BEFORE THE
PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Application Seeking Approval of Ohio Power Company's Proposal to Enter into an Affiliate Power Purchase Agreement for Inclusion in the Power Purchase Agreement Rider.	)))))))	Case No. 14-1693-EL-RDR

DIRECT TESTIMONY
OF
BRUCE BURCAT

On Behalf of the
Mid-Atlantic Renewable Energy Coalition

September 14, 2015

Q. Please state your name and business address.

A. My name is Bruce Burcat. My business address is 29 North State Street, Dover, Delaware.

Q. By whom are you employed and in what capacity?

A. I am employed by the Mid-Atlantic Renewable Energy Coalition as its Executive Director.

Q. Please provide a description of the Mid-Atlantic Renewable Energy Coalition.

A. MAREC is a nonprofit organization that was formed to help advance the opportunities for renewable energy development primarily in the region where the Regional Transmission Organization, PJM Interconnection, LLC ("PJM"), operates. MAREC's footprint includes the District of Columbia, Maryland, New Jersey, Delaware, Pennsylvania, Ohio, Virginia, West Virginia and North Carolina. MAREC's membership consists of wind developers, wind turbine manufacturers, service companies, nonprofit organizations and a transmission company dedicated to the growth of renewable energy technologies to improve our environment, boost economic development in the region and diversify our electric generation portfolio, thereby enhancing energy security. The primary areas of focus of MAREC are to work with state regulators to develop rules and supportive policies for renewable energy; provide education and expertise on the environmental sustainability of wind energy; and offer technical expertise and advice on integrating variable wind energy resources into the electric grid.

Q. Please describe your professional background.

A. I am an attorney with over twenty-five years' experience in the utility and energy regulatory fields. I am responsible for MAREC's efforts to promote the growth and development of renewable energy in its nine jurisdictions. I joined the Mid-Atlantic Renewable

Energy Coalition as its Executive Director in 2010 after serving for nearly fifteen years as the Executive Director of the Delaware Public Service Commission. In that capacity I was responsible for the major policy and technical positions taken by Commission staff in proceedings before the Commission. I was involved in all facets of utility regulation, including the restructuring of Delaware's electricity market and the reintroduction of integrated resource planning for Delaware's major electric utility. As part of the integrated planning process, Delaware's major electric utility was required to incorporate electricity generated from renewable resources into its long-term procurement plan. My office supervised the compliance by electric suppliers with the State's renewable portfolio standard. I was intricately involved in the two-year process that resulted in the first purchase power agreement in the United States for the energy generated from an offshore wind farm that will be located off the coast of Delaware. Prior to coming to the Delaware Commission, I was an attorney for the New Jersey Division of Rate Counsel. Before that position I served as a Senior Rate Attorney for General Waterworks Management and Service Company.

Q. Have you previously provided testimony in regulatory proceedings or testified before a legislative body?

A. In my position as Executive Director of MAREC, I provided pre-filed written testimony before the Public Utilities Commission of Ohio ("Ohio Commission") In the Matter of the Application of Ohio Edison Company, The Cleveland Electric Illumination Company and The Toledo Edison Company for Authority to Provide for a Standard Service Offer Pursuant to R.C. 4928.143 in the Form of an Electric Security Plan (Case No. 14-1297-EL-SSO). I have also provided written testimony related to integrated resource planning and the procurement of renewable energy through long-term contracts. In another proceeding before the Ohio

Commission, I provided testimony on the cost cap provision of Ohio's Alternative Energy Portfolio Standard. I have also testified before the Maryland Public Service Commission in its proceeding to approve the merger of Exelon Corporation and Constellation Energy Group Inc. I also recently testified as a witness in two of the Exelon/Pepco merger proceedings; one before the District of Columbia Public Service Commission and the other before the Maryland Public Service Commission having submitted pre-filed written testimony on behalf of MAREC in both matters.

I have also appeared before legislative committees in Ohio, Pennsylvania, New Jersey and Maryland to testify regarding legislation and issues concerning renewable energy policy. In my role as the Executive Director of the Delaware Commission, I testified before the Federal Energy Regulatory Commission on the impact of electric transmission congestion on the Delmarva Peninsula and had appeared numerous times before the Delaware House and Senate to respond to questions on proposed energy legislation and major energy issues facing the State.

Q. Please describe your educational background.

A. I am a graduate of the University of Delaware. I received my Juris Doctor degree from Rutgers University School of Law – Camden and a Masters in Law (LL.M) in Taxation from the Villanova University School of Law.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to address the Ohio Power Company's (The Company) application seeking approval of the Company's proposal to enter into a new affiliate power purchase agreement (PPA) between the Company and AEP Generation Resources, Inc.(the Application).

Q. What is the Company proposing in the Application?

A. In short, the Company is proposing to present a new affiliate PPA for inclusion in the PPA Rider originally proposed in Case Nos. 13-2385-EL-SSO, AEP Ohio's ESP III proceeding. The Application adds Cardinal Plant Unit 1, Conesville Plant Units 4, 5 and 6, Stuart Plant Units 1 through 4 and Zimmer Plant Unit 1 to the PPA proposal, which originally included just the costs associated with the Company's contractual entitlements related to the Ohio Valley Electric Corporation (OVEC) generating facility. The Company asks PUC to approve a life-of-unit PPA with AEP Generation Resources, Inc. (AEPGR). The PPA Rider would flow through customers on a non-bypassable basis and would be calculated as the net of all revenues accruing to the Company from sale of all products (energy, capacity, ancilliaries, etc.) into the PJM market less all costs associated with the generation. Together, these plants total 2,670 MWs (plus OVEC, which is the equivalent of 423 MWs per Company Witness Pearce).

Q. Do you believe the Company proposal is in the public interest?

A. I do not have a judgment on whether the proposal as specifically currently proposed is in the public interest. However, MAREC does regard long-term power purchase agreements as a vital component of well-functioning energy markets. MAREC also argues that the proposal can be improved by adding a competitive solicitation for approximately 1,000 MWs of fixed priced renewable energy to the supply proposed by the petitioners. My testimony will further explain our reasoning for this recommendation.

Q. Can you explain the importance of long-term power purchase agreements in energy markets?

A. Yes. Long-term contracts serve two essential functions in energy markets: (1) they enable project finance for new projects and assist in ensuring revenue adequacy for existing large generators, and; (2) they provide a hedge against volatile energy prices.

Q. Can you explain how long-term power purchase agreements enable project finance and assist in ensuring revenue adequacy for existing large generators?

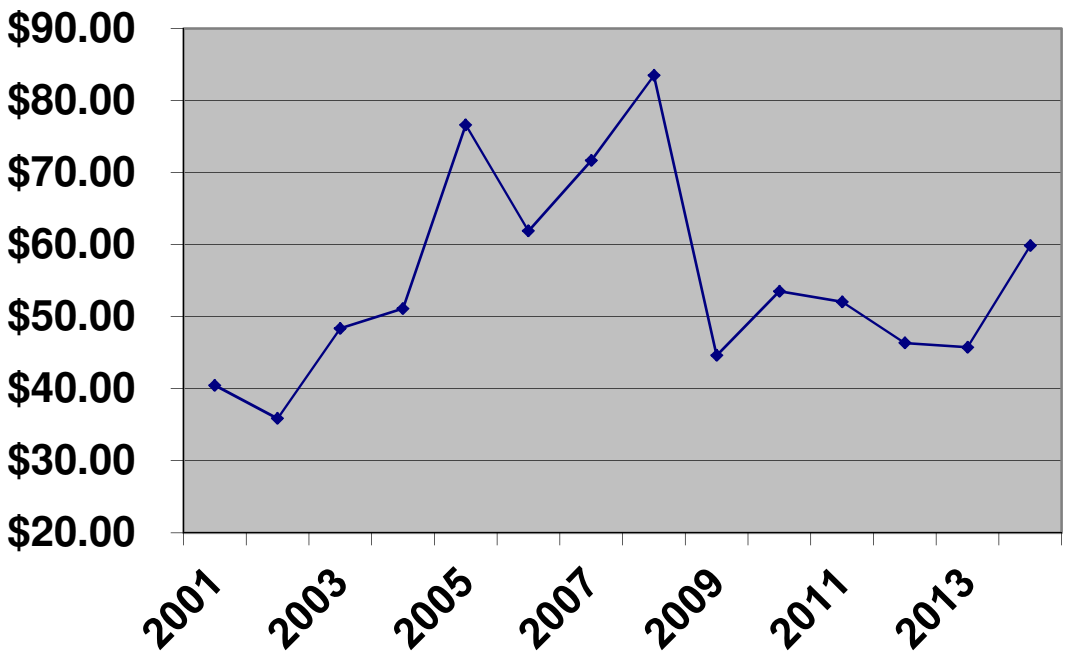
A. Yes. Energy markets require large-scale capital investments. Large-scale capital investments require large-scale financing. Large-scale financing requires some meaningful degree of certainty that adequate returns can be achieved. In fact, virtually the entire electricity system has been built based on government approved, long-term, guaranteed rates of return for just such reasons. This is still the case for the transmission and distribution system. However, electricity restructuring and wholesale regional power markets eliminated long-term, guaranteed rates of return for generation and introduced "electricity competition" at both the wholesale and retail levels. This fundamental change has not created a problem so long as new generation investments were not required and energy prices were high. However, the dearth of opportunities for long-term contracts and falling energy prices has created a lack of incentives both for new generation and concerns with revenue adequacy for existing generation. The latter problem is referred to as the "Missing Money" problem and has been attempted to be partly remedied by the creation of a wholesale capacity market by PJM.[1] The "Missing Money" problem arises, in short, because prices in energy markets reflect short-term variable costs, however, power generators must recover not only short-term variable costs, but long-term capital costs too in order to achieve revenue adequacy. As a result, short-term energy prices can fail to ensure revenue adequacy for power generators. Long-term power purchase agreements are a mechanism which enables project finance for large capital investments and which can help mitigate revenue adequacy challenges facing existing power generators.

[1] Resource Adequacy Mandates and Scarcity Pricing ("Belts and Suspenders")(February 23, 2006) Comments to the Federal Energy Regulatory Commission, Docket Nos. ER05-1410-000 and EL05-148-000. http://www.hks.harvard.edu/fs/whogan/Hogan_PJM_Energy_Market_022306.pdf

Q. Can you explain how long-term power purchase agreements provide a hedge against energy price volatility?

A. The following chart demonstrates wholesale power prices from 2001 until the middle of July 2014. The graph line represents the average annual price at the PJM West trading hub, the predominant wholesale trading hub for Ohio and other parts of PJM.

PJM West Average Annual LMP
2001-2014



As the graph demonstrates, wholesale energy prices are exceedingly volatile from year to year. Relying on short-term wholesale prices to set retail electricity rates will subject electricity consumers to significant price volatility. Long-term power purchase agreements are an effective mechanism to protect electricity consumers from this phenomenon. As a matter of public policy, it seems prudent that some part of the energy portfolio should be based on stable, fixed rates to mitigate potential energy price shocks.[2]

[2] Data from the Energy Information Administration. http://www.eia.gov/electricity/wholesale/index.cfm

Q. Do you consider long-term contracts to be a "market-mechanism?"

A. Yes. In my experience, it appears that electricity sector regulators and policy-makers have associated "market prices" with short-term or spot market energy prices only. However, this thinking belies the reality that the long-term cost of capital investments, plus the marginal cost of fuel set energy prices over the long-run. As a result, electricity sector regulators and policy-makers do a potential disservice to electricity customers by focusing only on short-term or spot market mechanisms in setting prices.

Short-term and spot market energy prices result from the short-term or spot market supply and demand balance for the marginal fuel. This price completely ignores the long-term cost of a capital investment (as discussed above) and the risks inherent in marginal fuel price volatility in long-term electricity price formation. Undoubtedly, short-term and spot market prices can send a "false" signal to electricity sector regulators and policy-makers leading them to promote market structures which may select energy resources and fuels that while cost effective today will not be so in the future.

The best ways to mitigate this risk it to include some competitively sourced, fixed-price, long-term contracts in the energy portfolio. Comparing fixed, long-term prices over a given term is the only true apples to apples comparison of the true long-term costs of energy. A market mechanism for comparing the long-term costs of electricity associated both with the cost of capital investments and fuel price volatility risk does not truly exist in any restructured electricity market to my knowledge. A competitively sourced, fixed priced, long-term market mechanism would be a major market innovation which could offer significant price protection for Ohio's electricity consumers.

Q. Are any of the power plants proposed as part of the Application subjected to fuel price volatility?

A. Yes. All of the plant units are exposed to coal-price fluctuations.

Q. Do other long-term risks besides price volatility and potentially rising marginal fuel costs potentially threaten price stability for Ohio's electricity consumers?

A. Yes. There are several important Environmental Protection Agency ("EPA") rules which could substantially change the mix of electricity resources on which Ohio relies for its power. The most notable are the Mercury Air Toxics Standard ("MATS") and the Clean Power Plan ("CPP").

Q. Can you describe the Mercury Air Toxics Standard and its potential impact on Ohio?

A. MATS regulates mercury emissions from power plants. According to EIA "between 2012 and 2020, about 60 gigawatts of coal-fired capacity is projected to retire in the AEO2014 Reference Case, which assumes implementation of the MATS standards, as well as other laws and regulations."[3] It is conceivable that some of these retirements will be in Ohio. The U.S. Supreme Court recently rejected the MATS standards, finding that the EPA did not properly consider the costs of emissions reductions when making its decision. The regulation is remanded to the D.C. Circuit, where next steps will be determined. The decision is expected to have little impact since a) power companies have already largely complied with the regulation and b) the decision does not vacate the rule, it only remands the rule for further consideration (that is, EPA's authority to regulate mercury is intact).

Q. Can you describe the Clean Power Plan and its potential impact on Ohio?

[3] http://www.eia.gov/todayinenergy/detail.cfm?id=15491

A. The Clean Power Plan regulates carbon dioxide emissions from coal plants. The recently released Final Clean Power Plan sets interim targets for carbon dioxide reductions beginning in 2022 and a final target in 2030. To meet the goals, EPA recommends that states use three different "building blocks:" (1) coal-plant efficiency uprates; (2) coal to natural gas conversions, and; (3) renewable energy. States are given maximum flexibility, including using mechanisms not included in the building blocks, to achieve the targets set by EPA in the CPP. Among many other possibilities, potential relevant implications for Ohio for this testimony include the need for additional renewable energy investments.

Q. Do any of the power plants included in the Application emit meaningful levels of carbon dioxide?

A. Yes. According to EPA eGRID data the Cardinal 1 unit emits 2,016 lbs of carbon dioxide per MW (lbs/MWh), Conesville units emit 2,179 lbs/MWh, the Stuart units emit 2,136 lbs/MWh and the Zimmer unit 1,874 lbs/MWh.[4]

Q. How do these emissions compare to the targets in the CPP?

A. They are much higher. Ohio's interim CPP goal is 1,501 lbs/MWh and its final CPP goal is 1,190 lbs/MWh.[5]

Q. Do options exist to offset some of AEPGR plant emissions so that they can continue to operate while the state strives to meet its CPP requirements?

[4] http://www.epa.gov/cleanenergy/energy-resources/egrid

[5] Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Plants. Environmental Protection Agency. 40 CFR Part 60. P. 842., http://www2.epa.gov/cleanpowerplan/clean-power-plan-final-rule

A. Yes. Renewable energy investments are one way to offset emissions coal power generation. These investments can enable the dual objective of enabling the AEPGR plants to operate while still meeting the CPP requirements.

Q. What are the implications of these EPA rules for the Application?

A. Although MATS is currently remanded to the D.C. Circuit and the CPP will certainly be subject to legal challenges, if these rules are finalized they present a challenge for Ohio's electricity system which will likely require additional investments in renewable energy in order to meet the CPP goals and to provide additional replacement energy for any coal units retired under MATS. The Application does not account for any potential impacts from these proposed environmental rules and as demonstrated above the AEPGR plants produce significant carbon dioxide emissions.

Q. Are there any ways in which Application could be improved?

Yes. The Application should include competitively sourced, fixed price, long-term contracts with renewable generators to match a meaningful portion of the electricity supply proposed to be contracted by the Company. MAREC identifies two reasons this is prudent: (1) Renewable energy is the only form of energy which can offer a guaranteed, long-term fixed price because renewable energy is not subject to fuel price volatility, and; (2) renewable energy sources can effectively offset carbon emissions from the AEPGR plants.

Q. Are you suggesting that renewable supply contracts should replace the generation supply proposed by the Company's Application?

No. MAREC recommends that renewable supply contracts should complement the power plants in the Application. The renewable supply contracts should be in addition to those proposed by the Company.

Q. Why would long-term power purchase agreements with renewable energy sources improve the Application?

A. As will be described further below, as proposed, the renewable supply contracts will provide electricity consumers with competitively procured, long-term, fixed-priced contracts that will be cheaper than the price of the contracts in the Application, will not subjects Ohio's electricity consumers to marginal fuel price volatility, and will offset carbon dioxide emissions to prepare for CPP implementation.

Q. What should be the term and volume of the long-term renewable supply contracts added to the Application?

A. The term should be life-of-plant; the equivalent of the contract length proposed in the Application.

The volume of renewable energy contracts should be 3,100,000 MWh annually. This is equivalent of approximately 1,000 MWs of new wind energy. By our calculations (contained in Attachment 1) this amount would offset approximately 50% of the carbon dioxide emissions necessary to offset the carbon emission from the plants necessary to bring the state into compliance with the interim CPP goal.

Q. Should there be a "cap" on the maximum price for renewable energy sources procured as part of the Application?

A. Yes. Renewable supply contacts should only be engaged in if they are cheaper than the average, levelized price of the contracts proposed in the Application.

Q. Are there enough renewable resources to cost-effectively achieve MAREC's recommendation?

A. Yes. There are currently 11 permitted wind farms in Ohio totaling the potential for 1,401 MWs. Additionally, the Final CPP contemplates that states will be able to procure out-of-state renewable energy to meet their CPP goals. The exact means of doing so will be more defined by the states and could require coordination with other states. For example, under the Final CPP, there is a model plan that could be adopted by the state to allow trading, or trading can occur is the mechanism if similar to other states (not necessarily a multi-state plan), or if the state implementation plans include similar transparent and confirmed means to demonstrate that a state load-serving entity is taking "ownership" of out-of-state renewable energy. Such a demonstration may likely include a power purchase agreement with an out-of-state renewable energy generator.

Q. To further enhance the economic development benefits of the Application outlined by the Company can you describe the general economic development benefits of adding approximately 1,000 MWs of Ohio wind energy to the Application?

A. Adding 1,000 MWs of Ohio wind energy to the Application would have significant local economic benefits including approximately the following for rural host communities:

- $9,000,000 in annual local tax payments ($180 million over the projects' lifetime)
- $5,000,000 in local landowner payments ($100 million over the projects' lifetime)
- 1,700 temporary construction jobs
- 60 permanent jobs

Q. Is it your contention that 1,000 MWs of wind energy (or other renewables) could be added to the Application for less than the cost of the proposed coal plants on a levelized per

MWh basis while providing the additional economic development benefits listed above if Ohio wind farms are the source of the renewable energy?

A. Yes.

Does this conclude your testimony?

A. Yes.

CERTIFICATE OF SERVICE

The Public Utility Commission of Ohio e-filing system will electronically serve notice of the filing of this document on the parties referenced in the service list of the docket card who have electronically subscribed to this case. In addition, the undersigned certifies that a courtesy copy of the foregoing document is also being served upon the persons below via electronic mail this 14th day of September, 2015.

/s/ Terrence O'Donnell
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Attachment 1

Application for PPA
111d Implications
AEP Ohio Proposal

Plant Name	Total
MW	2,671
Capacity Factor (average)	57.63%
Generation MWh	13,171,779
CO2 lbs/MWh (average)	2,108.14
Total CO2 Emissions	27,313,758,951
Final EPA Goal (lbs/MWh)	1,190
Required Reductions	11,639,342,355
Ohio CO2 System Average (lbs/MWh) per EIA	1,900
Required Replacement Zero Emissions (MWh)	6,125,970
Wind Capacity Equivalent	1,998
Required Additional Zero Emissions (MWh)	9,780,960
Wind Capacity Equivalent	3,190

Total CO2 Emissions	Required Reductions
27,313,758,951	11,639,342,355

Total Generation AEPGR and 1000 MW of Wind	Total Generation AEPGR and 2000 MW of Wind
16,234,763	19,297,748

CO2 Emissions lbs/MWh w/1000 MW of Wind	CO2 Emissions lbs/MWh w/2000 MW of Wind
1,682	1,415

CO2 Emissions lbs/MWh w/3000 MW of Wind
1,221

* Generation deduced by applying eGrid 09 capacity factor to AEP's capacity ownership share

** CO2 emission rate from eGrid 09

*** Final EPA Goal from EPA Clean Power Plan Draft Rulemaking

**** Ohio CO2 Emissions Average from EIA Ohio Electricity Profile

Application for PPA
111d Implications
AEP Ohio Proposal

Plant Name	Cardinal 1
MW	592
Capacity Factor	66.85%
Generation MWh	3,466,788
CO2 lbs/MWh	2,016.29
Total CO2 Emissions	6,990,049,009
Final EPA Goal (lbs/MWh)	1,190
Required Reductions	2,864,571,860
Ohio CO2 System Average (lbs/MWh) per EIA	1,900
Required Replacement Zero Emissions (MWh)	1,507,669
Wind Capacity Equivalent	492
Required Additional Zero Emissions (MWh)	2,407,203
Wind Capacity Equivalent	785

* Generation deduced by applying eGrid 09 capacity factor to AEP's capacity ownership share

** CO2 emission rate from eGrid 09

*** Final EPA Goal from EPA Clean Power Plan Draft Rulemaking

**** Ohio CO2 Emissions Average from EIA Ohio Electricity Profile

Application for PPA
111d Implications
AEP Ohio Proposal

Plant Name	Conesville 4-6
MW	1,149
Capacity Factor (average)	40.1%
Generation MWh	4,156,863
CO2 lbs/MWh	2,179.08
Total CO2 Emissions	9,058,136,268
Final EPA Goal (lbs/MWh)	1,190
Required Reductions	4,111,469,712
Ohio CO2 System Average (lbs/MWh) per EIA	1,900
Required Replacement Zero Emissions (MWh)	2,163,931
Wind Capacity Equivalent	706
Required Additional Zero Emissions (MWh)	3,455,016
Wind Capacity Equivalent	1,127

* Generation deduced by applying eGrid 09 capacity factor to AEP's capacity ownership share

** CO2 emission rate from eGrid 09

*** Final EPA Goal from EPA Clean Power Plan Draft Rulemaking

**** Ohio CO2 Emissions Average from EIA Ohio Electricity Profile

Application for PPA
111d Implications
AEP Ohio Proposal

Plant Name	Stuart 1-4
MW	600
Capacity Factor (average)	63.0%
Generation MWh	3,308,915
CO2 lbs/MWh	2,136.43
Total CO2 Emissions	7,069,264,846
Final EPA Goal (lbs/MWh)	1,190
Required Reductions	3,131,656,234
Ohio CO2 System Average (lbs/MWh) per EIA	1,900
Required Replacement Zero Emissions (MWh)	1,648,240
Wind Capacity Equivalent	538
Required Additional Zero Emissions (MWh)	2,631,644
Wind Capacity Equivalent	858

* Generation deduced by applying eGrid 09 capacity factor to AEP's capacity ownership share

** CO2 emission rate from eGrid 09

*** Final EPA Goal from EPA Clean Power Plan Draft Rulemaking

**** Ohio CO2 Emissions Average from EIA Ohio Electricity Profile

Application for PPA
111d Implications
AEP Ohio Proposal

Plant Name	Zimmer
MW	330
Capacity Factor	77.46%
Generation MWh	2,239,214
CO2 lbs/MWh	2,874.01
Total CO2 Emissions	4,196,308,828
Final EPA Goal (lbs/MWh)	1,190
Required Reductions	1,531,644,549
Ohio CO2 System Average (lbs/MWh) per EIA	1,900
Required Replacement Zero Emissions (MWh)	806,129
Wind Capacity Equivalent	263
Required Additional Zero Emissions (MWh)	1,287,096
Wind Capacity Equivalent	420

* Generation deduced by applying eGrid 09 capacity factor to AEP's capacity ownership share

** CO2 emission rate from eGrid 09

*** Final EPA Goal from EPA Clean Power Plan Draft Rulemaking

**** Ohio CO2 Emissions Average from EIA Ohio Electricity Profile

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Summary: Testimony electronically filed by Terrence O'Donnell on behalf of Mid-Atlantic Renewable Energy Coalition