State of West Virginia

Public Service Commission

In the Matter of:

MONONGAHELA POWER COMPANY AND THE POTOMAC EDISON COMPANY PETITION FOR APPROVAL OF A GENERATION RESOURCE TRANSACTION AND RELATED RELIEF	)))))	Case No. 12-1571-E-PC

Direct Testimony of

J. Richard Hornby

On Behalf of

Consumer Advocate Division of the Public Service Commission

of West Virginia

April 26, 2013

REDACTED

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I. Introduction and Qualifications

Q Please state your name, business address, and position.

A My name is J. Richard Hornby. I am a Senior Consultant at Synapse Energy Economics, 485 Massachusetts Avenue, Cambridge, MA 02139.

Q Please describe Synapse Energy Economics.

A Synapse Energy Economics ("Synapse") is a research and consulting firm specializing in energy and environmental issues. Its primary focus is on electricity resource planning and regulation including computer modeling, service reliability, resource portfolios, financial and economic risks, transmission planning, renewable energy portfolio standards, energy efficiency, and ratemaking. Synapse works for a wide range of clients including attorneys general, offices of consumer advocates, public utility commissions, and environmental groups, U.S. Environmental Protection Agency, Department of Energy, Department of Justice, Federal Trade Commission and National Association of Regulatory Utility Commissioners. Synapse has over twenty professional staff with extensive experience in the electricity

Q Please summarize your work experience and educational background.

A I have over thirty years of experience in the energy industry, primarily in utility regulation and energy policy. Since 1986, as a regulatory consultant I have provided expert testimony and litigation support on natural gas and electric utility resource planning, cost allocation and rate design issues in over 120 proceedings in the United States and Canada. During that period my clients have included utility regulators, consumer advocates, environmental groups, energy marketers, gas producers, and utilities. Prior to 1986 I served as Assistant Deputy Minister of Energy for Nova Scotia where I helped prepare the province's first comprehensive energy plan and served on a federal-provincial board responsible for regulating exploration and development of offshore oil and gas reserves.

I was the lead author of reports projecting long-term avoided energy supply costs in New England prepared in 2007, 2009 and 2011. I was co-author of Portfolio Management: How to Procure Electricity Resources to Provide Reliable, Low-Cost, and Efficient Electricity Services to All Retail Customers, a 2006 report prepared for the National Association of Regulatory Utility Commissioners (NARUC). In the past five years, I have testified in several electric resource planning cases in Arkansas and Kentucky, and I am currently engaged in another case in West Virginia regarding the acquisition of the Amos and Mitchell plants.

I have a Bachelor of Industrial Engineering from the Technical University of Nova Scotia, now the School of Engineering at Dalhousie University, and a Master of Science in Energy Technology and Policy from the Massachusetts Institute of Technology (MIT).

Q On whose behalf are you testifying in this case?

A I am testifying on behalf of the Consumer Advocate Division of the Public Service Commission of West Virginia.

Q Have you testified previously before the West Virginia Public Service Commission?

A Yes. In 1988, I submitted testimony on gas transportation rate design in Case No. 240-G. In 1990, I submitted testimony on a review of fuel increment adjustments to rates for Monongahela Power Company (Case No. 90-196-E-GI) and Potomac Edison Company (Case No. 90-197-E-GI).

Q What is the purpose of your testimony?

The CAD retained Synapse to assist in their review of the application by Monongahela Power Company and The Potomac Edison Company (or the "Companies") for the approval and rate recovery of the acquisition of additional ownership interest in the Harrison plant from Allegheny Energy Supply Company LLC (or "AE Supply") and sale of the Companies' share in the Pleasants plant to

AE Supply. The net impacts of this proposed purchase and sale, which the Companies refer to as the "Transaction", would require an investment of more than $1.2 billion to acquire an additional 1,476 megawatts ("MW") of baseload capacity. My testimony describes my analysis of whether the Transaction is reasonable.

Q What data sources did you rely upon to prepare your review of the Companies' request?

A My review relies primarily upon the Direct Testimony and Exhibits of Company witness Michael Delmar, the Companies responses to data requests in this proceeding, the Companies' 2012 Resource Plan (Case No. 11-1274-E-P) and projections and data regarding future wholesale market prices of natural gas, electric energy and electric capacity. I also reviewed the Companies Information Filing on Subcritical Facilities (March 2012) and the FirstEnergy 2012 Annual Report to Shareholders.

Q Are you sponsoring any exhibits?

A Yes, I am sponsoring the following exhibits:

Exhibit (JRH-1)	Resume of James Richard Hornby
Exhibit __(JRH-2)	Illustration of Capacity and Energy Positions in 2013 per 2012 Hourly Load and Generation Data
Exhibit __(JRH-3)	Projected Capacity Position, 2012 – 2026, Without Transaction and With Transaction
Exhibit __(JRH-4)	Economic Recovery Case Estimates, 2015 – 2034, 75% Capacity Factor
Exhibit __(JRH-5)	Economic Recovery Case Estimates, 2015 – 2034, 66% Capacity Factor
Exhibit __(JRH-6)	PJM Capacity Market Prices (RTO) $/MW-day, Actuals (2009 – 2015) and Companies' Projections (2016 – 2034)
Exhibit __(JRH-7)	PJM Energy Market Prices ($/MWh), Actuals (2006 – 2015) and Companies' Projections (2016 – 2034)

Exhibit __(JRH-8)	Status Quo Case Estimates, 2015 – 2034 , 75% and 66% Capacity Factors
Exhibit __(JRH-9)	Sensitivity of Levelized Cost Estimates to Market Price Projections and Harrison Capacity Factor assumption
Exhibit __(JRH-10)	Range of Hourly Energy Market Prices in 2012
Exhibit __(JRH-11)	Sensitivity of Levelized Cost Estimates to Future Carbon Prices
Exhibit __(JRH-12)	Status Quo Case Estimates at Consumer Advocate Proposed Acquisition Cost, 2015 – 2034
Exhibit __(JRH-13)	Sensitivity of Levelized Cost Estimates to Acquisition Cost
Exhibit __(JRH-14)	Data Responses

II. Summary, Conclusions and Recommendations

Q Please summarize the proposed Transaction.

A The Companies propose to acquire 1,576 MW of Harrison capacity by purchasing a 79.46% interest from AE Supply, which would give the Companies a 100% ownership. (AE Supply is an affiliate merchant generation company owned by FirstEnergy). The proposed acquisition will require an investment of over $1.3 billion based upon the acquisition cost of $1.1 billion and the projected capital costs of environmental compliance measures required at the plant of $244 million. Concurrently the Companies propose to sell their approximate 100 MW, or 7.69% share, of the Pleasants plant to AE Supply for $73.3 million.

Q Please summarize the Companies' rationale for the Transaction.

A The Companies currently own or control less capacity than they purchase from the wholesale market, which is a source of market price risk. They forecast this shortfall will increase due to projected load growth. According to Company witness Delmar, they are proposing the Transaction because they think it

> …will minimize Mon Power's market reliance on outside sources to make up for an ever-growing shortfall in capacity and energy - an approach that is expected to provide a hedge for customers from exposure to changes in market capacity and energy prices in future years and stabilize customer rates. The Transaction is *the lowest cost alternative* available to prudently manage Mon Power's *market price risk* and provide reliable, reasonably-priced capacity and energy to serve the Companies' customers. (*emphasis added*) (Delmar Direct, page 2).

Mr. Delmar bases his conclusion on his evaluation of five "all or nothing" possible strategies for managing market price risk and providing reasonably-priced capacity and energy to serve the Companies' customers over a twenty-year

period, 2015 to 2034. The five strategies were to either do nothing (i.e., meet 100% of the shortfall with purchases from wholesale markets) or to meet 100% of the shortfall either from the Transaction, from building and operating a new natural gas combined cycle unit ("NGCC"), from building and operating a new coal unit, or from building and operating a new nuclear unit. His evaluation consists of estimating the levelized cost of each of those five strategies, expressed in $/MWh, and comparing the results. He also cites as support the results of the Navigant Consulting market valuation of Harrison.

Q Please summarize the major findings from your analysis of the Companies' request.

The major findings from my analyses are summarized below.

First, this proceeding is not about ensuring reliable service. Instead, it is about managing market price risk and providing reasonably-priced capacity and energy to meet customer requirements. Moreover, the Companies' exposure to market price risk is due to a shortfall in peaking capacity, not to a shortfall in baseload capacity. The Companies have time to find a reasonable strategy to address their need for peaking capacity.

Second, acquiring a net 1,476 MW of baseload capacity under the Transaction would limit the Companies' ability to take advantage of other options over the next several years; options that are less expensive and have less fixed cost risk.

Third, acquisition of additional Harrison capacity would impose a large, long-term fixed cost risk on customers. If the Commission approves the Transaction, customers will be required to pay the fixed costs of the additional Harrison capacity for over twenty five years regardless of whether that acquisition proves to be the most cost-effective strategy.[1] According to the Companies' own

[1] 27 year depreciation period as of November 2012, Wise Direct Testimony, page 9 lines 12-13.

assumptions for the Economic Recovery Case, which they characterize as their base case, customers will not begin receiving a cumulative net savings from the acquisition of Harrison capacity until after 2029, assuming the Transaction was implemented in 2015. Of even more concern, customers might never receive a cumulative net savings from the Harrison capacity if any or all of the Companies' input assumptions about key independent variables prove to be even somewhat inaccurate. Those key independent variables are the capacity factor of Harrison, which to date has been lower than the average of 75% the Companies' are assuming over the twenty year levelization period;[2] wholesale energy market prices, which could be lower than the prices the Companies assumed in their Economic Recovery Case, and the cost of complying with future carbon emission regulations, which may be higher than the Companies' assumption of zero.

Fourth, the Companies failed to evaluate a reasonable range of strategies for managing market price risk and providing reasonably-priced capacity and energy from 2015 to 2034. The five all-or-nothing strategies the Companies evaluated are simple strategies for meeting a shortfall in baseload capacity, not a shortfall in peaking capacity. The Companies have a far larger universe of candidate strategies from which to choose. These candidate strategies include portfolios of resources relevant to a shortfall in peaking capacity such as existing peaking capacity, demand-side resources, purchase power agreements, new peaking capacity, and financial instruments. Such a portfolio would provide the Companies' the flexibility to adjust their strategy over time in response to changes in their needs and/or market conditions, A strategy with those characteristics would enable the Companies to manage market price risk and provide reasonably-priced capacity and energy without imposing a large, long-term fixed cost risk on customers.

[2] Capacity factor measures the use of a generating unit. It is the ratio of the actual quantity of electricity the unit produces during a period of time (e.g., a year) and the maximum quantity that unit could have been produced during that period of time.

Finally, the Companies evaluated their strategies using a simple levelized cost analysis rather than using a comprehensive method that simulates the performance of each possible strategy within the context of the Companies' entire system, i.e., its hourly load, its existing generation resources, the operation of the PJM energy market daily, if not hourly, as well as the PJM capacity market. A potential investment of over $1 billion certainly warrants that type of comprehensive analysis, which the Companies have the experience and resources to prepare.

Q Please summarize your major conclusion and recommendation regarding the proposed Transaction.

A My conclusion is that the proposed Transaction is not reasonable and is adverse to the public interest. I recommend that the Commission reject the Transaction. The Commission should also require the Company to issue an RFP for capacity of various types, and for energy associated with those types of capacity, in various quantities for various durations to determine exactly what resources are available to it. I further recommend that the Commission require the Companies to evaluate a reasonable range of hedging strategies including both economic and physical hedges.

III. The Companies' need peaking capacity not baseload capacity

Q Is the Companies' filing in this proceeding prompted by a concern about reliability or about reasonable rates?

A The Companies' filing is not prompted by a concern about reliability. This filing is prompted by the Companies' stated concern about providing service at reasonable rates, and in particular about choosing a strategy to manage their market price risk. The Companies' exposure to market price risk arises from the fact that they currently own and control less capacity than they purchase from the wholesale market, and they forecast this shortfall will increase due to projected load growth.

The Companies petition states, at page 2:

> The Companies have determined that Mon Power's current generation resources will not provide the capacity and energy coverage needed to protect the Companies' West Virginia customers against a significantly increasing reliance on capacity and energy markets that can show dramatic fluctuations over time.

The Companies are referring to dramatic fluctuations in market prices for capacity and energy.

Mr. Delmar states that the rationale for proposing the Transaction is that it

> …will minimize Mon Power's market reliance on outside sources to make up for an ever-growing shortfall in capacity and energy - an approach that is expected to provide a hedge for customers from exposure to changes in market capacity and energy prices in future years and stabilize customer rates. The Transaction is the lowest cost alternative available <u>to prudently manage Mon Power's market price risk and provide reliable, reasonably-priced capacity</u>

and energy to serve the Companies' customers. (Delmar Direct, page 2, emphasis added).

Q. What is the connection between reasonable rates, market price risk, and the shortfall between the capacity of the Companies' current generation resources and the Companies' capacity requirements?

A. The concern about reasonable rates, and specifically market price risk, arises from the fact that the Companies' buy all of the capacity and energy they require for their customers from PJM wholesale markets and sell all of the capacity and energy from their generation resources into those markets. The Companies credit the net revenues from those market sales, i.e. market revenues minus generation resource costs, against the costs of their market purchases they recover in rates. In other words, their net revenues from these market sales reduce the cost of capacity and energy they have to recover from customers.

The Companies currently own and control less capacity than they purchase from the wholesale market. Because of that shortfall they are selling less capacity into the market than they are buying from the market, and hence are receiving less market revenue to credit against those capacity costs.

Q Please describe the Companies' current shortfall in coverage of its capacity purchases

A The Companies current shortfall in capacity and associated energy is illustrated in Figure 1. This Figure plots the Companies' capacity requirements and generation resource capacity in 2013, this illustrates the shortfall in capacity. The Figure illustrates the shortfall in energy coverage by plotting the Companies' actual energy load by hour from 2012, as a proxy for 2013 actual load, in order of highest load in an hour to lowest load in an hour. This load duration curve illustrates the shortfall more clearly than plotting load in chronological order.

Figure 1. Illustration of Capacity and Energy Positions Without Transaction in 2013 per 2012 Hourly Load

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The Figure demonstrates that in 2013 the Companies' are purchasing approximately 1,000 MW, or 33%, more capacity than they are selling into the PJM market. In contrast, the Companies' generation resources have the ability to cover over 99% of the Companies' annual energy purchases, as demonstrated by the line showing their 2013 "unforced" capacity, or UCAP.[3] Thus, the Companies' have a very small shortfall in coverage of energy purchases.

Q How can the Companies shortfall in capacity coverage be so much greater than their shortfall in energy coverage?

A The Companies shortfall in capacity coverage is greater than their shortfall in energy coverage because the Companies are short peaking capacity rather than

[3] Mr. Delmar defines unforced capacity is what PJM procures to satisfy its Reliability Pricing Model reliability requirement. Installed capacity values are higher than unforced capacity values because unforced capacity takes into account the probability of outages and de-rates a unit's capacity value from its installed capacity value based on prior performance.

baseload capacity. Peaking capacity plays a key role in meeting customers demand in the few hours of the year when load is highest. However, it plays a tiny role in meeting customers annual energy load, again because it only generates energy in a very few hours of the year. Therefore, the Companies have a small physical shortfall in energy coverage, despite a large physical shortfall in capacity coverage, because they have a shortfall in peaking capacity rather than in load-following or baseload capacity.

Peaking capacity typically supplies energy in less than 10% of the hours of the year. For example, the capacity the Company retired in 2012 had an average capacity factor of 11% in 2011 and a projected capacity factor of less than 1% in 2012, indicating that it operating at full capacity in very few hours each year. The distinction between the capacity shortfall and the energy shortfall is discussed below and illustrated in Exhibits___(JRH-2) and ___(JRH-3).

Q Please explain the difference between peaking, load-following and baseload capacity.

A Peaking, load-following and baseload capacity generally have different characteristics in terms of physical operating capabilities, fixed costs and variable production cost. Peaking capacity ideally has the flexibility to operate at very high output levels with short notice for short periods. This segment would ideally be served by capacity with relatively low fixed costs because it only generates energy in a few hours of the year, e.g. less than 5%, and therefore have a very low capacity factor. Load following or intermediate capacity must have the flexibility to increase and decrease its generation substantially and quickly in response to increases and decreases in customer load. Base load capacity generally has high fixed costs and low variable costs relative to load-following and peaking capacity. Base load capacity is cost-effective when it operates at a relatively steady level and high capacity factor because its high fixed costs are recovered over a large annual quantity of annual energy.

The Companies current capacity is essentially all baseload and intermediate (load-following). Figure 2 illustrates that the actual generation from those resources in 2012 by hour closely matched the Companies' actual energy load by hour in that year.

Figure 2. Illustration of Capacity and Energy Positions Without Transaction in 2013 per 2012 Hourly Load and Hourly Generation

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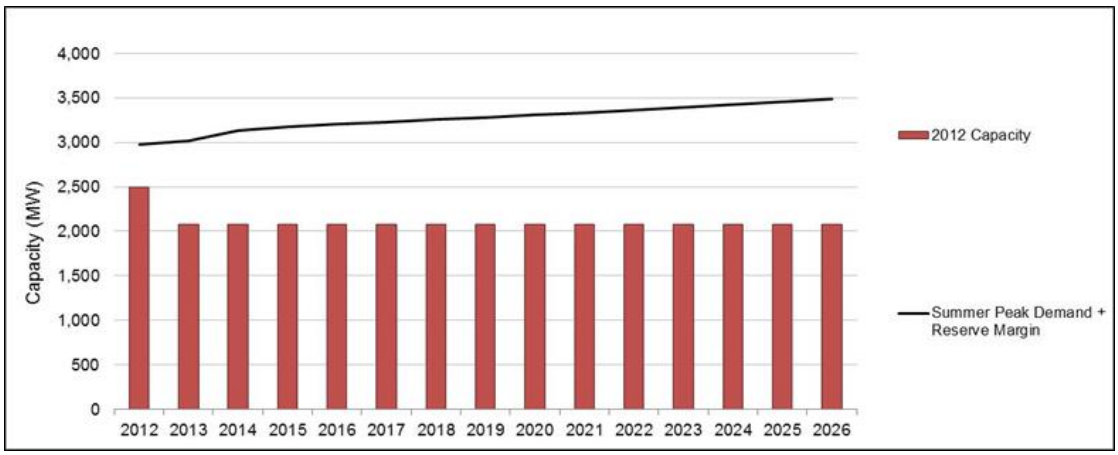
Q Are the Companies' projecting their shortfall in coverage of capacity and energy purchases to increase over time as their load grows?

A. Yes. The Companies are projecting their capacity requirements and annual energy to increase by approximately 17% and 21% respectively between 2013 and 2026.

The Companies' projection of its shortfall in capacity coverage by year from 2012 onward is presented in the top chart of Exhibit ___ (JRH-2) and presented below as Figure 3. Approximately 408 MW of the shortfall in 2013 is due to the Companies' decision to deactivate several of their old coal units effective September 2012. The chart plots the total capacity the Company is required to

have under its control each year in order to ensure reliable service and its 20131 UCAP

Figure 3. Projected Capacity Position, 2012 – 2026, Without Transaction



If the Companies' load projections are correct, by 2026 they will have larger shortfalls in their coverage of capacity and energy purchases. However, their shortfall in capacity purchases will still be much larger than their shortfall in coverage of their energy purchases, as shown in Figure 4 below, from page 2 of Exhibit___ (JRH-3).

Figure 4 – Illustration of Capacity and Energy Positions Without Transaction in 2026 per 2012 Hourly Load Increased by 21%

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Q What is the ratemaking mechanism through which the presence or absence of a shortfall in coverage of capacity and energy purchases affects the rates the Company charges its customers?

A The ENEC is the mechanism through which the existence of a shortfall, or the elimination of a shortfall, affects the rates the Company charges its customers.

The Companies buy all of the capacity, energy and ancillary services they need to provide service to retail customers from the relevant PJM wholesale markets. They book the resulting capacity, energy and ancillary service costs, which I will refer to in aggregate as "market costs", to the ENEC surcharge. Concurrently, the Companies sell all of the capacity available from the generation resources they own or control into the PJM wholesale capacity market and, when the cost of producing energy from those resources is less than the energy market price they sell that generation into the PJM energy market. The Companies credit the resulting revenues, net of variable production costs, to customers through the

ENEC surcharge. In other words, the Companies' net revenues from sales into the PJM markets help offset, or reduce, the amount of market costs the Companies collect from customers through the ENEC surcharge. Customers pay the fixed revenue requirements associated with the generation resources through the Companies' base rates.

The simple existence of a shortfall between the physical quantities of capacity and energy the Companies acquire and the generation resources they currently have available to them is not evidence that the Companies' rates are too high or not reasonable. Instead, the existence of a shortfall simply begs the question being addressed in this proceeding, i.e., is there a strategy for reducing or eliminating the shortfall under which customers will be better off relative to continuation of the shortfall? If the strategy for eliminating the shortfall increases costs and /or financial risks to customers then customers are better off to have the shortfall continue.

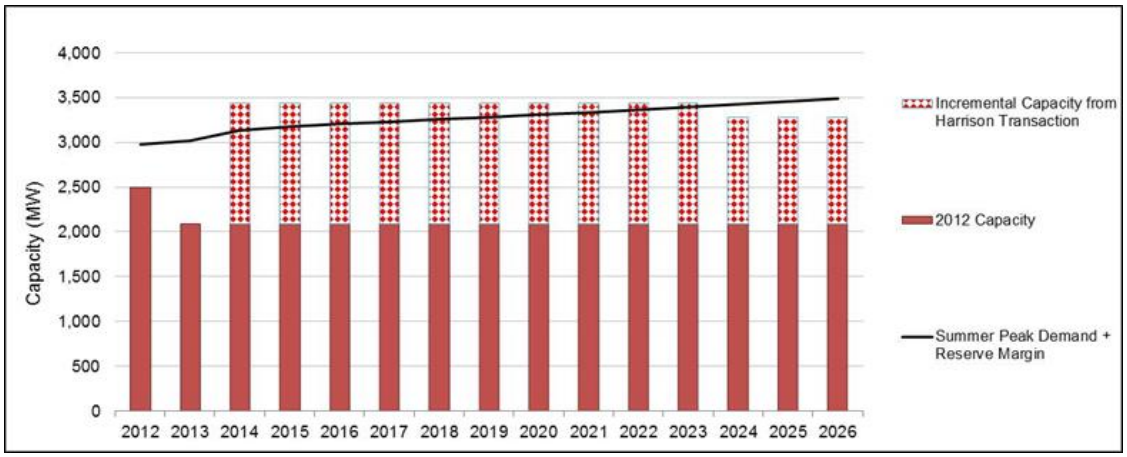
Q Do the Companies have time to address their current shortfall in coverage of capacity and associated purchases?

A Yes. The current shortfall in coverage of capacity and associated purchases does not pose an immediate, significant cost risk for the Companies' ratepayers relative to the fixed cost risk of the proposed Harrison capacity. As I discuss below, the fixed cost of Harrison capacity are substantially higher than the current and projected prices of capacity from the PJM market. In addition, Harrison's projected annual average variable cost of producing energy is not materially lower than its projected price of energy under the Economic Recovery Case for the next several years. Therefore the Companies have time to identify and evaluate strategies other than the Transaction for covering their shortfall

Q. Would acquisition of the Harrison capacity limit the Companies' ability to take advantage of other strategies?

A. Yes. Figure 5, the bottom chart on page 1 of Exhibit ___ (JRH-3), illustrates that, if approved, acquisition of Harrison capacity would not only eliminate the entire projected shortfall, but would result in excess capacity until approximately 2023.

Figure 5. Projected Capacity Position, 2012 – 2026, With Transaction



IV. Acquisition of the Harrison capacity will impose a large, long-term fixed cost risk on customers

Companies' Selection of Harrison capacity

Q Please summarize the strategies Mr. Delmar considered for managing the Companies' market price risk and providing reasonably-priced capacity and energy from 2015 to 2034.

A Mr. Delmar considered five different strategies for managing market price risk and providing reasonably-priced capacity and energy to serve the Companies' customers over a twenty-year period, 2015 to 2034. The five strategies were to either do nothing (i.e., meet 100% of the shortfall with purchases from wholesale markets) or to meet 100% of the shortfall either from the Transaction, from building and operating a new natural gas combined cycle unit ("NGCC"), from building and operating a new coal unit, or from building and operating a new nuclear unit. Of those five, only three were even remotely serious contenders – market purchases, the Harrison unit and a new NGCC.

Q Are any of those five strategies reasonable options for covering a shortfall in peaking capacity?

A No. Those five strategies are designed to cover a shortfall in baseload capacity, not peaking capacity. As shown earlier, Figure 1 demonstrated that the Companies existing resources have the ability to generate energy almost equal to the Companies' annual energy requirements and demonstrated that the actual generation from those resources in 2012, which was based on the economics of selling that generation into the market, closely matched those annual energy requirements. Therefore, assuming arguendo, the Companies had owned the additional Harrison capacity in 2012 and that the plant was operating at 75% capacity factor, the Companies would have been a major net seller of energy into the market. That net selling is illustrated in Figure 6.

Figure 6. Illustration of Capacity and Energy Positions With Transaction in 2013 per 2012 Hourly Load and Hourly Generation

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Q Please summarize the analytical method the Companies' used to evaluate each of the five all or nothing strategies.

A Mr. Delmar evaluated the five strategies by estimating the "levelized cost" of each over a 20 year period, 2015 to 2034. Under this approach Mr. Delmar began his estimate for each strategy by projecting its incremental capital costs, annual fixed Operation and Maintenance costs ("O&M"), annual financing cost, annual capacity factor and resulting annual variable production costs (fuel plus variable O&M) for each year of the twenty year study period. He then calculated the present value ('pv") of those costs. Finally he calculated the annual cost required to achieve the same present value. (This approach is essentially similar to the method a lender uses to calculate equal monthly mortgage payments of the term of a loan.) Finally, he calculated the levelized cost dollars per megawatt hour

("MWh") by dividing the annual absolute levelized cost by the projected annual generation from the strategy.

Q Please summarize the key input assumptions Mr. Delmar made to estimate the levelized cost of each strategy.

A Mr. Delmar made key input assumptions regarding the capacity factor at which each of the generating resources would operate, the future wholesale market prices for capacity and energy against which those resources would be competing, and the future cost of complying with carbon emission regulations.

Input assumptions regarding capacity factor are important because they affect the quantity of annual generation over which one recovers the fixed cost of the generating resource. The higher the capacity factor, the lower the unit fixed cost component of a generation resource's levelized cost and vice versa. For capacity factors Mr. Delmar assumed the Harrison unit would operate at 75% and a new NGCC at 25%. He assumed a new coal unit and a new nuclear unit would each operate at capacity factors greater than 75%.

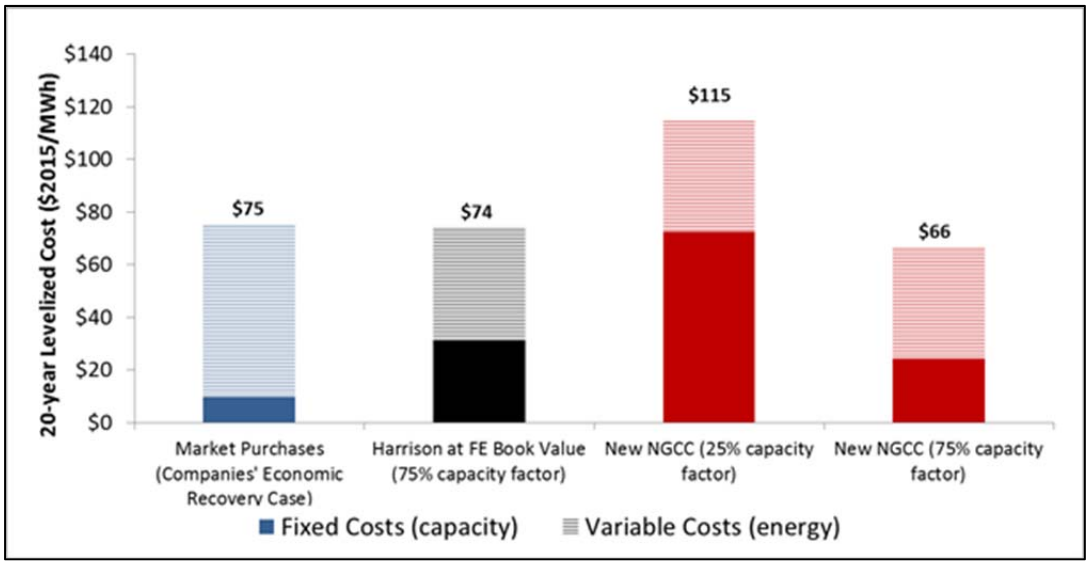
Input assumptions regarding future wholesale market prices are important because they represent the "market price risk" the Companies' maintain they are trying to address. For future wholesale market prices Mr. Delmar prepared estimates for three future cases, each of which has a different set of capacity and energy price forecasts. The three scenarios are an Economic Recovery Case, a Status Quo Case and a High Growth case. Mr. Delmar characterized the Economic Recovery Case as "a central scenario" and also refers to it as a "Base Case". He characterized the Status Quo and High Growth cases as presenting very low and very high price projections, respectively.

Q Please summarize the Companies' estimates of levelized costs under the Economic Recovery Case.

A Under the Economic Recovery Case the market purchase option and the Harrison acquisition each had essentially the same levelized cost of $75/MWh. The NGCC had a levelized cost of $115/MWh. (All in 2015 dollars.)

Exhibit___ (JRH-4) presents bar charts for each of those three Companies strategies, which are presented in Figure 7 below. The Figure has a fourth bar presenting the levelized cost of a NGCC at a 75% capacity factor. That higher capacity factor results in a lower levelized cost of $66/MWh because the NGCC fixed costs are recovered over a higher annual quantity of generation

Figure 7. Economic Recovery Case Estimates, 75% Capacity Factor



I present an estimate at a 75% capacity factor for the NGCC to provide a more realistic comparison. The Companies' own assumptions show a new NGCC having a lower marginal production cost than Harrison, which contradicts their assumption that the new NGCC would run one-third as often as Harrison (25% compared to 75% capacity factor). Moreover, the Companies presented no justification for their 25% capacity factor assumption, per response to Data response A-38 in Exhibit __ (JRH-14).

Q Do the Companies' levelized cost estimates provide a clear and complete picture of the relative fixed cost risk of each of the potential strategies?

A No.

Each bar in Exhibit___ (JRH-4) shows the fixed cost and variable cost portions of the total levelized cost. Strategies with a lower fixed cost have a lower fixed cost risk, all else being equal. For example, although the market purchase and the Harrison acquisition strategies have the same total levelized cost, the fixed cost portion of the Harrison unit costs is much higher than the fixed cost portion of market purchases. The Harrison fixed cost portion is a direct function of Mr. Delmar's capacity factor assumption for Harrison.

However, these bars do not demonstrate the difference in fixed cost risk between acquiring the Harrison capacity, or new NGCC capacity, relative to purchasing capacity and energy from the market. The Companies are currently buying capacity from the PJM market one year a time. In contrast, if the Companies acquire Harrison it is the equivalent of entering a 27-year contract for capacity as that is the number of years over which customers will be paying the fixed cost of that capacity.

Q Can you illustrate the fixed cost risk that acquisition of Harrison will impose on customers using the Companies' levelized cost analysis assumptions?

A Yes. Page 1 of Exhibit___ (JRH-5) presents two charts that illustrate the fixed cost risk acquisition of Harrison will impose on customers under the Companies' assumptions for the Economic Recovery Case.

The top chart from page 1 of that Exhibit plots the annual fixed costs of Harrison and the annual net market revenues from sale of Harrison capacity and energy into the PJM wholesale markets. The fixed costs of Harrison exceed the market revenues until 2023, as indicated in Figure 8.

Figure 8. Annual Net Market Revenues versus Harrison Capacity Fixed Costs at 75% Capacity Factor

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The bottom chart from page 1 of that exhibit, replicated in Figure 9, plots the cumulative recovery of those fixed costs from those market revenues. That Figure indicates that customers would not begin receiving a cumulative net savings from the Harrison capacity until 2032, according to the Companies' own assumptions for the Economic Recovery Case.

Figure 9 Cumulative Recovery of Fixed Costs for Harrison at 75% Capacity Factor

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Figures 8 and 9 are derived from the Companies' assumptions for the Economic Recovery Case and the Navigant assumptions regarding the unforced capacity of the Harrison capacity each year. The projection of capacity revenues in each year is equal to the Companies forecast of capacity prices for that year multiplied by the unforced capacity of the Harrison acquisition. This projection does not reflect alternative assumptions for capacity factors, Status Quo, market prices, or carbon compliance which I discuss later.

Q Is there a risk that acquisition of Harrison capacity will not provide any net savings to customers?

A Yes. Customers may never receive a cumulative net savings from the Harrison capacity if some or all of the Companies' key assumptions prove to be even somewhat incorrect. Those key assumptions include the capacity factor of

Harrison over the twenty-year levelization period, wholesale market prices and the cost of complying with future carbon emission regulations.

Impact of a Lower Capacity Factor

Q What is the basis for your position that the capacity factor of Harrison may be lower than the 75% the Companies' have assumed in their levelized cost analysis?

A The capacity factor assumed for Harrison over the twenty year study period is, in effect, an assumption about the quantity of energy the Harrison capacity will produce over the twenty year study period. My position that the capacity factor of Harrison may be lower than the 75% the Companies' have assumed is based on the plant's actual capacity factor in recent years, its age and the potential impact of measures it will install to comply with the MATS rule.

First, the Harrison units have operated at an average capacity factor of 66% over the past five years. That average is calculated from the historical annual capacity factors by unit presented in the Direct Testimony of CAD witness Billy Jack Greg.

Second, the quantity of energy the Harrison capacity will produce over the study period will primarily depend on its variable production cost relative to prices in the PJM Day-Ahead energy market each day. PJM will schedule the Harrison capacity to generate electric energy in that market if the Harrison capacity production cost is less than the Day-Ahead energy market price. The Companies could and should have, but did not, run a simulation model to estimate the capacity factor of the Harrison units over the study period for each of their future scenarios and reasonable production cost assumptions. The production cost of each Harrison unit is a function of its heat rate, its fuel cost and its variable O&M

cost.[4] The Companies' have assumed the units will have an average heat rate of 9,937 Btu/kWh over the twenty years. This is low for a coal plant that is 40 years old and it is reasonable to expect it would degrade over time as the units continue to age

Third, the units may experience some deterioration in heat rate and/or increases in variable O&M costs as a result of the measures installed to bring the Harrison plant in compliance with the MATS rule.

Q Have you estimated the levelized cost of the Harrison plant at a lower capacity factor?

A Yes. The chart on page 1 of Exhibit___ (JRH-5) presents bar charts for the Harrison unit and the new NGCC at 66% capacity factor under the Economic Recovery Case. At that capacity factor the levelized cost of Harrison is $79/MWh, higher than the levelized costs of market purchases and of a new NGCC.

Our analysis presented on Page 2 of Exhibit___ (JRH-5) indicates that customers would not receive a net cumulative saving at a 66% capacity factor.

Figure 10 Cumulative Recovery of Fixed Costs for Harrison at 66% Capacity Factor

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[4] Heat rate is a measure of the efficiency at which at plant converts fuel into electricity, the lower the heat rate the less fuel the plant requires to produce a MWh of electric energy.

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Impact of Lower Wholesale Market Prices

Q What is the basis for your position that wholesale market prices may be lower than the prices the Companies assumed in the Economic Recovery Case?

A Wholesale market prices may be closer to those in the Companies' Status Quo Case, which are lower than those in the Economic Recovery Case. My position is based on a review of PJM capacity market fundamentals, and on an analysis of the relationship between PJM energy prices and natural gas prices.

As noted earlier, Mr. Delmar characterized the Economic Recovery Case as "a central scenario", and also referred to it as a Base case. He characterized the Status Quo Case as presenting a very low price projection. However, the 2012 Resource Plan, at page 18, states that the Economic Recovery Case and the Status Quo Case are both "central scenarios". That Resource Plan characterizes the High Growth Case and the "Second Recession Case" as high and low bounding scenarios, respectively.

Q Please summarize your review of the Companies' forecasts of capacity market prices.

A The Companies' capacity market price forecasts for the Economic Recovery and Status Quo Cases are presented in Exhibit___ (JRH-6), along with actual prices from the past seven Base Residual Auctions. The line at the top shows the annual fixed costs of Harrison. That chart is replicated below as Figure 11.

Figure 11 PJM Capacity Market Prices (RTO) in $/MW-day, Actuals (2009 – 2015) and Companies' Projections (2016 – 2034)

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There are two key takeaways from this Figure. First, the annual fixed cost of Harrison capacity is higher than PJM's estimate of the marginal source of capacity, referred to as the Cost of New Entry ("CONE"), for the upcoming auction for 2016/2017. Second, the annual fixed cost of Harrison capacity is several times greater than the Companies projections under both the Economic Recovery Case and the Status Quo Case.

Base Residual Auction prices have averaged $129/MW-day over the past seven auctions, or 53% of the average net cost of new entry ("net CONE") over that period. The Companies' Status Quo Case projection of capacity market prices are consistent with my review and the actual average BRA prices to date.

Q Please summarize your review of the Companies' forecasts of energy market prices.

A Figure 12 presents actual annual average energy prices since 2006 as well as the Companies' energy market price forecasts for the Economic Recovery and Status Quo Cases. This Figure also presents a third forecast which is derived from the Companies' projection of natural gas prices under the Gas Combined Cycle levelization Case. This Figure is presented in Exhibit___ (JRH-7).

Figure 12. PJM Energy Market Prices ($/MWh), Actuals (2006 – 2015) and Companies' Projections (2016 – 2034)

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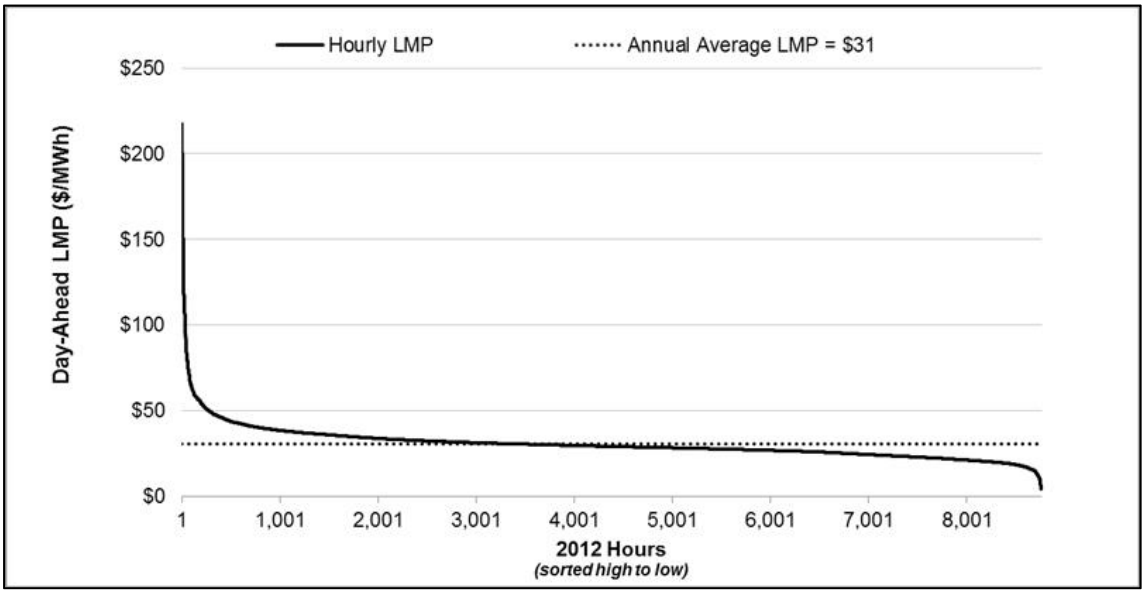
The key takeaway from this Figure is that the Companies' forecast of Harrison energy production costs are lower than the Companies' projection of energy prices under the Status Quo Case.

Energy market prices in PJM are correlated strongly with natural gas prices. The ratio of natural gas prices to energy market prices, i.e., MMBtu per MWh, is referred to as the "implied heat rate". Our analysis indicates that the energy prices the Companies' assumed in their Economic Recovery Case levelization are higher than one would expect based on the natural gas prices they assumed in that analysis, i.e. their energy prices are not consistent with those gas prices and the implied heat rate from the 2012 Resource Plan. Exhibit___(JRH-7) includes a forecast of energy prices we developed by applying the implied heat rate from the 2012 Resource Summary forecasts for the Economic Recovery Case to the Companies' natural gas price forecast for the Gas Combined Cycle levelization**.** The Companies' Status Quo Case projection of energy market prices are consistent with that derived forecast and with actual average annual energy prices to date.

Q Is the range of energy prices the Companies' presented in the 2012 Resource Plan relevant to the proposed Transaction?

A No. Figure 11 in the Companies 2012 Resource Plan indicates that energy prices range widely relative to the annual average. While that is true, it is important to understand that the high energy prices occur in a very few hours of the year. While it is obviously important to try to offset those prices in those few hours, the least expensive way of doing so is typical through the use of peaking capacity or demand response. This point is illustrated in Figure 13 which presents the distribution of energy market prices by hour in 2012.

Figure 13. Range of Hourly Energy Market Prices in 2012

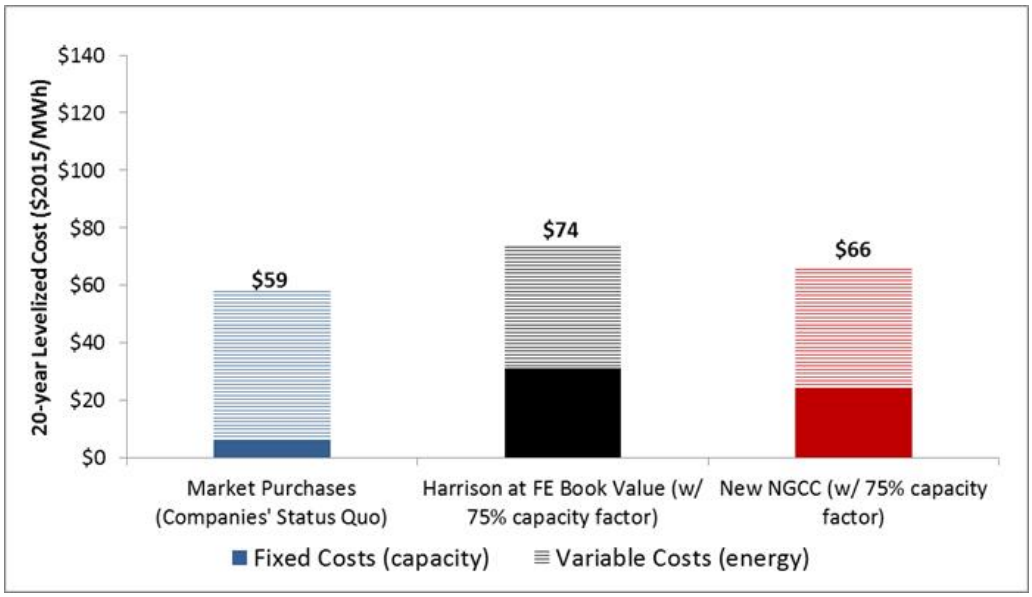


Q Have you estimated the levelized cost of the Harrison plant under the Status Quo market prices?

A Yes. The chart on the top of Exhibit___ (JRH-8) presents bar charts for the Harrison unit and the new NGCC at 75% capacity factor under the Status Quo Case while the chart at the bottom shows those estimates at a 66% capacity factor. The levelized cost of Harrison under the Status Quo Case exceeds the levelized costs of market purchases and a new NGCC under both capacity factor assumptions. The 75% capacity factor results are replicated in Figure 14.

Figure 14. Status Quo Case Estimates, 2015 – 2034

Levelized Costs at 75% Capacity Factors for Harrison and New NGCC



The two charts on page 1 of Exhibit___ (JRH-9) present the annual fixed costs of Harrison relative to annual net market revenues and the cumulative recovery of Harrison fixed costs from those market revenues using the Companies' assumed 75% capacity factor. Page 2 of that Exhibit presents those charts for a more realistic 66% capacity factor. These charts indicate that customers would not receive a cumulative net savings from the Harrison capacity under either capacity factor assumption. The 75% capacity factor results are replicated in Figure 15.

Figure 15 Status Quo, Cumulative Recovery of Transaction Fixed Costs for Harrison at 75% Capacity Factor

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Impact of Higher Carbon Prices

Q What is the basis for your position that the cost of complying with carbon emission regulations may be higher than the Companies' assumption of zero in its Economic Recovery Case analysis.

A My position that the cost of complying with carbon emission regulations may be higher than the Companies' assumption in its Economic Recovery Case analysis is based on the fact that the Companies' have provided different assumptions regarding costs of complying with future carbon emission regulations in various documents, as well as on a Synapse assessment of potential future carbon emission compliance costs.

The Companies' 2012 Resource Plan states at page 13 that they "believe that a carbon tax is likely to eventually be promulgated". The FirstEnergy Long Term Price Forecasts ("LTPF") of 2011 and 2012 assumed carbon prices beginning in the 2020 to 2023 timeframe of BEGIN CONFIDENTIAL

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Synapse released a report in late 2012 that reviews projections of various utilities and provides low, mid and high projections based on three different scenarios. The Synapse mid-case projections start at $20/ton in 2020 ($2012).

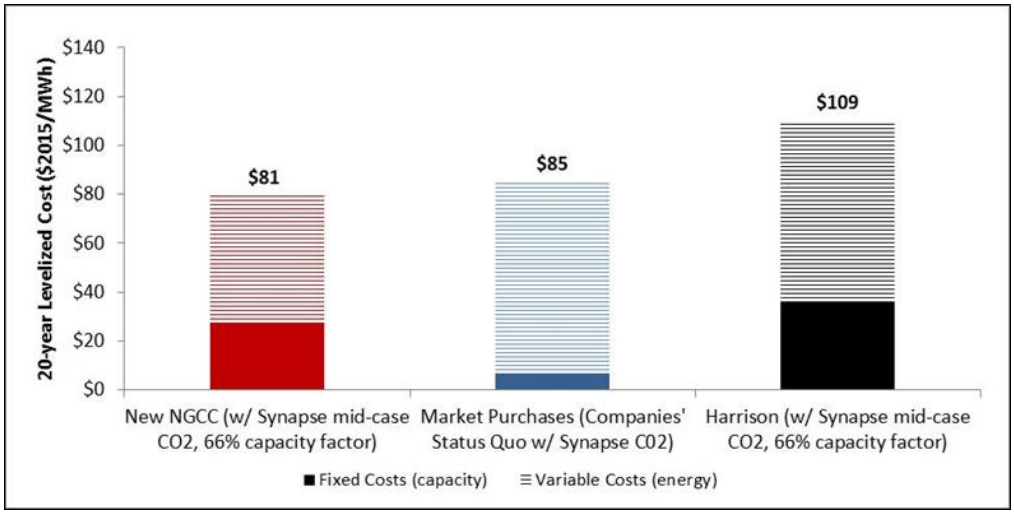
Q How would carbon prices affect the competitive position of Harrison relative to a new NGCC unit and to future energy market prices?

A Imposition of a carbon price would make Harrison less competitive with of a new NGCC unit and with energy market prices.

Q Have you estimate the levelized cost of the Harrison plant assuming a carbon price greater than zero?

A Yes. Exhibit___ (JRH-11) presents bar charts for the Harrison unit and the new NGCC, each at 66% capacity factor, under the Status Quo Case assuming the Synapse 2012 mid-case carbon price. Under those assumptions the levelized cost of Harrison exceeds the levelized costs of market purchases and of a new NGCC by an even greater amount than assumptions of a zero carbon price.

Figure 16 Sensitivity of Status Quo Case Estimates to Future Carbon Prices, Levelized Costs at 66% Capacity Factor



Impact of Lower Acquisition Cost

Q If the Companies' acquired Harrison capacity at the net book value excluding the mark up from the merger, would it likely provide net savings to customers?

A No. If the Companies' acquired Harrison capacity at the price the Consumer Advocate is recommending its fixed costs would be somewhat lower because of the lower acquisition costs. But even at that lower acquisition cost the Companies would still need to invest $244 million on measures to bring it into MATS compliance. In addition the levelized cost of Harrison at that lower acquisition cost would still be subject to the risks of its capacity factor being less than 75%, wholesale market prices may being lower than the prices the Companies assumed in the Economic Recovery Case and the cost of complying with carbon emission regulations being higher than it assumes.

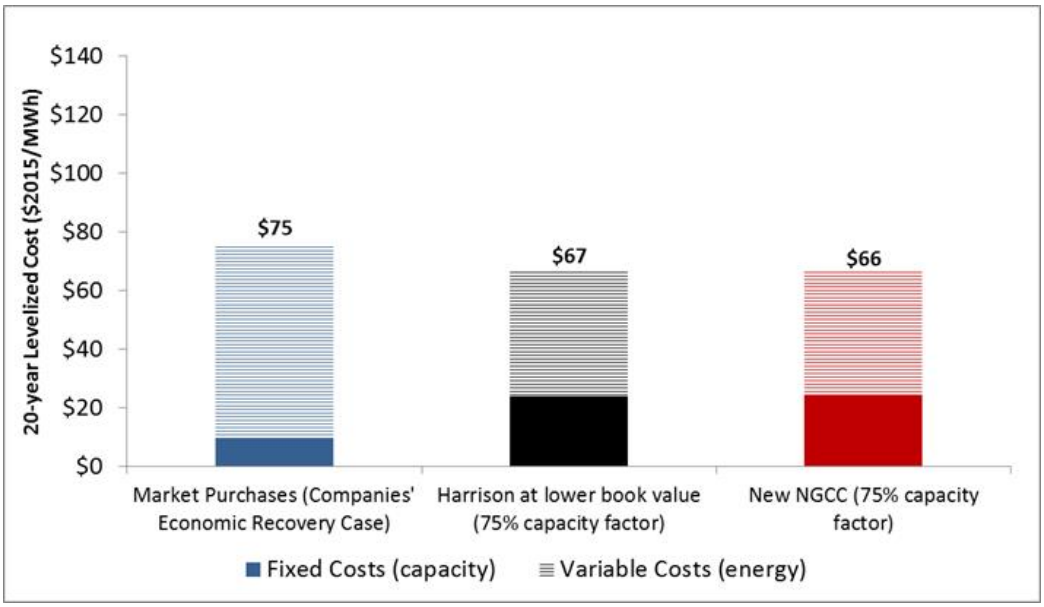
Q Have you estimated the levelized cost of the Harrison plant under the CAD acquisition costs under the Economic Recovery and Status Quo Cases?

A Yes. The chart on page 1 of Exhibit___ (JRH-12) presents bar charts for the Harrison unit and the new NGCC at 75% capacity factor under the Economic Recovery Case while the chart on page 1 of Exhibit___ (JRH-13) shows those estimates at a 66% capacity factor under the Status Quo Case.

Under the Economic Recovery Case at 75% capacity factor the levelized cost of Harrison is lower than the levelized costs of market purchases. Under the Status Quo Case at 66% capacity factor the levelized cost of Harrison is higher than market prices under the Status Quo Case.

Figure 17 presents the Economic Recovery case levelized cost results at 75% capacity factor. Under those assumptions customers would not begin receiving a cumulative net savings from the Harrison capacity until 2025.

Figure 17. Sensitivity of Economic Recovery Case Estimates to Acquisition Cost Levelized Cost, 75% Capacity Factor, CAD Proposed Acquisition Cost



As noted, even at a lower acquisition cost the Harrison capacity would still be subject to the risks of its capacity factor being less than 75%, and to lower wholesale market prices. Figure 18 presents the Status Quo Case results at a 66% capacity factor. Under those assumptions customers do not recover the cumulative fixed costs.

Figure 18. Economic Recovery Case. Cumulative Recovery of Fixed Costs, Consumer Advocate Acquisition Cost, 75% cf

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Navigant Market Valuation

Q Please comment on the Market Valuation prepared by Navigant.

A Mr. Delmar notes that the Market Valuation prepared by Navigant indicates that the Harrison capacity would have a positive net present value based upon revenues it would receive from into the wholesale capacity and energy markets. Navigant's results are a function of its input assumptions. The Navigant Market Valuation assumes higher capacity prices than the Companies' assumed for their Economic Recovery Case and the same energy prices. Consistent with the results of our analysis of the Harrison capacity under the Companies' Status Quo Case, Navigant's Market Valuation of the Harrison capacity results in a negative net present value when the calculation is prepared using the lower capacity and energy market price assumptions from the Companies' Status Quo Case.

V. The Companies have not identified a reasonable range of strategies

Q Have the Companies' conducted a detailed analysis of their resource needs and an extensive study of the resource alternatives available to address those needs?

A No. The Companies maintain that they have conducted a detailed analysis of their resource needs and an extensive study of the resource alternatives available to address those needs (Petition, at 2), but the Companies have only evaluated limited strategies.

Q What is the basis for your position that the Companies did not conduct a detailed analysis of their resource needs.

A According to Mr. Delmar, the goal of his analysis was to identify the best strategy to "…provide a hedge for customers from exposure to changes in market capacity and energy prices in future years and stabilize customer rates."

My position that Mr. Delmar did not present a detailed analysis of the Companies' resource needs is based on the fact that his analysis focuses on strategies for acquiring baseload capacity and energy. That focus is not consistent with the need the Companies identified in their Information Filing on Subcritical Generating Facilities. In that filing the Companies stated they would conduct an analysis "…of the need to replace all or a part of the capacity represented by the Facilities". The Facilities to which they were referring were units that had been operating as peaking capacity prior to being deactivated, with an average capacity factor of 11% in 2011. My analyses of the Companies shortfall in capacity and energy, illustrated in Exhibit___(JRH-3), confirms that the Companies have a shortfall in peaking capacity and energy, not in baseload capacity and energy. As I have previously discussed, the Companies need peak load or load-following capacity rather than baseload capacity.

Q Did the Companies directly assess the market for peaking capacity and associated energy?

A No, they did not. This could have been accomplished by issuing an RFP to determine if they could acquire capacity and associated energy, and in particular peaking capacity, in various quantities for various durations under bilateral agreements. They also did not did not issue an RFP to determine if they could acquire capacity and/or energy by purchasing an ownership interest in an existing gas unit, either existing peaking capacity (i.e., combustion turbine "CT") or existing load-following / baseload CC capacity.

Mr. Delmar states on pages 18 and 19 of his testimony that while the Transaction is available now, it would require years to conduct and evaluate RFPs and potentially construct new facilities. The Companies claimed that "the window of time which the Harrison transaction is available to them would be inadequate to accommodate an RFP" (Data Response A-37). They also claimed have "no expectation that it would receive offers that would meet the attributes it is seeking" (Data Response A-47b, Exhibit __ (JRH-14).

Q Is the Companies' decision to not issue an RFP reasonable?

A No. The Companies knew as of March 2012, if not earlier, that they would have a shortfall in peaking capacity. This was not a last-minute surprise, they had time to prepare and issue a Request for Proposals ("RFP").

Q Did the Companies' identify a reasonable range of potential strategies for hedging exposure to changes in market prices and stabilizing customer rates?

A. No. The five simple all-or-nothing strategies the Companies considered is not a reasonable range of strategies for hedging exposure to changes in market prices and stabilizing customer rates. The Companies have a far larger universe of candidate strategies from which to choose, including portfolios with mixes of financial instruments, market purchases of various quantities, supply side

resources of different types and sizes, and demand-side resources in which the relative composition of the mix could change over time.

Q Were the Companies' aware of other potential strategies they could have considered for hedging exposure to changes in market prices and stabilizing customer rates?

A Yes.

First, the Information Filing on Subcritical Generating Facilities indicates that the Companies were not only aware of, but proposed to analyze strategies which would replace only retired peaking capacity, would consider replacing only a portion of the retired peaking capacity and would consider a strategy consisting of a portfolio or mix of resources. Mr. Delmar did not identify or evaluate any of those strategies.

Second, the Companies use a variety of purchasing and contracting strategies to hedge their exposure to changes in coal market prices which they could use to hedge their purchases of capacity and energy. One such strategy is a portfolio approach under which they acquire their supplies under a number of contracts of varying durations such that they are only buying a portion of their annual requirements in a single year, sometimes referred to as "laddering". Another strategy used by their unregulated affiliates is to acquire financial instruments such as swaps and derivatives to hedge their market price risk.

Q Did the Companies explore an alternative resource strategy consisting of a mix or portfolio of resources such as keeping their share of Pleasants, and acquiring ownership of an existing CT, continuing the purchase of existing MW from the market, and possibly acquiring a smaller share of Harrison capacity?

A No, in Data Response A-37 (d) (Exhibit__ (JRH-14), the Companies responded to this alternative claiming that "it was not available alternative." However, they offered no explanation as to why this was the case.

Q Did the Companies consider market purchases as a serious alternative to acquiring Harrison capacity?

A No. Witness Delmar claims that the levelized cost analysis of market purchases was meant "to evaluate the financial risks associated with continued reliance on the market" (Delmar Direct, page 12, line 17 through page 9, line 1). Yet despite the result that Harrison was comparable in costs to the Economic Recovery Case market purchase costs and much higher than the Status Quo Case market purchase costs, the Companies' concluded that continuing to rely on market purchases would be risky due to the "potential instability in charges to ratepayers that can result from the significant movements in market prices" (Delmar Direct, page 8, line 17 through page 9, line 1).

Q Did the Companies' evaluate demand response ("DR") and/or energy efficiency ("EE") initiatives as a component of potential hedging strategy?

A No. Company witness Delmar acknowledges that DR and EE are potential resources (Direct testimony, page 27). However he did not consider them because the capacity shortfall is too large to be met by DR and EE resources.

Mr. Delmar's rationale reflects the problems with his reliance on simplistic "all-or-nothing" strategies. DR will not cover the Companies' entire capacity shortfall, but it could certainly play a role in covering a portion of that shortfall. Moreover, the portion that DR could cover would increase over time as programs enroll more participants. EE also has a role to play over time. This is particularly important since the cost of saving energy from DR and EE has been estimated to have a levelized cost of energy ranging from $0/MWh to $50/MWh.[5]

[5] Lazard. "Levelized Cost of Energy Analysis – Version 6.0." June 2012. Available at: https://www.misoenergy.org/Library/Repository/Meeting%20Material/Stakeholder/PAC/2012/20121221/20121221%20PAC%20Supplemental%20Levelized%20Cost%20of%20Energy%20Analysis.pdf

Those costs are well below the Companies' estimates of levelized costs of $75/MWh.

Q Is a levelized cost analysis the appropriate method for evaluating potential strategies for hedging exposure to changes in market prices and stabilizing customer rates?

A No. A levelized cost analysis is a useful screening tool. However a utility should not rely on that analytical approach to select a major strategy for capacity and energy. The Commission should be concerned that the Company has chosen to evaluate the economics of a $1.2 billion investment using the simple spreadsheet tool it relied upon in this filing when it has the experience and resources to prepare a comprehensive analysis or to retain consultants to do so. However, even the most comprehensive analysis will only produce reasonable results if its input assumptions are reasonable and it is used to evaluate a reasonable range of strategies.

Q What are the major limitations of a levelized cost analysis?

A A levelized cost only takes into account the expected production costs of a generating alternative over time. Its primary limitation from the perspective of evaluating the economics of a generating resource is that this approach does not reflect, or simulate, the performance of the candidate resource or strategy relative to the Companies' existing generation resources as well as the detailed operation of the electric energy market in which load and prices vary by hour, by day of the week and by season. Those dynamics have a significant influence on the extent to which a given generating unit will be dispatched each day over the course of a year. As discussed earlier, the Companies' have simply assumed that the Harrison capacity will operate at a 75% capacity factor on average for twenty years.

Q Would a comprehensive analytical method enable the Companies to evaluate a greater range of strategies more accurately?

A Yes. Assuming the Companies used reasonable input assumptions and considered a reasonable range of strategies, a comprehensive analytical methodology would enable them to evaluate the performance of those strategies more accurately. For example, an electric dispatch simulation model would enable the Companies to properly analyze the performance of each strategy taking into consideration the variation in energy market prices from hour to hour, day to day, and season to season. That simulation would provide a more accurate estimate of actual dispatch and associated energy production costs and energy market revenues.

The Companies apparently used that type of model to analyze the economics of continuing to operate their subcritical coal units versus retiring those units. That analysis is described on page 19 of the "Informational Filing on Subcritical Generating Facilities" where the Companies state that they

> evaluated the all-in cost of operating each of the Units, including the Reliability and Regulatory Investments ("Projected Costs"), and compared the Projected Costs to the market revenues (from energy, capacity, and ancillary services), where applicable, and taking into account the projected impact of the Projected Costs and Existing O&M expenses on each Unit's dispatch and market revenues ("Projected Revenues").

Q Would the comprehensive analysis you recommend be an alternative to, or substitute for, an RFP?

A No. As I just stated, a comprehensive analytical methodology would enable the Companies to evaluate the strategies best suited to meet its needs, including evaluation of acquiring alternative quantities and mixes of resources at various points in time. In contrast, the purpose of an RFP is to determine which of those resources are available in what quantities and at what prices and for what time periods.

A model is a tool that enables an analyst to estimate the performance of a particular strategy under an assumed set of future market conditions. In contrast, an RFP provides that analyst information on the resources actually available from the market based upon the myriad of factors affecting market participants based upon their respective economic situations and views of the future.

VI. Conclusions and Recommendations

Q Please summarize the major findings from your analysis of the Companies' proposal.

A. The major findings from my analyses are summarized below.

First, the Companies' have a shortfall in peaking capacity; they do not have a shortfall in baseload capacity, and they do not have a reliability problem. The Companies have time to fine a reasonable strategy to address that strategy.

Second, acquiring 1,576 MW of Harrison capacity will limit the Companies' ability to take advantage of other, less expensive with less fixed cost risk over the next several years.

Third, acquisition of additional Harrison capacity would impose a large, long-term fixed cost risk on customers. If the Commission approves the Transaction, customers will be required to pay the fixed costs of the additional Harrison capacity for twenty five years or more regardless of whether that acquisition proves to be the most cost-effective strategy. According to the Companies' own assumptions customers will not receive a cumulative net savings from the Harrison capacity for the first fifteen years, e.g., from 2015 through 2029. Moreover, customers may never receive a cumulative net savings from the Harrison capacity if the Companies' assumptions for capacity factor, wholesale market prices and carbon emission compliance over the period 2015 to 2034 prove to be incorrect.

Fourth, the Companies failed to evaluate a reasonable range of strategies for managing market price risk and providing reasonably-priced capacity and energy from 2015 to 2034. The Companies only evaluated five other all-or-nothing twenty-year strategies. The Companies have a far larger universe of candidate strategies from which to choose.

Fifth,, the Companies evaluated their strategies using a simple levelized cost analysis rather than using a comprehensive method that simulates the operation of each strategy in the context of the PJM capacity and energy markets over the twenty-year period. A potential investment of over $1 billion certainly warrants a comprehensive analysis than the Companies have provided in their filing, and the Companies have the experience and resources to prepare comprehensive analyses or to retain consultants to do so. However, regardless of the type of modeling and analysis, the Companies should have determined what resources were actually available from competitive suppliers to help address their shortfall in coverage of peaking capacity and associated energy by issuing an RFP.

Q Please summarize your major conclusion and recommendation regarding the proposed Transaction.

A My conclusion is that the proposed Transaction is not reasonable and is adverse to the public interest. I recommend that the Commission reject the Transaction. The Commission should also require the Company to issue an RFP for capacity of various types, and for energy associated with those types of capacity, in various quantities for various durations to determine exactly what resources are available to it. I further recommend that the Commission require the Companies to evaluate a reasonable range of hedging strategies including both economic and physical hedges.

Q Does this complete your Direct Testimony?

A Yes.

List of Exhibits

Exhibit (JRH-1)	Resume of James Richard Hornby
Exhibit __(JRH-2)	Illustration of Capacity and Energy Positions in 2013 per 2012 Hourly Load and Generation Data
Exhibit __(JRH-3)	Projected Capacity Position, 2012 – 2026, Without Transaction and With Transaction
Exhibit __(JRH-4)	Economic Recovery Case Estimates, 2015 – 2034, 75% Capacity Factor
Exhibit __(JRH-5)	Economic Recovery Case Estimates, 2015 – 2034, 66% Capacity Factor
Exhibit __(JRH-6)	PJM Capacity Market Prices (RTO) $/MW-day, Actuals (2009 – 2015) and Companies' Projections (2016 – 2034)
Exhibit __(JRH-7)	PJM Energy Market Prices ($/MWh), Actuals (2006 – 2015) and Companies' Projections (2016 – 2034)
Exhibit __(JRH-8)	Status Quo Case Estimates, 2015 – 2034 , 75% and 66% Capacity Factors
Exhibit __(JRH-9)	Sensitivity of Levelized Cost Estimates to Market Price Projections and Harrison Capacity Factor assumption
Exhibit __(JRH-10)	Range of Hourly Energy Market Prices in 2012
Exhibit __(JRH-11)	Sensitivity of Status Quo Case Levelized Costs to Carbon Prices
Exhibit __(JRH-12)	Sensitivity of Economic Recovery Case Estimates to Consumer Advocate Proposed Acquisition Cost
Exhibit __(JRH-13)	Sensitivity of Status Quo Case Estimates to Consumer Advocate Proposed Acquisition Cost
Exhibit __(JRH-14)	Data Responses

James Richard Hornby

Senior Consultant
Synapse Energy Economics, Inc.

PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA.
Senior Consultant, 2006 to present.
Provides analysis and expert testimony regarding planning, market structure, ratemaking and supply contracting issues in the electricity and natural gas industries. Planning cases include evaluation of resource options for meeting tighter air emission standards (e.g. retrofit vs. retire coal units) in Kentucky, West Virginia and U.S. Midwest as well as development of long-term projections of avoided costs of electricity and natural gas in New England. Ratemaking cases include electric utility load retention rate in NS, various gas utility rate cases and evaluation of proposals for advanced metering infrastructure (smart grid or AMI) and dynamic pricing in MD, PA, NJ, AR, ME, NV, DC and IL.

Charles River Associates (formerly Tabors Caramanis & Associates), Cambridge, MA.
Principal, 2004-2006, *Senior Consultant,* 1998–2004.
Expert testimony and litigation support in energy contract price arbitration proceedings and various ratemaking proceedings. Productivity improvement project for electric distribution companies in Abu Dhabi. Analyzed market structure and contracting issues in wholesale electricity markets.

Tellus Institute, Boston, MA.
Vice President and Director of Energy Group, 1997–1998.
Manager of Natural Gas Program, 1986–1997.
Presented expert testimony on rates for unbundled retail services, analyzed the options for purchasing electricity and gas in deregulated markets, prepared testimony and reports on a range of gas industry issues including market structure, strategic planning, market analyses, and supply planning.

Nova Scotia Department of Mines and Energy, Halifax, Canada.
Member, Canada-Nova Scotia Offshore Oil and Gas Board, 1983–1986.
Assistant Deputy Minister of Energy 1983–1986.
Director of Energy Resources 1982-1983
Assistant to the Deputy Minister 1981-1982

Nova Scotia Research Foundation, Dartmouth, Canada, *Consultant*, 1978–1981.
Canadian Keyes Fibre, Hantsport, Canada, *Project Engineer*, 1975–1977.
Imperial Group Limited, Bristol, England, *Management Consultant*, 1973–1975.

EDUCATION

M.S., Technology and Policy (Energy), Massachusetts Institute of Technology, 1979.
B.Eng., Industrial Engineering (with Distinction), Dalhousie University, Canada, 1973

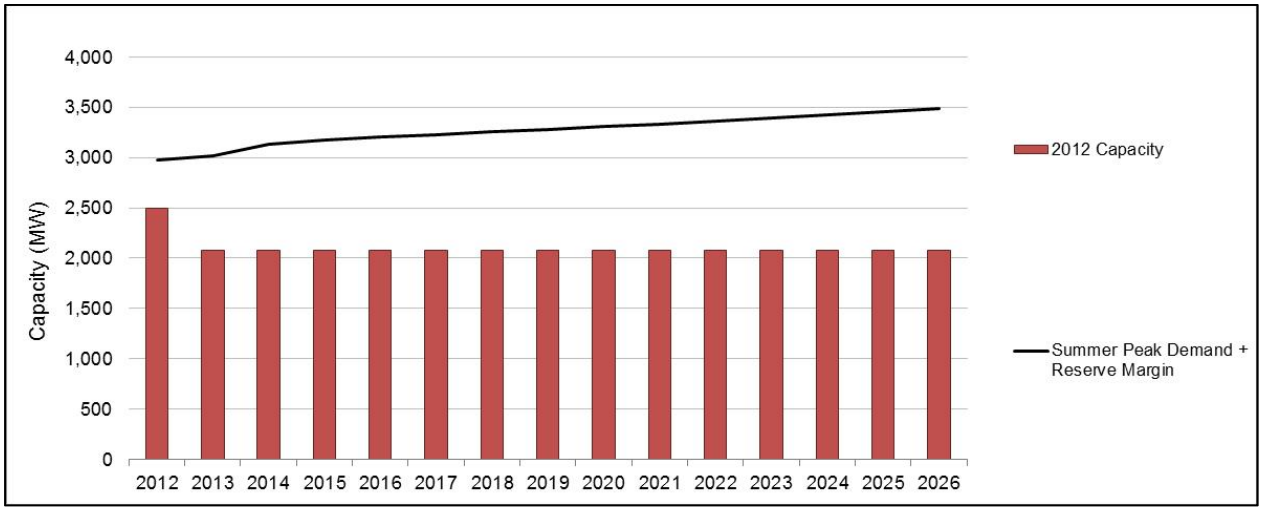
REDACTED

Exhibit __(JRH-2)

Illustration of Capacity and Energy Positions Without Transaction in 2013 per 2012 Hourly Load

Illustration of Capacity and Energy Positions Without Transaction in 2013 per 2012 Hourly Load and Hourly Generation

Projected Capacity Position, 2012 – 2026, Without Transaction



Projected Capacity Position, 2012 – 2026, With Transaction

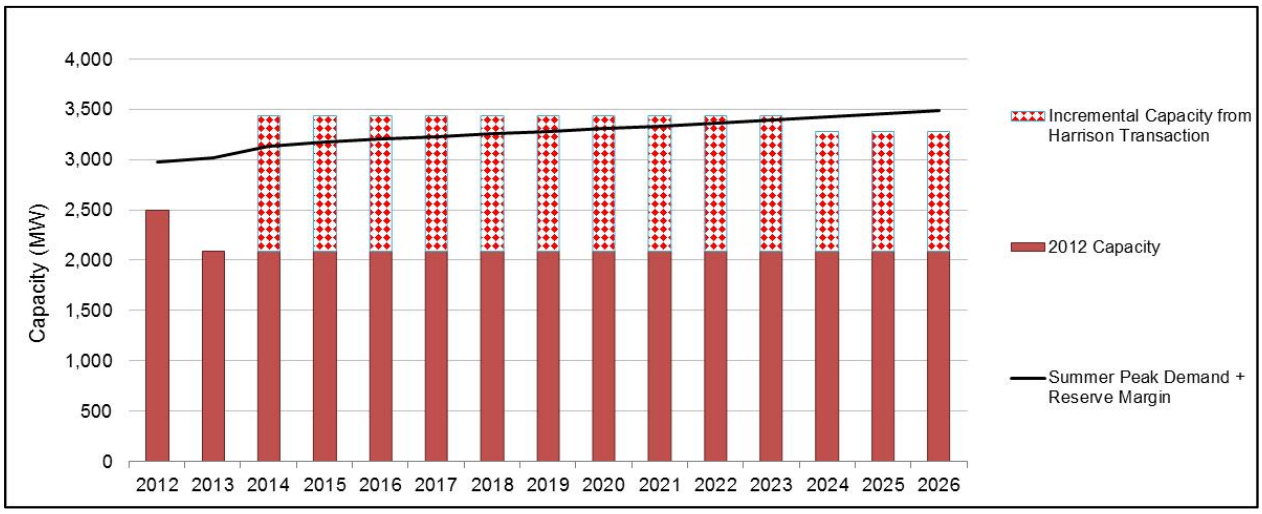


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Illustration of Capacity and Energy Positions Without Transaction in 2026 per 2012 Hourly Load Increased by 21%

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Economic Recovery Case Estimates, 2015 – 2034, 75% Capacity Factor

Levelized Costs $/MWH

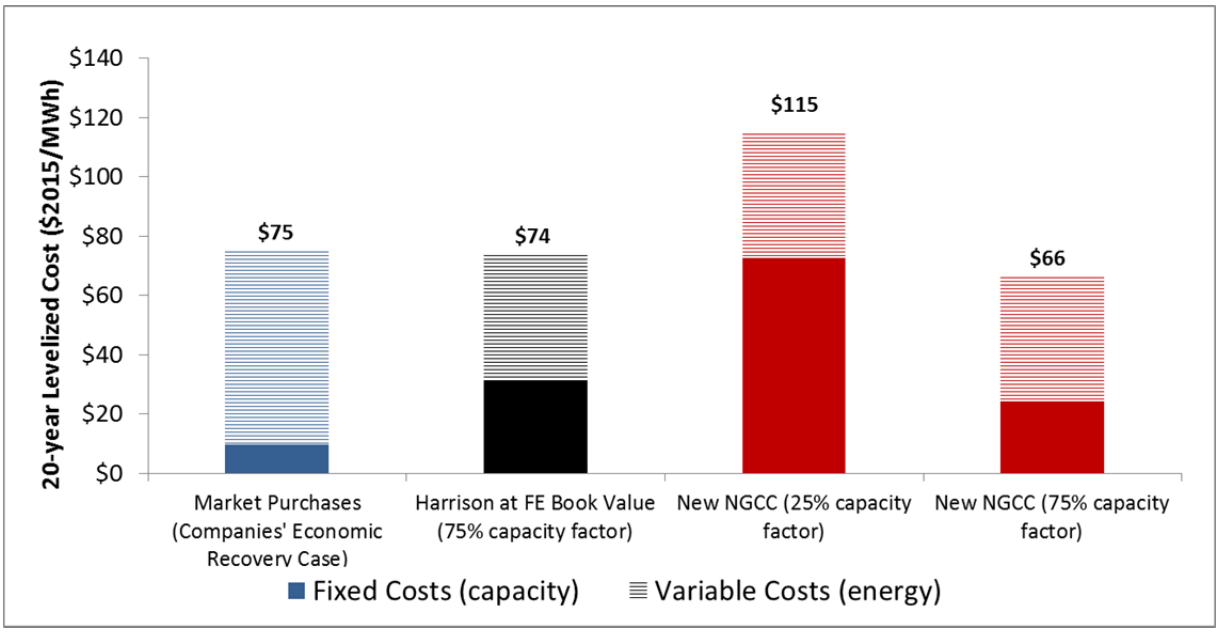

Illustration of Capacity and Energy Positions With Transaction in 2013 per 2012 Hourly Load and Hourly Generation

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Economic Recovery Case Estimates, 2015 – 2034, 75% Capacity Factor

Annual Net Market Revenues versus Harrison Capacity Fixed Costs at 75% Capacity Factor

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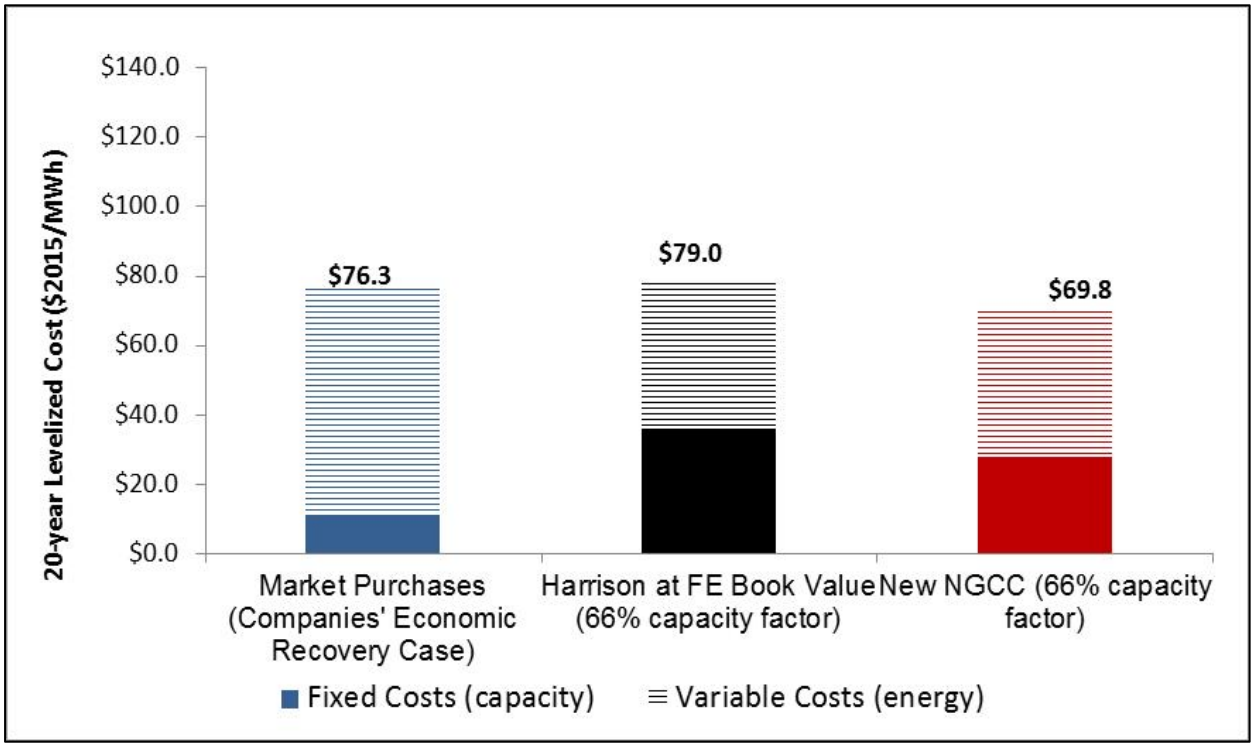
Cumulative Recovery of Fixed Costs for Harrison at 75% Capacity Factor

REDACTED

Economic Recovery Case Estimates, 2015 – 2034, 66% Capacity Factor

Levelized Costs $/MWH



Economic Recovery Case Estimates, 2015 – 2034, 66% Capacity Factor

Annual New Market Revenues versus Annual Harrison Capacity Fixed Costs

REDACTED

Cumulative Recovery of Fixed Costs for Harrison at 66% Capacity Factor

REDACTED

Exhibit __(JRH-6)

PJM Capacity Market Prices (RTO) in $/MW-day, Actuals (2009 – 2015) and Companies' Projections (2016 – 2034)

REDACTED

Exhibit __(JRH-7)

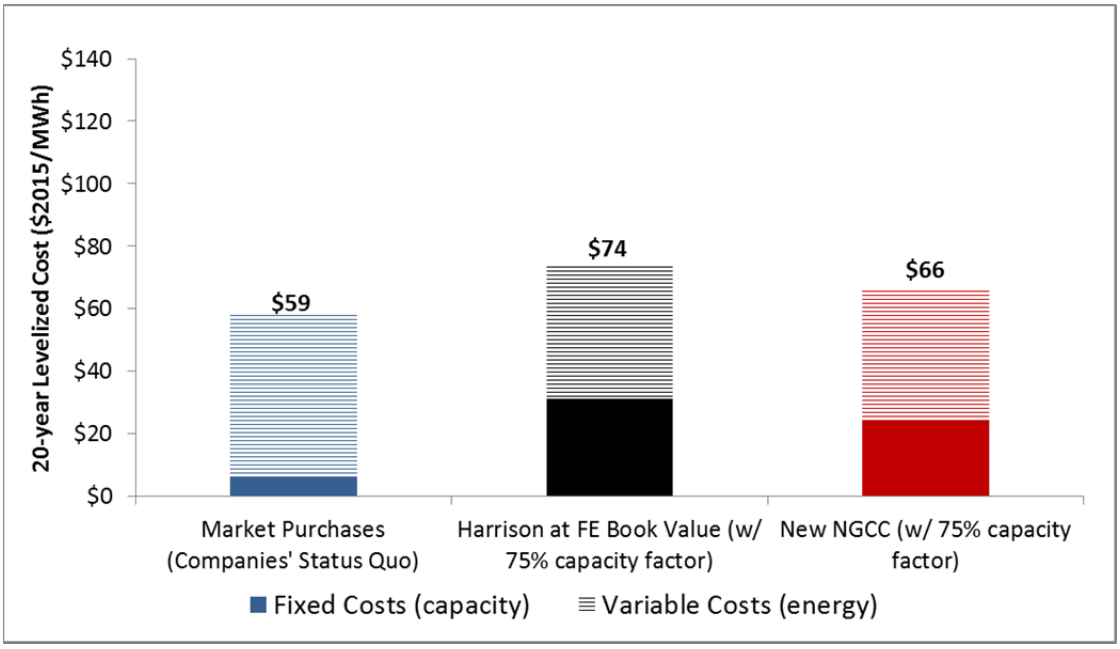
PJM Energy Market Prices ($/MWh), Actuals (2006 – 2015) and Companies' Projections (2016 – 2034)

REDACTED

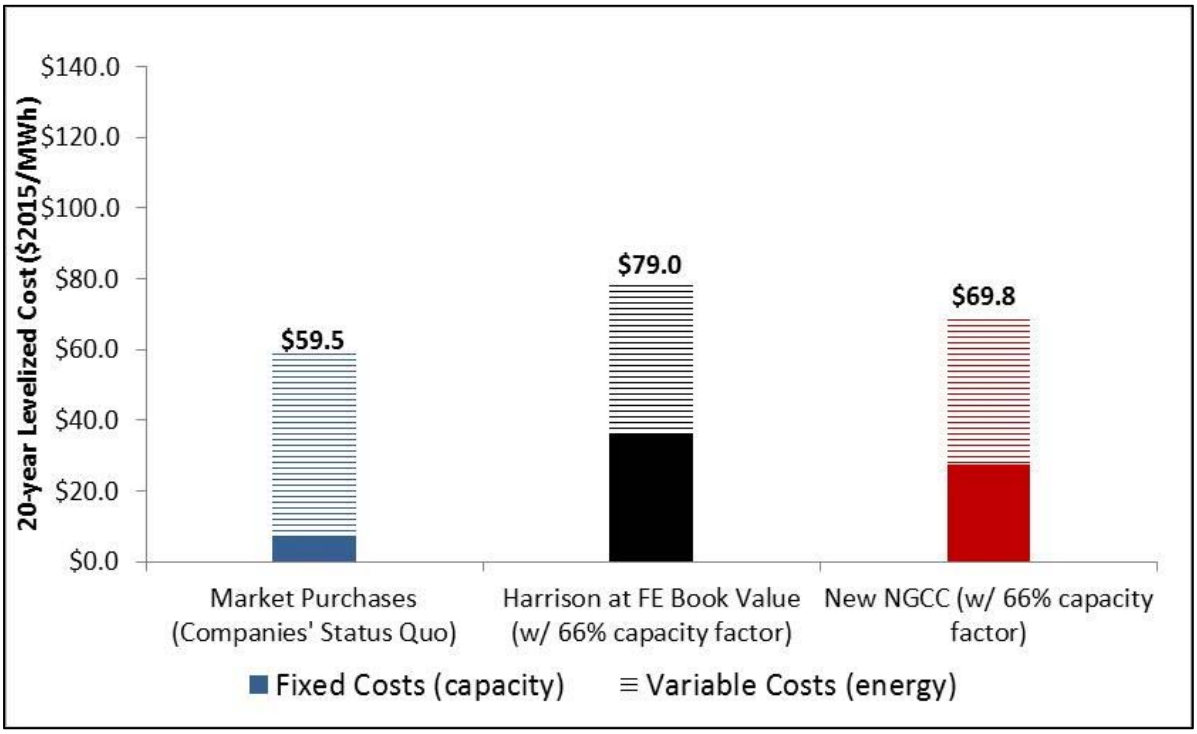
Exhibit __(JRH-8)

Status Quo Case Estimates, 2015 – 2034

Levelized Costs at 75% Capacity Factors for Harrison and New NGCC



Levelized Costs at 66% Capacity Factors for Harrison and New NGCC



Status Quo Case Estimates, 2015 – 2034

Annual Net Market Revenues versus Harrison Capacity Fixed Costs, 75% Capacity Factor

REDACTED

Cumulative Recovery of Transaction Fixed Costs for Harrison at 75% Capacity Factor

REDACTED

Status Quo Case Estimates, 2015 – 2034

Annual Net Market Revenues versus Harrison Capacity Fixed Costs, 75% Capacity Factor

REDACTED

Cumulative Recovery of Transaction Fixed Costs for Harrison at 66% Capacity Factor

REDACTED

Exhibit __(JRH-10)

Range of Hourly Energy Market Prices in 2012

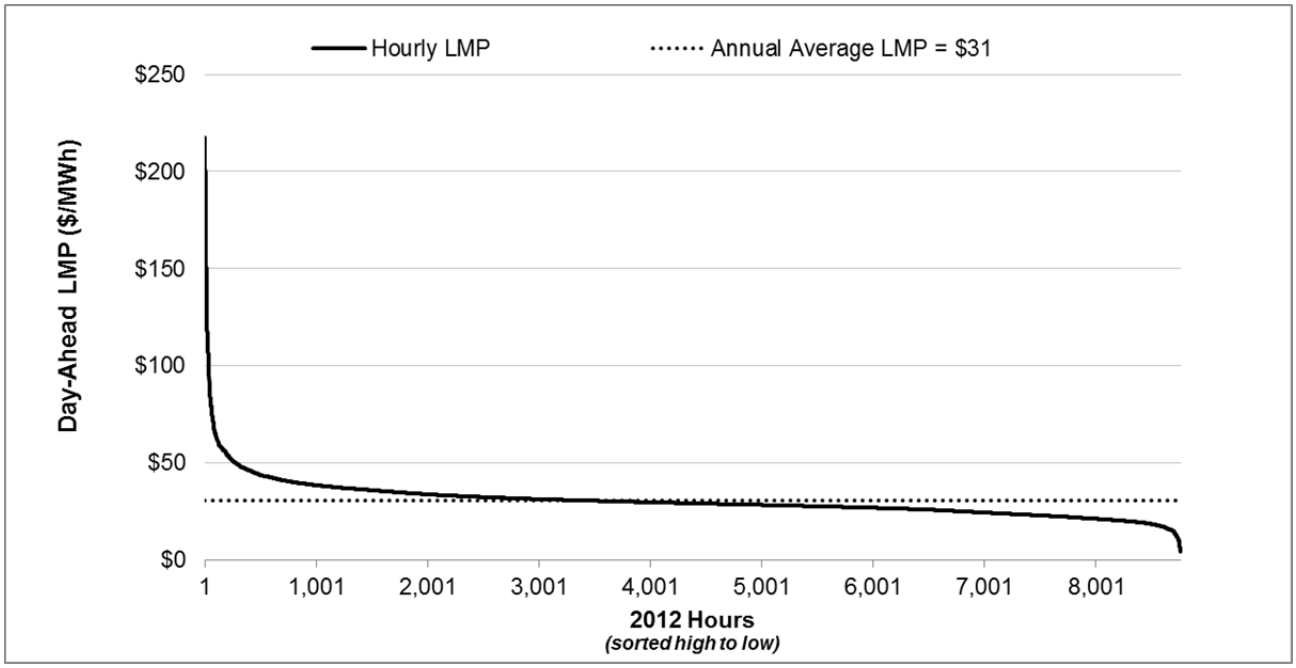
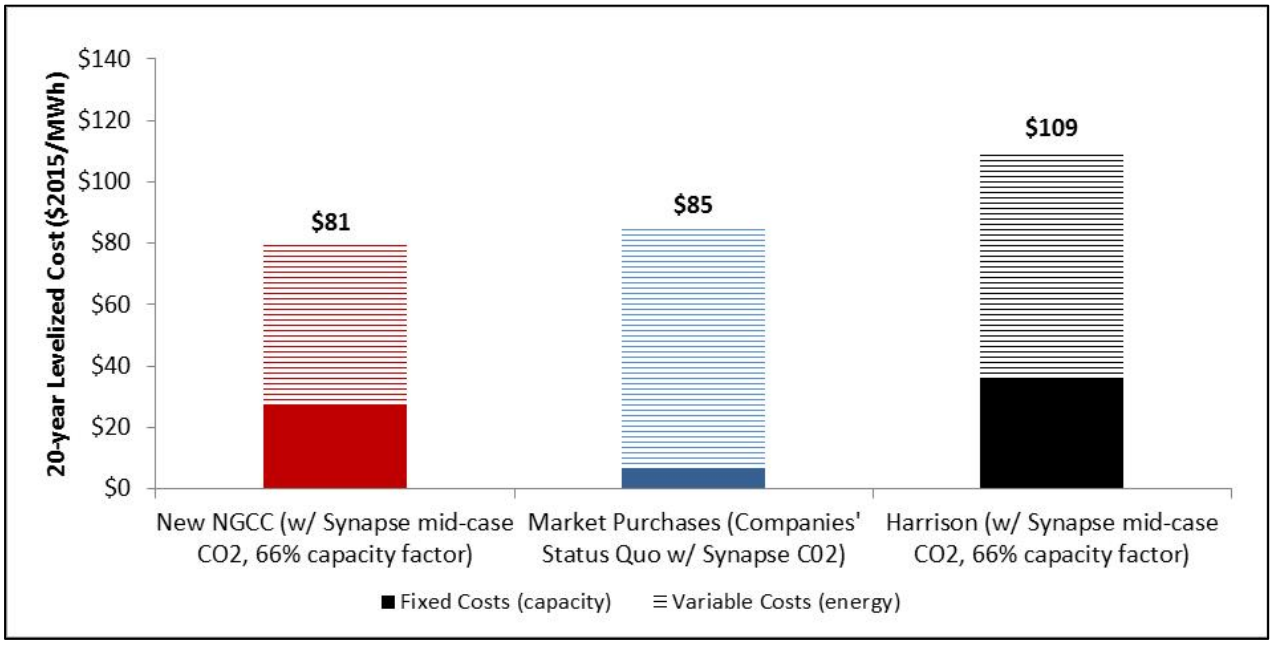


Exhibit __(JRH-11)

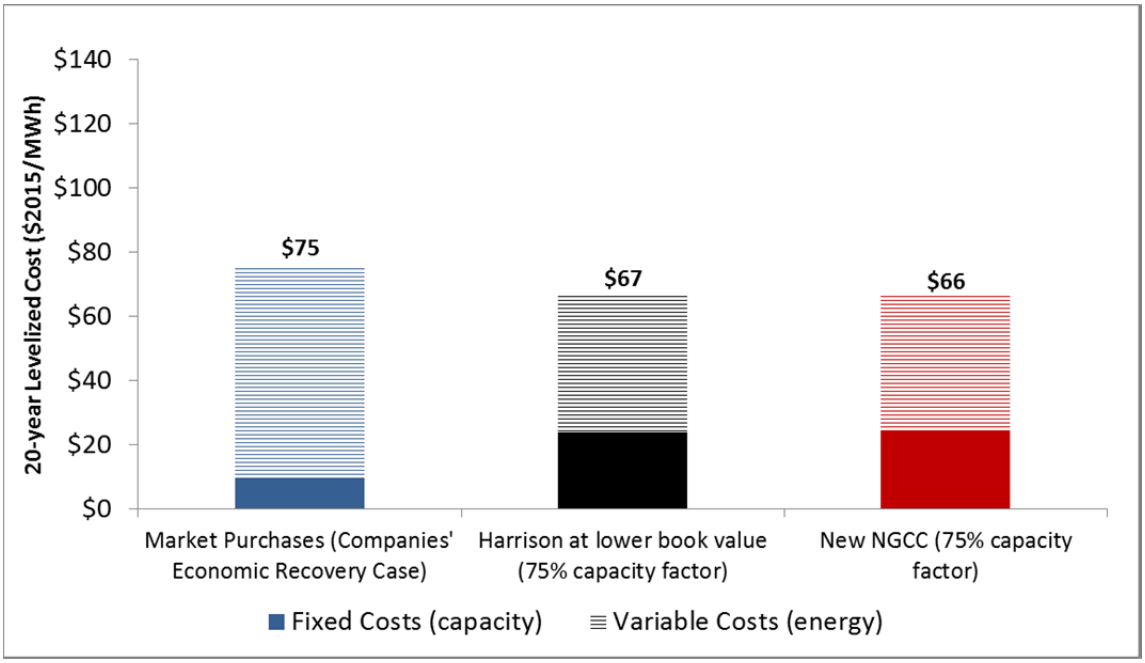
Sensitivity of Status Quo Case Estimates to Future Carbon Prices

Levelized Costs at 66% Capacity Factor



Sensitivity of Economic Recovery Case Estimates to Acquisition Cost

Levelized Cost, 75% Capacity Factor, Consumer Advocate Proposed Acquisition Cost



Sensitivity of Economic Recovery Case Estimates to Acquisition Cost

Annual Net Market Revenues vs. Fixed Costs, Consumer Advocate Acquisition Cost, 75% cf.

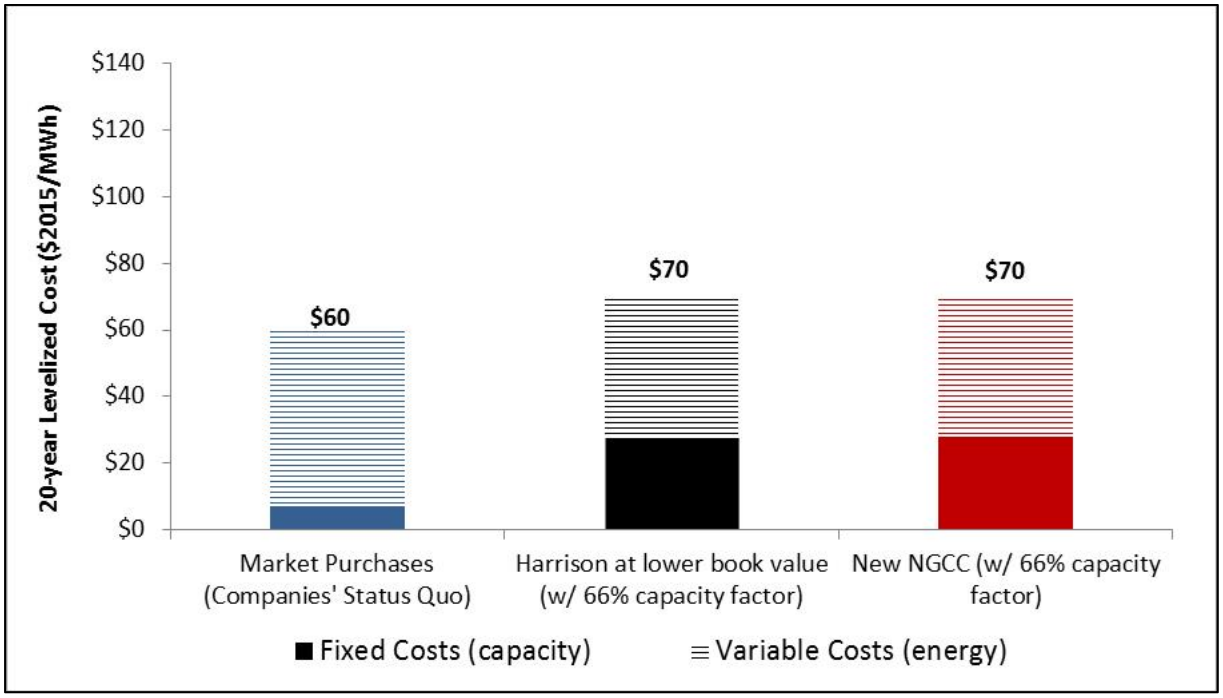
REDACTED

Cumulative Recovery of Fixed Costs, Consumer Advocate Acquisition Cost, 75% cf

REDACTED

Sensitivity of Status Quo Case Estimates to Acquisition Cost

66% Capacity Factor, Consumer Advocate Proposed Acquisition Cost



Sensitivity of Status Quo Case Estimates to Acquisition Cost

Annual Net Market Revenues vs. Fixed Costs, Consumer Advocate Acquisition Cost, 66% cf

REDACTED

Cumulative Recovery of Fixed Costs, Consumer Advocate Acquisition Cost, 66% cf

REDACTED

DATA RESPONSES

A-37

A-38

A-47

CONFIDENTIAL

A-43

Monongahela Power Company and The Potomac Edison Company
Case No. 12-1571-E-PC
Consumer Advocate Division's Corrected Fourth Request for Information

The following response to A-37 of the Corrected Fourth Request for Information of the Consumer Advocate Division received on January 31, 2013 has been prepared under the supervision of the person identified below.

Name:	Michael B. Delmar
Title:	Director, Regulated Generation and Dispatch
Company:	FirstEnergy Service Company
Date:	February 7, 2013

A-37 Please refer to the Testimony of Michael B. Delmar, page 17, line 3 through page 18 line 13. Section 8.3.4 of the 2012 Resource Plan cites acquisition of existing plants as the "preferred approach". Page 2 of the Companies' petition states that Mon Power conducted "…an extensive study of the resource alternatives".

a. Please list the existing coal-fired baseload units or plants that the Companies identified as potential candidates for purchase or a power purchase agreement, the rationale for considering those plants and the sources used to prepare this list. If none, please explain why not.

b. Please list the existing gas-fired combined cycle units or plants that the Companies identified as potential candidates for purchase or a power purchase agreement, the rationale for considering those plants and the sources used to prepare this list. If none, please explain why not.

c. Please list the existing gas-fired combustion turbine units or plants that the Companies identified as potential candidates for purchase or a power purchase agreement, the rationale for considering those plants and the sources used to prepare this list. If none, please explain why not.

d. Please explain why the Companies did not analyze a replacement portfolio that consisted of retaining the interest in Pleasants, continuing the existing MW of purchased capacity, acquiring a lesser percentage of the Harrison capacity and acquiring or building some mix of gas CT or NGCC capacity?

e. Please provide all memos, emails and reports that document the Company's analysis of the time it would take to develop, issue, and evaluate the results of an RFP, as well as the administrative costs associated with such an RFP. If there is no documentation, please explain why not

f. Please describe the most recent RFP that the Company issued for capacity and documentation of the time it took to develop, issue, and evaluate the

results of that RFP as well as the administrative costs associated with that RFP.

g. Please provide all memos, emails and reports upon which the Company based its conclusion that its cost estimates and analyses of potential resources were accurate and sufficient.

Response:

a. The Companies identified the Harrison Power Station as a candidate for purchase as it possessed the attributes necessary for meeting the Companies energy and capacity needs. Specifically, Harrison is located in West Virginia within the Companies' service territory, upon execution of the transaction Mon Power will have control of the asset rather than be a minority owner, and as a current owner, Mon Power knows Harrison is a proven, reliable performer in producing cost effective power supply.

b. The Companies did not identify any existing gas-fired combined cycle units or plants as potential candidates as they did not meet the criteria noted above.

c. The Companies did not identify any existing gas-fired combustion turbines units or plants as potential candidates as they did not meet the criteria noted above.

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d. The Companies did not evaluate the replacement portfolio identified in the question as it was not an available alternative. The building of natural gas combustion turbines and combined cycle generation was evaluated.

e. No documentation exists related to the time to develop, issue, and evaluate the results of an RFP, or estimate of the cost to administer an RFP. The Companies believe that the window of time which the Harrison transaction is available to them would be inadequate to accommodate an RFP. Additionally, the Companies do not believe that short term power supply or long term construction of generating assets are in the best interests of its customers. As detailed in the Resource Plan, the Companies believe that an existing asset that meets the criteria in (a) above is preferable and most cost effective.

f. The Companies have not issued any RFPs for capacity for their West Virginia jurisdictions.

g. The document relied upon by the Companies is its Resource Plan filed August 31 with the PSC. It provides cost estimates and analysis of potential resources which are accurate and sufficient. The companies relied on independent third party sources and to small extent data acquired through third party estimates. The sources are identified on pages 20 and 21 of my direct testimony.

Monongahela Power Company and The Potomac Edison Company
Case No. 12-1571-E-PC
Consumer Advocate Division's Fourth Request for Information

The following response to A-38 of the Fourth Request for Information of the Consumer Advocate Division received on January 31, 2013 has been prepared under the supervision of the person identified below.

Name:	Michael B. Delmar
Title:	Director, Regulated Generation and Dispatch
Company:	FirstEnergy Service Company
Date:	February 7, 2013

A-38 Please refer to the Testimony of Michael B. Delmar, pages 14 to 24, economic evaluation of resource.

a. Please provide any analyses of the actual operations of existing NGCC units by year since 2009 the Companies reviewed to develop their assumption that an NGCC unit would operate at 25% capacity factor. If none, please explain why not.

b. Page 15, lines 18-21 to page 16, line 2. Please confirm that the capacity factor at which an existing or new NGCC would be dispatched in any given time period operate is a function of its heat rate, the price of natural gas, the production cost of other available units and market prices during that time period. If not, please explain why not.

c. Please provide the analyses and all supporting workpapers in operational electronic format used to estimate the levelized costs presented in Figure 8.

d. Please provide the analyses and all supporting workpapers in operational electronic format used to estimate the levelized costs for alternatives to the Harrison acquisition under the "Status Quo" scenario. If none, please explain why not.

e. Please provide the analyses and all supporting workpapers in operational electronic format used to estimate the levelized costs for alternatives to the Harrison acquisition under the "High Growth" scenario. If none, please explain why not.

Response:

a. See Confidential Exhibit WVCAD A-38-A.

b. The capacity factors utilized in the levelized cost analysis were based on a review of current and historic results, the effect of the higher efficiency of new build technology, and a physical location within PJM West. Mon

Power reviewed capacity factors for year-to-date 2012 and the previous ten-year period to encompass periods of high and low demand and commodity prices to identify the various outcomes under a wide variety of market conditions.

c. See Confidential Exhibit WVCAD A-38-C.

d. A levelized cost analysis was not prepared under the "Status Quo" scenario as it was not selected as the Companies Long Term Price Forecast.

e. A levelized cost analysis was not prepared under the "High Growth" scenario as it was not selected as the Companies Long Term Price Forecast.

Monongahela Power Company and The Potomac Edison Company
Case No. 12-1571-E-PC
Consumer Advocate Division's Corrected Fourth Request for Information

The following response to A-47 of the Corrected Fourth Request for Information of the Consumer Advocate Division received on January 31, 2013 has been prepared under the supervision of the person identified below.

Name:	Michael B. Delmar
Title:	Director, Regulated Generation and Dispatch
Company:	FirstEnergy Service Company
Date:	February 8, 2013

A-47 Please refer to the Testimony of Michael B. Delmar, page 29, lines 7-12. "No comparable opportunities exist at this time to Mon Power's knowledge, and Mon Power received no offers for any such opportunities as it considered the Transaction."

a. Please provide all analyses, memos, emails and reports upon which the Company based its conclusion that "No comparable opportunities exist at this time to Mon Power's knowledge"

b. Please describe all steps the Company took to solicit offers for comparable opportunities. If none, please explain how Mon Power expected to receive any offers for comparable opportunities?

Response:

a. No specific documentation exists supporting Mon Power's statement. The statement was based on Mon Power's knowledge of generation assets located in proximity to its service territory that met the attributes necessary for meeting the Companies energy and capacity needs. Moreover, because the acquisition of Harrison is a transaction between affiliates, Mon Power has the added benefit of being able to acquire the asset at the lower of AE Supply's book value or market value, a savings of approximately $169 million.

b. The Company did not solicit offers, and had no expectation that it would receive offers that would meet the attributes it is seeking.

REDACTED

REDACTED

REDACTED

REDACTED