PUBLIC SERVICE COMMISSION
OF WEST VIRGINIA
CHARLESTON

CASE NO. 07-0508-E-CN

TRANS-ALLEGHENY INTERSTATE LINE COMPANY

Application of Trans-Allegheny Interstate Line Company for a certificate of public convenience and necessity under W. Va. Code § 24-2-11a authorizing the construction and operation of the West Virginia segments of a 500kV electric transmission line and related facilities in Monongalia, Preston, Tucker, Grant, Hardy, and Hampshire Counties, and for related relief.

DIRECT TESTIMONY OF HALE POWELL

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is Hale Powell, and my business address is HPowell Energy Associates, 20 Acton Rd, Westford, Massachusetts, 01886.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I have been an active professional in the electric utility industry since 1980 with a primary focus on the acquisition of electric system resources by means of improved ratepayer energy efficiency and reduced peak demand. Over the past 27 years I have been involved in every phase of demand side resource acquisition including market assessments, cost effectiveness analysis, DSM program design and marketing, equipment installation, performance assessment and metering and regulatory support. Since 2003 I have been an independent consultant specializing exclusively in demand side program design and associated regulatory issues. The bulk of my consulting practice entails providing technical and analytic support to utility DSM programs. My current major projects involve enhancing demand program designs for industrial energy efficiency in multiple New England states and participating in a formal collaboration with six Northeast states to reduce growing peak demand impacts from residential air conditioning systems.

I also have provided input and expert testimony in a variety of state regulatory settings. During 2007 I have participated in power plant approval dockets in Florida and Oklahoma in which approvals for new coal capacity investments were denied by state regulators. I am currently involved in a similar docket in the state of Louisiana. Most recently, following the denial of new coal generating capacity in Oklahoma, I have been involved in the development of regulatory rules to assist in the broad development demand side resources in that state

During the period 1992-2002 I was employed as a senior DSM evaluation and program design specialist at National Grid USA, a major electric utility with one of the most aggressive demand side programs in the US. National Grid has retail electric and gas operations in Massachusetts, New York, Rhode Island and New Hampshire.

From 2002-2003 I was employed by the Northeast Energy Efficiency Partnership (NEEP) an eight state regional collaborative funded by regulated utilities, the USDOE and the USEPA. While at NEEP I worked with utilities and regulatory officials in five states to increase energy efficiency and reduce peak demand impacts by means of enhanced energy code requirements for new residential and commercial buildings.

In 1989 I received a Bachelors degree in Public Policy from Hunter College. I earned a Master of Science degree from the University of Pennsylvania in 1991 in Energy Management and Policy with a specific concentration on demand side electric resources, energy policy and utility regulation.

Q. HAVE YOU REVIEWED TRAILCO'S APPLICATION FOR A CERTIFICATE OF CONVENIENCE AND NECESSITY AND ITS SUPPORTING DOCUMENTS?

A. Yes. In addition, I reviewed various discovery responses and other documents from TrAILCo, Allegheny Energy, PJM Interconnection and a variety of other materials as listed in my exhibits.

Q. PLEASE DESCRIBE YOUR EXPERIENCE IN THE METHODS AND APPLICATIONS OF ELECTRIC RESOURCE PLANNING AND RATEPAYER DEMAND REDUCTION STRATEGIES.

A. As an electric utility employee for National Grid during the period 1992 to 2002 I was engaged in the planning, evaluation and implementation of large scale demand and energy reduction programs targeted at the residential, commercial and industrial sectors in Massachusetts, New Hampshire and Rhode Island.

As a private consultant since 2003 I have continued to assist National Grid (and other utilities) in the design and implementation of demand side programs. As an indicator of the scale of these demand side programs, in 2005 alone, a total of

653,481 customers participated, in Massachusetts alone, producing 201 GWH of energy savings and 22.9 MW of peak summer savings[1].

From a broader perspective, my recent involvement in a variety of state regulatory proceedings has familiarized me with the most recent information in respect to rapidly evolving utility regulatory issues, escalating capacity construction costs, and the growing probability of carbon emissions regulation. Based on this experience it is clear to me that the West Virginia Public Service Commission will have the task, in this case, to make a decision in a rapidly evolving energy policy and economic environment.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I was asked by the Sierra Club, an intervenor in this case, to perform an independent evaluation of TrAILCo's Application for Certificate of Convenience and Necessity and determine whether continued reliability of electric service in West Virginia requires construction of the proposed West Virginia segments of the 500-kV transmission line and the proposed upgrades to the Mt. Storm substation in Grant County, West Virginia. In particular, I have been asked to explain to the Commission how the aggressive application of a variety of demand reduction strategies could be a preferable and more economic alternative to the construction of this line.

An additional objective of my testimony is to suggest a variety of specific "next steps" that might be undertaken by West Virginia policymakers and utilities to **a)** ensure a fuller analysis of all investment alternatives to the TrAIL line and **b)** begin the implementation of ambitious demand reduction strategies that offer broad economic and environmental benefits to West Virginia. These recommendations reflect my professional judgment as well as specific recommendations developed by the US Department of Energy, the Commonwealth of Virginia, and a wide variety of other authorities in energy and electric resource planning.

4

Q. DO YOU BELIEVE THAT THE 500-KV TRANSMISSION LINE AND ASSOCIATED FACILITIES PROPOSED BY TRAILCO FOR CONSTRUCTION IN WEST VIRGINIA ARE NECESSARY AND DESIRABLE FOR PRESENT AND ANTICIPATED RELIABILITY OF SERVICE FOR ELECTRIC POWER IN WEST VIRGINIA?

A. I believe that the materials and analysis in the TrAILCo application are not yet sufficient to make an informed determination about the optimal investment of

---

[1] These savings have been verified by state regulators in Massachusetts. See **EXHIBIT 1** for an extract of the savings report for 2005.

ratepayers' monies. In my professional opinion, the application is incomplete and the rationale for construction excessively narrow because it does not adequately address the full range of economic alternatives that could result in lower long range costs for electric service in the state. I believe that it is in the best interests of the ratepayers of West Virginia to require a more comprehensive analysis of all available options.

Q. IN IT'S APPLICATION FOR CONVENIENCE AND NECESSITY DID TRAILCO CAREFULLY CONSIDER ALL POSSIBLE ECONOMIC ALTERNATIVES POTENTIALLY IN THE PUBLIC INTEREST?

A. No. TrAILCo did not comprehensively review all alternatives. In large part TrAILCo's argument in favor of the TrAIL project is based on pursuing a specific "wires" approach to meeting PJM's transmission reliability criteria rather than establishing conclusively that the proposed project is in the best economic interests of the state's ratepayers[2].

For example, while TrAILCo's application devotes considerable attention to line siting and reliability concerns, its testimony and exhibits have provided insufficient analysis of the potential benefits and comparative costs of alternative investments in the demand side electric resources.

In addition, TrAILCo's analyses did not address a variety of other issues that will likely impact the long term viability of the project and the magnitude of future costs likely to be borne by West Virginia ratepayers.

Q. PLEASE BRIEFLY SUMMARIZE THE MAJOR ARGUMENTS WHICH YOU WILL AMPLIFY IN YOUR TESTIMONY.

A. I will argue that a significant expansion of demand and energy reduction efforts in West Virginia and the entire region is likely to be a preferable alternative to the construction of the proposed 500kV transmission line. The provisions of the US Energy Policy Act of 2005 requires the USDOE to consider all alternatives to conventional transmission corridors, including "non-wires" options which may improve reliability by means of the targeted reduction of peak demands of retail and wholesale electric customers. We believe that the interests of West Virginia ratepayers require an equally rigorous assessment of these alternatives to the proposed TrAIL line. The absence of such a comprehensive analysis in combination with other factors leads me to conclude that WVPSC approval of the proposed transmission line at this time does not serve the public interests of West Virginia. Specific reasons for this conclusion include the following:

[2] A so-called "wires" approach to transmission congestion places its primary emphasis on the construction of new transmission transfer capacity. In contrast, a "non-wires" approach is one that seeks to avoid large scale capital projects with significant environmental impacts. "Non-wires" approaches often emphasize the use of targeted reductions in ratepayer peak demand as a preferred strategy to reduce transmission congestion.

1. The Assessment Provided by TrAILCo is Insufficient to Reduce Ratepayer Risks. West Virginia, the United States and entire global energy market are in a period of extraordinarily high uncertainty about future electricity demand, energy prices, future state and federal energy policy and the prospects and implications of carbon emissions regulation. Given this uncertainty, TrAILCo's application utterly fails to address any of these risk factors that may impinge on the economic viability of the proposed line. Because these risks and uncertainties are left unaddressed, West Virginia ratepayers and taxpayers cannot be assured that the proposed line is the most "economic" and least cost approach for providing reliability and other economic benefits to WV ratepayers. Nor can they be assured that their collective investment of ratepayer dollars in this project will result in an economically viable asset. A higher level of scrutiny of these issues is both prudent and imperative and constitutes a reasonable requirement on the part of the Commission.

2. Demand Reductions are Available to Provide Needed Reliability Benefits Demand reduction strategies and programs are vastly under-developed in West Virginia and the entire region to be served by this line. Savings produced by demand reduction programs targeted at large customers is extremely limited and virtually no effort has been made to address these demand resources in the residential or medium/small commercial customer sectors that make up the bulk of system electric demand. In contrast, comprehensive demand reduction strategies have been widely and successfully implemented in other regions of the US to reduce demand growth.

   A more effective and ambitious implementation of these strategies in West Virginia and PJM as a whole can cost effectively produce large demand reductions that can address the congestion and reliability issues raised by the applicants. The "need" for the TrAIL transmission line does not reflect an immutable and unavoidable fact; instead, it merely reflects a failure to successfully restrain demand growth using policy and programmatic tools readily accessible to both policy-makers and utilities.

3. Expanded Demand Reduction Efforts Will Yield Broad Economic Benefits That Should be Considered in the Context of the TrAIL Line Proposal. The implementation of aggressive demand response and demand side management efforts can yield broad benefits over and above transmission reliability benefits. These economic benefits include lower wholesale and retail electricity costs, reduced emissions and regulatory compliance costs, improved statewide electric resource diversity and a reduced need to make future capital investments in increasingly expensive new generation and transmission assets. A fuller consideration of these benefits should be a precondition for any approval of large scale ratepayer investments such as the proposed TrAIL line.

Q. CAN YOU BRIEFLY DESCRIBE THE TYPE OF DEMAND AND ENERGY REDUCTION STRATEGIES THAT CAN HAVE A SIGNIFICANT IMPACT ON TRANSMISSION REQUIRMENTS IN WEST VIRGINIA AND THE BROADER PJM AREA?

A. Yes. A wide variety of such programs are described in literature developed by the USDOE, USEPA, regional transmission organizations (RTO and ISO), US electric utilities, regulatory filings and state governments and regulatory agencies around the US. In general, these programs fall into two categories within a broader grouping which may be termed "demand side resources" (DSR).

The first category is "demand response" (DR) programs which provide dispatchable and other types of demand reductions as part of a RTO or utility operated programs. Selected subcategories of DR programs include **a)** incentive-based dispatchable programs, **b)** price-based DR programs, **c)** direct load control (DLC) and **d)** capacity auctions of the type recently authorized by ISO New England. These DR programs normally provide improved short term control of electric end-uses in reference to system peak loads and/or transmission congestion.

The second category includes so-called "energy efficiency" (DSM) programs which encourage the permanent installation in ratepayer facilities of high efficiency/low peak demand electric end-use equipment such as air conditioning, industrial equipment, motors, lighting and other electric technologies[3]. These programs, in contrast to DR approaches, provide permanent benefits not limited to reduced load at peak periods.

Q. WHAT DOES THE <u>2006 PJM STATE</u> <u>OF THE MARKET REPORT</u> SAY ABOUT THE IMPORTANCE OF ACCERLERATED DEMAND REDUCTION PROGRAMS?

A. PJM believes that demand side programs are under-developed and need significant expansion. On page 89 of the <u>State of the Market Report</u> PJM states:

*"Markets require both a supply side and a demand side to function effectively. The demand side of wholesale markets is underdeveloped. It is widely recognized that wholesale electricity markets will work better when a significant level of potential demand side response is available on the market**. The PJM wholesale market demand side programs should be understood as one relatively small part of a transition to a fully functional demand side for the energy market.**(emphasis added) A fully developed demand side will include retail*

---

[3] A third category of DSR resources includes "distributed generation" which includes the use of small scale generation in proximity to areas of high customer demand and/or transmission congestion. This category will not be addressed in my testimony but should be considered an additional option by the Commission.

programs and an active, well-articulated interaction between wholesale and retail markets."

Q. IS IT YOUR POSITION THAT THESE DEMAND SIDE RESOURCES CAN PRODUCE SIGNIFICANT BENEFITS THAT CAN ADDRESS THE RELIABILITY ISSUES DETAILED THE TRAILCO APPLICATION?

A. This is my professional opinion. In addition, the capability of DSR induced demand reductions to produce significant transmission benefits is clearly underlined by the advocacy of such demand reductions by PJM and other regional transmission organizations, FERC and a diverse body of research conducted by government agencies, utilities, consultants and other bodies. In Table 3-2 of its recently published Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them[4], the USDOE identifies a number of clear benefits of DSR induced demand reductions. In terms of reliability the following benefits are identified resulting from reductions in customer demand produced by DSR programs:

- System reliability benefit: Reduced likelihood and consequences of forced outages
- System reliability benefit: Diversified resources available to maintain system reliability
- Customer reliability benefit: Reduced risk of losing service
- Customer reliability benefit: Reduced exposure to forced outages

In an effort to quantify these benefits the International Energy Agency (IEA) contracted with Summit Blue Consulting to conduct a systematic assessment of the benefits of demand reductions from DSR programs. Using a case study modeling approach the study concluded that:

*"**Loss of Load**: The addition of demand response resources decreased the loss of load (LOL) hours substantially across all cases. The base case had an average value of for loss of load of 7.64 hours across the cases, but value for some individual cases were as high as 30 hours. For the DRR with Peak Pricing, the average loss of load hours averaged across all cases was lowered to 0.33 hours[5]".*

This study also substantiated additional reliability benefits for customers in the form of reduced price volatility, resulting in more "reliable" and predictable pricing of electricity.

---

[4] See **EXHIBIT 2** for Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them published by the USDOE.
[5] See page 7 of **EXHIBIT 3** - Demand Response Resources Valuation and Market Analysis: Assessing DRR Benefits and Costs, Summit Blue Consulting for the International Energy Agency.

Q. PLEASE SUMMARIZE SOME OF THE OTHER ECONOMIC BENEFITS AVAILABLE TO WEST VIRGINIA AND THE PJM REGION RESULTING FROM AN EXPANDED DEMAND SIDE EFFORT.

A. A comprehensive summary of these benefits is well beyond the scope of this testimony. However, the Commission is encouraged to integrate the consideration of the non-reliability economic benefits of DSR efforts as it evaluates the comparative benefits and costs of the TrAIL proposal.

These economic benefits have been well researched by PJM, the USDOE and a broad spectrum of research efforts. However, of particular note is **<u>EXHIBIT 4</u>**, <u>Quantifying Demand Response Benefits in PJM</u>, a research project prepared by The Battle Group in 2007 for PJM and MADRI. This study quantified market impacts of curtailing 3% of load in the BGE, PECO, PEPCO and PSEG zones. Non reliability economic benefits identified and/or quantified by the Brattle study included:

- Significant reductions of market electricity prices during curtailment periods[6].
- Reduction in capacity requirements needed to maintain reserve margins.
- Reduced electricity price volatility
- Enhanced competitiveness of energy and capacity markets
- **Deferred transmission and distribution costs (**emphasis added**)**

Reflecting only a limited subset of these benefits, the Brattle report estimated annual benefits (in the MADRI states alone) of $138 to $281 million. Other economic benefits that have been identified by other research include:

- Increased capital efficiency in one of the most capital intensive industries
\- Risk management in the form of a hedge against extreme physical events.
- Increased customer choice and customer risk management opportunities
- Environmental benefits associated with reduced carbon emissions
- Market power mitigation[7].

Q. IT APPEARS THAT YOUR TESTIMONY MAKES PRIMARY EMPHASIS ON DATA ASSOCIATED WITH ALLEGHENY POWER AND ITS CUSTOMERS. SINCE THE TRAIL LINE WILL SERVE THE ENTIRE REGION AND MULTIPLE UTILITIES WHY DID YOU CHOSE TO FOCUS ON A SINGLE UTILITY FOR THIS ANALYSIS?

---

6 Brattle found that curtailing 3% of each selected zone's super-peak load, which reduces PJM's peak load by 0.9%, yields an energy market price reduction of $8-$25 per megawatt-hour, or 5-8% on average, during the 133-152 hours in which curtailment occurs in at least one zone.

[7] For a further discussion of these benefits see **<u>EXHIBIT 3</u>**, <u>Demand Response Resources Valuation and Market Analysis</u>, Summit Blue Consulting, 2006.

A. My testimony is not intended to highlight the performance of Allegheny Power as unique from other utilities in the region. However**,** in conducting research for this testimony I made multiple requests to TrAILCo for detailed information about a number of utilities to be served by the TrAIL line. TrAILCo responded to those requests with information exclusively about Allegheny Power operations and customers.

Despite the lack of detailed data on multiple utilities I believe that the Allegheny Power is a representative example of many of the utilities in the region. A review of regulatory and EIA data from the surrounding states suggests that AP operates in a similar regulatory environment in respect to demand side activities. In addition, it appears that its low level of demand side activity is broadly shared with other regional utilities.

Q. HAS TRAILCO IDENTIFIED A SPECIFIC LEVEL OF PEAK DEMAND REDUCTIONS THAT WOULD BE REQUIRED BY 2011 TO MITIGATE THE PREDICTED A) MEADOW BROOK SUBSTATION VOLTAGE PROBLEMS AND B) LINE OVERLOADING ON THE MOUNT STORM LINES?

A. No. Based on the TrAILCo response to SIERRA-IV-INT-3**,** it appears that TrAILCo has not performed such a fundamental analysis. Without such basic information it is impossible to compare the relative costs of potential demand reductions with the costs of transmission upgrades. The TrAILCo response suggests that the responsibility for such an engineering analysis should be lie with intervenors, not the proponents of the TrAIL line. On the contrary, I believe that the development of such information should be essential analytic element any large scale ratepayer funded investment.

Q. A COMPARISON BETWEEN COSTS OF ALL ATERNATIVES IS ESSENTIAL FOR AN APPROPRIATE DECISION IN THIS CASE. DOES THE COMMISSION HAVE ENOUGH INFORMATION ABOUT THE COSTS OF DEMAND SIDE PROGRAMS TO MAKE AN EFFECTIVE COMPARISON BEWEEN DEMAND REDUCTION AND TRANSMISSION STRATEGIES TO ENHANCE RELIABILITY?

A. No. TrAILCo application does not adequately address the costs of demand side alternatives to the TrAIL proposal. However, a variety of estimated cost data is available from a number of sources. Among these sources is a recent regulatory filing in Maryland in which Allegheny Power estimated that 141MW of peak demand reductions could be achieved for a cost of $23.69 million.

The Commission should request that TrAILCo review these and other demand reduction cost estimates produced by regulators, government agencies and utilities. Following this review TrAILCo should provide a report to the WVPSC on the comparative costs, per peak MW, between the TrAIL project and reasonably achievable demand reduction strategies.

Q. WHAT ELECTRIC MARKETS WILL THE PROPOSED TRAIL LINE SERVE?

A. In response to discovery TrAILCo has resisted identifying specific markets to be served by the line, insisting that the transfer capacity is intended to serve the entire region and not specific utilities or states. However, it is clear from the routing of the line and PJM's Regional Transmission Expansion Plan (RTEP) that primary markets to be served include areas of rapid demand growth in Northern Virginia, Maryland, Pennsylvania and the District of Columbia. Estimates of five year demand growth by 2011 in those areas is approximately 2500 MW, very close to the transfer capacity of the proposed TrAIL line[8].

Q. IS IT YOUR POSITION THAT THE WEST VIRGINIA PSC CAN EFFECTIVELY PROMOTE THE EXPANDED DEVELOPMENT OF DEMAND REDUCTION PROGRAMS IN WEST VIRGINIA AND THE PJM REGION?

A. Yes. As discussed in depth elsewhere in this testimony the WVPSC can and should adopt a variety of regulatory mechanisms for West Virginia that have been used in other state venues to promote the expansion of demand side resources. These regulatory initiatives include **a)** the removal of financial disincentives, **b**) the establishment of DSR program cost recovery and **c)** the implementation of financial incentive mechanisms that reward state utilities for verified demand and energy reductions resulting from successful DSR programs.

In respect to out-of-state demand reductions the PSC cannot exert direct influence on the policies and programs implemented in Virginia, Pennsylvania and other adjoining PJM states. However, a variety of indirect approaches have the potential for exerting considerable influence on the energy policies and programs pursued in those states. Among these strategies include close collaboration with PJM efforts to “ramp up” demand response programs and to promptly implement a RTO capacity auction which includes actionable demand reductions modeled on the Forward Capacity Market initiative adopted by ISO New England.

A requirement by the WVPSC that TrAILCo conduct a much more extensive assessment of the costs and availability of achievable demand side resources should also produce credible and well researched information on this resource that will aid other states in weighing the comparative benefits of these alternatives. As an example of this type of influential research see **<u>EXHIBIT 5</u>**, the <u>Virginia Energy Plan</u> recently produced by the Commonwealth of Virginia.

[8] For sources of this data see the following: PJM RTEP, pp 171, 215, 270 and 297. Also see sources cited in **<u>EXHIBIT 6</u>**, “How Dominion and Allegheny Power Got it Wrong”, page 10.

In contrast, the premature approval of the proposed TrAIL transmission project based on incomplete analyses of demand side alternatives will likely retard the development of these resources outside West Virginia. In that case, unrestrained and accelerating demand growth in rapidly growing urban and suburban areas outside the state will likely exacerbate future threats to reliability for West Virginia ratepayers.

Q. IN YOUR OPINION, WHAT ISSUES OF SIGNIFICANT ECONOMIC IMPACT WERE NOT ADDRESSED BY THE TRAILCO APPLICATION?

A. At least two significant issues of this type were not addressed in the TrAILCo Application.

The first is the possible impact of the enactment of Federal carbon emissions regulation on the economic viability of the TrAIL line. In recent years the level of scientific, public and political support for controlling greenhouse gas emissions has increased rapidly. Several years ago the probability of the enactment of such legislation was low. However, I believe that these probabilities have risen to a point where utility resource planning cannot prudently ignore this regulatory scenario and its likely associated ratepayer costs.

A second issue not fully considered are the possible implications on the TrAIL line of reduced rates of future electric demand growth in areas to be served by the line. An increasing number of states, including Virginia, are adopting policy objectives to **a)** reduce demand growth below current levels, **b)** increase consumer energy efficiency and **c)** reduce greenhouse gas emissions associated with electricity generation. My subsequent testimony will review the reasons for accelerating efforts in this regard as well as specific initiatives pursued by states governments, regional transmission organizations, and utilities with the objective of achieving these goals.

Q. WHAT PERCENTAGE OF TOTAL TRAIL LINE COSTS DOES TRAILCO ESTIMATE AS THE RESPONSIBILITY OF WEST VIRGINIA RATEPAYERS?

A. In its revised application dated May 23, 2007 TrAILCo estimated that state ratepayers will be responsible for 4.2% of the revenue requirements associated with the TrAIL line.

Q. CLIMATE CHANGE AND CARBON EMISSIONS HAVE BECOME A SERIOUS CONCERN FOR POLICY MAKERS. IN WHAT FASHION DID TRAILCO ASSESS THE IMPLICATIONS FOR THE TRAIL LINE OF THE POSSIBLE ENACTMENT OF CARBON REGULATION?

A. TrAILCo did not conduct an analysis of either the likelihood of carbon regulation or of possible implications of carbon emissions regulation and associated costs on the future viability and needs for the TrAIL line. In particular, TrAILCo did not assess the implications of carbon allowances or taxes on the financial performance of their proposed asset.

Q. IN YOUR OPINION, WHAT ARE THE POSSIBLE IMPLICATIONS FOR THE TRAIL LINE IF A CARBON TAX OR "CAP AND TRADE" REGULATORY REGIME IS IMPLEMENTED AT THE FEDERAL LEVEL?

A. Lacking access to detailed financial, electricity transfer and emissions data associated with the projected operation of the TrAIL line I cannot identify precise impacts. For example, I cannot estimate at what point the costs of "carbon allowances" associated with a cap and trade system would erode the price differential between electricity generated by gas and the coal based power likely to be transferred via the TrAIL line.

The economic viability of the proposed line is in part a function of the price differential per MWh between western PJM coal and eastern PJM gas fired generation. Coal based generation is much more carbon intensive than that of natural gas, producing approximately 2.0 pounds of carbon dioxide per kilowatt hour. If the objective of future Federal legislation is to significantly reduce greenhouse gas emissions, such legislation may seek to "level the playing field" between the net costs of gas and coal generation. In this scenario the costs of carbon allowances might be set in such a way as to eliminate the coal/gas price differential. For example, the graphic depiction of carbon costs in **EXHIBIT 11** suggests that if carbon allowances exceeded $10 per metric ton, the coal/gas price differential would disappear if natural gas were priced at $6 per million Btu. Similarly at $7/million Btu the price differential would be zero if carbon allowances were priced above $20 per metric ton.

The exact consequences of a zero or reduced gas/coal price differential resulting from carbon regulatory costs are uncertain but without doubt represent a significant risk to West Virginia ratepayers supporting the costs of the TrAIL line.

This issue of carbon regulation has been substantially addressed in a variety of state regulatory venues. In many of these settings state regulators have made resource and investment decisions on the basis of extensive analyses of projected carbon allowance costs[9]. Similarly, TrAILCo should be required to thoroughly assess these risks in order to ensure minimal ratepayer exposure factors that may impact the financial performance of the proposed TrAIL line.

[9] There are numerous regulatory proceedings in which carbon allowance cost projections were a significant factor in electric resource decisions which can be identified upon request.

Q. IN YOU OPINION, WHAT IS THE LIKELIHOOD OF THE ADOPTION OF A CARBON TAX OR “CAP AND TRADE” REGULATORY REGIME DURING THE EXPECTED LIFETIME OF THE PROPOSED TRAIL LINE?

A. It is difficult to predict when such a regime might be implemented. However, there appears to be a growing scientific and political consensus that the issue of climate change requires a strong policy initiative in respect to continuously growing US carbon emissions.

Increasing public and bi-partisan political support for carbon emissions legislation strongly suggests that such legislation will be forthcoming well within the lifetime of the proposed TrAIL line. For example, Senator Warner, the Republican senator from Virginia, formerly an opponent of carbon legislation, is now co-sponsoring “America’s Climate Security Act” (ACSA), a “cap and trade” proposal that sets ambitious targets for reduced carbon emissions[10].

The inability to exactly predict the likelihood of household fires or floods does not preclude the wisdom of purchasing insurance to protect against those uncertain risks. Similarly, a more thorough assessment of the possible implications of carbon regulation represents a form of “insurance” against the possible negative economic impacts of carbon emissions regulation on West Virginia ratepayers.

Q. ONE POSSIBLE CONSEQUENCE OF THE INCREASED TRANSFER OF ELECTRICITY FROM WEST VIRGINIA AND WESTERN PJM IS THAT THE OVERALL REGIONAL FUEL MIX WILL BECOME MORE “CARBON INTENSIVE” DUE TO INCREASED TRANSFERS OF COAL GENERATED ELECTRICITY. IN WHAT MANNER DID TRAILCO ASSESS THE IMPLICATIONS OF INCREASED CARBON EMISSIONS RESULTING FROM SUCH A SCENARIO?

A. TrAILCo conducted no analysis of the implications of increased carbon emissions resulting from changes in the region’s electric fuel mix.

Q. TRAILCO ATTRIBUTES THE NEED FOR TRANSMISSION ENHANCEMENTS TO THE CONTINUED RAPID GROWTH OF REGIONAL ELECTRICTY DEMAND. ARE THERE SUBSTANTIAL REASONS TO BELIEVE THAT THE RATE OF DEMAND GROWTH WILL BE REDUCED BELOW TRAILCO EXPECTATIONS?

A. Yes. The wide ranging economic and environmental costs of unrestrained electric demand growth are becoming widely recognized by policy makers at all levels. Rapid demand growth across America has resulted in a number of ambitious new policy initiatives and demand reduction programs with the objective of reducing

[10] For a brief summary of the ACSA legislative proposal and the extent of its legislative support, see the “Economist,” November 17, 2007, page 35.

demand growth and enhancing ratepayer energy efficiency. It is increasingly apparent that this type of demand initiative will be adopted in the PJM area and will have significant impacts on reducing demand in the region to be served by the TrAIL line.

Increased interest in these initiatives, in all regions, is the consequence of the following factors:

a) Rapid demand growth can imperil the reliability of electric service unless new capacity is constructed to keep pace.
b) Obtaining regulatory approvals and public support for new generation and transmission capacity is increasingly problematic and expensive.
c) Construction costs for new generation capacity have increased dramatically. In large part this is the result of increased international demand for these facilities and associated components and skilled labor.
d) Increased public concern about increasing carbon emissions, climate change and other environmental impacts has galvanized growing public opposition to new facilities.
e) Increases in primary fuel price levels and price volatility has made investments in reduced demand and energy consumption more economically attractive in comparison to traditional “supply side” resources.
f) Policy makers increasingly recognize that demand reductions can reduce energy costs at both the wholesale and retail levels.
g) Successful large scale demand reduction efforts in a number of “early adopter” states have demonstrated that the acquisition of demand side resources is achievable and cost-effective.
h) Careful assessments of DSM resource potential in a number of states has demonstrated that these resources are abundant, under-utilized and comparatively inexpensive.

For these reasons, and others, governments, utilities and RTOs nationwide are showing rapidly increasing interest in implementing ambitious programs and policies with the objective of reducing energy consumption and peak demands. In many areas of the US utility and public spending on demand programs is increasing at a very rapid pace, often driven by public policy mandates to reduce electric load growth, in some cases to zero annual growth rates.

Reflecting increased activity nation wide, in 2005 US states spent a total of $1.9 billion on demand side programs, a 23% increase over 2004 levels. The number and scope of these state energy demand reduction objectives is growing at a surprising rate. The table below identifies the achievements of a number of state demand side programs in 2005 alone[11].

[11] This data reflects data provided by utilities and state regulatory agencies in a 2007 study. See DSM in North America, Summit Blue Consulting, 2007.

Incremental DSM Program Results in 2005				
State	Energy Savings (GWh)	Peak Demand Savings (MW)	Energy Savings as % of Sales	Demand Savings as % of Peak Demand
California	2597	495	1.4%	1.1%
Minnesota	441	160	1.9%	1.2%
New Jersey	378	73	1.0%	0.7%
New York	1369	288	1.1%	0.7%
Texas	509	181	0.3%	1.0%
Vermont	57	9	1.0%	0.5%
Wisconsin	221	38	0.3%	0.2%

Q. SOME STATES, UTILITIES AND REGULATORY BODIES HAVE CONDUCTED SYSTEMATIC ASSESSMENTS OF THE MAGNITURE OF AVAILABLE DEMAND SIDE RESOURCES. CAN YOU PROVIDE ANY SUCH ESTIMATES?

A. In its recently published Virginia Energy Plan[12], the Commonwealth of Virginia summarized a number of such assessments conducted in a number of US states. These assessments of achievable demand side potential are summarized in data extracted from Table 3-2 of that report. Note that "horizon" in the table below indicates the number of years necessary to achieve the stated demand side savings.

Comparison of Achievable Demand Side Savings Estimates in US States		
State	Horizon (years)	Percent Savings
Conn.	8 years	17%
Georgia	10 years	20%
North Carolina	10 years	20%
New York	9 years	30%
Washington (State)	20 years	12%
Vermont	8 years	19%

Q. ON THE BASIS OF THESE DSM ASSESSMENTS AND ADDITIONAL VIRGINIA-SPECIFIC ANALYSIS, WHAT HAS THE STATE OF VIRGINIA CONCLUDED ABOUT THE AVAILABILITY OF ACHIEVABLE DEMAND SIDE SAVINGS IN THAT STATE?

[12] **EXHIBIT 5**, The Virginia Energy Plan, Commonwealth of Virginia, 2007.

A. In Table 3-4, the Virginia Energy Plan estimated that over a ten year period electric energy requirements in the state could be reduced, cost effectively, by 14%. See the table below for estimates by customer sector.

Virginia Savings: 10 Year Achievable and Cost Effective Savings	
Customer Sector	Percent Savings
Residential	15%
Commercial	17%
Industrial	12%
Total – All Sectors	14%

Q. BASED ON THESE ASSESSMENTS, WHAT SPECIFIC REDUCTIONS IN PEAK DEMAND DOES VIRGINIA ENVISION AS ACHIEVABLE AND COST EFFECTIVE?

A. In Table 2-4, the Virginia Energy Plan estimates that by 2016 peak reductions of 5,495 MW can be produced by the application of demand side programs.

Q. DOES THE VIRGINIA ENERGY PLAN CONSIDER ANY BENEFITS OF REDUCING ELECTRICITY IMPORTS INTO THE STATE VIA THE TRAIL LINE OR OTHER TRANSFER CAPABILITIES?

A. Yes. The document specifically discusses a variety of public interest benefits to the state of Virginia associated with reducing electricity imports from West Virginia and other states. Currently, the state imports roughly 30% of its electricity. In Table 2-8, the Virginia Energy Plan estimates each reduction of 1% in these imports result in a net in-state benefit of $20.1 million.

Q. HAS ALLEGHENY POWER ESTIMATED THE AVAILABILITY AND COSTS OF LARGE SCALE DEMAND SIDE RESOURCE ACQUISTION IN JURISDICTIONS OUTSIDE WEST VIRGINIA?

A. Yes. On October 26, 2007 Allegheny Power (operating as Potomac Edison) filed with the Maryland PSC a report entitled "Energy Efficiency, Conservation, and Demand Reduction Plans". In that report Allegheny estimated that eight new demand reduction programs in Maryland "may be able to achieve 269.61 GWh in cumulative energy savings and 141 *MW* in cumulative demand savings at a projected cost of $23.69 million[13]" I recommend that the WVPSC investigate the nature of these programs and consider their adoption in West Virginia as well.

Q. IN ADDITION TO VIRGINIA, ARE THERE OTHER STATES TO BE SERVED BY THE TRAIL LINE THAT ENVISION SIGNIFICANT REDUCTIONS IN DEMAND AND DEMAND GROWTH?

A. Yes. For the reasons described above many states in the region are investigating or implementing ambitious demand reduction strategies similar to those defined in Virginia. Specific examples of these initiatives are in evidence in Maryland and Pennsylvania.

In Maryland both PSC case # 9111 and the "Empower Maryland" initiative announced by the Governor in July 2007 envision ambitious efforts to reduce electric demand growth. In particular, EmPower Maryland is a program announced by Governor Martin O'Malley that envisions a statewide fifteen percent reduction in total electric usage in Maryland on a per capita basis by 2015.

In Pennsylvania, the PUC under Docket No. M-00061984 is evaluating the potential benefits of a significant expansion of demand side efforts in the state. An investigation of these issues was conducted by Commission staff with the assistance of the Demand Side Response Working Group and a report was filed at the PA PUC on June 6, 2007.

Q. IT IS CLEARLY A CENTRAL OBJECTIVE OF THE TRAILCO PROPOSAL TO PROVIDE ELECTRIC TRANSFER CAPABILITY TO THE ELECTRICITY MARKETS IN VIRGINIA, MARYLAND, PENNSYLVANIA AND OTHER STATES IN THE REGION. DOES THE TRALCO APPLICATION CONTAIN EXPLICIT CONSIDERATION OF THE IMPLICATIONS OF THE SIZABLE DEMAND REDUCTIONS ENVISIONED IN THOSE STATES?

A. No. In part due to the rapid evolution of energy policy and demand initiatives in the region TRAILCO's application does not consider the range of possible consequences of regional demand reductions of the scale outlined in Virginia and other states.

Q. TRAILCO'S APPLICATION INDICATES THAT WEST VIRGINIA'S ALLOCATION OF COSTS FOR THE TRAIL LINE MAY CHANGE OVER TIME. IS IT POSSIBLE THAT SUCCESSFUL EFFORTS TO REDUCE ELECTRIC DEMAND IN VIRGINIA AND OTHER STATES COULD AFFECT THE SIZE OF WEST VIRGINIA'S ALLOCATION?

---

[13] See TrAILCo attachment TO SIERRA-IV-I I-A, page 3. This information is contained in a letter from Allegheny Power to the Maryland PSC dated October 26, 2007.

A. I believe that such a change in allocation is possible, particularly if FERC or the Federal government adopt policies to recognize and promote successful state efforts to reduce demand growth and/or greenhouse gas emissions.

Q. BASED ON THE ANALYSIS COMPLETED BY THE COMMONWEATH OF VIRGINIA, WHAT LEVEL OF DEMAND SIDE SAVINGS COULD BE ACHIEVED OVER A TEN YEAR PERIOD IN WEST VIRGINIA AND THE PJM REGION?

A. Based only on Virginia's analysis, West Virginia and the PJM region could cost effectively achieve, over a ten year period, reductions of approximately 14% of peak demand[14].

Q. CAN YOU CITE ANY ADDITIONAL ESTIMATES OF POTENTIAL DEMAND REDUCTIONS IN THE PJM REGION THAT MIGHT PRODUCE RELIABILITY AND OTHER BENEFITS TO THE REGION?

A. Yes. An analysis conducted in 2007 by the American Council for an Energy Efficient Economy estimated that cumulative cost effective peak reductions approximately 24,068 MW could be achieved in the PJM region. Similar to the Virginia estimate, this would represent roughly 15% of PJM's 2022 forecast summer peak demand[15]. This estimate of multi-year cumulative MW savings is also congruent with the annual rate of 0.5% to 1.0% peak MW savings achieved by active demand programs in a variety of US states.

ACEEE Estimate of Total Demand Side Resource Potential in PJM	
Demand Resource Type	Total Potential (MW)
Energy Efficiency	15,503 MW
Demand Response	8,565 MW
Total Peak MW Savings	24,068 MW

Q. DID TRAILCO CONDUCT AN ANALYSIS OF THE IMPLICATONS OF DEMAND REDUCTONS OF THIS SCALE ON THE VIABILITY OF THE PROPOSED TRAIL LINE?

A. No such analysis was conducted. TrAILCo did not conduct scenario analyses assessing the impacts of different regional demand levels on the financial performance of the TrAIL line.

[14] It must be emphasized that an actionable assessment of potential demand savings requires an extensive state-specific analysis well beyond the scope of this testimony.

[15] **EXHIBIT 7** - Comments of the American Council for an Energy Efficient Economy (ACEEE) at the USDOE Draft Electric Transmission Corridor hearings, Docket # 2007-OE-01, page 2.

Q. PLEASE IDENTIFY EXAMPLES OF THE TYPES OF ENERGY EFFICIENCY PROGRAMS THAT COULD PRODUCE SUCH A HIGH LEVEL OF PEAK SAVINGS.

A. An excellent example of an energy efficiency program that could produce high peak MW savings would be a targeted effort to promote the replacement of existing low efficiency residential air conditioners with equipment with higher peak demand performance. Such programs operating in many US states provide ratepayers with financial incentives to purchase air conditioning equipment with higher peak performance (EER) and seasonal energy performance (SEER) ratings[16].

According to TrAILCo, there are a total of approximately 684,190 residential households with central air conditioning units in the service territories of Allegheny Power alone[17]. At two to three kilowatts demand per unit, their operation represent a very sizable fraction of the total Allegheny's 3,714 MW of peak residential demand.

According to field measured savings used by a major utility DSM program in New England, the replacement and proper installation of a single new three ton 12.5 EER air conditioning unit will produce summer peak savings of 0.473 kW[18]. Thus, the gradual replacement of approximately 600,000 residential units in the Allegheny service territories over a multi-year period would represent a potential on-peak savings of roughly 283 MW or 7.6% of Allegheny's peak residential load of 3714 MW. Note that these 7.6% savings estimates applies to central air conditioning end-uses only and does not include potential demand savings from other residential appliances operating on-peak.

Q. PLEASE IDENTIFY EXAMPLES OF THE TYPES OF DEMAND RESPONSE PROGRAMS THAT COULD PRODUCE HIGH LEVELS OF PEAK MW SAVINGS.

A. An example of such a demand response opportunity would be the promotion of the direct load control (DLC) of the peak loads of a substantial proportion of existing residential air conditioners in the Allegheny Power service territories. This strategy would enable the controlled cycling, on peak, of a portion of the

[16] See www.mycoolsmart.com for details.

[17] See TrAILCo response to SIERRA-IV-INT-16.

[18] This estimate was developed under regulatory oversight by National Grid's Massachusetts affiliate. See National Grid Savings Estimates for Residential HVAC, 2007.

roughly 1500 MW of peak residential central air conditioning loads likely operating at Allegheny's system peak[19].

Another example would be the rapid adoption, by PJM, of a capacity auction framework modeled on the Forward Capacity Market (FCM) currently being implemented by ISO New England. The FCM is a wholesale market designed by the six New England states to promote investment in both supply and demand side electric resources. It is the first capacity market in the US that includes a full range of demand side resources as fully qualified capacity resources. In the ISO New England FCM a total of 2400 MW of demand side savings projects will be available for auction in February 2008. This scale of demand reduction, if coincident with peak, would represent approximately 8.5 % of total ISO New England summer peak demands.

Q. YOU INDICATE THAT DEMAND RESPONSE PROGRAMS ARE GREATLY UNDERUTILIZED. CAN YOU PROVIDE A SPECIFIC EXAMPLE OF SUB OPTIMAL DEMAND RESPONSE PARTICIPATION AND DEMAND SAVINGS ACQUISTION?

A. Yes. In Allegheny Power's recently filed "Energy Efficiency, Conservation, and Demand Reduction Plans" in Maryland, identifies very limited results from the PJM demand response programs in that state. According to this report "Currently there is only one Allegheny customer registered in the PJM Economic Load Response program. ..There are no usage reductions as a result of customer participation in this program included in Allegheny's current analyses[20]".

Q. **553 US UTILITIES REPORTED THEIR LEVELS OF 2005 DEMAND SIDE ACTIVITY TO THE US ENERGY INFORMATION ADMINISTRATION. WHAT LEVEL OF DEMAND SIDE ACTIVITY IN WEST VIRGINIA AND THE PJM AREA IS IDENTIFIED IN THIS EIA INFORMATION**?

A. A number of PJM utilities did not report this data in any form to EIA. This suggests that demand side activity, spending and achievements were insignificant for those utilities. For those PJM utilities that did provide demand side data to EIA Potomac Electric Power Company is typical. Despite 2005 sales of 14.6

---

[19] The estimate of 1500 peak MW was based on assumed 600,000 three ton air conditioners operating at 1.0 kW/ton and utilizing an assumed peak coincidence factor of 85%. The use of West Virginia coincidence factors and prevailing kW/ton equipment ratings will likely produce an estimate of air conditioning load greater than 1500 MW.

[20] See page 42 of the Allegheny filing with the Maryland PSC included in TrAILCo's response to Sierra Club 's Fourth Discovery Request.

million MWh Potomac Edison reported zero energy reductions resulting from demand side programs[21].

Q. WHAT ARE THE CUSTOMER SIZE REQUIREMENTS FOR PARTICIPATION IN THE PJM DEMAND RESPONSE PROGRAMS AVAILABLE TO ALLEGHENY CUSTOMERS?

A. The minimum kW requirement to participate in the Generation Buy Back program is 300 kW. The minimum kW requirement to participate in the PJM Load Response program is Back 100 kW. Participation in the PJM ILR program requires that the customer have the ability to drop load upon request from PJM.

Q. WHAT IS THE TOTAL PEAK LOAD OF ALLEGHENY CUSTOMERS THAT EXCEED 100 KW AND ARE THUS ELIGIBLE FOR PARTICIPATION IN THE GENERATION BUY BACK AND LOAD RESPONSE PROGRAMS? WHAT WERE THE ACHIEVEMENTS OF THESE PROGRAMS IN 2006?

A. The total peak load of Allegheny customers with peak loads greater than 100 kW was 3,409 in 2006. According to TrAILCo's response to SIERRA-V-INT-16 there was no MW reductions from the Generation Buyback program in 2006. A total of 14 large Allegheny customers participated in the PJM Load Response Program, producing a total peak load reduction of 399.4 MW. Thus, savings in this sector represents 11.7% of total large customer load.

Q. PLEASE DESCRIBE THE DEMAND PROGRAMS AVAILABLE TO ALLEGHENY CUSTOMERS WITH LESS THAN 100 MW IN PEAK LOAD. PLEASE DESCRIBE THE PARTICIPATION AND DEMAND SAVINGS ACHIEVED IN THESE CUSTOMER SECTORS.

A. Residential and business customers with less than 100 MW of peak load represented approximately 61% of total Allegheny Power 2006 peak load. However, despite the size of this sector TrAILCo's response to SIERRA-V-INT-20 confirms that no programs are currently producing peak load reductions for this class of customer. As discussed below this reflects the absence of DLC or equipment upgrade programs for end-uses that have high coincidence factors with system peak (eg air conditioning).

Allegheny Power – 2006 Peak Loads and Load Reductions		
Customer Sector	Peak Load (MW)	Demand Reduction
>100 MW	3409 MW	399 MW (11.7%)
<100 MW	5324 MW	0 MW (0%)
All Loads	8733 MW	399 MW (4.5%)

[21] See **EXHIBIT 8**, EIA demand side activity data in exhibit spreadsheet "DSM_05_EIA.xls.

Q. PLEASE DESCRIBE CURRENT DIRECT LOAD CONTROL EFFORTS WHICH ATTEMPT TO OBTAIN PEAK DEMAND REDUCTIONS FROM ALLEGHENY POWER'S APPROXIMATELY 684,000 RESIDENTIAL AIR CONDITONING UNITS.

A According to TrAILCo's response to SIERRA-V-INT-26, Allegheny Power conducted, in Pennsylvania, a DLC "Electricity Price Response Pilot Program" during the period 2001 to 2006. The maximum participation in the program during the period was 158 customers. Neither this program nor any other DLC program of its type appears to be available in to Allegheny Power residential customers in 2007.

Q. AS AN INDICATION OF REGIONAL DEMAND SIDE ACTIVITY LEVELS PLEASE IDENTIFY THE LEVEL OF DEMAND SIDE SPENDING FOR UTILITY OPERATED PROGRAMS AS REPORTED BY ALLEGHENY POWER IN 2006 IN ALL ITS RETAIL SERVICE TERRITORIES.

A. According to TrAILCo's response to SIERRA-V-INT-20 its total spending for both demand response and DSM programs in all service territories in 2006 was $4.04 million. This spending was roughly divided equally into contributions toward low income usage reduction (LIURP) and a Pennsylvania sustainable energy fund (WPPSEF). No MW or MWh savings appear to have been reported associated with these expenditures so they appear to have been primarily "educational" in nature.

Q. HOW DOES THIS LEVEL OF DEMAND SIDE SPENDING COMPARE WITH SPENDING LEVELS FOR UTILITIES WITH ACTIVE DEMAND REDUCTION AND DSM PROGRAMS?

A. Allegheny Power demand side spending is extremely limited in comparison with efforts of many other utilities. In many states demand side expenditures exceed 0.5% or 1.0% of total retail revenues. As cited in the earlier example of Massachusetts Electric, these programs also produce reportable and verified demand and energy savings.

Q. DID TRAILCO'S APPLICATION ADDRESS THE IMPLICATIONS OF DEMAND REDUCTIONS RESULTING FROM IMPROVEMENTS IN AIR CONDITIONING DEMAND PERFORMANCE OR DIRECT LOAD CONTROL OF THIS EQUPMENT? DID THE APPLICATION CONSIDER THE IMPLICATIONS ON THE NEED FOR THE TRAIL LINE RESULTING FROM ADOPTION OF A PJM FORWARD CAPACITY MARKET THAT INCLUDES SUBSTANTIAL DEMAND REDUCTIONS AS QUALTIFIED CAPACITY RESOURCES?

A. No. TrAILCo did not complete such an analysis of potential peak savings from air conditioning DLC or equipment efficiency upgrades. Nor did it complete an assessment of demand savings associated with improvements to any other end-use technologies.

Q. THE STATE OF VIRGINIA, AN AREA TO BE SERVED BY PROPOSED LINE, HAS RECENTLY ADOPTED A STATE ENERGY POLICY WITH AGGRESSIVE GOALS IN RESPECT TO REDUCING DEMAND GROWTH AND STATE ENERGY CONSUMPTION. MARYLAND AND PENNSYLVANIA ARE ALSO ADOPTING OR CONSIDERING ADOPTING SIMILAR DEMAND REDUCTION GOALS. CAN YOU DESCRIBE THE POSSIBLE IMPLICATIONS OF NEW STATE ENERGY POLICIES SUCH AS THESE FOR THE PROPOSED TRAIL PROJECT?

A. A precise estimate of the financial impact of reduced energy transfers to those states is well beyond the scope of this testimony. However, reduced demand for any "product" is normally associated with reduced revenue flows and weakened financial viability.

Q. AS YOU INDICATE, AGGRESSIVE DEMAND SIDE PROGRAMS IN SOME US STATES HAVE PRODUCED ANNUAL INCREMENTAL PEAK MW SAVINGS OF 1%. HAS TRAILCO ANALYZED THE IMPACT THAT THE IMPLEMENTATION OF THIS TYPE OF PROGRAM WOULD HAVE ON SYSTEM RELIABILITY OR THE ECONOMIC VIABILITY OF THE TRAIL LINE?

A. Despite that possibility that the widespread adoption of such demand reduction programs could reduce the demand for electricity transfers through the TrAIL line TrAILCo's response to SIERRA-IV-INT-9 was that "there have been no such studies performed by TrAILCo".

Q. CURRENTLY DEMAND GROWTH IN PJM IS PROJECTED TO BE APPROXIMATELY 1.5% PER YEAR. HAS TRAILCO ANALYZED THE POSSIBLE IMPACT ON THE NEED FOR RELIABILITY IMPROVEMENTS OR THE ECONOMIC VIABILTY OF THE TRAIL LINE IF PJM DEMAND GROWTH IS REDUCED BY DEMAND PROGRAMS TO BELOW THAT 1.5% LEVEL?

A. According to TrAILCo's response to Sierra-IV-INT-9. TrAILCo has not conducted such a scenario analysis of varying demand growth levels.

Q. HAS ALLEGHENY POWER OR ANY OF ITS AFFILIATES CONDUCTED ASSESSMENTS OF THE COSTS OR AVAILABILITY OF COST EFFECTIVE DEMAND SIDE RESOURCE POTENTIALS IN THE AREAS TO BE SERVED BY THE TRAILCO LINE?

A. According to TrAILCo's response to Sierra-IV-INT-9, Allegheny Power has not conducted formal assessments of total cost-effective Demand Side resource potentials (in MW & MWh)..

Q. IN YOUR OPINION, WHY ARE DEMAND REDUCTION STRATEGIES UNDER-UTILIZED IN WEST VIRGINIA AND THE PJM REGION?

There are a variety of reasons that demand response and demand side management programs are under-utilized in the region. Ultimately, I believe these "barriers" must be eliminated by regulators and other policy makers if electric reliability and reasonable electric costs are to be sustained.

1- The regional organization (PJM) responsible for system reliability has limited tools to stimulate reduced demand even in areas of transmission congestion.
2- Funding and/or cost recovery for demand reduction programs is often uncertain, absent or inadequate.
3- Regulators have not removed regulatory disincentives for utility programs that improve ratepayer energy efficiency.
4- Regulators have not established financial incentives for utility success in reducing demand and energy consumption.
5- Difficulties in establishing appropriate price signals to motivate changes in energy use for all customer sectors.
6- Demand program "cost effectiveness" is defined in such a way that many of these programs are discouraged.
7- Utilities and regulators are unaware of effective program and regulatory approaches applied in other regions.

Q. BEYOND THE PEAK DEMAND AND RELIABILTY BENEFITS DISCUSSED EARLIER, CAN YOU SUMMARIZE THE MAJOR REASONS WHEN EXPANDED DEMAND SIDE PROGRAMS WOULD SERVE THE PUBLIC INTEREST IN WEST VIRGINIA AND THE PJM REGION?

A. The following public interest objectives that will be served by accelerating the scale of demand side programs. Note that many of these specific benefits are substantiated by a number of recently released reports produced with extensive support of state regulators, federal agencies and a variety of electric utilities. Notable among these is **EXHIBIT 9**, the National Action Plan for Energy Efficiency, co-chaired by the President of the National Association of Regulatory Commissioners and the Chief Executive of Duke Power.

(a) DSM and DR promote the public interest by minimizing long term electric resource costs.

As is demonstrated in **<u>EXHIBIT 5</u>**, <u>The Virginia Energy Plan</u>**,** national utility experience with DSM programs establishes that aggressive programs are cost effective relative to most supply side resources. Nationwide, average levelized costs of utility DSM programs are approximately $0.03 to $0.04 per saved kWh, less than the levelized cost per kWh of recently proposed new coal generation[22].

(b) Demand Side Resources provide additional diversity benefits in a volatile energy environment

TrAILCo's proposal arrives at a time of highly volatile and uncertain fuel, environmental, and construction costs. Failure to anticipate these uncertainties by means of diversification and other strategies will likely shift a substantial portion of those risks to West Virginia ratepayers.

Currently, West Virginia' electricity portfolio is extraordinarily dependent on coal fired generation. According to the US Department of Energy in 2006 97.5% of the 93.8 million megawatt hours generated in the state were produced using coal as the primary fuel. This dependence on a single fuel asset has remained largely unchanged since 1990 when 97.6% of MWh were produced from coal. West Virginia currently has the sixth most carbon-intensive electric system in the US.[23]

On an individual level, a financial portfolio so heavily dependent on a single asset would clearly represent a high risk of exposure to a variety of risks. In the case of personal financial planning, the systematic mitigation of these risks would be largely achieved by means of portfolio diversification and other risk management strategies. West Virginia's high degree of dependence on coal presents a similar concentrated exposure to risks and requires a similar diversification. The development of significant DSM and DR resources in West Virginia is an essential step toward crucial energy diversification in the state.

In West Virginia, specific diversity benefits from DSR would include the following:

a) *DSR will reduce West Virginia's exposure to $C0_2$ regulatory risk.* Since DSM is an electric resource that reduces carbon emissions, an electric portfolio with sizable demand side resources will provide West Virginia with a hedge against future costs associated with power plant carbon emissions. Reducing the state's current high level of carbon intensity will also reduce

---

[22] This estimate is based on 2007 cost estimates for new coal generation presented to state regulators in Louisiana, Oklahoma, Florida and other venues. DSM costs per kWh are from the Virginia Energy Plan and a variety of other sources.

[23] See **<u>EXHIBIT 10</u>**, EERE, Table 5. Electric Power Industry Generation by Primary Energy Source, 1990 Through 2006 (Megawatthours)

ratepayer exposure to compliance costs associated with future greenhouse gas regulation.

b) *) DSR can defer the need for costly new generation.*

Although West Virginia currently has excess electric capacity available for export, increased exports via TrAIL and other new transmission capabilities will accelerate the need for the development of new in-state generation. Allegheny Power indicated in recent WVPSC "Smart Metering" hearings that appropriate demand reduction programs need to be developed with the objective of lowering peak demand, thereby “lowering the need for future capacity additions”[24].

Before implicitly agreeing to increased electricity exports West Virginia policy makers should be fully cognizant of the likely future costs of developing new in-state capacity. Unfortunately, construction costs associated with the development of such new generation capabilities are inflating at a rapid rate. Dramatic increases in international demand for electric capacity, associated engineered materials and other factors are continuing to drive capacity construction costs upward $3000 or more per kW.

A final issue here is the question of the degree to which electricity exports via the TrAIL project will result in increased utilization rate of existing West Virginia generation facilities. Is it possible that increased "wear and tear" on these facilities resulting from higher utilization rates will produce increased rates of component failure and/or higher operation and maintenance costs? Is it possible that increased capacity factors resulting from electricity exports will diminish the expected remaining lifetime of these plants and accelerate the need for their replacement by West Virginia ratepayers?

Although these are clearly important issues for West Virginia ratepayers, TrAILCo has been unresponsive to specific questions in respect to changes in capacity factor and utilization rates of West Virginia generation resulting from the proposed transmission project. As a result, no informed assessment of these issues can be made. We encourage the WVPSC to make a full investigation of these scenarios.

c) DSR will reduce wholesale electric costs, consumers’ electric bills and reduce the cost of operation of West Virginia businesses

[24] Smart Metering Hearings WV. Case No. 06-0708-E-GI, Initial Information Requests to Electric Utilities, Allegheny Power response to question #6.

As discussed elsewhere, The Brattle Group's report for the PJM MADRI states estimated reductions in whole costs of 5% to 8% resulting from a 3% curtailment.

Additional benefits for state ratepayers would be produced by DSM programs that promote ratepayer investments in high efficiency air conditioners, lighting, industrial process equipment and other end-use equipment. By permanently improving the energy efficiency of ratepayer homes and businesses, DSM of this type programs will reduce the energy bills and the costs of operation for West Virginians. As an example of what might be applied in the State, the 1,363 commercial and industrial customers who participated in National Grid's Massachusetts Electric DSM programs in 2005 saved a total of 76.7 million kWh. Over the lifetime of the DSM equipment installed in 2005 alone, these programs produced net benefits of approximately $57 million. 2005 residential net benefits were approximately $56 million[25]. See Exhibits.

d) *DSR Investments Have Reduced Risks of Asset Stranding.*

Unlike a power plant or transmission facility, if only 50% of a planned DSM program is completed, the MW and MWh resources from the measures installed will produce long term electric resources in rough proportion to ratepayer expenditures. On the other hand, if a new power plant or transmission project proves to be economically unviable it becomes virtually useless, resulting in a "stranded" liability for utility ratepayers or shareholders. Given the broad uncertainties in future electric demand and regulatory costs that may impact the economic viability of the TrAIL project, this issue should be thoroughly scrutinized by the WVPSC.

e) *Reduced In-State Peak Demand Reductions due to DSM may have economic value in the PJM Region or within proposed carbon regulatory systems.*

Elsewhere is this testimony I have estimated that a ten year commitment to demand reduction objectives would reduce peak demands by up to 14%. In addition to the reliability benefits associated with this level of peak demand reduction this scale of incremental capacity would become available for transfer and sale to out of state high demand growth areas such Northern Virginia and other PJM sectors. In fact, it is possible that the costs per kW of demand reduction may be less than the value of the resulting capacity on the wholesale market.

---

[25] See **EXHIBIT 1**, the 2005 Massachusetts Electric Annual Efficiency Report filed with state regulators in that state.

Q. YOU ARGUE THAT THE INCREASED UTILIZATION OF DEMAND SIDE RESOURCES MAY BE A PREFERED ALTERNATIVE TO THE DEVELOPMENT OF THE TRAIL LINE. WHAT SPECIFIC NEXT STEPS ARE NECESSARY IN ORDER TO FULLY ASSESS THE COMPARATIVE COSTS OF THIS ALTERNATIVE?

A. I believe that a request for additional information relating to this issue is a prudent and reasonable step for the Commission.

In particular, an accurate estimate of the costs and availability of demand side resources is essential in order to make an informed decision in respect to the need for the proposed TrAIL transmission line. Such an assessment is also a necessary first step toward the development of an informed and comprehensive state resource policy. I recommend that the Commission direct TrAILCo and its parent company Allegheny Power to promptly complete a thorough study of the economically achievable potential for demand and energy efficiency investments in the Allegheny Power service territory as well on a localized basis in capacity constrained areas of its system. This "DSM resource assessment" should be based on best practices in demand side program design, implementation and performance measurement as approved by state regulators in states with active and sizable DSM programs. As a further guide for the completion of this research I suggest the use of the objectives and methodologies as outlined in the recently published <u>Guide for Conducting Energy Efficiency Potential Studies</u>, produced with the support of the US Departments of Energy and the US Department of Environmental Protection. This publication, supported by the USEPA, USDOE and a number of US utilities, outlines a reasonable and achievable process by which TrAILCo could systematically estimate the availability of demand side resources in West Virginia.

It is essential that his assessment include a quantification of potential peak demand response resources including reasonable achievable participation levels in all PJM demand response programs as well as aggressive utility operated "load management" programs such as direct load control of air conditioners and other electric end-uses typically operating at system peak.

Q. YOU ALSO ARGUE THAT PENDING AND RECENTLY ENACTED STATE ENERGY POLICIES IN VIRGINIA AND ADJOINING OTHER STATES MAY IMPACT THE VIABILTY OF THE TRAIL LINE AND HAVE POTENTIAL IMPACTS ON WEST VIRGINIA RATEPAYERS. HOW CAN THE COMMISSION ADDRESS THIS UNCERTAINTY AND PROTECT THE INTERESTS OF RATEPAYERS IN THIS RESPECT?

A. I recommend that the Commission direct TrAILCo and its parent company Allegheny Power to complete an assessment of possible implications of likely demand reductions resulting from newly enacted energy policies promulgated in PJM states like Virginia and Pennsylvania. In particular, this assessment should a scenario analysis of the possible impacts of varying state and regional electric demand growth rates on the financial viability of the TRAIL line. The assessment should also identify how these diverse growth rates might affect TrAIL associated costs that would be the responsibility of West Virginia ratepayers.

Q. HOW WILL THE RESULTS OF DEMAND SIDE ASSESSMENTS AFFECT THE DEVELOPMENT OF THE TRAIL TRANSMISSION LINE?

A. The assessments outlined will enable the Commission to make a fully informed decision in respect to the appropriate least cost approach to providing low cost and reliable electric service in West Virginia. The assessments will clarify the elements crucial to a decision in respect to the TrAIL line: 1) the sufficiency of achievable demand reductions to produce needed reliability transmission improvements and 2) the relative cost of achieving these demand reductions in comparison to the costs of constructing and operating the TrAIL line.
If achievable demand reductions are inadequate and the comparative costs are high construction of the TrAIL line will be conclusively the appropriate choice for West Virginia. On the other hand, if the assessment demonstrates that potential demand savings are abundant and comparatively inexpensive the Commission may decide to further defer approval of the TrAILCo proposal

Q. FOLLOWING THE COMPLETION OF AN ASSESSMENT OF AVAILABLE DEMAND SIDE RESOURCES WHAT ARE THE NEXT STEPS TO DEVELOPING THESE RESOURCES IN THE STATE OF WEST VIRGINIA?

A. If the aggressive pursuit of demand side resources is determined to be in the best interests of West Virginia a variety of regulatory rules and mechanisms will require modification to ensure that demand side resources are effectively promoted, funded and incentivized. In the 2006 PSC hearing on Smart Metering Allegheny Power made the following recommendations in this respect:

"To devote greater attention to peak-load management, Allegheny Power recommends that the Commission adopt the following policies:

1. Allow the use of a public benefits charge for peak-load management as well as for energy efficiency programs;
2. Allow use of consumer education funds to pay for programs to educate consumers on the electricity market and fund peak-load management programs;
3. Allow the use of a public benefit charge funds to install equipment to facilitate real-time pricing and load control;
4. Provide distribution companies the flexibility to create price signals through the use of innovative rate designs;
5. Encourage and permit distribution companies the flexibility to establish pilot programs offering company-specific tariff services for special

metering devices and load-control equipment to enable customers to react to price signals; and,
6. Encourage the allocation of more low-income funds to peak-load management programs to enable low-income residential customers to pay for specialized equipment required to participate in peak-load"

While I don't necessarily agree with all of Allegheny's recommendations, they do underline the need for clear regulatory support and adequate funding for increased demand reduction programs. Without such support the availability of DSR resources will be limited In West Virginia.

As an important supplement to the above Allegheny Power recommendations I would suggest that, in addition, the WVPSC consider the establishment of financial incentives for utility demand and energy reduction improvements and the removal of financial disincentives that deter utility investments in the improved energy efficiency of their ratepayers. I am currently involved in a rule-making docket in the State of Oklahoma to develop demand side regulatory rules with these objectives in mind[26]. See exhibits for specific rule recommendations I have developed in that venue.

Q. DOES THE US DEPARTMENT OF ENERGY HAVE ANY SPECIFIC RECOMMENDATIONS FOR INCREASING THE SCALE OF DEMAND RESOURCES?

A. Yes. Pursuant to the requirements of the Energy Policy Act of 2005 the (**EXHIBIT 3**) produced a report entitled "Benefits of Demand Response in Electricity Markets and Recommendations for Achieving Them". In this document is a comprehensive list of recommendations for action by regulators, utilities and transmission organizations. Specific recommendations include some of the above suggestions as well additional ideas for large, medium and small electric customers. Included in the many recommendations are the following:

a) Traditional load management programs such as direct load control of residential and small commercial equipment and appliances (e.g., air conditioners, water heaters and pool pumps) with an established record of providing cost-effective demand response should be maintained or expanded.

b) State regulatory agencies and electric utilities should consider offering participants in load management programs "pay-for-performance" incentive designs, similar to those implemented by ISOs/RTOs and some utilities which include a certain level of payment to customer who successfully reduce demand when called upon to do so.

---

[26] Cause No. RM 200700007, Oklahoma Corporation Commission. "Initial Policy Assessment of Proposed Rules Governing Demand Programs in Oklahoma," pp. 10 – 30, Hale Powell

c)State regulatory authorities should provide cost recovery for demand response investments undertaken by distribution utilities.

Q. ARE THERE SPECIFIC DEMAND PROGRAM APPROACHES THAT SHOULD BE INVESTIGATED IN WEST VIRGINIA IN THE NEAR TERM?

A. As was discussed earlier in this testimony, air conditioning and space cooling represents a major element of peak electric load during system peak days. As a result, improvements in equipment efficiency, installation practices and equipment control will produce sizable peak MW savings benefits. Utilities around the US have adopted a variety of demand program models that attempt to capture these savings[27]. West Virginia utilities and regulators may want to commence consideration of the following approaches:

1) Financial incentive programs that encourage the purchase of high EER (peak demand rating) HVAC equipment for the residential and small commercial market.

2) Training programs that improve installation practices of HVAC equipment, yielding both demand and energy savings.

3) "Market transformation" programs jointly operated by utilities and air conditioning manufacturers to increase the "market share" of high efficiency cooling equipment.

4) Direct load control (DLC) of cooling equipment during periods of transmission congestion or high demand conditions.

5) Utility assistance with improved state building code requirements and enforcement with the objective of reducing equipment over-sizing and encouraging appropriate equipment installation practices.

In addition, I recommend that the Commission closely review the costs and benefits of the eight demand programs submitted to the Maryland PSC by Allegheny Power in October 2007. As indicated earlier in this testimony, Allegheny has estimated that these programs could produce high levels of peak savings at a reasonable cost. The joint consideration and adoption of these programs by Maryland and West Virginia might both reduce costs and increase the probability of successful implementation.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

---

[27] See www.mycoolsmart.com for an example of a multi-utility cooling program that pays incentives for high EER equipment as well as improved contractor installation practices.