factors affecting demand but it provides a measure of where on the supply curve the market is operating. The results are consistent with and thus confirm the actual calculated market shares for the post-merger combined company presented above.

Table 3-13 Calculated PJM RTO Demand by Block Including Dominion

Demand (MW) Greater Than	Demand (MW) Less Than or Equal to	2001	2002	2003	2004
0	25,000	0.00%	0.00%	0.00%	0.00%
25,000	50,000	2.01%	0.88%	0.18%	0.08%
50,000	75,000	58.79%	52.37%	42.43%	40.27%
75,000	100,000	35.99%	40.57%	51.70%	52.99%
100,000	125,000	3.15%	6.12%	5.66%	6.66%
125,000	150,000	0.06%	0.06%	0.02%	0.00%
150,000		0.00%	0.00%	0.00%	0.00%
Detail of High Percentage MW Load Blocks					
50,000	60,000	16.32%	13.05%	10.98%	8.44%
60,000	75,000	42.47%	39.33%	31.45%	31.83%

Locational Energy Markets

In addition to the analysis of the aggregate Energy Market, significant locational markets were also examined. In an LMP-based market, constraints create smaller, locational markets with different structural characteristics than the aggregate market. The relatively broad locational markets defined by the Western, Central and Eastern interfaces exist as separate markets when these interfaces are binding constraints. The locational eastern market created when the Keeney 500/230 kV transformer is constrained was also examined. The Keeney transformer was the only locational constraint in the east, occurring more than 100 hours in 2004, where the proposed merger had an impact on the market structure tests performed.

The analysis was performed utilizing a real-time snapshot of actual generation conditions including output, real-time bids and bid limits for October 30, 2004, for the hour beginning 1600 EPT. The analysis was done so as to be fully consistent with the way that PJM actually dispatches units to solve a constraint. As a result, detailed unit characteristics were explicitly accounted for, including: distribution factors; operational status; fuel type; start and notification time; minimum run time; steam units' ramp rates; and unit economic maximum and economic minimum limits.

The analysis included only units whose increased output would relieve the constraint. The objective was to simulate conditions in which the constraint was in effect and the system price was high enough that units whose output could be lowered to relieve the constraint would not be competitive. The higher the system price, the higher the effective cost of units for which lowering the output could relieve the constraint. The analysis considers all units whose increased output relieves the constraint, regardless of their effective cost.

This approach is consistent with the FERC approach that looks at a variety of demand conditions. FERC considers a supplier to have market power if the FERC screens are failed for any one of the identified demand conditions. The analysis here is not intended to and does not represent all demand conditions but it does represent demand conditions which are likely to occur for a significant number of hours. The analysis also represents the conditions under which the merging companies are most likely to have high market shares.

Eastern Interface

The Eastern interface pre-merger results show that two participants have market shares in excess of 20 percent and jointly have a 68 percent market share, that the HHI is 2593, that the single supplier RSI is not less than 1.0, but that the three pivotal supplier test is passed. (See Table 3-16.) The "system total relief MW" are the total available MW of relief for the constraint. The MMU concludes that this market is structurally competitive on a pre-merger basis. The conclusion is based on the fact that, while the market fails the FERC's AEP Order market share and HHI metrics for market power, the market passes the three pivotal supplier test. This conclusion is consistent with the conclusion reached in the October 26, 2004 filing by the Market Monitoring Unit in Docket Nos. ER04-539-001, 002 and EL04-121-000.

The Eastern interface post-merger results show that two participants have market shares in excess of 20 percent and jointly have an 83 percent market share, that the HHI is 3565, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is failed. (See Table 3-17.)

The merger would result in an increase in the maximum market share of 12 percentage points, an increase in the HHI of 972 points and the failure of the three pivotal supplier test.

Conclusion

The analysis of the Eastern interface post merger shows that when the Eastern interface is constrained and the system price is high enough such that lowers are not cost effective, the proposed merger results in an increase in HHI that exceeds the increase specified in the Guidelines. The proposed merger would significantly increase concentration in the locational Energy Market created by the Eastern Interface as defined by these metrics and the standards of the Guidelines and therefore raises concerns about potential adverse competitive effects, absent mitigation. These results should be interpreted based on the Guidelines.

Mitigation

The result of the merger could be mitigated in a number of ways. Effective mitigation would result from the application of PJM's locational market offer capping rules for the times when the locational market defined by the Eastern Interface is not competitive. Such mitigation would require a rule change as the Eastern Interface is currently exempt from offer capping because the locational market is competitive as corroborated by the pre-merger analysis. Effective mitigation would also result from an agreement of the merged company to offer units only at marginal cost as defined in the offer capping rules.

In addition, adequate divestiture could result in a structurally competitive market. For the market defined by the Eastern Interface, the required divestiture of total effective MW of supply necessary to return the post-merger HHI to the pre-merger level was determined. A supply curve was constructed comprised solely of combustion turbines (CTs) for which an increase in output provides relief for the constraint. The units comprising the supply curve were then ranked in ascending order of effective cost for each unit. Units were then selected beginning with the lowest effective cost resource until the volume of required divestiture in terms of effective MW of supply was achieved. The ranking of resources by effective cost is a function of unit specific energy offers and distribution factors. It is therefore not possible to state definitively how many MW of capacity must be divested without an exact specification of the units.

Table 3-14 Eastern Interface Pre-Merger Results (Raise Only Relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]		2835	35%	2593	4.77	No
		2835	33%	2593	4.95	No
		2835	15%	2593	6.25	No
		2835	6%	2593	6.92	Yes
		2835	5%	2593	6.94	Yes
		2835	3%	2593	7.15	Yes
		2835	2%	2593	7.18	Yes
		2835	1%	2593	7.30	Yes
		2835	0%	2593	7.32	Yes
		2835	0%	2593	7.33	Yes

The MMU evaluated the mitigation proposal of Exelon. The analysis performed by the MMU was designed to determine whether a return to pre-merger HHI levels was achievable given the candidate facilities and total volume of CT capacity to be divested. The list of units identified above was compared to the candidate facilities for divestiture as listed in the Answer of Exelon Corporation and Public Service Enterprise Group, Inc. in Docket No. EC05-43-000 dated May 9, 2005. For the Eastern Interface, there was sufficient CT capacity available within the list of candidate facilities to return the post-merger HHI to pre-merger

levels. However, a critical caveat is that effective mitigation is, and can only be, based on specific units. The effective MWs available to resolve the Eastern Interface are unit specific as they are based both on distribution factors and effective cost. It is not possible to make a meaningful assessment of the effectiveness of a proposed divestiture in remedying structural market problems resulting from the proposed merger in the absence of the actual identification of specific units. A supplemental analysis must be performed once a definitive declaration of divested assets has been developed. Given that the pre-merger level of HHI can be achieved, any intermediate post-merger level of HHI can also be achieved, with the same caveats.

In order to evaluate the sensitivity of the post-merger results to the characteristics of the entities purchasing the divested assets, the MMU calculated the HHI results under two additional scenarios. The first scenario assumed that the divested capacity is purchased by one existing company whose market share was 35 percent. The second scenario assumed that the divested capacity is purchased by an existing company whose market share is five percent. The post-merger HHIs were calculated for each scenario. In both cases, the post-merger HHI increase was greater than in the base case divestiture scenario. While any specific divestiture requires detailed analysis, post-divestiture results are sensitive to the market position of the purchaser.

Table 3-15 Eastern Interface Post-Merger Results (Raise Only Relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
		2835	48%	3565	3.85	No
		2835	35%	3565	4.77	No
		2835	6%	3565	6.92	Yes
		2835	5%	3565	6.94	Yes
		2835	3%	3565	7.15	Yes
		2835	2%	3565	7.18	Yes
		2835	1%	3565	7.30	Yes
		2835	0%	3565	7.32	Yes
		2835	0%	3565	7.33	Yes

Table 3-16 Eastern Interface Pre-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
2835	35%	2593	4.77	4

Table 3-17 Eastern Interface Post-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
2835	48%	3565	3.85	3

Table 3-18 Eastern Interface Summary Differences

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
0	12%	972	-0.92	-1

Western Interface

The Western interface pre-merger results show that one participant has a market share in excess of 20 percent, that the HHI is 1552, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is passed. (See Table 3-21.) The "system total relief MW" are the total available MW of relief for the constraint. The MMU concludes that this market is structurally competitive on a pre-merger basis. The conclusion is based on the fact that, while the market fails the FERC's AEP Order market share metric for market power, the market passes the three pivotal supplier test. This conclusion is consistent with the conclusion reached in the October 26, 2004 filing by the Market Monitoring Unit in Docket Nos. ER04-539-001, 002 and EL04-121-000.

The Western interface post-merger results show that two participants have market shares in excess of 20 percent, that the HHI is 1792, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is failed. (See Table 3-22.)

The merger would result in no increase in the maximum market share, an increase in the HHI of 240 points and the failure of the three pivotal supplier test.

Conclusion

The analysis of the Western interface post merger shows that when the Western interface is constrained and the system price is high enough such that lowers are not cost effective, the proposed merger results in an increase in HHI that exceeds the increase specified in the Guidelines. The proposed merger would significantly increase concentration in the locational Energy Market created by the Western Interface as defined by these metrics and the standards of the Guidelines and therefore raises concerns about potential adverse competitive effects, absent mitigation. These results should be interpreted based on the Guidelines.

Mitigation

The result of the merger could be mitigated in a number of ways. Effective mitigation would result from the application of PJM's locational market offer capping rules for the times when the locational market defined by the Western Interface is not competitive. Such mitigation would require a rule change as the Western Interface is currently exempt from offer capping because the locational market is competitive as corroborated by the pre-merger analysis. Effective mitigation would also result from an agreement of the merged company to offer units only at marginal cost as defined in the offer capping rules.

In addition, adequate divestiture could result in a structurally competitive market. For the market defined by the Western Interface, the required divestiture of total effective MW of supply necessary to return the post-merger HHI to the pre-merger level was determined. A supply curve was constructed comprised solely of CTs for which an increase in output provides relief for the constraint. The units comprising the supply curve were then ranked in ascending order of effective cost for each unit. Units were then selected beginning with the lowest effective cost resource until the volume of required divestiture in terms of effective

MW of supply was achieved. The ranking of resources by effective cost is a function of unit specific energy offers and distribution factors. It is therefore not possible to state definitively how many MW of capacity must be divested without an exact specification of the units.

The MMU evaluated the mitigation proposal of Exelon. The analysis performed by the MMU was designed to determine whether a return to pre-merger HHI levels was achievable given the candidate facilities and total volume of CT capacity to be divested. The list of units identified above was compared to the candidate facilities for divestiture as listed in the Answer of Exelon Corporation and Public Service Enterprise Group, Inc. in Docket No. EC05-43-000 dated May 9, 2005. For the Western Interface, there was sufficient CT capacity available within the list of candidate facilities to return the post-merger HHI to pre-merger levels. However, a critical caveat is that effective mitigation is, and can only be, based on specific units. The effective MWs available to resolve the Western Interface are unit specific as they are based both on distribution factors and effective cost. It is not possible to make a meaningful assessment of the effectiveness of a proposed divestiture in remedying structural market problems resulting from the proposed merger in the absence of the actual identification of specific units. A supplemental analysis must be performed once a definitive declaration of divested assets has been developed. Given that the pre-merger level of HHI can be achieved, any intermediate post-merger level of HHI can also be achieved, with the same caveats.

In order to evaluate the sensitivity of the post-merger results to the characteristics of the entities purchasing the divested assets, the MMU calculated the HHI results under two additional scenarios. The first scenario assumed that the divested capacity is purchased by one existing company whose market share was 16 percent. The second scenario assumed that the divested capacity is purchased by an existing company whose market share is 7 percent. The post-merger HHIs were calculated for each scenario. In both cases, the post-merger HHI increase was greater than in the base case divestiture scenario. While any specific divestiture requires detailed analysis, post-divestiture results are sensitive to the market position of the purchaser.

Table 3-19 Western Interface Pre-Merger Results (Raise only relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]		4677	28%	1552	2.05	No
		4677	16%	1552	2.38	No
		4677	16%	1552	2.39	No
		4677	9%	1552	2.57	Yes
		4677	9%	1552	2.58	Yes
		4677	7%	1552	2.62	Yes
		4677	7%	1552	2.65	Yes
		4677	3%	1552	2.76	Yes
		4677	2%	1552	2.76	Yes
		4677	1%	1552	2.79	Yes
		4677	0%	1552	2.82	Yes
		4677	0%	1552	2.82	Yes
		4677	0%	1552	2.82	Yes
		4677	0%	1552	2.83	Yes
		4677	0%	1552	2.83	Yes
		4677	0%	1552	2.83	Yes
		4677	0%	1552	2.83	Yes

Table 3-20 Western Interface Post-Merger Merger (Raise only relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]		4677	28%	1792	2.05	No
		4677	24%	1792	2.17	No
		4677	16%	1792	2.39	Yes
		4677	9%	1792	2.57	Yes
		4677	9%	1792	2.58	Yes
		4677	7%	1792	2.65	Yes
		4677	3%	1792	2.76	Yes
		4677	2%	1792	2.76	Yes
		4677	1%	1792	2.79	Yes
		4677	0%	1792	2.82	Yes
		4677	0%	1792	2.82	Yes
		4677	0%	1792	2.82	Yes
		4677	0%	1792	2.83	Yes
		4677	0%	1792	2.83	Yes
		4677	0%	1792	2.83	Yes
		4677	0%	1792	2.83	Yes

Table 3-21 Western Interface Pre-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
4677	28%	1552	2.05	4

Table 3-22 Western Interface Post-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
4677	28%	1792	2.05	3

Table 3-23 Western Interface Summary Differences

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
0	0%	240	0	-1

Central Interface

The Central interface pre-merger results show that three participants have market shares in excess of 20 percent, that the HHI is 1870, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is passed. (See Table 3-26.) The "system total relief MW" are the total available MW of relief for the constraint. The MMU concludes that this market is structurally competitive on a pre-merger basis. The conclusion is based on the fact that, while the market fails the FERC's AEP Order market share metric for market power, the market passes the three pivotal supplier test. This conclusion is consistent with the

conclusion reached in the October 26, 2004 filing by the Market Monitoring Unit in Docket Nos. ER04-539-001, 002 and EL04-121-000.

The Central interface post-merger results show that three participants have market shares in excess of 20 percent, that the HHI is 2349, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is passed. (See Table 3-27.)

The merger would result in an increase in the maximum market share of 7 percentage points and an increase in the HHI of 479 points.

Table 3-24 Central Interface Pre-Merger Results (Raise Only Relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]		3739	26%	1870	9.26	No
		3739	23%	1870	9.75	No
		3739	22%	1870	9.85	No
		3739	11%	1870	11.25	No
		3739	7%	1870	11.73	No
		3739	4%	1870	12.08	Yes
		3739	4%	1870	12.11	Yes
		3739	2%	1870	12.38	Yes
		3739	1%	1870	12.52	Yes
		3739	1%	1870	12.52	Yes
		3739	0%	1870	12.54	Yes
		3739	0%	1870	12.54	Yes
		3739	0%	1870	12.54	Yes
		3739	0%	1870	12.57	Yes

Table 3-25 Central Interface Post-Merger Results (Raise Only Relief)

	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]		3739	33%	2349	8.42	No
		3739	26%	2349	9.26	No
		3739	22%	2349	9.85	No
		3739	7%	2349	11.73	No
		3739	4%	2349	12.08	Yes
		3739	4%	2349	12.11	Yes
		3739	2%	2349	12.38	Yes
		3739	1%	2349	12.52	Yes
		3739	1%	2349	12.52	Yes
		3739	0%	2349	12.54	Yes
		3739	0%	2349	12.54	Yes
		3739	0%	2349	12.54	Yes
		3739	0%	2349	12.57	Yes

Table 3-26 Central Interface Pre-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
3739	26%	1870	9.26	6

Table 3-27 Central Interface Post-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
3739	33%	2349	8.42	5

Table 3-28 Central Interface Summary Differences

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
0	7%	479	-0.84	-1

Conclusion

The analysis of the Central Interface post merger shows that when the Central interface is constrained and the system price is high enough such that lowers are not cost effective, the proposed merger results in an increase in HHI that exceeds the increase specified in the Guidelines. The proposed merger would significantly increase concentration in the locational Energy Market created by the Central Interface as defined by these metrics and the standards of the Guidelines and therefore raises concerns about potential adverse competitive effects, absent mitigation. These results should be interpreted based on the Guidelines.

Mitigation

The result of the merger could be mitigated in a number of ways. Effective mitigation would not result from the application of PJM's locational market offer capping rules for the times when the locational market defined by the Central Interface is not competitive as the market is structurally competitive post merger using the three pivotal supplier test. Effective mitigation would result from an agreement of the merged company to offer units only at marginal cost as defined in the offer capping rules.

In addition, adequate divestiture could result in a structurally competitive market. For the market defined by the Central Interface, the required divestiture of total effective MW of supply necessary to return the post-merger HHI to the pre-merger level was determined. A supply curve was constructed comprised solely of CT's for which an increase in output provides relief for the constraint. The units comprising the supply curve were then ranked in ascending order of effective cost for each unit. Units were then selected beginning with the lowest effective cost resource until the volume of required divestiture in terms of effective MW of supply was achieved. The ranking of resources by effective cost is a function of unit specific energy offers and distribution factors. It is therefore not possible to state definitively how many MW of capacity must be divested without an exact specification of the units.

The MMU evaluated the mitigation proposal of Exelon. The analysis performed by the MMU was designed to determine whether a return to pre-merger HHI levels was achievable given the candidate facilities and total volume of CT capacity to be divested. The list of units identified above was compared to the candidate facilities for divestiture as listed in the Answer of Exelon Corporation and Public Service Enterprise Group, Inc. in Docket No. EC05-43-000 dated May 9, 2005. For the Central Interface, there was sufficient CT capacity available within the list of candidate facilities to return the post-merger HHI to pre-merger levels. However, a critical caveat is that effective mitigation is, and can only be, based on specific units. The effective MWs available to resolve the Central Interface are unit specific as they are based both on distribution factors and effective cost. It is not possible to evaluate a proposed divestiture of installed capacity without an exact specification of the units. It is not possible to make a meaningful assessment of the effectiveness of a proposed divestiture in remedying structural market problems resulting from the proposed merger in the absence of the identification of specific units. A supplemental analysis must be performed once a definitive declaration of divested assets has been developed. Given that the pre-merger level of HHI can be achieved, any intermediate post-merger level of HHI can also be achieved, with the same caveats.

In order to evaluate the sensitivity of the post-merger results to the characteristics of the entities purchasing the divested assets, the MMU calculated the HHI results under two additional scenarios. The first scenario assumed that the divested capacity is purchased by one existing company whose market share was 22 percent. The second scenario assumed that the divested capacity is purchased by an existing company whose market share is seven percent. The post-merger HHIs were calculated for each scenario. In both cases, the post-merger HHI increase was greater than in the base case divestiture scenario. While any specific divestiture requires detailed analysis, post-divestiture results are sensitive to the market position of the purchaser.

Keeney 500/230 kV Transformer

The Keeney transformer pre-merger results show that two participants have market shares in excess of [redacted] that the HHI is 3004, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is failed. (See Table 3-31.) The MMU concludes that this market is structurally non-competitive on a pre-merger basis. The conclusion is based on the fact that the market fails the FERC's AEP Order market share and HHI metrics for market power and that these metric failures are not offset by the three pivotal supplier test as the market also fails the three pivotal supplier test.

The Keeney transformer post-merger results show that three participants have market shares in excess [redacted] that the HHI is 3165, that the single supplier RSI is not less than 1.0 and that the three pivotal supplier test is failed. (See Table 3-32.)

The merger would not change the maximum market share, but would create an additional company with a market share of 20 percent or more. The HHI was increased by 161 points.

Conclusion

The analysis of the Keeney transformer post merger shows that when the Keeney transformer is constrained, the proposed merger results in an increase in HHI that exceeds the increase specified in the Guidelines. The proposed merger would significantly increase concentration in the locational Energy Market created by the Keeney transformer as defined by these metrics and the standards of the Guidelines and therefore raises concerns about

potential adverse competitive effects, absent mitigation. These results should be interpreted based on the Guidelines.

Mitigation

The result of the merger could be mitigated in a number of ways. Effective mitigation would result from the continued application of PJM's locational market offer capping rules for the times when the locational market defined by the Keeney transformer is not competitive. Effective mitigation would also result from an agreement of the merged company to offer units only at marginal cost as defined in the offer capping rules.

In addition, adequate divestiture could result in a structurally competitive market. For the market defined by the Keeney transformer, the required divestiture of total effective MW of supply necessary to return the post-merger HHI to the pre-merger level was determined. A supply curve was constructed comprised solely of CT's for which an increase in output provides relief for the constraint. The units comprising the supply curve were then ranked in ascending order of effective cost for each unit. Units were then selected beginning with the lowest effective cost resource until the volume of required divestiture in terms of effective MW of supply was achieved. The ranking of resources by effective cost is a function of unit specific energy offers and distribution factors. It is therefore not possible to state definitively how many MW of capacity must be divested without an exact specification of the units.

The MMU evaluated the mitigation proposal of Exelon. The analysis performed by the MMU was designed to determine whether a return to pre-merger HHI levels was achievable given the candidate facilities and total volume of CT capacity to be divested. The list of units identified above was compared to the candidate facilities for divestiture as listed in the Answer of Exelon Corporation and Public Service Enterprise Group, Inc. in Docket No. EC05-43-000 dated May 9, 2005. For the Keeney transformer, there was sufficient CT capacity available within the list of candidate facilities to return the post-merger HHI to pre-merger levels. However, a critical caveat is that effective mitigation is, and can only be, based on specific units. The effective MWs available to resolve the Keeney transformer are unit specific as they are based both on distribution factors and effective cost. It is not possible to evaluate a proposed divestiture of installed capacity without an exact specification of the units. It is not possible to make a meaningful assessment of the effectiveness of a proposed divestiture in remedying structural market problems resulting from the proposed merger in the absence of the identification of specific units. A supplemental analysis must be performed once a definitive declaration of divested assets has been developed. Given that the pre-merger level of HHI can be achieved, any intermediate post-merger level of HHI can also be achieved, with the same caveats.

In order to evaluate the sensitivity of the post-merger results to the characteristics of the entities purchasing the divested assets, the MMU calculated the HHI results under two additional scenarios. The first scenario assumed that the divested capacity is purchased by one existing company whose market share was 31 percent. The second scenario assumed that the divested capacity is purchased by an existing company whose market share is three percent. The post-merger HHIs were calculated for each scenario. In both cases, the post-merger HHI increase was greater than in the base case divestiture scenario. While any specific divestiture requires detailed analysis, post-divestiture results are sensitive to the market position of the purchaser.

Table 3-29 Keeney Transformer Pre-Merger Results (Raise Only Relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]	[redacted]	555	42%	3004	2.52	No
		555	31%	3004	2.99	No
		555	15%	3004	3.70	Yes
		555	5%	3004	4.10	Yes
		555	3%	3004	4.19	Yes
		555	3%	3004	4.20	Yes

Table 3-30 Keeney Transformer Post-Merger Results (Raise Only Relief)

Company	Owner Total Relief MW	System Total Relief MW	Owner Market Share	HHI	RSI	Pivotal
[redacted]	[redacted]	555	42%	3165	2.52	No
		555	31%	3165	2.99	No
		555	20%	3165	3.46	Yes
		555	3%	3165	4.19	Yes
		555	3%	3165	4.20	Yes

Table 3-31 Keeney Transformer Pre-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
555	42%	3004	2.52	3

Table 3-32 Keeney Transformer Post-Merger Summary

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
555	42%	3165	2.52	3

Table 3-33 Keeney Transformer Summary Differences

System Total Relief MW	Largest Market Share	HHI	RSI	Number Jointly Pivotal
0	0%	161	0	0

4. Capacity Market

Methods of Analysis

The merger analysis of the Capacity Market includes the aggregate Capacity Market and defined locational Capacity Markets. The aggregate Capacity Market is analyzed using actual market data and using total capacity. Locational Capacity Markets are analyzed using total capacity and incremental capacity.

In evaluating actual Capacity Market results on a pre-merger and on a post-merger basis, the actual market configuration is a critical factor. There have been significant changes in the aggregate PJM markets resulting from the integration of ComEd, AEP, Dayton, Duquesne and Dominion. In each case the market has become larger and one or more significant participants have joined the PJM Energy Markets. While the MMU has access to actual market results, actual market results must be interpreted carefully when evaluating the merger. In particular, there is a tradeoff between using historical data for the period prior to the integration of Dominion on May 1, 2005 as it does not include a significant new supplier and using data from the brief period after May 1, 2005 as it does not reflect a full range of seasonal conditions in the analysis.

In addition to the historical analysis of actual Capacity Market results, an analysis of a total post-Dominion capacity is included.

The MMU examined locational Capacity Markets, created by transmission constraints, that are affected by the proposed merger. These include the relatively broad PJM Mid-Atlantic and PJM East markets. The locational Capacity Markets were evaluated both based on total capacity in each area plus imports and based on the incremental supply curves likely to be actually available to solve transmission constraints in a locational Capacity Market. Regardless of the final details of the Capacity Market construct, Capacity Markets have locational features and the locational results are relevant to evaluating the potential impact of the proposed merger on the competitiveness of the Capacity Markets.

Basic measures of market structure are calculated for the period from October 1, 2004 through April 30, 2005, including market shares, HHI and RSI metrics. This period was chosen because it includes the impact of the integrations of AEP, Dayton and Duquesne. The approach here is to calculate the market structure metrics for actual market data for the defined period and then to recalculate the market structure metrics treating PSEG and Exelon as a single company. The analysis covers the full PJM footprint as well as the potential smaller eastern locational markets that are expected to be created under RPM or any likely modification to the Capacity Market design.

For the entire PJM footprint, unforced capacity was used in the Capacity Market analysis. The unforced capacity takes into account imports, exports, unit specific purchases and sales, Capacity Credit Market transactions and unit specific EFORd. For smaller locational markets, unforced capacity was also used but actual imports into specific zones were not automatically reflected as capacity is not accounted for on that basis. Imports into zones are addressed explicitly in the analysis, as indicated. ComEd installed capacity values were converted into unforced capacity values by using an estimated EFORd of eight percent.

Each organization serving PJM load must own or acquire capacity resources to meet its respective capacity obligations. Load-serving entities (LSEs) can acquire capacity resources by entering into bilateral agreements, by participating in the PJM-operated Capacity Credit

Market or by constructing generation. Collectively, all arrangements by which LSEs acquire capacity are known as the Capacity Market.[24] As a result of the structure of the PJM Capacity Market, demand for capacity is extremely inelastic. This fact needs to be accounted for in any analysis of the competitive impacts of the proposed merger.

The PJM Capacity Credit Market[25] provides a mechanism to balance supply and demand for capacity unmet by the bilateral market or self-supply. The PJM Capacity Credit Market consists of the Daily, Interval,[26] Monthly and Multimonthly Capacity Credit Markets. Each Capacity Credit Market is intended to provide a transparent, market-based mechanism for competitive retail LSEs to acquire the capacity resources needed to meet their capacity obligations and to sell capacity resources when no longer needed to serve load. The PJM Daily Capacity Credit Market permits LSEs to match capacity resources with short-term shifts in retail load while Interval, Monthly and Multimonthly Capacity Credit Markets provide mechanisms to match longer term obligations with capacity resources.

Capacity Market – Historical Market Results

The MMU structural analysis of actual capacity auctions run by PJM during the defined period indicates that the PJM Capacity Credit Markets exhibited moderate levels of concentration in the Daily Capacity Credit Market and high levels of concentration in the Monthly and Multimonthly Capacity Credit Markets on a pre-merger basis. Actual imports and exports of capacity are explicitly accounted for in this analysis. As shown in Table 4-1 and Table 4-2, HHIs for the Daily Capacity Credit Market averaged 1233 with a maximum of 2659 and a minimum of 820. About 1 percent of the daily auctions had HHIs in excess of 2500. HHIs for the longer term Monthly and Multimonthly Capacity Credit Markets averaged 2125, with a maximum of 4151 and a minimum of 841. About 26 percent of the longer term auctions had HHIs in excess of 2500.

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24 See PJM State of the Market Report, Appendix H, "Glossary," for definitions of PJM Capacity Credit Market terms.

25 All PJM Capacity Market values (capacities) are in terms of unforced MW.

26 PJM defines three intervals for its Capacity Markets. The first interval extends for five months and runs from January through May. The second interval extends for four months and runs from June through September. The third interval extends for three months and runs from October through December.

Table 4-1 PJM Capacity Market Pre-Merger and Post-Merger HHI: October 2004 through April 2005

Pre-Merger	Statistic	Daily	Monthly & Multimonthly
HHI	Average	1233	2125
	Minimum	820	841
	Maximum	2659	4151
Highest Market Share		49%	62%
Post-Merger			
HHI	Average	1389	2149
	Minimum	886	954
	Maximum	3578	4151
Highest Market Share		58%	62%
Difference			
HHI	Average	156	24
	Minimum	65	113
	Maximum	919	0
Highest Market Share		9.0%	0.0%

Table 4-2 PJM Capacity Market Pre-Merger and Post-Merger HHI Auction Data: October 2004 through April 2005

Pre-Merger	Daily	Monthly & Multimonthly
# Auctions	212	42
# Auctions with HHI >=2500	3	11
% Auctions with HHI >=2500	1.4%	26.2%
Post-Merger		
# Auctions with HHI >=2500	8	11
% Auctions with HHI >=2500	3.8%	26.2%
Difference		
# Auctions with HHI >=2500	5	0
% Auctions with HHI >=2500	2.4%	0.0%

As shown in Table 4-3 and Table 4-4, RSI levels averaged 5.52 for the Daily Capacity Credit Markets, and none of the auctions had a single pivotal supplier. RSI levels for the Monthly and Multimonthly Capacity Credit Markets averaged 2.48. Approximately 21 percent of the auctions had a single pivotal supplier (RSI < 1.00), while almost 55 percent of the auctions had three or fewer pivotal suppliers.

Table 4-3 PJM Capacity Market Pre-Merger and Post-Merger RSI: October 2004 through April 2005

Pre-Merger	Statistic	Daily	Monthly & Multimonthly
RSI	Average	5.52	2.48
	Minimum	2.11	0.26
	Maximum	9.97	14.92
Post-Merger RSI	Average	5.29	2.45
	Minimum	1.99	0.26
	Maximum	9.25	14.92
Difference RSI	Average	-0.23	-0.03
	Minimum	-0.12	0.00
	Maximum	-0.72	0.00

Table 4-4 PJM Capacity Market Pre-Merger and Post-Merger RSI Auction Data: October 2004 through April 2005

Pre-Merger	Daily	Monthly & Multimonthly
# Auctions	212	42
# Auctions with RSI <= 1.0	0	9
% Auctions with RSI <= 1.0	0.0%	21.4%
# Auctions with <= 3 Pivotal Suppliers	0	23
% Auctions with <= 3 Pivotal Suppliers	0.0%	54.8%
Post-Merger		
# Auctions with RSI <= 1.0	0	9
% Auctions with RSI <= 1.0	0.0%	21.4%
# Auctions with <= 3 Pivotal Suppliers	0	23
% Auctions with <= 3 Pivotal Suppliers	0.0%	54.8%
Difference		
# Auctions with RSI <= 1.0	0	0
% Auctions with RSI <= 1.0	0.0%	0.0%
# Auctions with <= 3 Pivotal Suppliers	0	0
% Auctions with <= 3 Pivotal Suppliers	0.0%	0.0%

The MMU structural analysis of actual capacity auctions run by PJM during the defined period, assuming that the proposed merger takes place, indicates that the PJM Capacity Credit Markets exhibited moderate post-merger levels of concentration in the Daily Capacity Credit Market and high post-merger levels of concentration in the Monthly and Multimonthly Capacity Credit Markets. As shown in Table 4-1 and Table 4-2, post-merger HHIs for the Daily Capacity Credit Market averaged 1389, an increase of 156 points from the pre-merger value, with a maximum of 3578 and a minimum of 886. About 4 percent of the post-merger daily auctions had HHIs in excess of 2500, an increase from approximately 1 percent from the pre-merger levels. Post-merger HHIs for the longer term Monthly and Multimonthly Capacity Credit Markets averaged 2149, with a maximum of 4151 and a minimum of 954. This was an increase of 24 points from the pre-merger average. Approximately 26 percent of the longer term auctions had post-merger HHIs in excess of 2500, which was the same as the pre-merger percentage.

The analysis of actual capacity auctions run by PJM indicates that post-merger RSI levels (Table 4-3 and Table 4-4) averaged 5.29 for the Daily Capacity Credit Markets, which was a decrease of 0.23 from the pre-merger values. None of the auctions had a single pivotal supplier. Post-merger RSI levels for the Monthly and Multimonthly Capacity Credit Markets averaged 2.45 (a decrease of 0.03 from the pre-merger level), while the percentage of auctions with a single pivotal supplier and with three pivotal suppliers remained at pre-merger levels.

Capacity Market – Total Capacity

The market structure for total capacity in the aggregate PJM market, including ComEd, and for total capacity in defined locational Capacity Markets was also evaluated[27]. In particular, the total capacity in locational Capacity Markets for PJM East and PJM Mid-Atlantic were evaluated. PJM East is defined to include the PECO, PSEG, JCPL, RECO, AECO and DPL zones, while PJM Mid-Atlantic includes the original PJM zones (PECO, PSEG, JCPL, RECO, AECO, DPL, BGE, METE, PENE, PEPC and PPL). Table 4-5 and Table 4-6 show the results. Under current ownership conditions, HHIs for total capacity fall in the low to moderate range, the maximum market share exceeds 20 percent for PJM East and there is a single pivotal supplier in each defined market. Since PJM East may also import capacity, analysis was also performed utilizing an 8,000 MW import, which is the capacity import limit into this area. Cases were run with an 8,000 MW import from a single entity with no other PJM capacity resources and unaffiliated with existing generation owners, and with an 8,000 MW import from five separate entities, each with no other PJM capacity resources and each unaffiliated with existing generator owners. As shown in Table 4-5, imports lowered HHIs in eastern PJM from a highly concentrated level to a moderate level of concentration.

[27] PJM East and PJM Mid-Atlantic are terms used by William Hieronymous in the merger filing.

Table 4-5 PJM Capacity Pre-Merger and Post-Merger HHI[28]

Pre-Merger	Total PJM Pre-Dominion	Total PJM Post-Dominion	PJM Mid-Atlantic	PJM East	PJM East with Single 8,000 MW Import	PJM East with Multiple 8,000 MW Import
HHI	941	886	1020	2025	1708	1345
Highest Market Share	18%	16%	16%	31%	24%	24%
Post-Merger						
HHI	1255	1127	1521	3835	2829	2465
Highest Market Share	26%	23%	32%	60%	47%	47%
Difference						
HHI	314	241	501	1810	1121	1120
Highest Market Share	8%	7%	16%	29%	23%	23%

Table 4-6 PJM Capacity Pre-Merger and Post-Merger RSI[29]

Pre-Merger	Total PJM Pre-Dominion	Total PJM Post-Dominion	PJM Mid-Atlantic	PJM East	PJM East with Single 8,000 MW Import	PJM East with Multiple 8,000 MW Import
RSI	0.91	0.92	0.84	0.62	0.86	0.86
Pivotal Suppliers	1	1	1	1	1	1
Post-Merger						
RSI	0.82	0.84	0.69	0.36	0.60	0.60
Pivotal Suppliers	1	1	1	1	1	1
Difference						
RSI	-0.09	-0.08	-0.15	-0.26	-0.26	-0.26
Pivotal Suppliers	0	0	0	0	0	0

In order to include the impact of the integration of Dominion, effective May 1, 2005, Table 4-5 and Table 4-6 also show HHI and RSI results as of May 10, 2005 for total capacity in the entire PJM market. The inclusion of Dominion reduced the pre-merger HHI 55 points, from 941 (Table 4-5) to 886, reduced the pre-merger maximum market share from 18 to 16 percent and did not change the fact that there is a single pivotal supplier.

The market structure for total capacity in the PJM market and for total capacity in defined locational Capacity Markets was also evaluated post merger. The results of the analysis (Table 4-5 and Table 4-6) show that concentration is moderate for total PJM and PJM Mid-Atlantic while concentration is high in PJM East, regardless of the treatment of capacity imports. The results also show that there is a single pivotal supplier in every case.

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28 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

29 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

In order to include the impact of the integration of Dominion, effective May 1, 2005, Table 4-5 and Table 4-6 also show HHI and RSI results as of May 10, 2005 for total capacity in the entire PJM market. The results of the analysis show that the inclusion of Dominion lowered post-merger HHI 128 points, from 1255 to 1127. There was a single pivotal supplier for the pre-merger and the post-merger market with Dominion.

Capacity Market – Locational Markets – Incremental Analysis

Given the potential for a locational Capacity Market in eastern PJM, additional analysis was performed for the eastern PJM Capacity Market to more accurately reflect the incremental way in which a locational Capacity Market would clear. A supply curve for capacity in eastern PJM was created using the incremental cost of capacity by unit. Using the capacity obligation for eastern PJM as the demand, two levels of demand (25 and 50 percent of the total demand) were used to segment the supply curve for capacity in eastern PJM. These two demand levels bracket the best estimate of the level of capacity in eastern PJM that would clear in the aggregate market and correspondingly the level of incremental capacity remaining in eastern PJM to meet the remaining demand for capacity when transmission constraints are binding in the Capacity Market. In a locational Capacity Market like the one proposed under the RPM, when the eastern PJM Capacity Market becomes constrained, remaining demand would have to be met by remaining eastern PJM resources. Some eastern PJM resources would clear in the market prior to the eastern constraint becoming binding. The remaining resources, those that did not clear in merit order in the market, constitute the available incremental supply curve for eastern PJM. The same logic would apply to any locational Capacity Market.

The locational incremental market structure metrics were calculated for eastern PJM for each segment of the supply curve. The market structure metrics were calculated assuming that 25 percent and 50 percent of existing resources cleared in the overall market prior to the eastern constraint binding In the case where 25 percent of existing resources cleared in the overall market, the incremental supply curve for eastern PJM available to meet demand in the constrained eastern market includes the remaining 75 percent of existing resources. In the case where 50 percent of existing resources cleared in the overall market, the incremental supply curve for eastern PJM includes the remaining 50 percent of existing resources.

The results of the locational incremental analysis for eastern PJM (Table 4-7 and Table 4-8) show that, in both cases, pre-merger HHIs are in the moderate range, that maximum market share exceeded 20 percent in the 75 percent incremental case, and that there is a single pivotal supplier in both cases.

Table 4-7 PJM East Capacity Pre-Merger and Post-Merger RPM Incremental HHI[30]

Pre-Merger	75% Incremental	50% Incremental
HHI	1654	1113
Highest Market Share	27%	18%
Post-Merger		
HHI	2898	1648
Highest Market Share	50%	33%
Difference		
HHI	1244	535
Highest Market Share	23%	15%

Table 4-8 PJM East Capacity Pre-Merger and Post-Merger RPM Incremental HHI and RSI[31]

Pre-Merger	75% Incremental	50% Incremental
RSI	0.72	0.81
Pivotal Suppliers	1	1
Post-Merger		
RSI	0.49	0.66
Pivotal Suppliers	1	1
Difference		
RSI	-0.23	-0.15
Pivotal Suppliers	0	0

Table 4-7 and Table 4-8 also show that post-merger HHIs are in the moderate to high range with increases in HHI of 535 and 1244 points, that the highest market share also increased (both cases are now above 20 percent) and that pivotal supplier results also deteriorated.

Conclusion

The analysis of the aggregate and local Capacity Markets shows that the proposed merger results in an increase in HHI that exceeds the threshold specified in the Guidelines. The proposed merger would significantly increase concentration in the Capacity Market as defined by these metrics and the standards of the Guidelines and therefore raises concerns about potential adverse competitive effects, absent mitigation. These results should be interpreted based on those standards and Guidelines. In particular, HHI levels increase by more than 100 points for the relevant market definitions: Total PJM – Post Dominion capacity; PJM East capacity with imports; and the incremental PJM East Capacity Market.

30 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

31 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

Mitigation

Assuming that the proposed merger takes place, the MMU performed an analysis to determine what level of mitigation would be required to bring post-merger HHI values to within 100 points of pre-merger values where HHI is less than or equal to 1800, and to within 50 points where HHI values are greater than 1800. Mitigation is assumed to mean that the combined company would divest a specified level of capacity to a new company which currently has no capacity resources within PJM.

As shown in Table 4-9, 5,400 MW would be required to mitigate for the entire PJM footprint with Dominion (6,500 MW without Dominion), while 6,250 MW would be required for eastern PJM including imports of 8,000 MW from either a single entity or from five separate entities.

Table 4-10 shows the mitigation results for the locational incremental analysis for eastern PJM. Depending on the level of existing resources that cleared, mitigation levels would range from 1,350 MW to 3,900 MW.

Table 4-11 shows the results for mitigation values submitted by the merging companies. For the Total PJM – Post Dominion, the post-merger HHI value is within 100 points of the pre-merger value. For PJM East with imports, the post-merger HHI values increase by 162 points after the merging companies' proposed mitigation, meaning that these mitigation levels do not pass the threshold in the DOJ Guidelines. These are the two market definitions for total capacity that are relevant to a determination of competitive market structure.

The merging companies' proposal to offer capacity at a zero price represents a form of behavioral mitigation that would resolve the issue if properly structured. The companies' proposal must be structured so that it would provide the required mitigation for a variety of Capacity Market designs, given the current uncertainty about the ultimate design. If the Capacity Market were restructured so that all participants were required to offer all capacity into the market, the companies' proposal would have to cover all capacity offered to the market.

In order to evaluate the sensitivity of the post-merger results to the characteristics of the entities purchasing the divested assets, the MMU calculated the HHI results under two additional scenarios. The first scenario assumed that the divested capacity is purchased by one existing company whose market share was close to twenty percent. The second scenario assumed that the divested capacity is purchased by five existing companies whose individual market shares averaged approximately five percent. The post-merger HHIs were calculated for each scenario. (See
Table 4-12 and Table 4-13)

For the scenario in which the divested capacity is purchased by an existing company with a market share close to 20 percent, for the Total PJM – Post Dominion, the post-merger HHI value is 215 points above the pre-merger value. For PJM East with imports, the post-merger HHI values increase by 418 points in this scenario, meaning that these mitigation levels do not pass the DOJ Guidelines. The increases in HHI are higher than those associated with the base case assumption that the divested assets are purchased by an entity with no current market position. These are the two market definitions for total capacity that are relevant to a determination of competitive market structure.

For the scenario in which the divested capacity is purchased by five existing companies whose individual market shares averaged approximately 5 percent, for the Total PJM – Post Dominion, the post-merger HHI value is 125 points above the pre-merger value meaning that these mitigation levels do not pass the DOJ Guidelines for the aggregate Capacity Market,

although it should be noted that the resultant HHI is very close to 1000. For PJM East with imports, the post-merger HHI values increase by 6 points in this scenario, meaning that these mitigation levels do pass the DOJ Guidelines. These are the two market definitions for total capacity that are relevant to a determination of competitive market structure.

Table 4-9 PJM Capacity Post-Merger Mitigation[32]

Pre-Merger	Total PJM Pre-Dominion	Total PJM Post-Dominion	PJM Mid-Atlantic	PJM East	PJM East with Single 8,000 MW Import	PJM East with Multiple 8,000 MW Import
HHI	941	886	1020	2025	1708	1345
Highest Market Share	18%	16%	16%	31%	24%	24%
RSI	0.91	0.92	0.84	0.62	0.86	0.86
Pivotal Suppliers	1	1	1	1	1	1
Post-Merger - 1 New Company						
Mitigation Level (MW)	6,500	5,400	5,300	7,500	6,250	6,250
HHI	1041	985	1120	2068	1806	1443
Highest Market Share	21%	19%	23%	35%	31%	31%
New Company Market Share	5%	4%	9%	25%	17%	17%
RSI	0.87	0.88	0.78	0.58	0.79	0.79
Pivotal Suppliers	1	1	1	1	1	1
Difference						
HHI	100	99	100	43	98	98
Highest Market Share	3%	3%	7%	4%	7%	7%
RSI	-0.04	-0.04	-0.06	-0.04	-0.07	-0.07
Pivotal Suppliers	0	0	0	0	0	0

32 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

Table 4-10 PJM East Capacity Post-Merger RPM Incremental Mitigation[33]

Pre-Merger	75% Incremental	50% Incremental
HHI	1654	1113
Highest Market Share	27%	18%
RSI	0.72	0.81
Pivotal Suppliers	1	1
Post-Merger - 1 New Company		
Mitigation Level (MW)	3,900	1,350
HHI	1748	1212
Highest Market Share	32%	24%
New Company Market Share	18%	9%
RSI	0.67	0.76
Pivotal Suppliers	1	1
Difference		
HHI	94	99
Highest Market Share	5%	6%
RSI	-0.05	-0.05
Pivotal Suppliers	0	0

Table 4-11 Hieronymus PJM Capacity Post-Merger Mitigation[34]

Pre-Merger	Total PJM Pre-Dominion	Total PJM Post-Dominion	PJM Mid-Atlantic	PJM East	PJM East with Single 8,000 MW Import	PJM East with Multiple 8,000 MW Import
HHI	941	886	1020	2025	1708	1345
Highest Market Share	18%	16%	16%	31%	24%	24%
RSI	0.91	0.92	0.84	0.62	0.86	0.86
Pivotal Suppliers	1	1	1	1	1	1
Post-Merger - 1 New Company						
Mitigation Level (MW)	6,600	6,600	6,600	5,500	5,500	5,500
HHI	1039	961	1068	2287	1870	1507
Highest Market Share	21%	19%	21%	42%	33%	33%
New Company Market Share	5%	4%	11%	19%	15%	15%
RSI	0.87	0.89	0.80	0.52	0.76	0.76
Pivotal Suppliers	1	1	1	1	1	1
Difference						
HHI	98	75	48	262	162	162
Highest Market Share	3%	3%	5%	11%	9%	9%
RSI	-0.04	-0.03	-0.04	-0.10	-0.10	-0.10
Pivotal Suppliers	0	0	0	0	0	0

33 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

34 Dominion data is as of 5/10/05. All other data is as of 3/31/05.

Table 4-12 Divestiture Purchaser Sensitivity - Total Capacity

Pre-Merger	Total PJM Pre-Dominion	Total PJM Post-Dominion	PJM Mid-Atlantic	PJM East	PJM East with Single 8,000 MW Import	PJM East with Multiple 8,000 MW Import
HHI	941	886	1020	2025	1708	1345
Highest Market Share	18%	16%	16%	31%	24%	24%
RSI	0.91	0.92	0.84	0.62	0.86	0.86
Pivotal Suppliers	1	1	1	1	1	1
Post-Merger - 1 Existing Company						
Mitigation Level (MW)	6,500	5,400	5,300	7,500	6,250	6,250
HHI	1222	1101	1368	2688	2126	1763
Highest Market Share	23%	19%	23%	38%	31%	31%
RSI	0.85	0.88	0.78	0.56	0.79	0.79
Pivotal Suppliers	1	1	1	1	1	1
Difference from Pre-Merger HHI	281	215	348	663	418	418
Post-Merger - 5 Existing Companies						
Mitigation Level (MW)	6,500	5,400	5,300	7,500	6,250	6,250
HHI	1078	1011	1156	1706	1714	1351
Highest Market Share	21%	19%	23%	35%	31%	31%
RSI	0.87	0.88	0.78	0.58	0.79	0.79
Pivotal Suppliers	1	1	1	1	1	1
Difference from Pre-Merger HHI	137	125	136	-319	6	6

Table 4-13 Divestiture Purchaser Sensitivity - Incremental Capacity

Pre-Merger	75% Incremental	50% Incremental
HHI	1654	1113
Highest Market Share	27%	18%
RSI	0.72	0.81
Pivotal Suppliers	1	1
Post-Merger - 1 Existing Company		
Mitigation Level (MW)	3,900	1,350
HHI	2359	1548
Highest Market Share	35%	27%
RSI	0.64	0.72
Pivotal Suppliers	1	1
Difference from Pre-Merger HHI	705	435
Post-Merger - 5 Existing Companies		
Mitigation Level (MW)	3,900	1,350
HHI	1743	1261
Highest Market Share	32%	24%
RSI	0.67	0.76
Pivotal Suppliers	1	1
Difference from Pre-Merger HHI	89	148

5. Regulation Market

Methods of Analysis

The merger analysis focuses on the Mid-Atlantic Regulation Market as the regulation market most likely to be impacted by the merger. The analysis of the competitiveness of the PJM Mid-Atlantic Regulation Market before and after the proposed merger of PSEG and Exelon is based on 12 months of actual regulation market data through March 31, 2005. The pre-merger data reflects actual market results during this period and the post-merger data combines the ownership of PSEG and Exelon from the actual market results. The actual market results for the Mid-Atlantic Regulation Market are unaffected by the integrations as the integrations added regulation capability solely to the PJM Western Region Regulation Market.

The basic measures of market structure are examined including market shares, HHI and RSI.

The provision of the regulation ancillary service, defined by FERC in Order No. 888,[35] is coordinated by PJM. NERC requires that PJM maintain regulating capability in order to match short-term deviations in system load. Regulation refers to the PJM control action that is performed to correct for load changes that may cause the power system to operate above or below 60 Hz.[36] The generating resources assigned to meet the PJM Regulation Requirement must be capable of responding to the Area Regulation ("AR") signal within five minutes and must increase or decrease their outputs at the Ramping Capability rates that are specified in the Offer Data that is submitted to PJM.[37] The regulation service supplied by individual generating units is: "[t]he capability of a specific generating unit with appropriate telecommunications, control and response capability to increase or decrease its output in response to a regulating control signal."[38]

A Regulation Zone is defined as any of those one or more geographic areas, each consisting of a combination of one or more Control Zone(s) as designated by the Office of the Interconnection in the PJM Manuals, relevant to the provision of and requirement for, regulation service.[39] Regulation for each Regulation Zone shall be supplied from generators located within the metered electrical boundaries of such Regulation Zone.[40] Thus, the largest relevant geographic market for regulation service in the PJM Mid-Atlantic Regulation Market is that entire regulation zone. Imports of regulation are not possible. Suppliers in the relevant geographic market include all entities which own generating capacity in the market that have the required capability to provide regulation and pass PJM tests for regulation.

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35 Promoting Wholesale Competition Through Open Access Non-Discriminatory Transmission Services by Public Utilities; Recovery of Stranded Costs by Public Utilities and Transmitting Utilities, Order No. 888, 1991-1996 FERC Stats. & Regs., Regs. Preambles ¶ 31,036 (1996), order on reh'g, Order No. 888-A, 1996-2000 FERC Stats. & Regs., Regs. Preambles ¶ 31,048, order on reh'g, Order No. 888-B, 81 FERC ¶ 61,248 (1997), reh'g denied, Order No. 888-C, 82 FERC 61,046 (1998), aff'd in part and remanded in part sub nom. Transmission Access Policy Study Group v. FERC, 225 F.3d 667 (D.C. Cir. 2000), aff'd sub nom. New York v. FERC, 535 U.S. 1 (2002).

36 See "PJM Manual 10: Pre-Scheduling Operations," p. 25.
37 See "PJM Manual 10: Pre-Scheduling Operations," p. 26.
38 See "PJM Manual 35: Definitions and Acronyms," p. 54.
39 See "PJM Operating Agreement," Section 1.38A.
40 See "PJM Operating Agreement," Section 1.7.18 (a).

The provision of regulation in the Mid-Atlantic Regulation Market constitutes a separate market as there are no good substitutes for the regulation product in the PJM Mid-Atlantic Regulation Market.

The supply of regulation can be measured as regulation capability, regulation offered, regulation offered and eligible, or regulation assigned.

- Regulation capability represents the total volume of regulation capability reported by resource owners based on unit characteristics. Regulation capability represents the absolute maximum level of regulation and exceeds the expected level of regulation offers for a variety of reasons discussed below.[41]

- Regulation offered represents the level of regulation capability actually offered to the PJM Regulation Market. Resource owners may offer those units with approved regulation capability into the PJM Regulation Market. PJM does not require a resource capable of providing regulation service to offer its capability to the market. Regulation offers may be submitted on a daily basis and these daily offers may be modified on an hourly basis. It is possible to offer regulation for a day but to subsequently make that capability unavailable for any number of hours, including all hours of the day.

- Regulation offered and eligible represents the level of regulation capability actually offered to the PJM Regulation Market and actually eligible to provide regulation in an hour. Some regulation offered to the market is not eligible to participate in the regulation market as a result of identifiable offer parameters specified by the supplier. As an example, the regulation capability of a unit will be included in regulation offered based on the daily offer and availability status, but that regulation capability will not be eligible in one or more hours because the supplier sets the availability status to unavailable for one or more hours of that same day. (The availability status of a unit may be set in both a daily offer and an hourly update table in the PJM market software.) As another example, the regulation capability of a unit will be included in regulation offered if the owner of a unit offers regulation, but that regulation capability will not be eligible if the owner sets the unit's economic maximum generation level equal to its economic minimum generation level. In that case, the unit cannot provide regulation and is not eligible to provide regulation. As another example, the regulation capability of a unit will be included in regulation offered but that regulation capability will not be eligible if the unit is not operating, unless the unit is a combustion turbine that meets specific operating parameter requirements, including start time.

  Only those offers which are eligible to provide regulation in an hour are part of supply for that hour, and only those offers actually are considered by PJM for purposes of clearing the market. Regulation offered and eligible constitute the full extent of the market in an hour and are, therefore, the appropriate market offers for the application of market structure tests.

- Regulation assigned represents those regulation resources selected through the regulation market-clearing mechanism to provide regulation service for a given hour.

[41] The extent and height of barriers to entry into the regulation market are also relevant in considering the competitiveness of the market.

Available market data across all PJM regulation markets, both market-based and cost-based, indicates that from 53 percent to 55 percent of submitted capability is actually offered into the regulation market on an hourly basis while from 44 percent to 49 percent of submitted capability is offered and eligible. This result does not imply that withholding is occurring. There are many legitimate reasons why regulation capability is not offered into the regulation markets on an hourly basis including whether a unit is on line, how a unit's operating parameters are set, whether a combustion turbine ("CT") has a start time permitting it to participate in the next hour and a variety of other factors. The level of actual offers also does not imply anything about reliability. With some exceptions in the ComEd control zone during Phase 2 of 2005 and in the Western Region Regulation Market following the integration of Dominion, PJM has always had adequate regulation resources available to meet the regulation requirements.[42]

For this report, the twelve months of available market data for the PJM Mid-Atlantic Regulation Market was analyzed for the period April 1, 2004 through March 31, 2005.

The market power analysis follows the Commission logic specified in the AEP Order.[43] The MMU follows the logic of the delivered price test by calculating market share, HHI and pivotal supplier metrics for each market configuration. The analysis presented here differs in two ways from the Commission's delivered price test. The analysis here includes all regulation capability offered into the market without regard to cost. The delivered price test would start with the universe of regulation offered and eligible and then limit the analysis to those units that could offer regulation at less than or equal to 1.05 times the clearing price. In addition, the analysis here includes all regulation offered by each supplier while the delivered price test uses the gross supply by participant net of their load obligation. The fact that suppliers have load obligations does affect their incentives to exercise market power.

The Commission's AEP Order indicates that failure of any one of the specified tests is adequate for a showing of market power. The analysis presented here goes one step further in order to analyze the significance of excess supply. If the market fails either or both of the market share test or the HHI test in the presence of excess supply, the MMU applies the three pivotal supplier test. The analysis here uses the three pivotal supplier test as a specific threshold in the presence of excess supply. The three pivotal supplier test permits an explicit evaluation of whether available excess supply offsets market power concerns associated with market share and market concentration results. If the three pivotal supplier test is passed, the available suppliers could meet the demand for regulation without the three dominant suppliers and the market would be deemed competitive. The three pivotal supplier test is used here only to determine if there is evidence to mitigate the results of the market share and market concentration analyses.

The three pivotal supplier test represents an analytical approach to the issue of excess supply. Excess supply, by itself, is not necessarily adequate to ensure a competitive outcome. A monopolist could have substantial excess supply but the monopolist would not be expected to change its market behavior as a result. The same logic applies to a small group of dominant suppliers. However, if there is adequate supply without the three dominant suppliers to meet the demand, then the market can reasonably be deemed competitive.

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42 Phase 2 is the five-month period from May 1 through September 30, 2004 during which PJM was comprised of the Mid-Atlantic Region, including its 11 zones, the AP Control Zone and the ComEd Control Zone.

43 AEP Power Mktg. Inc., 107 FERC ¶ 61,018 ("AEP Order"), order on reh'g, 108 FERC ¶ 61,026 (2004).

Pre-Merger Market Conditions

The pre-merger analysis is based on actual regulation market data for the twelve months ended March 31, 2005. This period is a reasonable representation of the regulation market as the Mid-Atlantic Regulation Market was not affected by the integrations that occurred in 2004 and 2005.

Excess supply, defined as the ratio of the hourly regulation offered to the hourly regulation requirement, averaged 2.44. Based on hourly offered and eligible regulation, this ratio averaged 1.89. The average regulation requirement for the PJM Mid-Atlantic Regulation Market was 427.6 MW during this twelve-month period. The regulation requirement ranged from a minimum of 215 MW to a maximum of 659 MW during the twelve-month period ended March 31, 2005.[44]

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible, and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 2511 to a minimum of 1205 with an average value of 1692. For regulation offered, the HHI was at or above 2500 during less than one percent of the studied hours. Based upon regulation offered and eligible, HHI values ranged from a maximum of 2784 to a minimum of 1209, with an average of 1772. For regulation offered and eligible, the HHI was at or above 2500 during one percent of the studied hours. Based upon regulation assigned, HHI values ranged from a maximum of 6882 to a minimum of 1341. The average HHI value for regulation assigned was 2497. For regulation assigned, the HHI was at or above 2500 during 42 percent of the studied hours. Table 5-1 summarizes the HHI results.

Table 5-1 PJM Hourly Regulation Market pre-merger HHI: April 1, 2004 through March 31, 2005

	Minimum	Average	Maximum
Offered	1205	1692	2511
Eligible	1209	1772	2784
Assigned	1341	2497	6882

There was one supplier with a market share in excess of 20 percent for offered supply. The largest market share for offered regulation was [redacted] with 28 percent. The second largest market share for offered supply was [redacted] with 18 percent. The third largest market share for offered supply was [redacted] with 16 percent. [redacted] and [redacted] had [redacted] market shares respectively for offered regulation. There were two suppliers with market shares in excess of 20 percent for regulation offered and eligible. The largest market shares for regulation offered and eligible were [redacted] and [redacted] with 21 percent each. The third largest market share for regulation offered and eligible was [redacted] with 20 percent. [redacted] percent market shares respectively for regulation offered and eligible. There were three suppliers with market shares in excess of 20 percent for regulation assigned. The largest market share for regulation assigned was [redacted] with 24 percent. The second largest market share for regulation assigned was [redacted] with

[44] During the study period, PJM made periodic adjustments to the required level of regulation in the PJM Western and PJM Mid-Atlantic Regulation Markets. These adjustments increased the amount of required regulation in order to improve system performance as measured by the NERC Control Performance Standards. PJM currently has such an adjustment in effect. The removal of these adjustments has the effect of reducing hourly regulation demand thereby increasing the excess supply and potentially reducing the hours during which there are one or more pivotal suppliers. The removal of these adjustments affects only the demand for regulation and therefore does not affect market share or HHI results.

23 percent. The third largest market share for regulation assigned was [redacted] with 21 percent. [redacted] percent market shares respectively for regulation assigned. Table 5-2 summarizes the market share results.

Table 5-2 PJM Hourly Regulation Market pre-merger market shares: April 1, 2004 through March 31, 2005

	Offered	Eligible	Assigned
[redacted]	28%	21%	21%
	18%	21%	24%
	16%	20%	23%
	5%	6%	10%
	11%	12%	7%

In the PJM Mid-Atlantic Regulation Market, one percent of the hours failed the single pivotal supplier test for offered supply. This means that during one percent of the hours, total demand could not be met in the absence of the largest single supplier in the market. For offered regulation, 19 percent of the hours failed the two pivotal supplier test for offered supply. This means that during 19 percent of the hours, total demand could not be met in the absence of the two largest suppliers in the market. For offered regulation, 65 percent of the hours failed the three pivotal supplier test for offered supply. This means that during 65 percent of the hours, total demand could not be met in the absence of the three largest suppliers in the market.

For regulation offered and eligible, 12 percent of the hours failed the single pivotal supplier test. This means that during 12 percent of the hours, total demand could not be met in the absence of the largest single supplier in the market. For regulation offered and eligible, 51 percent of the hours failed the two pivotal supplier test. This means that during 51 percent of the hours, total demand could not be met in the absence of the two largest suppliers in the market. For regulation offered and eligible, 87 percent of the hours failed the three pivotal supplier test. This means that during 87 percent of the hours, total demand could not be met in the absence of the three largest suppliers in the market. Table 5-3 summarizes the pivotal supplier results.

Table 5-3 PJM Hourly Regulation Market pre-merger pivotal supplier results: April 1, 2004 through March 31, 2005

	Percent of Hours Offered	Percent of Hours Eligible
1-pivotal	1%	12%
2-pivotal	19%	51%
3-pivotal	65%	87%

Post-Merger Market Conditions

The post-merger analysis is based on actual regulation market data for the twelve months ended March 31, 2005 modified to combine the ownership of PSEG and Exelon resources into a single company.

The excess supply results do not change as a result of the merger.

Changes in hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible, and regulation assigned. Based upon regulation offered, HHI values increased by 22 from 2511 to 2533 for the maximum, by 162 from 1205 to 1367 for the minimum and by 103 from 1692 to 1795 for the average. Based upon regulation offered, the number of hours that the HHI was above 2500 increased by less than one percent. Based upon regulation offered and eligible, HHI values increased by 19 from 2784 to 2803 for the maximum, by 143 from 1209 to 1352 for the minimum and by 128 from 1772 to 1900 for the average. Based upon regulation offered and eligible, the number of hours that the HHI was above 2500 increased by less than one percent. Based upon regulation assigned, HHI values were unchanged at 6882 for the maximum, increased by 141 from 1341 to 1482 for the minimum and increased by 131 from 2497 to 2628 for the average. Based upon regulation assigned, the number of hours that the HHI was above 2500 increased by ten percentage points. Table 5-7 summarizes the changes in HHI for post-merger versus pre-merger conditions.

Table 5-4 PJM Hourly Regulation Market post-merger HHI : April 1, 2004 through March 31, 2005

	Minimum	Average	Maximum
Offered	1367	1795	2533
Eligible	1352	1900	2803
Assigned	1482	2628	6882

There was one supplier with a market share in excess of 20 percent for offered supply. The largest market share for offered regulation was [redacted] with 28 percent. The second largest market share for offered supply was [redacted] with 18 percent. The third largest market share for offered supply was [redacted] with 16 percent. The [redacted] merged company had a market share of [redacted] percent for regulation offered. There were two suppliers with market shares in excess of 20 percent for regulation offered and eligible. The largest market shares for regulation offered and eligible were [redacted] percent each. The third largest market share for regulation offered and eligible was [redacted], with 20 percent. The [redacted] had a market share of [redacted] percent for regulation offered and eligible. There were three suppliers with market shares in excess of 20 percent for regulation assigned. The largest market share for regulation assigned was [redacted] with 24 percent. The second largest market share for regulation assigned was [redacted] with 23 percent. The third largest market share for regulation assigned was [redacted] with 21 percent. The [redacted] merged company had a market share of [redacted] percent for regulation assigned. Table 5-5 summarizes the market share results.

Table 5-5 PJM Hourly Regulation Market post-merger market shares: April 1, 2004 through March 31, 2005

	Offered	Eligible	Assigned
[redacted]	28%	21%	21%
	18%	21%	24%
	16%	20%	23%
	16%	17%	16%

In the PJM Mid-Atlantic Regulation Market, one percent of the hours failed the single pivotal supplier test for offered supply. This means that during one percent of the hours, total demand could not be met in the absence of the largest single supplier in the market. For

offered regulation, 22 percent of the hours failed the two pivotal supplier test for offered supply. This means that during 22 percent of the hours, total demand could not be met in the absence of the two largest suppliers in the market. For offered regulation, 74 percent of the hours failed the three pivotal supplier test for offered supply. This means that during 74 percent of the hours, total demand could not be met in the absence of the three largest suppliers in the market.

For regulation offered and eligible, 13 percent of the hours failed the single pivotal supplier test. This means that during 13 percent of the hours, total demand could not be met in the absence of the largest single supplier in the market. For regulation offered and eligible, 55 percent of the hours failed the two pivotal supplier test. This means that during 55 percent of the hours, total demand could not be met in the absence of the two largest suppliers in the market. For regulation offered and eligible, 92 percent of the hours failed the three pivotal supplier test. This means that during 92 percent of the hours, total demand could not be met in the absence of the three largest suppliers in the market. Table 5-6 summarizes the pivotal supplier results.

Table 5-6 PJM Hourly Regulation Market post-merger pivotal supplier results: April 1, 2004 through March 31, 2005

	Percent of Hours Offered	Percent of Hours Eligible
1-pivotal	1%	13%
2-pivotal	22%	55%
3-pivotal	74%	92%

Table 5-7 PJM Hourly Regulation Market post merger HHI Differences: April 1, 2004 through March 31, 2005

	Minimum	Average	Maximum
Offered	162	103	22
Eligible	143	128	19
Assigned	141	131	0

Changes in pivotal supplier results were calculated based upon the regulation offered and regulation offered and eligible. Based upon regulation offered, single pivotal supplier results were unchanged at one percent of the total hours. Based upon regulation offered, the percent of hours during which the two-pivotal supplier test is failed increased 3 percentage points to 22 percent of the total hours. Based upon regulation offered, the percent of hours during which the three-pivotal supplier test is failed increased 9 percentage points to 74 percent of the total hours.

Based upon regulation offered and eligible, the percent of hours during which the one-pivotal supplier test is failed increased by one percentage point to 13 percent of the total hours. Based upon regulation offered and eligible, the percent of hours during which the two-pivotal supplier test is failed increased by 4 percentage points to 55 percent of the total hours. Based upon regulation offered and eligible, the percent of hours during which the three-pivotal supplier test is failed increased by 5 percentage points to 92 percent of the total hours. Table 5-8 summarizes the changes in pivotal supplier results for post-merger versus pre-merger conditions.

Table 5-8 PJM Hourly Regulation Market post merger pivotal supplier differences: April 1, 2004 through March 31, 2005

	Percent of Hours Offered	Percent of Hours Eligible
1-pivotal	0%	1%
2-pivotal	3%	4%
3-pivotal	9%	5%

Conclusions

The analysis of the regulation market shows that the proposed merger results in an increase in HHI that exceeds the increase specified in the Guidelines. The proposed merger would significantly increase concentration in the regulation market as defined by these metrics and the standards of the Guidelines and therefore raises concerns about potential adverse competitive effects, absent mitigation. These results should be interpreted based on those standards and Guidelines. This conclusion is based on the increase of 128 in average HHI for offered and eligible regulation from an average of 1772 to an average of 1900.

Mitigation

Mitigation of the merger impacts could be provided by an application of existing PJM market rules to the PJM Mid-Atlantic Regulation Market. This market could be made a cost-based market, as the PJM West Regulation Market and the PJM spinning markets are currently. As an alternative, the merged company could agree to offer its regulation capability into the market at cost-based levels. Finally, divestiture of regulation ownership could be designed in order to reverse the consequences of the merger for competitive conditions in the Mid-Atlantic Regulation Market.

The MMU evaluated the mitigation proposal of Exelon. The regulation capability of the units identified as candidate facilities for divestiture as listed in the Answer of Exelon Corporation and Public Service Enterprise Group, Inc. in Docket # EC05-43-000 dated May 9, 2005 was compiled. For the PJM Mid-Atlantic Regulation Market, there was sufficient regulation capability available within the list of candidate facilities to return the post-merger HHI to pre-merger levels. However, a critical caveat is that effective mitigation is, and can only be, based on specific units. The regulation capability available to resolve the structural issues resulting from the proposed merger is unit specific. It is not possible to evaluate a proposed divestiture of installed capacity without an exact specification of the units. It is not possible to make a meaningful assessment of the effectiveness of a proposed divestiture in remedying structural market problems resulting from the proposed merger in the absence of the identification of specific units. A supplemental analysis must be performed once a definitive declaration of divested assets has been developed. Given that the pre-merger level of HHI can be achieved, any intermediate post-merger level of HHI can also be achieved, with the same caveats.

Divestiture

Analysis was performed to determine the PSEG/Exelon divestiture requirement to return the PJM Mid-Atlantic Regulation Market to the pre-merger structural conditions.

In the 2004 Regulation Market in the PJM Mid-Atlantic Region, the submitted capability[45] was 2,140 MW with an average hourly eligible offer level of 948 MW. On average therefore, approximately 44 percent of the stated capability of regulation resources was offered and eligible to participate in the PJM Mid-Atlantic Regulation Market on an hourly basis.

It was determined that a divestiture of 60 MW of hourly eligible regulation supply, or 136 MW of capability, by the PSEG/Exelon merged company would return the structural conditions to near the pre-merger conditions. This divestiture assumes that the total supply of regulation remains constant. The average hourly total volume of regulation offered was 1,010 MW, with a minimum value of 597 MW and a maximum value of 2,529 MW. For regulation offered, [redacted] offered a minimum and maximum hourly volume of regulation during the twelve month period of [redacted] and [redacted] respectively. For regulation offered, [redacted] offered a minimum and maximum hourly volume of regulation during the twelve month period of [redacted] and [redacted] respectively. The average hourly total volume of regulation offered and eligible was 788 MW, with a minimum value of 353 MW and a maximum value of 1,634 MW. For regulation offered and eligible, [redacted] offered a minimum and maximum hourly volume of regulation during the twelve month period of [redacted] and [redacted] respectively. For regulation offered and eligible, [redacted] offered a minimum and maximum hourly volume of regulation during the twelve month period of [redacted] and [redacted] respectively. It was assumed that the divested MW were transferred to a single firm currently having no position in the PJM Mid-Atlantic Regulation Market. The analysis was conducted by removing 60 MW of offered and eligible supply each hour from the combined company and assigning it to a new firm having zero MW of regulation prior to the divestiture. Market shares, HHI and pivotal supplier results were then recalculated for each hour of the twelve-month period and compared to the pre-merger structural conditions.

Following such a hypothetical divestiture, the expected structural conditions were determined on the basis of both offered and offered and eligible supply.

The post-divestiture analysis is based on actual regulation market data for the twelve months ended March 31, 2005 modified to combine the ownership of PSEG and Exelon resources into a single company and then modified to remove ownership of 60 MW of offered and eligible regulation resources from the combined company.

Hourly HHI values were calculated based upon the regulation offered, regulation offered and eligible, and regulation assigned. Based upon regulation offered, HHI ranged from a maximum of 2535 to a minimum of 1255 with an average value of 1689. For regulation offered, the HHI was at or above 2500 during less than one percent of the studied hours. Based upon regulation offered and eligible, HHI values ranged from a maximum of 2866 to a minimum of 1227, with an average of 1769. For regulation offered and eligible, the HHI was at or above 2500 during two percent of the studied hours. Table 5-9 and Table 5-10 summarize the HHI results for post-merger conditions assuming a 60 MW divestiture of offered and eligible supply.

[45] Submitted capability is defined as the maximum daily offer volume during the period without regard to the actual availability of the resource.

Table 5-9 PJM Hourly Regulation Market post-merger with divestiture HHI : April 1, 2004 through March 31, 2005

	Minimum	Average	Maximum
Offered	1255	1689	2535
Eligible	1227	1769	2866

Table 5-10 PJM Hourly Regulation Market post-merger with divestiture HHI differences from pre-merger case: April 1, 2004 through March 31, 2005

	Minimum	Average	Maximum
Offered	50	-3	24
Eligible	18	-3	82

There was one supplier with a market share in excess of 20 percent for offered supply. The largest market share for offered regulation was [redacted] with 28 percent. The second largest market share for offered supply was [redacted] with 18 percent. The third largest market share for offered supply was [redacted] with 16 percent. The [redacted] had a market share of [redacted] percent for regulation offered. There were two suppliers with market shares in excess of 20 percent for regulation offered and eligible. The largest market shares for regulation offered and eligible were [redacted]. The third largest market share for regulation offered and eligible was [redacted], with 20 percent. The [redacted] had a market share of [redacted] percent for regulation offered and eligible. Table 5-11 summarizes the market share results for post-merger conditions assuming a 60 MW divestiture of offered and eligible supply.

Table 5-11 PJM Hourly Regulation Market post-merger with divestiture market shares: April 1, 2004 through March 31, 2005

	Offered	Eligible
[redacted]	28%	21%
	18%	21%
	16%	20%
	10%	10%

In the PJM Mid-Atlantic Regulation Market, one percent of the hours failed the single pivotal supplier test for offered supply. This means that during one percent of the hours, total demand could not be met in the absence of the largest single supplier in the market. For offered regulation, 19 percent of the hours failed the two pivotal supplier test for offered supply. This means that during 19 percent of the hours, total demand could not be met in the absence of the two largest suppliers in the market. For offered regulation, 66 percent of the hours failed the three pivotal supplier test for offered supply. This means that during 66 percent of the hours, total demand could not be met in the absence of the three largest suppliers in the market.

For regulation offered and eligible, 12 percent of the hours failed the single pivotal supplier test. This means that during 12 percent of the hours, total demand could not be met in the absence of the largest single supplier in the market. For regulation offered and eligible, 51 percent of the hours failed the two pivotal supplier test. This means that during 51 percent of the hours, total demand could not be met in the absence of the two largest suppliers in the market. For regulation offered and eligible, 87 percent of the hours failed the three pivotal

supplier test. This means that during 87 percent of the hours, total demand could not be met in the absence of the three largest suppliers in the market.

Table 5-12 and Table 5-13 summarize the pivotal supplier results for post-merger conditions assuming a 60 MW divestiture of offered and eligible supply.

Table 5-12 PJM Hourly Regulation Market post-merger with divestiture pivotal supplier results: April 1, 2004 through March 31, 2005

	Percent of Hours Offered	Percent of Hours Eligible
1-pivotal	1%	12%
2-pivotal	19%	51%
3-pivotal	66%	87%

Table 5-13 PJM Hourly Regulation Market post-merger with divestiture pivotal supplier differences from pre-merger case: April 1, 2004 through March 31, 2005

	Percent of Hours Offered	Percent of Hours Eligible
1-pivotal	0%	0%
2-pivotal	0%	0%
3-pivotal	1%	0%

In summary, the MMU analysis shows that divestiture of 136 MW of regulation capability would result in post-merger HHI levels equal to pre-merger HHI levels and post-merger three pivotal RSIs equal to pre-merger three pivotal RSIs. The MMU analysis also shows that divestiture of 80 MW of regulation capability would result in a post-merger HHI increase of less than 100 points. These details are presented in Table 5-14 which shows the level of eligible regulation and the corresponding level of regulation capability divestiture required to return the post-merger HHI and RSI to the pre-merger levels. A divestiture target is also presented to return the post-merger HHI to within 100 points of the pre-merger level.

Table 5-14 PJM Hourly Regulation Market divestiture targets

	Regulation MW	
Target	Eligible	Capability
Pre-Merger HHI	60	136
HHI Delta < 100 (HHI < 1800)	35	80
HHI Delta < 50 (HHI > 1800)	N/A	N/A
Pre-Merger 3-Pivotal Levels	60	136

In order to evaluate the sensitivity of the post-merger results to the characteristics of the entities purchasing the divested assets, the MMU calculated the HHI results under two additional scenarios. The first scenario assumed that the divested regulation is purchased by one existing company whose market share was close to twenty percent (18 percent). The second scenario assumed that the divested capacity is purchased by an existing company whose market share is five percent. The post-merger HHIs were calculated for each scenario. (See Table 5-15)

For the scenario in which the divested regulation is purchased by an existing company with a market share close to 20 percent, the post-merger HHI value is 350 points above the pre-merger value, meaning that this mitigation level does not pass the DOJ Guidelines. The increase in HHI is higher than that associated with the base case assumption that the divested assets are purchased by an entity with no current market position and is higher than that associated with the post-merger case with no divestiture.

For the scenario in which the divested regulation is purchased by an existing company with a market share of five percent, the post-merger HHI value is 78 points above the pre-merger value, meaning that this mitigation level does pass the DOJ Guidelines. The increase in HHI is also higher than that associated with the base case assumption that the divested assets are purchased by an entity with no current market position.

Table 5-15 PJM Hourly Regulation Market post-merger with divestiture HHI differences from pre-merger case for offered and eligible supply: April 1, 2004 through March 31, 2005

Purchasing Company Pre-merger Market Share	Minimum	Average	Maximum
0%	18	-3	82
5%	96	78	126
18%	180	350	1198

6. Spinning Reserves Market

Method of Analysis

The merger analysis focuses on the Mid-Atlantic Spinning Market as the spinning reserves market most likely to be impacted by the merger. The basic measures of market structure are examined including market shares and HHI. This market is not structurally competitive under current circumstances. The merger has no significant impact on the structure of the spinning reserve market.

The results are based on an analysis of the competitiveness of the PJM Mid-Atlantic Spinning Market before and after the proposed merger of PSEG and Exelon based on 12 months of actual spinning market data through March 31, 2005. The pre-merger data reflects actual market results during this period and the post-merger data combines the ownership of PSEG and Exelon from the actual market results.

Spinning reserve is an ancillary service defined as generation that is synchronized to the system and capable of producing output within 10 minutes. Spinning reserve can, at present, be provided by a number of sources, including steam units with available ramp, condensing hydroelectric units, condensing CTs and CTs running at minimum generation.

All of the units that participate in the Spinning Reserve Market are categorized as either Tier 1 or Tier 2 spinning. Tier 1 resources are those units that are online following economic dispatch and able to respond to a spinning event by ramping up from their present output. All units operating on the PJM system are considered potential Tier 1 resources, except for those explicitly assigned to Tier 2 spinning. Tier 2 resources include units that are backed down to provide spinning capability and condensing units synchronized to the system and available to increase output.

PJM introduced a market for spinning reserve on December 1, 2002. Before the Spinning Reserve Market, Tier 1 spinning reserve had not been compensated directly and Tier 2 spinning reserve had been compensated on a unit-specific, cost-based formula.

Under the Spinning Reserve Market rules, Tier 1 resources are paid when they respond to an identified spinning event as an incentive to respond when needed. Tier 1 spinning payments or credits are equal to the integrated increase in MW output above economic dispatch from each generator over the length of a spinning event, multiplied by the spinning energy premium less the hourly integrated LMP. The spinning energy premium is defined as the average of the five-minute LMPs calculated during the spinning event plus $50 per MWh.[46] All units called on to supply Tier 1 or Tier 2 spinning have their actual MW monitored. Tier 1 units are not penalized if their output fails to match their expected response as they are only compensated for their actual response. Tier 2 units assigned spinning by market operations are compensated whether or not they are actually called on to supply spinning so they are penalized if their MW output fails to meet their assignment.

Tier 2 spinning requirements are determined by subtracting the amount of Tier 1 spinning available from the total control area spinning reserve requirement for the period.

Under the Spinning Reserve Market rules, Tier 2 spinning resources are paid in order to be available as spinning reserve, regardless of whether the units are called upon to generate in

[46] See "PJM Manual 11: Scheduling Operations," Revision 23 (December 7, 2004), pp. 66-67.

response to a spinning event. The price for Tier 2 spinning resources is determined in a market for Tier 2 spinning resources. Several steps are necessary before the hourly Tier 2 Spinning Reserve Market is cleared. Ninety minutes prior to the start of the hour, PJM estimates the amount of Tier 1 reserve available from every unit; 60 minutes prior to the start of the hour, self-scheduled Tier 2 units are identified. If spinning requirements are not met by Tier 1 and self-scheduled Tier 2 resources, then a Tier 2 clearing price is determined 30 minutes prior to the start of the hour. This Tier 2 price is equivalent to the merit order price of the highest price, Tier 2 resource needed to fulfill spinning requirements, the marginal unit. A unit's merit order price is a combination of the unit's spinning offer price, the cost of energy use per MWh of capability and the unit's opportunity cost.[47]

The spinning offer price submitted for a unit can be no greater than the maximum value of the unit's operating and maintenance cost plus a $7.50 per MWh margin.[48, 49] The market-clearing price is comprised of the marginal unit's offer price, cost of energy use and opportunity cost. All units cleared in the Spinning Reserve Market are paid the higher of either the market-clearing price or the unit's spinning offer plus the unit-specific LOC and cost of energy use incurred. The Mid-Atlantic Region's Tier 2 Spinning Reserve Market is cleared on cost-based offers because the structural conditions for competition do not exist. The structural issue can be more severe when the Spinning Reserve Market becomes locational because of transmission constraints.[50]

For this report, the twelve months of available market data for the PJM Mid-Atlantic Spinning Market was analyzed for the period April 1, 2004 through March 31, 2005.

The MMU calculates market share and HHI metrics for the spinning reserve market for each hour. The analysis presented here focuses on actual market clearing results.

Table 6-1 PSEG / Exelon Merger Analysis, Tier 2 Spinning Reserve Market, April 1, 2004 - April 1, 2005

	HHI min	HHI max	HHI avg	Market share max pct.
Pre merger	1946	10000	4651	41%
Post merger	2051	10000	4671	41%
Delta	105	0	20	0%

47 Although it is unusual, a PJM dispatcher can deselect units which have been committed after the clearing price is established. This only happens if real-time system conditions require dispatch of a spinning unit for constraint control, or problems with a generator or monitoring equipment are reported.

48 See "PJM Manual 11: Scheduling Operations," Revision 23 (December 7, 2004), p. 58.

49 See PJM Manual 15: Cost Development Guidelines, Rev. 4, (September 1, 2004), p. 31.

50 PJM Mid-Atlantic spinning assignments are bifurcated in the presence of significant west-east constraints. PJM assigns spin to the Mid-Atlantic region via east and west sub-region components to account for the limited ability to deliver western energy to eastern load during congestion. With the merger of two of the largest eastern sub-region firms, this sub-market would become more concentrated during times of congestion.

Pre-Merger Market Conditions

The pre-merger analysis is based on actual Tier 2 spinning reserve market data for the twelve months ended March 31, 2005. This period is a reasonable representation of the Tier 2 spinning reserve market as the Mid-Atlantic Spinning Reserve market was not affected by the integrations that occurred in 2004 and 2005.

Hourly HHI values were calculated based upon spinning reserve cleared in the market. HHI ranged from a maximum of 10000 to a minimum of 1946 with an average value of 4651. Table 5-1 summarizes the HHI results.

There were three suppliers with a market share in excess of 20 percent for spinning reserve cleared in the market. The largest market share for spinning reserve was [redacted] with 40 percent. The second largest market share for spinning reserve was [redacted] with 28 percent. The third largest market share for spinning reserve was [redacted] with 24 percent. [redacted] had less than one percent market share.

Post-Merger Market Conditions

The post-merger analysis is based on actual Tier 2 spinning reserve market data for the twelve months ended March 31, 2005 modified to combine the ownership of PSEG and Exelon resources into a single company.

Hourly HHI values were calculated based upon spinning reserve cleared in the market. HHI ranged from a maximum of 10000 to a minimum of 2051 with an average value of 4671. Table 5-1 summarizes the HHI results.

The market share results were not significantly affected by the proposed merger.

The MMU concludes, based on the above analysis that the merger will not have a significant impact on the competitiveness of the PJM Mid-Atlantic Tier 2 Spinning Reserve Market. This conclusion is based on the increase of 20 points in average HHI for the spinning reserve market from an average of 4651 to an average of 4671. The combined company has a market share of [redacted] percent.

Conclusion

The analysis of the spinning reserve market shows that the proposed merger results in an increase in HHI that is less than the increase specified in the Guidelines. The proposed merger would not significantly increase concentration in the spinning reserve market as defined by these metrics and the standards of the Guidelines and therefore there are no concerns about potential adverse competitive effects. These results should be interpreted based on those standards and Guidelines.