

**BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO**

In the Matter of the Long-Term Forecast	)	
Report of Ohio Power Company and Related	)	Case No. 18-501-EL-FOR
Matters.	)	
 In the Matter of the Application Seeking	)	
Approval of Ohio Power Company's	)	
Proposal to Enter Into Renewable Energy	)	Case No. 18-1392-EL-RDR
Purchase Agreements for Inclusion in the	)	
Renewable Generation Rider.	)	
 In the Matter of the Application of Ohio	)	Case No. 18-1393-EL-ATA
Power Company to Amend its Tariffs.	)	

**DIRECT TESTIMONY OF FRANK LACEY
ON BEHALF OF DIRECT ENERGY, L.P.**

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**Direct Testimony of
Frank Lacey**

I. INTRODUCTION

Q1. PLEASE INTRODUCE YOURSELF.

A1. My name is Frank Lacey. I am the founding partner and president of Electric Advisors Consulting, LLC. My business address is 3 Traylor Drive, West Chester, PA 19382.

Q2. ON WHOSE BEHALF ARE YOU TESTIFYING?

A2. I am testifying on behalf of Direct Energy, LP.

Q3. PLEASE DESCRIBE DIRECT ENERGY'S BUSINESS.

A3. Direct Energy, L.P. is a subsidiary of UK-based energy company Centrica PLC. Direct Energy, LP and various affiliates provide retail electricity and natural gas to more than four million residential, small commercial and large commercial and industrial customers throughout North America, including the service territory of AEP Ohio. Affiliates of Direct Energy, LP also offer a number of non-commodity products and services, such as on-site generation (including on-site renewable and solar energy options) demand response, electric storage resources, enhanced usage analytics, and other advanced energy management solutions. Direct Energy Solar has installed over 9,000 solar installations across 15 states, including Ohio. For clarity and convenience, my testimony refers to Direct Energy, LP and its subsidiaries and affiliates collectively as "Direct Energy" or "Direct."

Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A4. My testimony addresses AEP Ohio's request of the Commission to find that there is a need for at least 900 MW of additional renewable energy resources in Ohio. I conclude that the current and planned portfolio of renewable energy located in Ohio or deliverable into Ohio is sufficient to satisfy the legal, economic, and operational requirements of

1 electric utilities and competitive retail electric suppliers. The addition of at least 900 MW
2 of additional renewable capacity is not needed. Forcing ratepayers to fund this level of
3 unnecessary renewable capacity would adversely affect the competitive market, to the
4 detriment of non-utility suppliers as well as consumers.

5 **Q5. HOW IS YOUR TESTIMONY ORGANIZED?**

6 A5. Part II of my testimony addresses my background and qualifications. Part III explains
7 AEP Ohio's obligation to supply electricity to SSO customers and how it meets this
8 obligation. Part IV explains Ohio's renewable portfolio standard and the availability of
9 renewable energy sited in or deliverable into Ohio. Part V addresses AEP Ohio's long-
10 term forecast report. Part VI explains why AEP Ohio has failed to support its claim that
11 additional renewable energy resources should be built in its service territory and operated
12 by AEP Ohio.

13 **II. BACKGROUND AND QUALIFICATIONS**

14 **Q6. PLEASE SUMMARIZE YOUR EDUCATION AND WORK EXPERIENCE.**

15 A6. I hold a Bachelor of Science degree in Transportation and Logistics from the University
16 of Maryland and a Master of Science in Industrial Administration with concentrations in
17 finance and environmental management from the Tepper School of Business at Carnegie
18 Mellon University. I have worked in the electric power industry for approximately 25
19 years, beginning immediately after earning my graduate degree. I have worked on major
20 industry restructuring issues including generation asset divestiture, with a specialization
21 in environmental asset valuation; stranded cost valuations; transmission restructuring
22 including the development of Independent System Operators ("ISOs"), Regional
23 Transmission Organization ("RTOs") and other independent transmission entities; the
24 development of retail energy markets; and the development of demand response markets.

1 Early in my career, I was employed as a consultant to industry participants, first by
2 Putnam, Hayes & Bartlett, Inc. and then by Arthur Andersen Business Consulting. Within
3 the industry, I have worked for Strategic Energy, a retail electricity supplier, Direct
4 Energy, a retail energy supplier that acquired Strategic Energy in 2008, and most
5 recently, Comverge, Inc. and CPower, two companies that shared a common owner and
6 provide demand response services to residential and to commercial & industrial (“C&I”)
7 customers, respectively. I created Electric Advisors Consulting LLC in the fall of 2015.
8 As a consultant, I provide policy- and market-related consulting services to advanced
9 energy management companies and end-use customers. My resume is provided as
10 Exhibit FL-1.

11 **Q7. ARE YOU A MEMBER OF ANY PROFESSIONAL ASSOCIATIONS?**

12 A7. I am a founding member and the current Chairman of the Advanced Energy Management
13 Alliance (“AEMA”), a trade association dedicated to advancing market opportunities for
14 demand response and distributed energy resources. I recently served as a member of the
15 board of directors of the Smart Electric Power Alliance (“SEPA”), a trade association
16 with more than 1,000 members including utilities, distributed resource providers and
17 related service providers. My tenure on that board expired in December 2018. Prior to
18 their dissolutions in 2015, I served on the board of directors of the Association for
19 Demand Response and Smart Grid and the Demand Response and Smart Grid Coalition. I
20 also served on the board of directors of the Electric Reliability Council of Texas
21 (“ERCOT”), the grid operator in Texas, from 2002 to 2004.

1 **III. AEP OHIO’S SUPPLY OBLIGATION**

2 **Q8. DOES AEP OHIO HAVE A DEFAULT SERVICE OBLIGATION?**

3 A8. Yes. AEP Ohio is required to maintain a “standard service offer” or SSO to all customers
4 within its certified service territory.

5 **Q9. DOES AEP OHIO OWN GENERATION FACILITIES?**

6 A9. No. AEP Ohio divested its generation assets after retail competition was introduced in
7 Ohio. Now that electric generation is a competitive service, customers may receive their
8 electric supply from AEP Ohio under the SSO, or from any certified retail electric service
9 (CRES) provider. AEP Ohio still has an obligation to supply and deliver electricity, but it
10 no longer has an obligation to generate electricity.

11 **Q10. HOW DOES AEP OHIO MEET ITS OBLIGATION TO SUPPLY ELECTRICITY**
12 **TO SSO CUSTOMERS?**

13 A10. As Mr. William Allen explains, “[t]he Company procures energy and capacity for its
14 SSO customers by conducting a competitive auction several times a year, in which
15 potential suppliers bid to provide tranches of the SSO load.”¹

16 **Q11. WHERE DO SUCCESSFUL BIDDERS IN THE SSO AUCTIONS OBTAIN**
17 **GENERATION?**

18 A11. Electricity delivered by AEP Ohio to retail customers is generated at plants located
19 throughout the PJM Interconnection, LLC (“PJM”) region. Generally, these plants are
20 owned by vertically-integrated utilities, affiliates of regulated utilities, merchant
21 generators, or government entities. These generators sell the output of their plants in the
22 wholesale market, where it is purchased by SSO providers or CRES and resold to retail
23 customers.

¹ Direct Testimony of William A. Allen (Allen Direct) at 8:13-15.

1 **Q12. WHAT IS PJM?**

2 A12. PJM is a regional transmission organization that coordinates the transmission of
3 electricity across all or parts of 13 states and the District of Columbia. PJM also
4 administers a wholesale electricity market. Additionally, PJM engages in various forms
5 of resource planning to ensure that sufficient generating capacity exists to meet the needs
6 of the region, which includes Ohio. AEP Ohio is a member participant of PJM.

7 **Q13. HOW DOES PJM ENSURE THAT SUFFICIENT CAPACITY EXISTS TO MEET**
8 **DEMAND IN THE REGION?**

9 A13. PJM members, including AEP Ohio, are bound by an Operating Agreement (“OA”),
10 Reliability Assurance Agreement (“RAA”) and Open Access Transmission Tariff
11 (“OATT”). The purpose of the RAA is to “ensure that adequate Capacity Resources,
12 including planned and Existing Generation Capacity Resources, planned and existing
13 Demand Resources, and Energy Efficiency Resources will be planned and made available
14 to provide reliable service to loads within the PJM Region, to assist other Parties during
15 Emergencies and to coordinate planning of such resources consistent with the Reliability
16 Principles and Standards.”²

17 **Q14. DOES ANYONE REGULATE PJM?**

18 A14. Yes. PJM is regulated by the Federal Energy Regulatory Commission (“FERC”). FERC
19 oversees PJM’s reliability assessments and capacity procurement to ensure that these
20 activities are performed in accordance with PJM’s rules, tariffs and agreements. FERC
21 also hears complaints regarding PJM’s activities.

² An excerpt of the Reliability Assurance Agreement is attached as Exhibit FL-6. The complete agreement is 251 pages.

1 **Q15. HAS PJM SUCCEEDED IN ENSURING THE AVAILABILITY OF SUFFICIENT**
2 **CAPACITY?**

3 A15. Yes. PJM has used its forward capacity market and all of the tools and calculations that
4 go into determining resource need effectively. PJM procures generation resources,
5 including a reserve margin, three years forward of the forecasted need. The generation
6 resources can be renewable, traditional fossil, nuclear or demand resources. PJM levies
7 financial penalties against a capacity resource that fails to be available when called upon.
8 PJM allows for “Planned” resources to participate in its capacity auctions, allowing a
9 developer to determine if there is an economic need before it constructs its facility. Funds
10 from the capacity auction can be used to help finance the development of the facility. In
11 addition, the FERC is currently evaluating stakeholders’ comments in FERC Docket Nos.
12 RM18-9-000 and AD18-10-000 on FERC’s proposed rules that would allow distributed
13 energy resources to participate in the wholesale energy markets. If FERC moves forward
14 with its proposed rules on distributed energy resources, it will add to the resources in, and
15 the resilience of, the market.

16 **Q16. HAS PJM DETERMINED WHETHER CAPACITY RESOURCES IN THE**
17 **REGION ARE SUFFICIENT TO MEET FUTURE NEEDS?**

18 A16. Yes. PJM recently released the results of a fuel security study that it conducted. A
19 summary of the results of the study is attached as Exhibit FL-2. In the study, “PJM
20 looked five years into the future, using a 2023/2024 system model, to analyze more than
21 300 different scenarios ranging from typical operations to extreme scenarios, considering
22 elements like generation retirements, customer demand, fuel delivery and fuel
23 disruptions.”³ Its study showed that in a “14-day period of cold weather with typical

³ *Id.* at 1.

1 winter load and generation retirements announced as of Oct. 1, 2018, PJM's system can
2 withstand an extended period of stress while remaining reliable. Even in an extreme
3 scenario, such as an extended period of severe weather combined with high customer
4 demand and a fuel supply disruption, the PJM system would still remain reliable.”⁴ PJM
5 stated that its system would be “reliable under all but the most extreme scenarios.” The
6 extreme scenarios it analyzed included one in which over 32,000 MW of capacity was
7 retired and replaced with less than 17,000 MW. The other extreme scenario it analyzed
8 was one in which almost 16,000 MW were retired, and no replacement capacity came
9 back into the market. Market forces would indicate that neither of these scenarios is
10 likely.

11 **Q17. WHAT FACTORS INFLUENCE WHETHER GENERATION FACILITIES ARE**
12 **BUILT OR RETIRED WITHIN PJM?**

13 A17. The decision to build or retire generation is driven by market economics. Under
14 “traditional” cost-based regulation, vertically-integrated utilities had a financial incentive
15 to build more generation than needed. So long as regulators authorized cost recovery of
16 new generation resources, it did not really matter whether or how often these plants ran.
17 Utilities acted on this incentive during the 1970s and 1980s, resulting in the construction
18 of more generation resources than needed. Excess generation capacity led to the
19 development of wholesale markets in the 1990s. This allowed utilities with too much
20 generation to more easily sell energy to utilities with too little, alleviating the need to
21 build even more generating plants. Supply and demand now dictate when to build or
22 retire generation.

⁴ *Id.*

1 **Q18. HOW DO MARKET PARTICIPANTS ASSESS SUPPLY AND DEMAND?**

2 A18. PJM has created tools to send market participants price signals that aid in assessing
3 market conditions. Among others, PJM holds annual capacity auctions, posts day-ahead
4 and real-time hourly energy clearing prices and quantities and ancillary service prices.
5 PJM also provides transparency into the generation development and interconnection
6 queue, allowing developers to better understand the current and future competitive
7 landscape. If a developer believes it can build generation and make money, it will do so.
8 Thus, what cost-based regulation once tacitly encouraged—building excess capacity—is
9 now punished in competitive markets.

10 **Q19. DOES AEP OHIO'S RELIANCE ON PJM FOR CAPACITY PLANNING PUT**
11 **OHIO CUSTOMERS AT RISK?**

12 A19. No. AEP Ohio gives no indication that PJM is not up for the task. Moreover, the State of
13 Ohio is not entirely beholden to PJM if unforeseen factors negatively impact wholesale
14 markets or the availability of capacity. R.C. 4928.143(B)(2)(b) and (c) allow the
15 Commission to authorize a utility to institute a surcharge for a new generating facility if,
16 among other requirements, there is a “need” for the facility “based on resource planning
17 projections.” As indicated in its LTFR amendment filing, AEP Ohio “is not proposing to
18 alter the process through which it procures SSO supply through this Amended LTFR
19 filing. Nor is the Company proposing through this filing that it has a traditional integrated
20 resource planning (IRP) need for generation.”⁵ In other words, AEP Ohio acknowledges
21 that there is sufficient generating capacity within PJM to meet customer demand.

⁵ Amendment to the 2018 Long-Term Forecast Report of Ohio Power Company (Sept. 19, 2018) at 3.

1 **Q20. WHAT ARE “RESOURCE PLANNING PROJECTIONS”?**

2 A20. In the field of electric utility regulation, “resource planning” is often referred to as
3 “integrated resource planning,” and is a term that describes the process of identifying
4 energy and capacity resources available to serve current and future demand. Projections
5 of future load and the resources available to serve that load are typically the basis for
6 determining the “need” for additional generating capacity.

7 **Q21. WILL YOUR TESTIMONY BE ADDRESSING THE “NEED” FOR ANY**
8 **SPECIFIC GENERATING FACILITIES BASED ON “RESOURCE PLANNING**
9 **PROJECTIONS”?**

10 A21. No. I have been informed by counsel that the Commission will address this issue in a
11 subsequent phase of this proceeding. At this time, my testimony is limited to AEP Ohio’s
12 claim of a “generic” need for 900 MW of renewable generation in Ohio.

13 **IV. RENEWABLE RESOURCES**

14 **Q22. DOES OHIO HAVE A RENEWABLE ENERGY REQUIREMENT FOR**
15 **COMPANIES THAT SUPPLY ELECTRICITY TO CUSTOMERS?**

16 A22. It does. The requirements are contained in R.C. 4928.64 and apply to both electric
17 distribution utilities such as AEP Ohio and competitive suppliers such as Direct Energy.
18 The Ohio standard requires that 12.5 percent of electricity sold by a supplier must be
19 generated from renewable energy sources by 2027. At least 0.5 of the 12.5 percent must
20 come from solar sources. Suppliers who do not meet the standard are subject to
21 compliance payments.

22 **Q23. ARE SUPPLIERS REQUIRED TO OWN OR OPERATE THE FACILITIES**
23 **THAT SUPPLY THE ELECTRICITY USED TO MEET THE RENEWABLE**
24 **STANDARDS?**

25 A23. No. Suppliers may purchase renewable energy credits to meet the standard.

1 **Q24. WHAT IS A RENEWABLE ENERGY CREDIT?**

2 A24. A renewable energy credit or “REC” is a certification that indicates a purchaser paid for
3 the output of a renewable energy facility and that facility put renewable energy onto the
4 grid. One certificate is generated every time one megawatt hour of renewable energy is
5 produced.

6 **Q25. DOES THE STATUTE ADDRESS WHETHER THE RENEWABLE RESOURCES**
7 **MUST BE LOCATED IN OHIO?**

8 A25. The statute says that the renewable resources must be generated from facilities in Ohio or
9 deliverable into Ohio. Thus, whether a supplier obtains all or none of its renewable
10 resource requirement from within the state makes no difference for compliance purposes.

11 **Q26. ARE COMPETITIVE SUPPLIERS OFFERING RENEWABLE POWER IN**
12 **OHIO?**

13 A26. Yes. According to Ohio’s electricity shopping comparison website, CRES are offering
14 more than 45 different renewable electricity supply products in AEP’s service territory.⁶

15 **Q27. HAVE ENERGY SUPPLIERS HAD PROBLEMS MEETING THEIR**
16 **RENEWABLE ENERGY PORTFOLIO REQUIREMENTS?**

17 A27. No. According to the Commission’s most recent Renewable Portfolio Standard Report to
18 the General Assembly (“RPS Report”), all energy suppliers (including the utilities) were
19 in compliance and achieved their renewable goals for 2016. A copy of this report is
20 attached as Exhibit FL-3.⁷

⁶ See:
<http://energychoice.ohio.gov/ApplesToApplesComparision.aspx?Category=Electric&TerritoryId=2&RateCode=1>.

⁷ See: <http://dis.puc.state.oh.us/DocumentRecord.aspx?DocID=6a55c0fd-fec2-4af2-a0ed-f2920a0c1085>.

1 **Q28. ARE YOU AWARE OF ANY CONCERNS BEING RAISED ABOUT THE**
2 **ABILITY OF SUPPLIERS TO MEET THE RENEWABLE STANDARDS GOING**
3 **FORWARD?**

4 A28. No. The PUCO requires suppliers to submit a non-binding 10-year compliance plan. As
5 part of that plan, companies are asked to address perceived impediments to achieving
6 compliance with the renewable portfolio requirements. The PUCO summarizes these
7 plans in an annual report. The PUCO's report for 2015 indicates that no supplier reported
8 impediments to meeting future requirements. *See* Exhibit FL-4. The PUCO's 2016 report
9 states, "[m]ost of the companies either did not mention any perceived impediments or
10 mentioned that they believe there is a lack of perceived impediments in the near-term,"
11 but that "a few companies" cited "potential supply and pricing constraints."⁸ The report
12 offers no detail about who reported this concern or the validity of the concern. Nor are
13 any potential solutions for any perceived impediments identified.

14 **V. AEP OHIO'S LONG-TERM FORECAST REPORT**

15 **Q29. HAVE YOU REVIEWED AEP OHIO'S MOST RECENT LONG-TERM**
16 **FORECAST REPORT?**

17 A29. Yes. I reviewed original LTFR filed on April 16, 2018, and the amendment filed on
18 September 19, 2018. I have also reviewed the testimony filed in Case No. 18-501-EL-
19 FOR.

20 **Q30. ARE YOU GENERALLY FAMILIAR WITH THE REGULATIONS THAT**
21 **REQUIRE THE FILING OF THIS REPORT?**

22 A30. Yes. Owners of high-voltage transmission lines and utilities furnishing electricity to more
23 than 15,000 customers are required to file an annual "long-term forecast report."⁹ The
24 long-term forecast report must also include an "integrated resource plan." An integrated

⁸ Exhibit FL-3 at 10.

⁹ R.C. 4935.04(A)(1)(a) and (C).

1 resource plan “means that plan or program, established by a person subject to the
2 requirements of this chapter, to furnish electric energy services in a cost-effective and
3 reasonable manner consistent with the provision of adequate and reliable service, which
4 gives appropriate consideration to supply- and demand-side resources and transmission or
5 distribution investments for meeting the person's projected demand and energy
6 requirements.”¹⁰ O.A.C. 4901:5-5-06(A) lists the required content of an IRP, which
7 include completed Forms FE-R1 through FE-R9.

8 **Q31. DOES THE IRP FILED IN APRIL 2018 ADDRESS PLANS FOR NEW**
9 **GENERATION?**

10 A31. Only at a very high level. Form FE-R1, footnote d (page 101) notes that “Under the AEP
11 Ohio current ESP, SSO load is served with purchases.” Form FE-R5 (page 105) asks for
12 information about projected generating capability changes to meet future Ohio peak load.
13 Here, AEP Ohio references an RFP issued on December 16, 2016 for projects that would
14 generate 250 MW of wind energy and 100 MW of solar. This RFP is referenced again on
15 Form FE-R10, which requires disclosure of planned electric generation facilities.

16 **Q32. AEP OHIO’S FORMS FE-R5 AND FE-R10 STATE THAT THE COMPANY**
17 **RECEIVED PROPOSALS BASED ON THE DECEMBER 2016 RFP AND THAT**
18 **THOSE PROPOSALS “ARE CURRENTLY BEING EVALUATED.” IS THAT**
19 **CONSISTENT WITH THE TESTIMONY YOU HAVE REVIEWED?**

20 A32. It is not. Mr. Bradley’s testimony in Case Nos. 18-1392-EL-RED and 13-1393-EL-ATA
21 states that proposals to fulfill the December 2016 RFP were received in February 2017,
22 but that this RFP was terminated in July 2017.¹¹ A new solar RFP was issued in October
23 2017, and proposals were received in December 2017.¹² The LTFR filed in April 2018

¹⁰ OAC 4901:5-5-06(A); OAC 4901:5-5-01(L).

¹¹ Direct Testimony of Daniel R. Bradley at 14:13- 15:6.

¹² *Id.* at 15:5.

1 mentions the original RFP, but it does not disclose that this RFP had been cancelled, that
2 a new RFP had been issued, or that proposals had been submitted in response to the new
3 RFP.

4 **Q33. DID AEP OHIO SUPPLEMENT ITS APRIL 2018 LTFR?**

5 A33. Yes. On May 31, 2018, the Company filed corrected forms FE-T9 and FE-T10, both of
6 which relate to transmission facilities. On June 26, 2018, the Company filed
7 supplemental information about its 69 kV transmission facilities.

8 **Q34. HOW WOULD YOU CHARACTERIZE THE “AMENDMENT” FILED ON**
9 **SEPTEMBER 19, 2018?**

10 A34. The “amendment” appears to be a legal document that asks the Commission to render
11 certain findings about an alleged need for an additional 900 MW of renewable energy.
12 AEP Ohio also filed testimony the same day it filed the “amendment.” The Direct
13 Testimony of Mr. Torpey sponsors a document titled “Integrated Resource Planning
14 Report,” dated September 19, 2018. This document, however, does not update the
15 technical information, forms, or schedules presented in the April 2018 LTFR and IRP.
16 The September 2018 LTFR does not even constitute an LTFR in the traditional sense
17 because it focuses almost exclusively on renewable generation rather than an “integrated”
18 resource plan.

19 **Q35. WHAT DOES THE “AMENDMENT” TO THE LTFR ASK THE COMMISSION**
20 **TO DO?**

21 A35. AEP Ohio’s amendment asks the Commission find that there is a need for “at least” 900
22 MW of in-state renewable energy.¹³ At various places in AEP Ohio’s testimony,
23 however, witnesses discuss the alleged need for “up to” 900 MW of additional

¹³ Amendment to the 2018 Long-Term Forecast Report (Sept. 19, 2018) at 2-3, 5, 7.

1 renewables.¹⁴ The September 2018 LTFR itself refers to both “at least” and “up to” 900
2 MW.¹⁵ Rather than add to the confusion, for purposes of my testimony I will characterize
3 AEP Ohio’s request as a claim of need for “900 MW.”

4 **Q36. DOES THE SEPTEMBER 2018 AMENDMENT ADDRESS HOW THIS**
5 **ALLEGED NEED SHOULD BE FULLFILLED?**

6 A36. No. Mr. Allen’s testimony is very clear: “The Company is not proposing specific
7 renewable projects in this case.”¹⁶ He goes on to explain AEP Ohio’s intent to file a cost
8 recovery application for specific projects.¹⁷ AEP Ohio filed the separate cost recovery
9 application in Case Nos. 18-392-EL-RDR and 18-393-EL-ATA. The September 2018
10 LTFR does not even constitute an LTFR in the traditional sense. It

11 **Q37. DO EITHER THE APRIL OR SEPTEMBER 2018 THE LTFR SUPPORT A**
12 **CLAIM OF NEED FOR 900 MW OF ADDITIONAL RENEWABLE ENERGY?**

13 A37. No. The April 2018 LTFR discloses an RFP to pursue 350 MW of renewable energy.
14 This LTFR does not explain why there is a “need” for even this level of renewables, let
15 alone nearly three times this amount. In fact, neither LTFR demonstrates a need for *any*
16 new generation, renewable or otherwise. As discussed earlier, AEP Ohio meets its
17 capacity needs through PJM. AEP Ohio “is not proposing to alter the process through
18 which it procures SSO supply through this Amended LTFR filing. Nor is the Company
19 proposing through this filing that it has a traditional integrated resource planning (IRP)
20 need for generation.”¹⁸

¹⁴ See, e.g., Allen Direct at 4:6, 9:13.

¹⁵ Direct Testimony of John F. Torpey, Exhibit JFT-1 at 6-7.

¹⁶ Allen Direct at 4:3-5.

¹⁷ *Id.* at 4:11-12.

¹⁸ Amendment to the 2018 Long-Term Forecast Report of Ohio Power Company (Sept. 19, 2018) at 3.

1 **Q38. DOES THE LTFR MENTION THE SPECIFIC SOLAR PROJECTS IDENTIFIED**
2 **IN THE COMPANION TARIFF CASES?**

3 A38. No. Despite the claim of need for 900 MW of renewable capacity, AEP Ohio issued an
4 RFP for only 400 MW, and awarded bids for two solar PPAs. As already mentioned,
5 counsel has advised me that the Commission will address the “need” for these specific
6 solar facilities in a separate proceeding. I am mentioning these two specific projects
7 simply to point out that neither is addressed in the April 2018 LTFR, and both are
8 completely different projects than those mentioned in the LTFR.

9 **Q39. APART FROM THE TWO SOLAR PPAS YOU JUST MENTIONED, ARE YOU**
10 **AWARE OF ANY OTHER PLANNED SOLAR PROJECTS IN AEP OHIO’S**
11 **SERVICE AREA?**

12 A39. Yes. According to PJM’s interconnection queue, attached as Exhibit FL-5, more than
13 2,000 mw of solar resources are currently planned for the AEP Ohio service territory.

14 **VI. AEP OHIO’S CLAIM OF NEED FOR ADDITIONAL RENEWABLE GENERATION**

15 **Q40. WHAT IS YOUR OVERALL REACTION TO AEP OHIO’S CLAIM OF**
16 **“NEED”?**

17 A40. Instead of demonstrating “need,” AEP Ohio has presented a case based on consumer
18 “wants,” and its analysis supporting consumer “wants” is very weak. AEP Ohio claims
19 that customers “need” low cost energy and that customers are “demanding” renewable
20 energy. These consumer desires do not reflect a resource “need.” Even if AEP Ohio’s
21 claims of need are true, they do not reflect the need for the distribution utility to build and
22 charge distribution ratepayers for the resources, or to contract for these resources outside
23 of the normal SSO auctions. The competitive market is planning more renewable
24 resources in Ohio. If the Commission wanted to incorporate renewables into the SSO, the
25 Commission or AEP Ohio could open a docket to consider that option. Instead, AEP

1 wants the benefit of subsidized monopoly service without assuming the risks that a
2 competitive supplier would incur.

3 **Q41. DOES AEP OHIO EXPLAIN HOW IT DEFINES OR EVALUATED THE**
4 **“NEED” FOR AT LEAST 900 MW OF RENEWABLE ENERGY?**

5 A41. No. The Company refers to the stipulation in its ESP IV proceeding (Case No. 14-1693-
6 EL-SSO) and the provision requiring it to “pursue the development of at least 900 MW of
7 renewable energy resources in Ohio—at least 400 MW of solar and 500 MW of wind.”¹⁹
8 AEP Ohio has not explained—in the ESP IV proceeding or here—how it came up with
9 either the 900 MW figure or the breakdown between wind and solar.

10 **Q42. AEP OHIO CLAIMS THE ADDING 900 MW OF ADDITIONAL RENEWABLES**
11 **WOULD PROVIDE VARIOUS BENEFITS. DO THESE BENEFITS**
12 **DEMONSTRATE “NEED”?**

13 A42. No. Whether additional renewable resources would provide “benefits” is a different
14 question from whether there is a “need” for these resources. There are several ways to
15 objectively and empirically address “need,” and AEP Ohio has addressed none of them.

16 **Q43. CAN YOU PROVIDE EXAMPLES OF HOW “NEED” MAY BE ASSESSED**
17 **EMPIRICALLY OR OBJECTIVELY?**

18 A43. Certainly. First, as mentioned earlier, PJM continually assesses the need for generation
19 capacity throughout PJM. These assessments consider, among other factors, existing and
20 planned capacity, transmission constraints, peak load requirements, and load growth
21 forecasts. PJM does not dictate when or where new generating plants should be built. It
22 does not issue formal declarations of “need.” Rather, PJM disseminates the analyses and
23 information it compiles to market participants, and market participants fulfil capacity
24 needs. If a new resource can be offered at a price that clears the market, that is a

¹⁹ Case Nos. 18-1392-EL-RDR/18-1393-EL-ATA, Direct Testimony of Jon F. Williams at 3:12-15. *See also* Allen Direct at 5:14-6:7.

1 demonstrable sign of “need.” Entities that do not recover the cost of new generation from
2 captive ratepayers are not in the business of building resources for which there is no need.

3 **Q44. HOW ELSE MIGHT THE “NEED” FOR NEW RESOURCES BE DETERMINED**
4 **OBJECTIVELY?**

5 A44. With regard to renewable resources specifically, “need” is essentially defined by law.

6 Utilities and competitive suppliers are required to furnish a certain percentage of energy
7 from renewable resources. There is a “need” for sufficient renewable capacity to meet
8 these requirements. AEP Ohio concedes that this need is already being met and offers no
9 information to suggest that the need will not continue to be met in the future. With regard
10 to generation resources in general, “need” can also be demonstrated by resource planning
11 projections. For example, if a critical facility is at or near the end of its useful life and a
12 shut-down would threaten safety or reliability, a replacement facility may be “needed.”
13 AEP Ohio’s LTFR offers no information to suggest that the failure to add 900 MW of
14 renewable generation would threaten safety or reliability. In fact, the Company admits
15 that this is *not* the case.

16 **Q45. SETTING ASIDE THE QUESTION OF “NEED”, WHAT “BENEFITS” DOES**
17 **AEP OHIO CLAIM THE ADDITION OF RENEWABLE RESOURCES WOULD**
18 **PROVIDE?**

19 A45. Mr. Allen claims that adding 900 MW of renewable resources would produce three
20 primary benefits:

- 21 1. “[T]he addition of economically beneficial renewable projects will
22 lead to lower energy costs for Ohio customers.”²⁰

²⁰ Allen Direct at 7:13-17.

1 2. “[T]here is a strong desire on the part of AEP Ohio customers for in-
2 state renewable power.”²¹

3 3. “[L]ocal renewable energy projects provide local economic
4 development benefits.”²²

5 **Q46. DO THESE ALLEGED BENEFITS DEMONSTRATE “NEED”?**

6 A46. No. If anything, AEP Ohio’s focus on “benefits” merely shows that there is no objective
7 “need” for these resources. For example, if resource planning projections showed that
8 safety or reliability would be jeopardized unless a new generating plant is built, then the
9 plant must be built—regardless of whether the plant will lead to “lower energy costs”
10 (new generation in rate base typically leads to higher rates, not lower rates); regardless of
11 whether there is a “strong desire” for the plant (Power Siting Board proceedings tend to
12 generate the opposite reaction); and regardless of any “local economic development
13 benefits” (a catch-phrase for most schemes to privatize gains and socialize losses). None
14 of the benefits cited by AEP Ohio relate to an objective need for more renewable
15 generation. If an objective need existed, that need would have to be met-- regardless of
16 whether meeting it would produce ancillary benefits.

17 **Q47. IS IT REASONABLE TO EXPECT THAT ANY OF THE ALLEGED BENEFITS**
18 **DISCUSSED BY MR. ALLEN WILL OCCUR?**

19 A47. No. To the contrary, it is unreasonable to expect any of them to occur, based on AEP
20 Ohio’s own data.

²¹ *Id.* at:19-20.

²² *Id.* at 9:16-17

1 **Q48. WHAT DOES AEP OHIO'S DATA SHOW ABOUT "LOWER ENERGY**
2 **COSTS"?**

3 A48. AEP claims that its proposed resources will reduce spot market clearing prices in the
4 AEP Ohio zone by \$0.05 per MWh or \$0.00005 per kWh in the year 2021. They state
5 that this rate reflects the "low-cost" that customers "need." If AEP's calculations were
6 correct (and I will show below that they are not) and the average residential electricity
7 consumer uses 1,000 kWh per month, this "low-cost" product would save residential
8 consumers a scant \$0.60 (sixty cents) per year. But AEP's analysis falls woefully short
9 as it does not consider at all any impact to customers of the cost of any tariff rider(s) that
10 will be sought by the utility that will be associated with these projects.

11 **Q49. HOW DID AEP OHIO DEVELOP ITS FIGURE OF PER KWH SAVINGS?**

12 A49. AEP ran a series of market simulations with and without the inclusion of the proposed
13 renewable resources. The market simulations purport to show that with the renewable
14 resources in place, the spot market price of power in the AEP zone would drop by 5 cents
15 per MWh in 2021, 4.3 cents in 2024 and 6.2 cents in 2027.

16 **Q50. IS IT REASONABLE TO ASSUME THAT ADDITIONAL RENEWABLE**
17 **RESOURCES WILL HAVE THE EFFECT ON SPOT PRICES CLAIMED BY**
18 **AEP OHIO?**

19 A50. Nothing can be assumed from AEP Ohio's data. Undoubtedly, AEP input costs into their
20 market simulation models for these resources that are lower than the costs of the existing
21 resources. The net impact of this is that they show marginally lower spot market prices in
22 the AEP zone if these resources are built. But AEP has not analyzed the impact of the
23 lower prices on the overall renewable market in Ohio or AEP Ohio's service territory.
24 For example, if these resources actually lower the price of power, by definition, they will
25 be displacing other resources that would have cleared in the market in the absence of
26 these resources. AEP Ohio provides no analysis of what resources it will displace or

1 where the displaced resources are located. The resources displaced might be coal,
2 nuclear, gas or renewable resources and might be located in the AEP Ohio service
3 territory or elsewhere in Ohio, which could produce an overall net-negative economic
4 impact in Ohio.

5 **Q51. DO SPOT PRICES DETERMINE THE RATES PAID BY AEP OHIO**
6 **CUSTOMERS?**

7 A51. For most customers, no. Nearly 65% (835,000) of AEP's residential customers are being
8 served by the SSO, and the SSO generation rate is based primarily on blended auction
9 results, not spot market prices.²³ Some large commercial and industrial customers are
10 able to purchase energy at spot prices through hourly priced products, but this option is
11 generally not available to residential consumers.

12 **Q52. DO AEP OHIO'S CUSTOMER SURVEY RESULTS DEMONSTRATE A NEED**
13 **FOR ADDITIONAL RENEWABLE RESOURCES?**

14 A52. No. The Company issued the solar RFP on October 17, 2017 and responses were due by
15 December 18, 2017.²⁴ Navigant conducted its surveys between August 14 and 24, 2018—
16 over eight months *after* bids for the solar projects had already been received.²⁵ The
17 Navigant "surveys" merely sought to validate a decision already made. Moreover,
18 customer surveys are neither a rationale or appropriate way to decide whether AEP Ohio
19 should be allowed to recover costs associated with the construction and operation of
20 renewable energy facilities.

²³ See utility migration data for September 2018 at:

<https://app.powerbigov.us/view?r=eyJrJoiMjU1ZWZkNGUtYmJmZS00YTEyLTk5NWYtMGE1NmJmZjYxMzVjliwidCI6IjUwZjhmY2M0LTk0ZDgtNGYwNy04NGViLTM2ZWQ1N2M3YzhhMjI9>.

²⁴ Case Nos. 18-1392-EL-RDR/18-1393-EL-ATA, Direct Testimony of Daniel R. Bradley at 8:21 and 9:18-19.

²⁵ Direct Testimony of Nicole Fry at 2:11-12.

1 **Q53. ARE THE ALLEGED ECONOMIC DEVELOPMENT IMPACTS A VALID**
2 **CONSIDERATION IN DETERMINING “NEED”?**

3 A53. No. AEP Ohio’s entire discussion of “economic development” is a red-herring. If there is
4 a market for 900 MW of additional renewable capacity, the market will meet this
5 demand. Jobs will be created, taxes will be paid, and all of the other alleged benefits will
6 accrue. AEP Ohio offers no evidence or other reason to believe that any economic
7 development benefits would diminish if someone other than AEP Ohio developed, owned
8 or operated additional renewable facilities.

9 **Q54. EVEN IF THERE IS NO OBJECTIVE NEED FOR AN ADDITIONAL 900 MW**
10 **OF RENEWABLE ENERGY, WHAT WOULD BE THE HARM IN BUILDING**
11 **THIS CAPACITY ANYWAY?**

12 A54. Allowing AEP Ohio to develop unnecessary renewable projects and recover the costs
13 from ratepayers could ultimately result in fewer renewable energy resources in Ohio, not
14 more.

15 **Q55. HOW SO?**

16 A55. Existing and planned renewable generation in the state has been developed and financed
17 by non-utility entities. These entities have a strong financial incentive to avoid the type of
18 uneconomic duplication of generation facilities that occurred in the utility industry in the
19 1970s and 1980s. Forcing captive ratepayers to finance renewable capacity would remove
20 this incentive for AEP Ohio. As AEP Ohio is now demonstrating, investment decisions
21 will be based on whether the utility can get cost recovery for its renewable projects, not
22 whether the market is signaling the need for more renewable capacity.

23 **Q56. BUT WOULDN’T INCREASING THE SUPPLY OF RENEWABLE ENERGY**
24 **LOWER THE PRICE CONSUMERS PAY FOR RENEWABLES?**

25 A56. Perhaps in the short term, if the cost assumptions input into the market simulation models
26 are true, and AEP Ohio turns out to be an efficient owner/operator of the plants.

1 However, even if true in the short-term, there is a heavy price to pay in the long-term.

2 The developers of the current fleet of existing and planned renewable capacity made
3 investment decisions based on projections and assumption about supply and demand,
4 assumptions about market prices for renewable energy, and assumptions about a
5 competitive economic framework under which they would be operating long-term. The
6 market is providing the level of renewable capacity needed, but AEP Ohio is proposing to
7 develop resources outside of that competitive market construct. The capacity that AEP
8 Ohio proposes to add could push the price of renewable energy below a price that would
9 otherwise be signaled by the competitive market. Project developers who expected to
10 receive a market price for renewable energy will receive something less. The rational,
11 economic response for these developers is to develop projects where they can earn a
12 market price for renewable energy, rather than the below-market, ratepayer-subsidized
13 price that would result from AEP Ohio's proposal. But as developers leave the state, the
14 scarcity of renewable energy will increase, along with prices. Regulated utilities could be
15 the only entities left to provide renewable energy.

16 **Q57. WHAT WOULD BE WRONG WITH THAT?**

17 A57. From a policy perspective, forcing non-utility suppliers out of the renewable energy
18 market goes against the principle of competition. Principles aside, history shows that
19 regulated utilities provide renewable energy far less efficiently than competitive suppliers,
20 at a significant cost to consumers.

21 **Q58. WHAT DATA LEADS YOU TO THIS CONCLUSION?**

22 A58. According to the 2016 RPS Report, Ohio distribution utilities (not AEP specifically) paid
23 on average, over \$112 per S-REC to meet their renewable mandates. The CRES

1 community, by comparison, paid less than \$76 per S-REC.²⁶ The same disparity is found
2 with the non-solar renewable RECs that were retired. The distribution utilities paid \$14
3 for RECs while the CRES community paid just over \$8.00. This pricing data suggests that
4 there is something fundamentally different in the way the distribution utilities and CRES
5 operate their businesses, and CRES appear to be more efficient.

6 **Q59. ARE THERE WAYS AEP OHIO COULD SUPPORT THE DEVELOPMENT OF**
7 **RENEWABLE ENERGY WITHOUT DEVELOPING AND OPERATING NEW**
8 **CAPACITY RESOURCES?**

9 A59. Certainly. AEP Ohio should work with developers, improve its internal interconnection
10 processes, and invest in transmission and distribution infrastructure necessary to support
11 the delivery of renewable energy. Granting AEP Ohio the right to invest in generation
12 and to recover its costs from captive customers is not going to incentivize investment in
13 renewable energy resources and economic development in Ohio. It is going to push
14 investments into neighboring states or possibly disincentivize regional investments in
15 renewable energy from the private sector altogether.

16 **Q60. HAS AEP OHIO IDENTIFIED ANY HARM IT WOULD SUSTAIN IF THE**
17 **COMMISSION FINDS THE COMPANY DOES NOT NEED TO ADD 900 MW OF**
18 **ADDITIONAL RENEWABLE CAPACITY IN ITS SERVICE TERRITORY?**

19 A60. None at all. Again, it is my understanding that the only matter at issue in the first phase of
20 these proceeding is whether there is a need for at least 900 MW of additional renewable
21 capacity. AEP Ohio has not explained the significance of such a finding, if any, or why it
22 is seeking this finding. If the Commission declines to render this finding, it is not at all
23 clear how AEP Ohio would be harmed. For that matter, it is not at all clear how such a

²⁶ Exhibit FL-3 at 9.

1 finding helps AEP Ohio. My understanding is that the Company will still need to show a
2 “need” for the specific solar facilities in a separate proceeding.

3 **Q61. IS THERE ANYTHING PREVENTING AN UNREGULATED AFFILIATE OF**
4 **AEP OHIO FROM INVESTING IN ADDITIONAL RENEWABLE RESOURCES?**

5 A61. Not that I am aware of. Again, generation and energy supply are competitive services in
6 Ohio. If the AEP organization believes it makes economic sense to invest in 900 MW of
7 renewable generation, it is free to make that investment with shareholder funds, just like
8 any other project developer.

9 **Q62. WOULD A DECISION NOT TO RENDER THE FINDING SOUGHT BY AEP**
10 **OHIO SIGNAL THAT THE COMMISSION OPPOSES RENEWABLE**
11 **ENERGY?**

12 A62. Absolutely not, and anyone who makes this claim is not being fair to the Commission. To
13 my knowledge, none of the current or planned renewable resources in Ohio required the
14 developers to seek Commission approval. That is not the Commission’s job. The
15 Commission does not decide which renewable projects should be built and which should
16 not. AEP Ohio or an affiliate could start building new renewable resources today without
17 asking for the Commission’s permission. The only reason AEP Ohio is seeking a finding
18 of “need” for 900 MW of additional renewable capacity is to lay the groundwork for cost
19 recovery from distribution ratepayers for two solar facilities. A private developer could
20 pursue these solar projects without seeking Commission approval. AEP Ohio is not really
21 seeking permission to build these solar facilities; it is seeking approval to recover the cost
22 of these projects from ratepayers. Denying cost recovery is not the same thing as denying
23 the opportunity for these solar projects to proceed. AEP Ohio’s counterparties under the
24 solar PPAs may pursue these projects regardless of the regulatory treatment afforded to
25 AEP Ohio. If the claim is that these counterparties will not proceed with the projects

1 unless they are financed by AEP Ohio ratepayers, then that tells the Commission
2 everything it needs to know: that there is no market and hence no “need” for these
3 facilities. If Ohio wishes to maximize the use of renewable energy, regulatory policy
4 should support the efficient allocation of resources to achieve this goal. Flooding the
5 market with ratepayer-subsidized renewable capacity would signal that Ohio is willing to
6 sacrifice the long-term market for renewable energy in order to satisfy a short-term goal
7 of supporting projects the market is not willing to support.

8 **Q63. DOES THIS CONCLUDE YOUR TESTIMONY?**

9 A63. Yes.

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing Testimony was served by electronic mail this

2nd day of January, 2019, to the following:

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Senior Regulatory Advisor

Recognized energy market consultant and executive known for implementing innovative regulatory and business strategies to support emerging energy market products and services. Successful in achieving business growth through regulatory interpretation and strategy development. Strong knowledge of regional energy markets, market trends and national energy policy. Provided expert testimony in numerous states' PUCs, State legislatures, judicial proceedings, and at FERC technical conferences. Success in bringing cross-functional teams together to achieve superior results to capitalize on non-traditional business opportunities.

Board of Directors positions: Advanced Energy Management Alliance (Chairman) (2012-Present); Smart Electric Power Alliance (finance committee) (2015-2018); Association for Demand Response and Smart Grid (finance chair) (2011-2015); ERCOT (finance committee) (2002-2004); Electric Power Supply Association (2002-2004).

Experience

Electric Advisors Consulting Founder and President

2015- Present

Advise senior leadership on developing strategies to address legislative, regulatory and market design changes in the energy industry. Provide expert testimony to advise and assist entities on facilitating legislative, regulatory and market changes to accommodate evolving business strategies and technologies.

Comverge, Inc./CPower Corporation Senior Vice President, Regulatory and Market Strategy

2011-2015

Served on both companies' executive teams, developing and implementing corporate and regulatory strategy, including M&A analyses and due diligence, market entry plans and complex communications for entities with a combined \$150 million in revenue from demand response services in the electricity markets.

Direct Energy Director, Complex Transactions (2008-2011)

2006 - 2011

For a multi-billion dollar retail electric and gas company, led team consisting of four direct reports and eight cross-functional leaders, facilitating incremental gross margin sales in excess of \$100 million from non-standard product requests.

Director, Government and Regulatory Affairs (2006-2008)

Managed regulatory strategy and regulatory risk in Mid-Atlantic region of US, participating in multiple rate proceedings and regulatory initiatives, securing greater than \$90 million in shareholder value through reduced credit and collateral exposure and increased sales.

Starlight Energy

2004 - 2006

President

Led the development of business plan and pro formas for venture seeking \$20 million in equity financing and other financial relationships. Successes included securing \$100 million credit relationship and working capital financing to enable launch of competitive electricity markets retail supply company.

Strategic Energy

2001- 2004

Director, Regulatory Affairs

Served on the company's Leadership team, managing a regulatory group of 15 people. Managed the development of regulatory strategy, the oversight of regulatory risk and the attainment of desired regulatory results, advocating for market design structures in emerging electricity markets across 16 states and the federal government.

Arthur Andersen

1998 - 2001

Senior Manager

Responsibility for development and growth of Andersen's transmission restructuring business in Eastern half of US market, achieving annual consulting sales in excess of \$2 million.

Putnam, Hayes and Bartlett, Inc

1995 - 1998

Associate Consultant

Financial analyst in firm's energy practice with expertise in asset valuation, including stranded costs, power plants and environmental assets.

Education

Carnegie Mellon University, Tepper School of Business

MSIA/MBA with concentrations in finance, entrepreneurship and environmental management

University of Maryland

B.S. in Transportation and Logistics

Programs for Life

Certified Leadership Development Trainer

Prepared Direct Testimony of Frank Lacey On Behalf of Strategic Energy, LLC, before the Public Utilities Commission of the State of California in the matter of the Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060. Docket No. R. 02-01-011. June 6, 2002.

Prepared Rebuttal Testimony of Frank Lacey On Behalf of Strategic Energy, LLC before the Public Utilities Commission of the State of California in the matter of the Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060. Docket No. R. 02-01-011. June 20, 2002

Cross Examination testimony of On Behalf of Strategic Energy, LLC before the Public Utilities Commission of the State of California in the matter of the Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060. Docket No. R. 02-01-011. July 2002.

Prepared Testimony of Frank Lacey on the subject of truing up the CERS Fee On Behalf of Strategic Energy, LLC before the Public Utilities Commission Of the State Of California in the matter of the Order Instituting Rulemaking Regarding the Implementation of the Suspension of Direct Access Pursuant to Assembly Bill 1X and Decision 01-09-060. Docket No. R. 02-01-011. March 19, 2003

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company, Docket Nos. R-00038092, R-00038092C0001 and R-00038092C0002. January 2003.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Strategic Energy L.L. C. Before the Pennsylvania Public Utility Commission in the matter Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company Docket Nos. R-00038092, R-00038092C0001 and R-00038092C0002. February 2003.

Prepared Supplemental Testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company Docket Nos. R-00038092, R-00038092C0001, R-00038092C0002. November 2003

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy L.L.C. before the Pennsylvania Public Utility Commission in the matter Pennsylvania Public Utility Commission, et al. v. Duquesne Light Company Docket Nos. R-00038092, R-00038092C0001, R-00038092C0002. July 1, 2003.

Prepared Direct Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company Case No. 02-2779-EL-ATA and the Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code Case No. 02-2879-EL-AAM. May 19, 2003.

Prepared Supplemental Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company Case No. 02-2779-EL-ATA and the Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code Case No. 02-2879-EL-AAM. June 12, 2003.

Deposition Testimony of Frank Lacey submitted on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company Case No. 02-2779-EL-ATA and the Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code Case No. 02-2879-EL-AAM. May 2003 and June 2003.

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy L.L.C. and Dominion Retail, Inc. before the Public Utilities Commission of Ohio in the matters of the Continuation of the Rate Freeze and Extension of the Market Development Period for The Dayton Power and Light Company Case No. 02-2779-EL-ATA and the Application of The Dayton Power and Light Company for Certain Accounting Authority Pursuant to Section 4905.13, Ohio Revised Code Case No. 02-2879-EL-AAM. June 2003.

Oral Testimony of Frank Lacey before the Standing Committee on Energy of the New York State Assembly on the issue of Ensuring a Reliable Supply of Electricity to the People of New York, Chairman Paul D Tonko, presiding. March 6, 2003

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service. Docket No. P-00032071. February 2004.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service. Docket No. P-00032071. February 2004.

Cross Examination testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. before the Pennsylvania Public Utility Commission in the matter of the Petition of Duquesne Light Company for Approval of Plan for Post-Transition Period Provider of Last Resort Service. Docket No. P-00032071. April 1, 2004.

Oral Testimony of Frank Lacey at the POLR Roundtable before the Pennsylvania Public Utility Commission re: Optimal Future POLR Design models. May 3, 2004.

Prepared Direct Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. and Mid-American Energy Company before the Public Utilities Commission of Ohio in the matters of The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period, Case No. 03-93-EL-ATA, The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO, Case No. 03-2079-EL-AAM, and The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 6, 2003.

Deposition of Frank Lacey in the matters of The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period, Case No. 03-93-EL-ATA, The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO, Case No. 03-2079-EL-AAM, and The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 2003.

Cross Examination Testimony of Frank Lacey on behalf of Strategic Energy, L.L.C. and Mid-American Energy Company before the Public Utilities Commission of Ohio in the matters of The Application of the Cincinnati Gas & Electric Company to Modify its Non-Residential Generation Rates to Provide for Market-Based Standard Service Offer Pricing and to Establish a Pilot Alternative Competitively-Bid Service Rate Option Subsequent to Market Development Period, Case No. 03-93-EL-ATA, The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Certain Costs Associated with the Midwest ISO, Case

No. 03-2079-EL-AAM, and *The Application of the Cincinnati Gas & Electric Company for Authority to Modify Current Accounting Procedures for Capital investment in its Electric Transmission and Distribution System and to Establish a Capital Investment Reliability Rider to be Effective After the Market Development Period*, Case Nos. 03-2080-EL-AAM and 03-2080-EL-ATA. May 18, 2003.

Oral Testimony of Frank Lacey before the Michigan Senate Committee on Technology and Energy on the subject of revision to Public Act 141, the Michigan Electricity Choice and Restructuring Act, Chairman Bruce Patterson, Presiding. May 19, 2004.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland Senate Finance Committee on Senate Bill 561 on the subject of communications between electric companies and suppliers to enhance the development of competitive electric markets, Chairman Thomas Middleton, Presiding. March 7, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland Senate Finance Committee on Senate Bills 814, 1048, 1051 and 1078 on the subject of retail electricity market design, Chairman Thomas Middleton, Presiding. March 14, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Maryland House of Delegates Economic Matters Committee on House Bills 1334, 1654 and 1712 on the subject of retail electricity market design, Chairman Dereck Davis, Presiding. March 14, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utility Commission in the Matter of *Petition of Direct Energy Services, LLC for Emergency Order*, Docket No. P-00062205, April 11, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utility Commission in the Matter of *Policies to Mitigate Potential Electricity Price Increases*, Docket No. M-00061957, June 22, 2006.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, July 7, 2006. (Case Settled)

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, August 2, 2006. (Case Settled)

Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of *Duquesne Light Company Base Rate Case*, Docket No. R-00061346, August 16, 2006. (Case Settled)

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan, Docket No. P-00062227, November 15, 2006.

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan, Docket No. P-00062227, December 6, 2006.

Prepared Surrebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan, Docket No. P-00062227, December 15, 2006.

Oral Rejoinder Testimony and Cross-examination of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania Public Utilities Commission in the Matter of Petition of PPL Electric Utilities Corporation for Approval of Competitive Bridge Plan, Docket No. P-00062227, December 15, 2006.

Oral Testimony of Frank Lacey on behalf of Direct Energy Services, LLC before the Pennsylvania House of Representatives, Consumer Affairs Committee, Honorable Joseph Preston Jr., Chairman, March 15, 2007.

Prepared Direct Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of Petition of Duquesne Light Company for Approval of Default Service Plan for the Period January 1, 2008 through December 31, 2010, Docket No. P-00072247, March 29, 2007. (case settled)

Prepared Rebuttal Testimony of Frank Lacey on behalf of Direct Energy Services, LLC and the Retail Energy Supply Association before the Pennsylvania Public Utilities Commission in the Matter of Petition of Duquesne Light Company for Approval of Default Service Plan for the Period January 1, 2008 through December 31, 2010, Docket No. P-00072247, April 12, 2007. (case settled)

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Fuel Security

Analyzing Fuel Supply Resilience in the PJM Region

Summary of Results, Conclusions and Next Steps





Highlights

- PJM's fuel security analysis is the next step in ensuring the resilience of the grid, focusing on one of its most important elements – fuel supply.
- The PJM system is reliable today and will remain reliable into the future.
- In the analysis, PJM stress-tested the fuel delivery systems serving generation in the PJM region under extreme scenarios to identify when the system begins to be impacted and to identify key drivers of reliability risk.
- In order to enhance the fuel security of the grid into the future, PJM believes market-based mechanisms for retaining or procuring resources with the necessary attributes should be explored.

Analysis and Results:

- PJM looked five years into the future, using a 2023/2024 system model, to analyze more than 300 different scenarios ranging from typical operations to extreme scenarios, considering elements like generation retirements, customer demand, fuel delivery and fuel disruptions.¹
- In a 14-day period of cold weather with typical winter load and generation retirements announced as of Oct. 1, 2018, PJM's system can withstand an extended period of stress while remaining reliable. Even in an extreme scenario, such as an extended period of severe weather combined with high customer demand and a fuel supply disruption, the PJM system would still remain reliable.
- As in any stress test, the analysis was intended to discover the tipping point when the PJM system begins to be impacted. Looking five years into the future, under escalated retirement scenarios combined with extreme winter load, the system may be at risk for emergency procedures and load loss.
- Key elements such as on-site fuel inventory, oil deliverability, location of a fuel supply disruption, availability of non-firm natural gas service, pipeline configuration and demand response become increasingly important as the system comes under more stress.
- The development of demand response programs has helped to provide more options for PJM operators and reduced, though not eliminated, the vulnerability of the system to fuel supply disruptions.

Actions:

- While there is no imminent threat, fuel security is an important component of ensuring reliability – especially if multiple risks come to fruition. The findings underscore the importance of PJM exploring proactive measures to value fuel security attributes, and PJM believes this is best done through competitive wholesale markets.
- PJM will continue to engage the Federal Energy Regulatory Commission (FERC) in the national consideration of fuel security issues addressed in FERC's resilience docket.²

¹ The analysis is neither meant to be predictive of future conditions nor meant to imply that analyzed scenarios are unavoidable.

² <https://www.pjm.com/-/media/documents/ferc/filings/2018/20180309-ad18-7-000.ashx>

Focus on Fuel Supply

Electricity is a public necessity and is critical to the public health and welfare of the nation. Keeping power available whenever and wherever it is needed is the number one priority of PJM Interconnection and other grid operators. In the last several years, changes in the energy industry and increased cyber and physical threats to the grid and the fuel supply chain serving that grid have introduced a heightened focus on risk. Grid operators around the world find themselves contending with new challenges, including a rapidly changing fuel mix, stressed fuel delivery systems, extreme weather, cyberattacks and physical security threats. As a result, the security of the fuel supply – one component of the resilience of the power grid – has become an increased area of focus.

Fuel Security as a Resilience Effort

Resilience is how grid operators manage the risk of high-impact disruptions, which can happen simultaneously or persist for a period of time. Operators must prepare for, be capable of operating through and be able to recover as quickly as possible from these disruptions, no matter the cause.

There are many dimensions of resilience that span the markets, operations, planning and supporting infrastructures of the grid. In PJM's March 2017 paper, "[PJM's Evolving Resource Mix and System Reliability](#)," PJM recognized that the shift in fuel mix and changes in technology raised important fuel security questions. This spurred PJM to undertake an analysis of risks to fuel supply, which is summarized in this document. PJM will publish a detailed report on this analysis, including the background, method, approach, analysis results, conclusions and next steps in December 2018.

Analysis: Assumptions and Scenarios

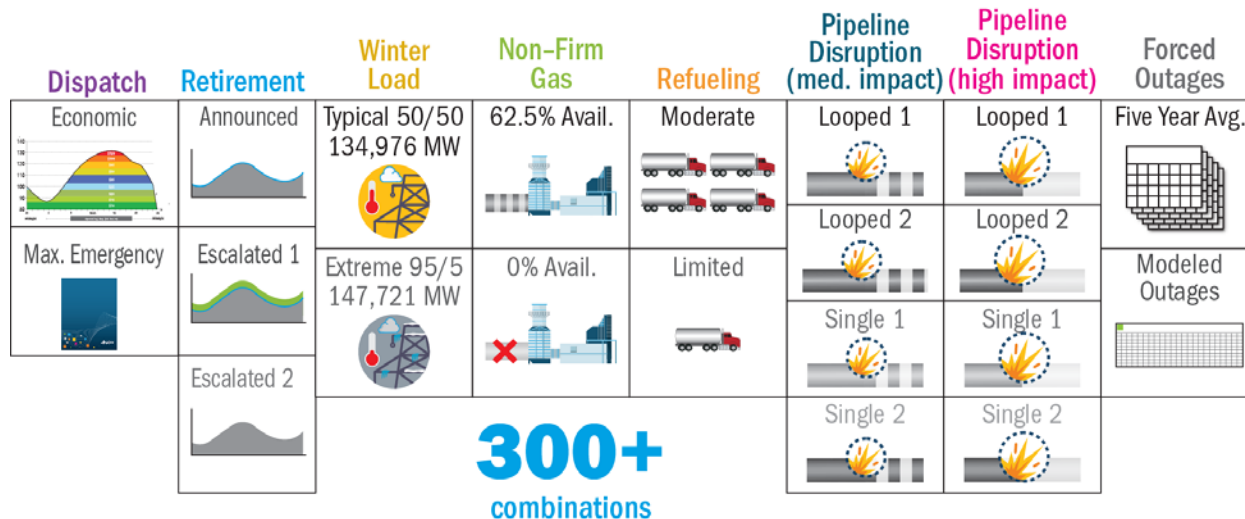
PJM designed its analysis to stress-test the grid under a series of extreme, but plausible events. As in any stress test, the analysis was intended to discover the tipping point at which the PJM system begins to be impacted.

PJM studied more than 300 different scenarios that could occur during an extended period of cold weather, varying elements such as customer demand (also called "load"), fuel availability, oil refueling frequency, generator forced outage rates, retirements and natural gas pipeline disruptions (Figure 1).³

In order to develop a robust and plausible set of assumptions, sensitivities and scenarios, PJM analyzed historical weather data spanning more than 45 years, researched previously completed studies, issued supplemental surveys to PJM generation owners, and met extensively with industry groups, generation owners, various companies in the fuel supply chain in the PJM region, government agencies and other system operators.

³ The impact of available demand response, renewables and energy storage was incorporated in the analysis for all scenarios.

Figure 1: Overview of Assumptions



Why Winter Demand?

PJM selected a 14-day period of cold weather for the analysis. Though PJM consistently sees its highest customer demand during the summer, the greatest strain on fuel supply and delivery occurs in the winter. This is primarily because during the winter, the needs of commercial and residential heating are competing with natural-gas-fired and dual-fuel generators (which generate more than 30 percent of the energy produced in PJM) for natural gas, oil, pipeline transportation and oil deliveries.

Retirements, Load and Disruptions

In the analysis, PJM simulated typical winter load on the system,⁴ looking five years into the future and taking into account the announced retirements,⁵ new generation slated to be in operation by 2023 and interstate pipeline build-out. This allowed PJM to analyze the assumptions against what it would experience in a typical winter.

PJM then layered in additional assumptions to stress-test the system under more extreme conditions, asking questions such as: “What if the peak load is much higher than usual?”, “What if there is a pipeline break at a critical location?”, “What if deliveries of fuel don’t come in as scheduled?”, “What if there are more generator retirements than expected?”

⁴ “Typical winter load” is that which would occur about 50 percent of the time and represents a peak demand of approximately 134,976 MW. “Extreme winter load” is that which would occur only about 5 percent of the time and represents a peak load of approximately 147,721 MW.

⁵ Retirements announced by Oct. 1, 2018.

The key variables included in the analysis were:

- Availability of non-firm gas service
- Ability of the fuel-oil delivery system to replenish oil supplies during an extended period of extreme cold weather
- Physical breaks at key locations on the pipeline system
- Customer demand (load)
- Generator retirements, replacements and resulting installed reserve margin
- Use of operating procedures to conserve fuel during peak winter conditions

Results: Reliable Under All but the Most Extreme Scenarios

The results of the analysis are summarized in Figure 2 and Figure 3. Each box represents a single scenario, which is color-coded by level of operational procedure. Boxes include all operational procedures up to and including the one indicated by color. For instance, a yellow-colored square would indicate an operational reserve shortage, and some level of demand response would have already been deployed; voltage reduction and load shed would not have occurred.

Labels indicate the following:

- Winter Load: Typical (134,976 MW peak) or extreme (147,721 MW peak)
- Non-Firm Gas Availability: 62.5 percent or 0 percent available
- Dispatch: PJM's usual economic dispatch or a maximum emergency dispatch
- Moderate/Limited Refueling: Amount of oil refueling
- Single 1/Single 2/Looped 1/Looped 2: Names assigned to simulated pipeline disruptions
- Medium/High: Severity of simulated pipeline disruptions

Announced Retirements, Typical and Extreme Winter Load

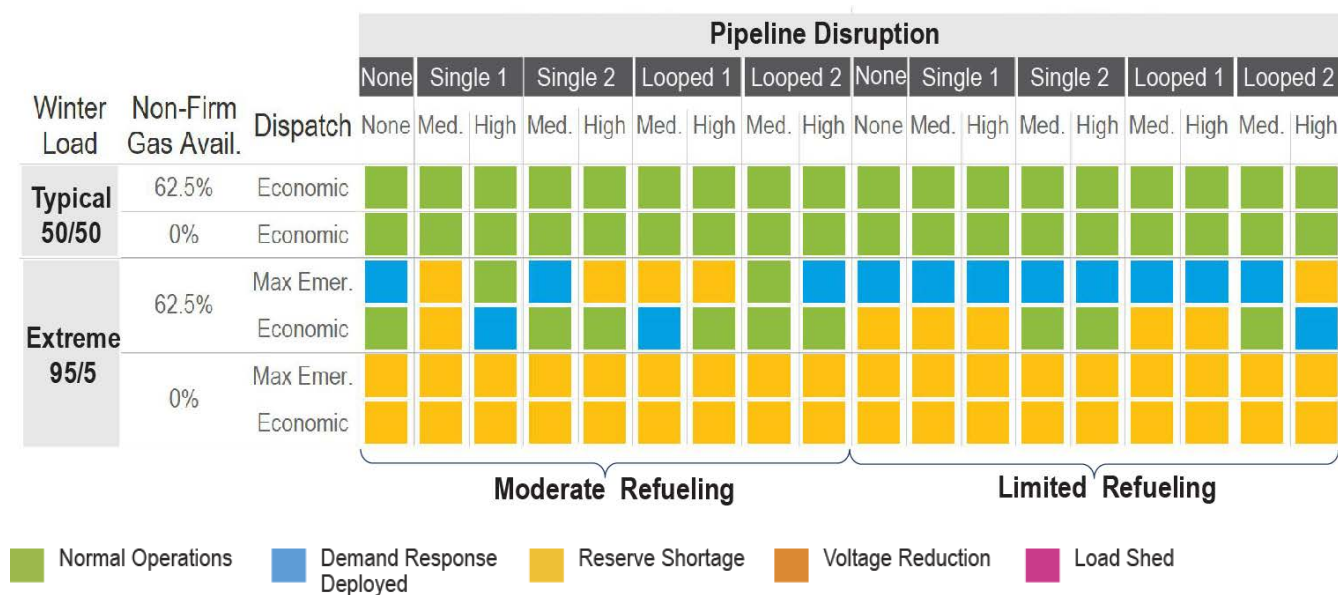
The analysis showed no issues on the system in a prolonged period of cold weather with typical winter load,⁶ accounting for announced retirements⁷ and new generation slated to be in operation by 2023 (Figure 2). Even in a scenario such as extreme winter load⁸ combined with a pipeline disruption at a critical location on the pipeline system from which a significant number of generators are served, PJM's system would still be reliable. While there could be reserve shortages in the extreme winter load scenarios, the grid would remain reliable and able to continue to deliver electricity reliably under these extreme conditions.

⁶ "Typical winter load" is that which would occur about 50 percent of the time and represents a peak load of 134,976 MW.

⁷ Retirements announced by Oct. 1, 2018.

⁸ "Extreme winter load" is that which would occur only about 5 percent of the time and represents a peak load of 147,721 MW.

Figure 2: Results: Announced Retirements, Typical and Extreme Winter Load



Escalated Retirements, Typical and Extreme Winter Load

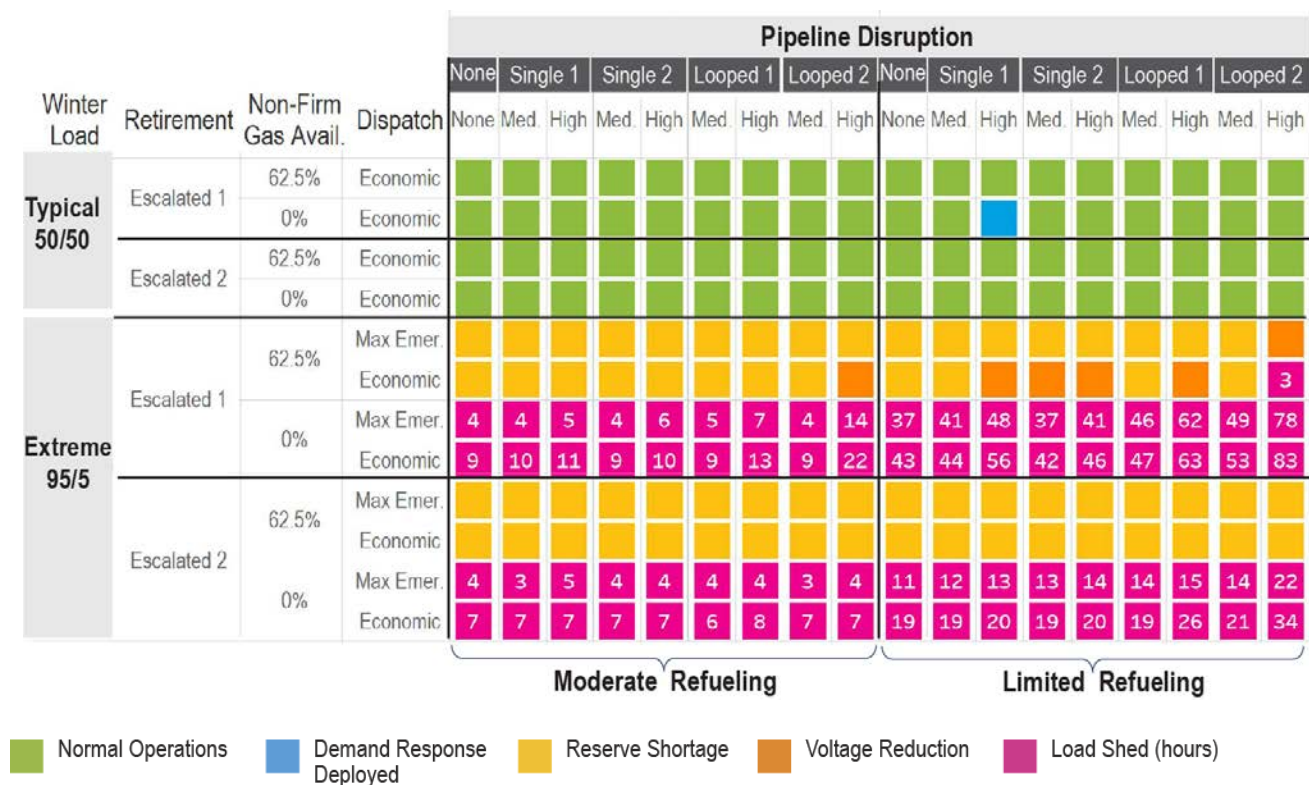
For the more extreme scenarios, PJM analyzed two separate generation retirement scenarios, termed Escalated 1 and Escalated 2. Both Escalated 1 and Escalated 2 included securing enough capacity to meet PJM's installed reserve margin reliability requirement.⁹ Escalated 1 modeled generation retirements of 32,216 MW by 2023, with 16,788 MW of capacity added to meet the installed reserve margin requirement. Recognizing that as units retire, market signals could slow the rate of further retirements, Escalated 2 modeled generation retirements of 15,618 MW by 2023 with no capacity replacement.

When combined with extreme winter load, PJM's analysis indicates that the two escalated retirement scenarios have similar results that indicate the system may be at risk for emergency procedures and load loss. A summary of the results of the extreme scenarios with escalated retirements is shown in Figure 3.

PJM acknowledges that its reserves have historically exceeded the installed reserve margin reliability requirement. The escalated retirements are, by design, a stress analysis. The goal is to simulate the retirement of different levels of resources that are financially at risk while maintaining the current installed reserve margin reliability requirement of 15.8 percent. In the Escalated 1 analyses, PJM retired beyond the reliability requirement and replaced up to the reliability requirement. In the Escalated 2 analyses, PJM simply retired up to the reliability requirement and did not replace any of the retirements. The range of retirements analyzed represents possible bounds of retirement levels, recognizing that market signals would limit retirements between those bounds.

⁹ In the Escalated 1 scenario, 16,788 MW of replacement resources were added to meet the 15.8% installed reserve margin reliability requirement. In the Escalated 2 scenario, a level of retirements (15,618 MW) was assumed that resulted in meeting the 15.8% installed reserve margin reliability requirement and therefore no replacement resources were added.

Figure 3: Results: Escalated Retirements, Typical and Extreme Winter Load



In looking at more than 300 scenarios, it is clear that key elements such as availability of non-firm gas service, oil deliverability, pipeline design, reserve level, method of dispatch and availability of demand response become increasingly important as the system comes under more stress.

In particular, the combination of the following factors contributes to potential load loss events:

- The level of retirements and replacements
- The availability of non-firm gas service
- The ability to replenish oil supplies
- The location, magnitude and duration of pipeline disruption
- Pipeline configuration

While there is no imminent threat, fuel security is an important component of ensuring reliability – especially if multiple risks come to fruition. The findings underscore the importance of PJM exploring proactive measures to value fuel security attributes, and PJM believes this is best done through the competitive wholesale markets.

Next Steps

This document is intended as a summary of PJM's fuel security analysis and results. In December 2018, PJM will publish a paper on the analysis detailing the background, method, approach, analysis results, conclusions and next steps.

Results from the analysis were also reported in PJM's Nov. 1, 2018, Special Markets & Reliability Committee meeting. Based on these results, PJM will begin a stakeholder process to discuss potential solutions.

To continue stakeholder engagement, PJM will:

- Host a follow-up Special Markets & Reliability conference call on Nov. 26, 2018, to address additional questions that may arise as stakeholders review the study results.
- Host a Special Markets & Reliability meeting on Dec. 20, 2018, to discuss the additional detail provided in the paper.
- Introduce a Problem Statement and Issue Charge for stakeholder consideration in the first quarter of 2019 with any potential market rule changes targeted for filing with FERC in early 2020.

PJM will also continue to engage FERC in the national consideration of fuel security issues addressed in FERC's resilience docket.¹⁰

¹⁰ <https://www.pjm.com/-/media/documents/ferc/filings/2018/20180309-ad18-7-000.ashx>

DRAFT

RENEWABLE PORTFOLIO STANDARD REPORT

TO THE GENERAL ASSEMBLY

BY THE STAFF OF THE PUBLIC UTILITIES COMMISSION OF OHIO

FOR THE 2016 COMPLIANCE YEAR

PUCO Case No. 18-1840-EL-ACP

www.puco.ohio.gov

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I. EXECUTIVE SUMMARY

Amended Substitute Senate Bill 221 created Ohio's Alternative Energy Portfolio Standard (AEPS). The AEPS originally contained specific compliance benchmarks for the total renewable energy resources and advanced energy requirements for electric distribution utilities (EDUs) and the competitive retail electric service (CRES) providers.

Substitute Senate Bill 310 (SB 310), which became effective on September 10, 2014, revised Ohio's AEPS and, among other things, eliminated the advanced energy provision.¹ Since the advanced energy provision was eliminated, the AEPS will now be referred to as the Renewable Portfolio Standard (RPS).

The Ohio Revised Code (R.C.) section enacting this legislation requires the Public Utilities Commission of Ohio (PUCO) to submit a report detailing information regarding renewable energy compliance with the statutory standards to the General Assembly.² Specifically:

The commission annually shall submit to the general assembly in accordance with section 101.68 of the Revised Code a report describing all of the following:

- (1) The compliance of electric distribution utilities and electric services companies with division (B) of this section;
- (2) The average annual cost of renewable energy credits purchased by utilities and companies for the year covered in the report;
- (3) Any strategy for utility and company compliance or for encouraging the use of qualifying renewable energy resources in supplying this state's electricity needs in a manner that considers available technology, costs, job creation, and economic impacts.

PUCO rules require EDUs and CRES providers to file by April 15 of each year, a renewable energy portfolio status report that analyzes all activities undertaken in the previous calendar year.³ The public may comment on the status report of each EDU and

¹ Additionally, SB 310 eliminated the requirement that 50% of renewable energy credits (RECs) come from in-state renewable facilities and froze the percentages of electric sales required to result from renewable sources at 2014 levels until 2017. Finally, in addition to the ability to use a compliance baseline based on a three year average of sales, an EDU or CRES provider can now choose to use compliance year sales as the compliance baseline.

² See R.C. 4928.64.

³ See Ohio Administrative Code (Ohio Adm.Code) 4901:1-40-05(A).

CRES provider within 30 days of its filing.⁴ While the PUCO reviews status reports for individual company compliance with the renewable energy requirements, the status reports also provide a substantial portion of information necessary for the RPS reports. The information contained in this report reflects the information as filed by the EDUs and CRES providers, and not necessarily as modified and verified by PUCO review.⁵

The information required to be submitted by the PUCO to the General Assembly is contained herein as the PUCO's eighth annual General Assembly filing (2016 RPS Report). Section II summarizes the 2016 compliance efforts of the EDUs and CRES providers. Section III details the average costs of renewable energy credits (RECs) and solar RECs (S-RECs) used for compliance in 2016. Section IV considers the resources and strategy for encouraging the use of renewable energy resources.

II. 2016 COMPLIANCE ACTIVITIES

The RPS requirements are addressed most specifically in R.C. 4928.64, with additional supporting language found throughout R.C. Chapter 4928. To implement the RPS, the statute includes specific annual benchmarks, including a requirement for solar resources. The requirements for 2016, as specified by R.C. 4928.64(B)(2), were as follows:

Year	Renewable Energy Resources	Solar Energy Resources	Non-Solar Energy Resources⁶
2016	2.50%	0.120%	2.38%

Each EDU and CRES provider is subject to a compliance payment if it does not meet the annual benchmarks. EDUs and CRES providers may purchase RECs and S-RECs to comply with this rule and therefore RECs and S-RECs represent the compliance currency for Ohio's RPS.⁷

⁴ See Ohio Adm.Code 4901:1-40-05(B).

⁵ Staff reviews the information filed annually by each EDU and CRES provider in individual PUCO dockets, each of which is then accompanied by a Commission Finding and Order.

⁶ This report uses the term "non-solar energy resources" to represent the total renewable energy resource requirement net of the specific solar requirement.

⁷ Based on the compliance status reports, the companies obtained RECs and S-RECs through several different methods including, but not limited to, self-generation, bilateral transactions, brokers, residential REC programs and the use of requests for proposals.

Attribute tracking systems act as electronic bookkeepers for RECs and S-RECs and maintain an accounting system that facilitates several regulatory processes including compliance verification.⁸ During the 2016 RPS compliance year, Ohio's EDUs and CRES providers used the following tracking systems to monitor their compliance efforts: the PJM Environmental Information Services Generation Attribute Tracking System (GATS) and the Midwest Renewable Energy Tracking System (M-RETS).⁹ The PUCO maintains a regulatory account with each tracking system that permits the PUCO to review the REC and S-REC data associated with each company's compliance efforts.¹⁰

Compliance obligations are a result of a company's historic retail electric sales in the state. As consumers continue to exercise their choice of electric providers, the compliance obligations are gradually shifting from EDUs to CRES providers. Pursuant to the EDUs and CRES providers' 2016 compliance filings, the EDUs were responsible for approximately twenty-seven percent (27.0%) of the overall compliance obligation in 2016 with seventy-three percent (73.0%) assignable to CRES providers.

The information in Table 1 below summarizes the 2016 compliance performances, as presented by the EDUs and CRES providers in their respective annual compliance status reports.¹¹ The 2016 RPS Report combines the details for the CRES providers to protect certain individual company data for which CRES providers have requested confidential treatment. As shown in Table 1, both the EDUs and CRES providers reported meeting, if not exceeding, their compliance obligations during 2016 for both solar and non-solar categories. As noted above, each company's compliance with the RPS is reviewed by the PUCO, and therefore the information contained in the status reports may be subsequently verified or modified based on the PUCO's review. Thus, the data provided in Table 1 is as filed by the companies, and not as verified or modified by the PUCO.

⁸ The tracking systems also provide an avenue for RECs and S-RECs to be retired, officially removing them from circulation and preventing any potential double-counting.

⁹ In 2016, Ohio's EDUs and CRES providers predominantly retired RECs and S-RECs through GATS, with only 1.4% of RECs and S-RECs retired through M-RETS.

¹⁰ PUCO staff utilized GATS and M-RETS data as the source for many of the charts in this report, with the data having been aggregated in places so as to not disclose specifics that may be deemed confidential.

¹¹ See R.C. 4928.64(C)(1); *see also*, Ohio Adm.Code 4901:1-40-05(A). Additionally, the individual compliance status reports can be accessed at the PUCO Ohio Renewable Energy Portfolio Standard web page (www.puco.ohio.gov/puco/renewables/) by clicking on the link to [Renewable portfolio standard status reports – 2016](#).

Table 1:**EDU and CRES Providers' Reported 2016 Compliance Data in Summary Form**

Company	Non-Solar (MWhs)		Solar (MWhs)	
	Total Required	Total Retired	Total Required	Total Retired
Cleveland Electric Illuminating	68,654	68,654	3,462	3,462
Dayton Power and Light	91,245	91,245	4,601	4,601
Duke	120,469	120,469	6,074	6,074
Ohio Edison	121,494	121,494	6,126	6,126
Ohio Power	255,461	255,461	12,880	12,880
Toledo Edison	59,140	59,140	2,982	2,982
EDU Totals	716,463	716,463	36,125	36,125
CRES Providers	1,959,463	1,966,125	98,703	99,021
TOTALS	2,675,926	2,682,588	134,828	135,146

A. Non-solar compliance

The figures reported by EDUs and CRES providers for all non-solar compliance show a total compliance obligation of 2,675,926 megawatt-hours (MWhs), which was exceeded as a result of over-compliance from some CRES providers.

B. Solar compliance

Based on information reported by EDUs and CRES providers, the total solar obligation for 2016 was 134,828 MWhs, which was exceeded as a result of over compliance from some CRES providers.

C. Additional details on 2016 compliance resources

The table and charts below provide further details on the state of origin and renewable resource categories used for compliance during the 2016 compliance year. Once a REC or S-REC is used for compliance, it is deemed “retired” in the GATS and M-RETS tracking systems. The below usage data of renewable resources during the compliance year is based on REC and S-REC retirement data gathered from GATS and MRETS.

Table 2:
2016 Ohio REC Retirements by State of Origin

Source: PJM GATS and MRETS Databases

	Ohio	Indiana	Kentucky	Michigan	West Virginia	Pennsylvania	Total
Total S-REC Retirements	69.49%	9.33%	1.19%	0.63%	0.31%	19.04%	100.0%
Total Non-solar REC Retirements	20.79%	24.41%	14.77%	1.72%	17.67%	20.63%	100.0%
Wind-Specific	37.31%	42.03%	---	---	1.03%	19.63%	100.0%
Biomass-Specific	28.68%	21.37%	47.13%	2.82%	---	---	100.0%
Hydro-Specific	1.36%	---	5.41%	---	50.82%	42.42%	100.0%

Chart 1:

Source: PJM GATS and MRETS Databases

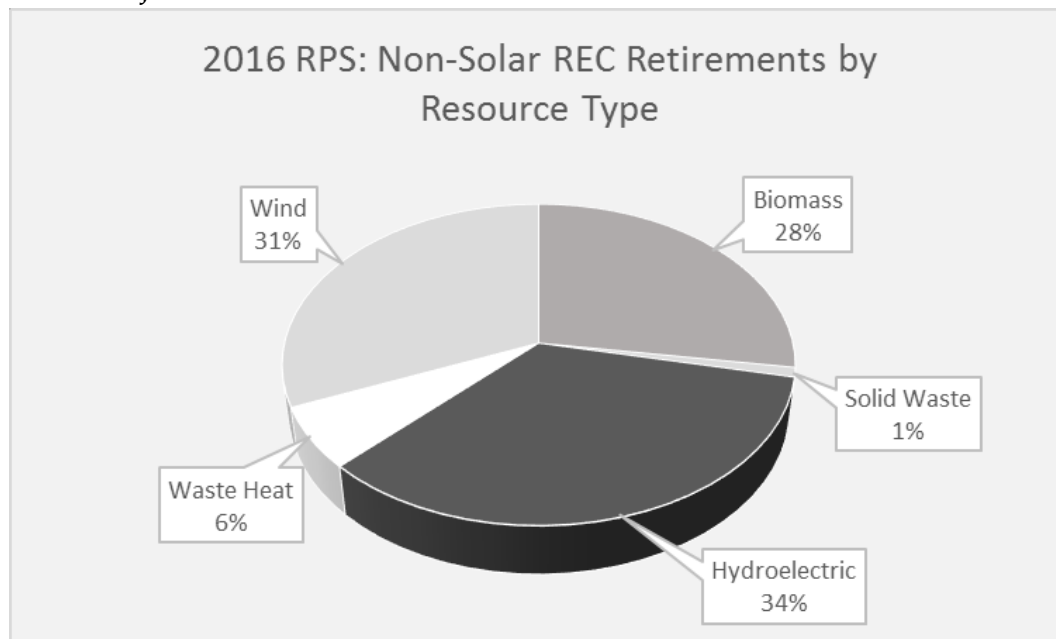


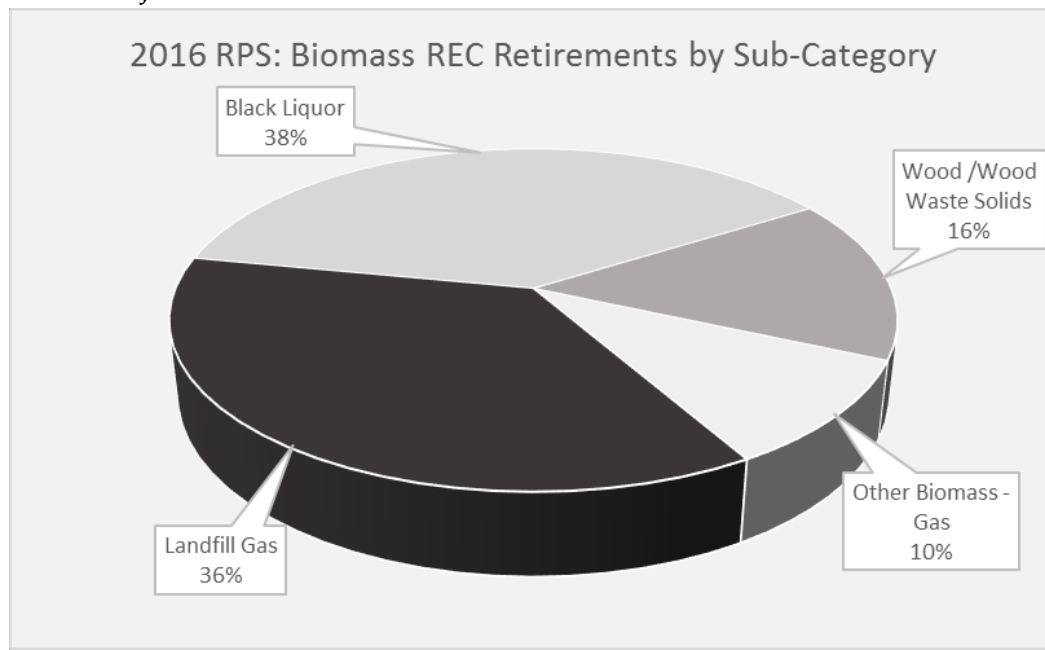
Chart 1 details the REC retirements by resource category from 2016. Biomass energy was a significant contributor to the 2016 REC retirements. By PUCO rule, biomass energy includes several different subcategories of energy produced from organic material derived from plants or animals and available on a renewable basis, including but not

limited to biologically derived methane gas, wood/wood waste solids, and sludge waste.¹²

Chart 2 details the different categories of biomass REC retirements for 2016. As shown by Chart 2, black liquor was the single largest subcategory. Landfill gas and wood/wood waste solids also contributed meaningfully to the volume of biomass REC retirements for 2016.¹³

Chart 2:

Source: PJM GATS Database¹⁴



III. 2016 AVERAGE REC COSTS

Ohio law requires that the RPS report describe, "... [t]he average annual cost of renewable energy credits purchased by utilities and companies for the year covered in the report."¹⁵ The PUCO received required cost information from many, but not all, of the CRES providers. PUCO staff used this average cost information reported by the EDUs and

¹² See Ohio Adm.Code 4901:1-40-01(E).

¹³ Not included in Chart 2 are other biomass-liquids and sludge waste, which together comprised 0.21%.

¹⁴ Biomass retirements were only reported in the PJM GATS database for the 2016 compliance year; no biomass retirements were reported in MRETS for that time.

¹⁵ See R.C. 4928.64(D)(2).

CRES providers, along with their respective compliance volumes reported in GATS and MRETS, to calculate weighted average costs for RECs used for 2016 compliance.¹⁶ This weighted average REC cost information is summarized in Table 3 below and divided into categories in recognition of the market differences between the REC and S-REC categories.

Table 3:¹⁷

EDU and CRES Providers' Reported 2016 REC and S-REC Cost Information

Category	Ohio EDUs Avg. \$/REC	Ohio CRES Providers Avg. \$/REC
Solar	\$112.08	\$75.90
Non-Solar	\$13.99	\$8.16

IV. STRATEGY AND POLICY CONSIDERATION

Ohio law requires that the RPS report describe any strategy for utility and company compliance, or encouraging the use of renewable energy resources to satisfy the state's electricity demand, with consideration of such factors as technology, costs, job creation, and economic impacts.¹⁸

A. Purchasing of RECs and S-RECs

With respect to EDU and CRES provider compliance, some entities have self-generated a portion of their needed compliance resources, but the predominant compliance strategy has been the purchase of RECs and S-RECs. The sellers in such instances could be numerous, including independent power producers, aggregators or brokers.

The procurement strategies for the purchase of RECs and S-RECs have varied from longer-term solicitations to spot purchases.¹⁹ The longer-term solicitations, often using an instrument such as a request for proposal, may offer greater assurance for a supply

¹⁶ For those companies for which the cost data were not available, the REC and S-REC volumes were excluded from the average cost calculations.

¹⁷ The costs in Table 3 are an average of the costs for RECs and S-RECs retired for 2016 compliance. As these RECs and S-RECs may have been purchased several years prior, the costs in the table should not be interpreted as indicative of current market costs.

¹⁸ See R.C. 4928.64(D)(3).

¹⁹ A longer-term solicitation typically seeks delivery of a renewable resource over a multi-year period, such as five to 20 years. A spot purchase, on the other hand, typically covers a much shorter period and may entail immediate delivery of the resource.

into the future. With such supply certainty, however, comes fixed prices that may preclude a buyer from recognizing any cost reductions in the REC or S-REC spot markets. The long-term renewable contracts have taken different forms including fully-bundled power purchase agreements as well as REC-only unbundled products.

Other companies have exhibited a preference for shorter-term transactions, in part due to uncertainty about their future sales and thus their future compliance obligations. Long-term cost recovery questions may also be a factor supporting a greater use of short-term transactions. Shorter-term transactions may offer greater flexibility, but can also expose a buyer to potential market price volatilities. A balanced approach may be used to address potential concerns of future supply that result from shorter commitments.

B. Excusing non-compliance

Ohio law permits EDUs and CRES providers to make a *force majeure* filing to the PUCO to excuse compliance with minimum benchmarks during times when sufficient quantities of renewable energy resources are not reasonably available in the market.²⁰ The PUCO received no *force majeure* requests in 2016.

C. Perceived impediments to compliance

PUCO rules require affected companies to submit a report annually that describes their non-binding compliance plans over a 10-year planning horizon.²¹ As part of this report, companies also address perceived impediments to achieving compliance with the RPS requirements and suggest means for addressing such impediments.

Most of the companies either did not mention any perceived impediments or mentioned that they believe there is a lack of perceived impediments in the near-term. However, a few companies did cite potential impediments to achieving compliance, including potential future supply and pricing constraints.

The companies offered no suggestions about how to address the perceived impediments.

²⁰ See R.C. 4928.64(C)(4)(a).

²¹ See Ohio Adm.Code 4901:1-40-03(C).

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Case No(s). 18-1840-EL-ACP

Summary: Application In the matter of the Renewable Portfolio Standard Report to the General Assembly for the 2016 Compliance Year electronically filed by Mr. Stuart M Siegfried on behalf of PUCO Staff

**RENEWABLE PORTFOLIO STANDARD REPORT
TO THE GENERAL ASSEMBLY
BY THE PUBLIC UTILITIES COMMISSION OF OHIO
FOR THE 2015 COMPLIANCE YEAR**

PUCO Case No. 17-0442-EL-ACP

www.puco.ohio.gov

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I. EXECUTIVE SUMMARY

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Substitute Senate Bill 310 (SB 310), which became effective on September 10, 2014, revised Ohio's AEPS and, among other things, eliminated the advanced energy provision.¹ Since the advanced energy provision was eliminated, the AEPS will now be referred to as the Renewable Portfolio Standard (RPS).

The Ohio Revised Code (R.C.) section enacting this legislation requires the Public Utilities Commission of Ohio (PUCO) to submit a report detailing information regarding renewable energy compliance with the statutory standards to the General Assembly.² Specifically:

The commission annually shall submit to the general assembly in accordance with section 101.68 of the Revised Code a report describing all of the following:

- (1) The compliance of electric distribution utilities and electric services companies with division (B) of this section;
- (2) The average annual cost of renewable energy credits purchased by utilities and companies for the year covered in the report;
- (3) Any strategy for utility and company compliance or for encouraging the use of qualifying renewable energy resources in supplying this state's electricity needs in a manner that considers available technology, costs, job creation, and economic impacts.

PUCO rules require EDUs and CRES providers to file by April 15 of each year, a renewable energy portfolio status report that analyzes all activities undertaken in the previous calendar year.³ The public may comment on the status report of each EDU and

¹ Additionally, SB 310 eliminated the requirement that 50% of renewable energy credits (RECs) come from in-state renewable facilities and froze the percentages of electric sales required to result from renewable sources at 2014 levels until 2017. Finally, in addition to the ability to use a compliance baseline based on a three year average of sales, an EDU or CRES provider can now choose to use compliance year sales as the compliance baseline.

² See R.C. 4928.64.

³ See Ohio Administrative Code (Ohio Adm.Code) 4901:1-40-05(A).

CRES provider within 30 days of its filing.⁴ While the PUCO reviews status reports for individual company compliance with the renewable energy requirements, the status reports also provide a substantial portion of information necessary for the RPS reports. The information contained in this report reflects the information as filed by the EDUs and CRES providers, and not necessarily as corrected and verified by PUCO review.⁵

The information required to be submitted by the PUCO to the General Assembly is contained herein as the PUCO's seventh annual General Assembly filing (2015 RPS Report). Section II summarizes the 2015 compliance efforts of the EDUs and CRES providers. Section III details the average costs of renewable energy credits (RECs) and solar RECs (S-RECs) used for compliance in 2015. Section IV considers the resources and strategy for encouraging the use of renewable energy resources.

II. 2015 COMPLIANCE ACTIVITIES

The RPS requirements are addressed most specifically in R.C. 4928.64, with additional supporting language found throughout R.C. Chapter 4928. To implement the RPS, the statute includes specific annual benchmarks, including a requirement for solar resources. The requirements for 2015, as specified by R.C. 4928.64(B)(2), were as follows:

Year	Renewable Energy Resources	Solar Energy Resources	Non-Solar Energy Resources⁶
2015	2.50%	0.120%	2.38%

Each EDU and CRES provider is subject to a compliance payment if it does not meet the annual benchmarks. EDUs and CRES providers may purchase RECs and S-RECs to comply with this rule and therefore RECs and S-RECs represent the compliance currency for Ohio's RPS.⁷

⁴ See Ohio Adm.Code 4901:1-40-05(B).

⁵ Staff reviews the information filed annually by each EDU and CRES provider in individual PUCO dockets, each of which is then accompanied by a Commission Finding and Order.

⁶ This report uses the term "non-solar energy resources" to represent the total renewable energy resource requirement net of the specific solar requirement.

⁷ Based on the compliance status reports, the companies obtained RECs and S-RECs through several different methods including, but not limited to, self-generation, bilateral transactions, brokers, residential REC programs and the use of requests for proposals.

Attribute tracking systems act as electronic bookkeepers for RECs and S-RECs and maintain an accounting system that facilitates several regulatory processes including compliance verification.⁸ During the 2015 RPS compliance year, Ohio's EDUs and CRES providers used the following tracking systems to monitor their compliance efforts: the PJM Environmental Information Services Generation Attribute Tracking System (GATS) and the Midwest Renewable Energy Tracking System (M-RETS).⁹ The PUCO maintains a regulatory account with each tracking system that permits the PUCO to review the REC and S-REC data associated with each company's compliance efforts.¹⁰

Compliance obligations are a result of a company's historic retail electric sales in the state. As consumers continue to exercise their choice of electric providers, the compliance obligations are gradually shifting from EDUs to CRES providers. Pursuant to the EDUs and CRES providers' 2015 compliance filings, the EDUs were responsible for approximately twenty-nine percent (29.0%) of the overall compliance obligation in 2015 with seventy-one percent (71.0%) assignable to CRES providers.

The information in Table 1 below summarizes the 2015 compliance performances, as presented by the EDUs and CRES providers in their respective annual compliance status reports.¹¹ The 2015 RPS Report combines the details for the CRES providers to protect certain individual company data for which CRES providers have requested confidential treatment. As shown in Table 1, both the EDUs and CRES providers reported meeting, if not exceeding, their compliance obligations during 2015 for both solar and non-solar categories. As noted above, each company's compliance with the RPS is reviewed by the PUCO, and therefore the information contained in the status reports may be subsequently verified or modified based on the PUCO's review. Thus, the data provided in Table 1 is as filed by the companies, and not as verified or modified by the PUCO.

⁸ The tracking systems also provide an avenue for RECs and S-RECs to be retired, officially removing them from circulation and preventing any potential double-counting.

⁹ In 2015, Ohio's EDUs and CRES providers predominantly tracked retired RECs and S-RECs through GATS, with only 5.4% of RECs and S-RECs tracked through M-RETS.

¹⁰ PUCO staff utilized GATS and M-RETS data as the source for many of the charts in this report, with the data having been aggregated in places so as to not disclose specifics that may be deemed confidential.

¹¹ See R.C. 4928.64(C)(1); *see also*, Ohio Adm.Code 4901:1-40-05(A). Additionally, the individual compliance status reports can be accessed at the PUCO Ohio Renewable and Advanced Energy Portfolio Standard web page (www.puco.ohio.gov/puco/renewables/) by clicking on the link to [Renewable portfolio standard status reports – 2015](#).

Table 1:**EDU and CRES Providers' Reported 2015 Compliance Data in Summary Form**

Company	Non-Solar (MWhs)		Solar (MWhs)	
	Total Required	Total Retired	Total Required	Total Retired
Cleveland Electric Illuminating	66,688	66,688	3,362	3,362
Dayton Power and Light	93,501	93,501	4,714	4,714
Duke	121,864	121,864	6,144	6,144
Ohio Edison	127,860	127,860	6,447	6,447
Ohio Power	298,592	298,592	15,055	15,055
Toledo Edison	59,005	59,005	2,975	2,975
EDU Totals	767,510	767,510	38,697	38,697
CRES Providers	1,744,591	1,749,482	88,577	88,790
TOTALS	2,512,101	2,516,992	127,274	127,487

A. Non-solar compliance

The figures reported by EDUs and CRES providers for all non-solar compliance show a total compliance obligation of 2,512,101 megawatt-hours (MWhs), which was exceeded as a result of over-compliance from some CRES providers.

B. Solar compliance

Based on information reported by EDUs and CRES providers, the total solar obligation for 2015 was 127,274 MWhs, which was exceeded as a result of over compliance from some CRES providers.

C. Additional details on 2015 compliance resources

The table and charts below provide further details on the state of origin and renewable resource categories used for compliance during the 2015 compliance year. Once a REC or S-REC is used for compliance, it is deemed “retired” in the GATS and M-RETS tracking systems. The below usage data of renewable resources during the compliance year is based on REC and S-REC retirement data gathered from GATS and MRETS.

Table 2:
2015 Ohio REC Retirements by State of Origin

Source: PJM GATS and MRETS Databases

	Ohio	Indiana	Kentucky	Michigan	West Virginia	Pennsylvania	Total
Total S-REC Retirements	70.4%	5.6%	0.1%	0.1%	0.3%	23.5%	100.0%
Total Non-solar REC Retirements	38.3%	21.2%	7.5%	0.3%	16.5%	16.2%	100.0%
Wind-Specific	30.5%	51.1%	-	-	1.1%	17.3%	100.0%
Biomass-Specific	70.4%	9.4%	20.2%	-	-	-	100.0%
Hydro-Specific	1.2%	-	-	-	60.2%	38.6%	100.0%

Chart 1:

Source: PJM GATS and MRETS Databases

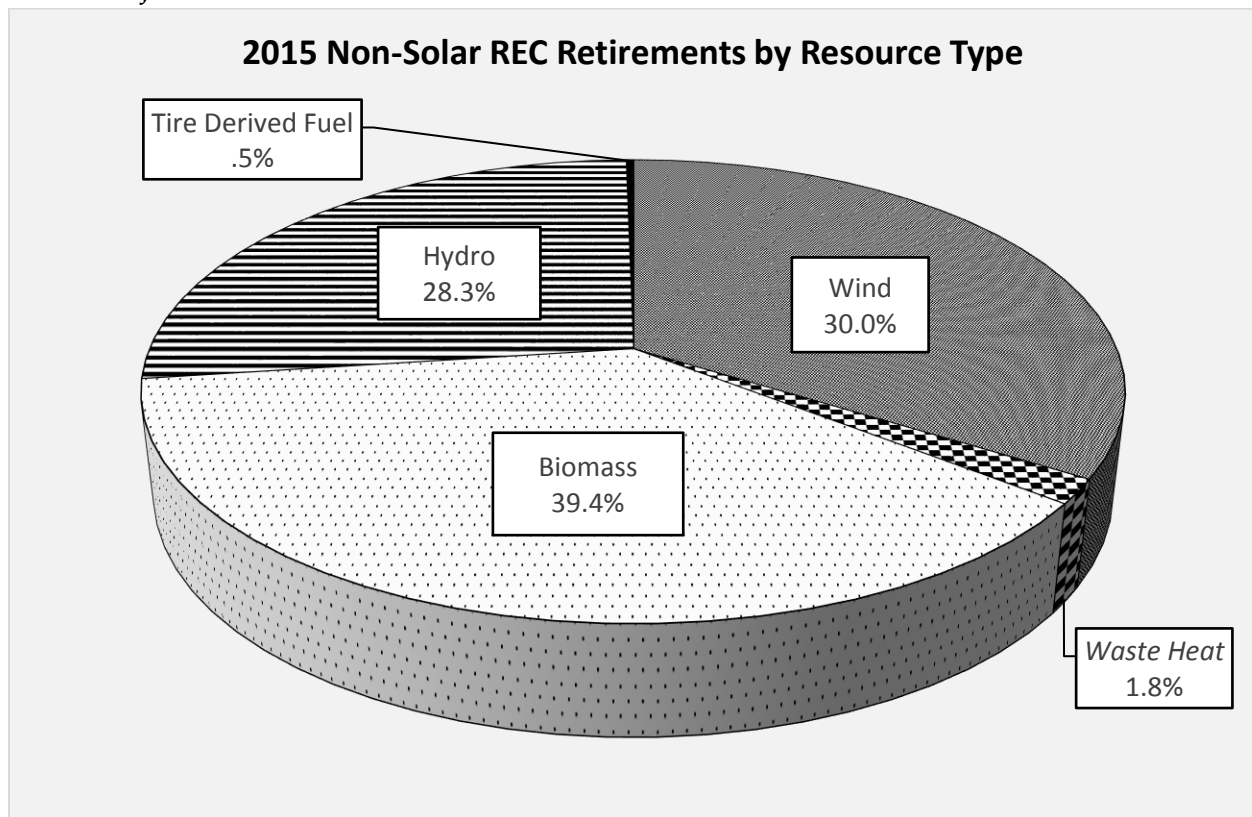


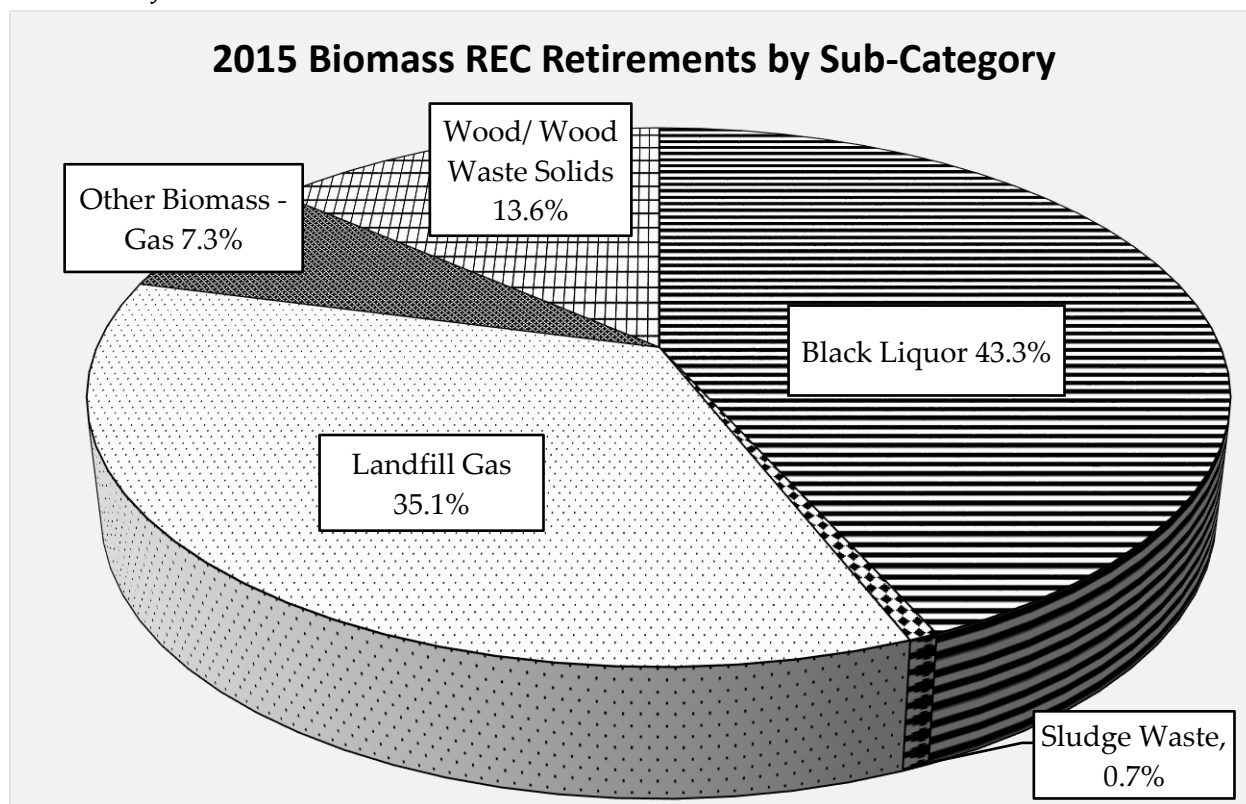
Chart 1 details the REC retirements by resource category from 2015. Biomass energy was a significant contributor to the 2015 REC retirements. By PUCO rule, biomass energy includes several different subcategories of energy produced from organic material derived from plants or animals and available on a renewable basis, including but not limited to biologically derived methane gas, wood/wood waste solids, and sludge waste.¹²

Chart 2 details the different categories of biomass RECs retired for 2015. As shown by Chart 2, black liquor was the single largest subcategory. Landfill gas and wood/wood waste solids also contributed meaningfully to the volume of biomass RECs retired for 2015.

¹² See Ohio Adm.Code 4901:1-40-01(E).

Chart 2:

Source: PJM GATS Database¹³



2015 AVERAGE REC COSTS

Ohio law requires that the RPS report describe, "... [t]he average annual cost of renewable energy credits purchased by utilities and companies for the year covered in the report."¹⁴ The PUCO received required cost information from many, but not all, of the CRES providers. PUCO staff used this average cost information reported by the EDUs and CRES providers, along with their respective compliance volumes reported in GATS and MRETS, to calculate weighted average costs for RECs used for 2015 compliance.¹⁵ This weighted average REC cost information is summarized in Table 3 below and divided into categories in recognition of the market differences between the REC and S-REC categories.

¹³ Biomass retirements were only reported in the PJM GATS database for the 2015 compliance year; no biomass retirements were reported in MRETS for that time.

¹⁴ See R.C. 4928.64(D)(2).

¹⁵ For those companies for which the cost data were not available, the REC and S-REC volumes were excluded from the average cost calculations.

Table 3:¹⁶

EDU and CRES Providers' Reported 2015 REC and S-REC Cost Information

Category	Ohio EDUs Avg. \$/REC	Ohio CRES Providers Avg. \$/REC
Solar	\$168.21	\$93.86
Non-Solar	\$15.47	\$9.07

III. STRATEGY AND POLICY CONSIDERATION

Ohio law requires that the RPS report describe any strategy for utility and company compliance, or encouraging the use of renewable energy resources to satisfy the state's electricity demand, with consideration of such factors as technology, costs, job creation, and economic impacts.¹⁷

A. Purchasing of RECs and S-RECs

With respect to EDU and CRES provider compliance, some entities have self-generated a portion of their needed compliance resources, but the predominant compliance strategy has been the purchase of RECs and S-RECs. The sellers in such instances could be numerous, including independent power producers, aggregators or brokers.

The procurement strategies for the purchase of RECs and S-RECs have varied from longer-term solicitations to spot purchases.¹⁸ The longer-term solicitations, often using an instrument such as a request for proposal, may offer greater assurance for a supply into the future. With such supply certainty, however, comes fixed prices that may preclude a buyer from recognizing any cost reductions in the REC or S-REC spot markets. The long-term renewable contracts have taken different forms including fully-bundled power purchase agreements as well as REC-only unbundled products.

Other companies have exhibited a preference for shorter-term transactions, in part due to uncertainty about their future sales and thus their future compliance obligations.

¹⁶ The costs in Table 3 are an average of the costs for RECs and S-RECs retired for 2015 compliance. As these RECs and S-RECs may have been purchased several years prior, the costs in the table should not be interpreted as indicative of current market costs.

¹⁷ See R.C. 4928.64(D)(3).

¹⁸ A longer-term solicitation typically seeks delivery of a renewable resource over a multi-year period, such as five to 20 years. A spot purchase, on the other hand, typically covers a much shorter period and may entail immediate delivery of the resource.

Long-term cost recovery questions may also be a factor supporting a greater use of short-term transactions. Shorter-term transactions may offer greater flexibility, but can also expose a buyer to potential market price volatilities. A balanced approach may be used to address potential concerns of future supply that result from shorter commitments.

B. Excusing non-compliance

Ohio law permits EDUs and CRES providers to make a *force majeure* filing to the PUCO to excuse compliance with minimum benchmarks during times when sufficient quantities of renewable energy resources are not reasonably available in the market.¹⁹ The PUCO received no *force majeure* requests in 2015.

C. Perceived impediments to compliance

PUCO rules require affected companies to submit a report annually that describes their non-binding compliance plans over a 10-year planning horizon.²⁰ As part of this report, companies also address perceived impediments to achieving compliance with the RPS requirements and suggest means for addressing such impediments.

Most of the companies either did not mention any perceived impediments or mentioned that they believe there is a lack of perceived impediments in the near-term. However, a few companies did cite potential impediments to achieving compliance. Impediments listed in the 2015 compliance status reports included, but were not limited to, the following concerns:

- Potential future supply and pricing constraints;
- Changes in Ohio law or PUCO rules that may limit the supply of qualified resources or expand the amount of qualified resources required which could create supply constraints that could impede a company's ability to achieve compliance.

The companies offered no suggestions about how to address the perceived impediments.

¹⁹ See R.C. 4928.64(C)(4)(a).

²⁰ See Ohio Adm.Code 4901:1-40-03(C).

The Public Utilities Commission of Ohio

John R. Kasich, Governor

Asim Z. Haque, Chairman

180 E. Broad Street, Columbus, Ohio 43215-3793

800 | 686-PUCO (7826)

An Equal Opportunity Employer and Service Provider

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Case No(s). 17-0442-EL-ACP

Summary: Report - Electronic version of the FINAL Renewable Portfolio Standard Report for Compliance Year 2015 filed on behalf of the Commission. - electronically filed by Sandra Coffey on behalf of Richard Bulgrin, Attorney Examiner, Public Utilities Commission of Ohio

Queue Number	Name	State	County	Status	Transmission Owner	MFO	MW Energy	MW Capacity	Capacity or Energy	Project Type	Fuel	Projected In Service Date
AB2-083	Delano 138kV	OH	Ross	Active	AEP	40	40	27.2	Capacity	Generation Interconnection	Solar	10/31/2017
AB2-085	Adams 138kV	OH	Adams	Active	AEP	80	80	54.4	Capacity	Generation Interconnection	Solar	10/31/2017
AB2-170	East Lima-Marysville 345kV	OH	Hardin	Active	AEP	130	130	49.4	Capacity	Generation Interconnection	Solar	12/31/2018
AC1-001	Delano 138kV	OH	Ross	Active	AEP	80	80	54.4	Capacity	Generation Interconnection	Solar	10/31/2017
AC1-082	Ravenswood-Hemlock 69kV	OH	Meigs	Active	AEP	48	48	29	Capacity	Generation Interconnection	Solar	5/1/2018
AC1-089	Hillsboro-Wildcat 138kV	OH	Highland	Active	AEP	150	150	57	Capacity	Generation Interconnection	Solar	10/1/2020
AC1-167	Mark Center 69kV	OH	Defiance	Active	AEP	49.9	49.9	33.6	Capacity	Generation Interconnection	Solar	12/1/2019
AC1-188	Rio-Lick 138kV	OH	Jackson	Active	AEP	70	70	46.6	Capacity	Generation Interconnection	Solar	12/31/2017
AC1-194	Elk 138kV	OH	Vinton	Active	AEP	125	125	47.5	Capacity	Generation Interconnection	Solar	12/31/2018
AC2-015	Chatfield-Howard 138kV	OH	Crawford	Active	AEP	117	117	53.55	Capacity	Generation Interconnection	Solar	12/31/2019
AC2-029	Circleville 138kV	OH	Pickaway	Active	AEP	70	70	26.6	Capacity	Generation Interconnection	Solar	12/31/2018
AC2-035	Lick-Firebrick 69kV	OH	Jackson	Active	AEP	49	49	29.4	Capacity	Generation Interconnection	Solar	6/1/2019
AC2-036	Ravenswood-East Bashan Switch 69kV	OH	Meigs	Active	AEP	0	20	12	Capacity	Generation Interconnection	Solar	6/1/2020
AC2-038	Lee 69kV	OH	Athens	Active	AEP	20	20	12	Capacity	Generation Interconnection	Solar	6/1/2019
AC2-044	Maddox Creek 345kV	OH	Van Wert	Active	AEP	20	20	7.6	Capacity	Generation Interconnection	Solar	12/31/2018
AC2-048	Sporn 138kV	OH	Meigs	Active	AEP	60	60	22.8	Capacity	Generation Interconnection	Solar	12/31/2018
AC2-055	Buckskin-Petersburg 69kV	OH	Highland	Active	AEP	47.5	47.5	18.05	Capacity	Generation Interconnection	Solar	7/1/2019
AC2-059	Biers Run-Circleville 138kV	OH	Ross	Active	AEP	127	127	62.5	Capacity	Generation Interconnection	Solar	12/31/2019
AC2-060	Buckskin 69kV	OH	Ross	Active	AEP	100	100	64	Capacity	Generation Interconnection	Solar	12/31/2019
AC2-061	Hillsboro-Clinton 138kV	OH	Ross	Active	AEP	117	117	58.1	Capacity	Generation Interconnection	Solar	12/31/2019
AC2-064	Hillsboro-Millbrook 138kV	OH	Highland	Active	AEP	115	115	69	Capacity	Generation Interconnection	Solar	6/1/2019
AC2-087	Buckskin 69kV	OH	Ross	Active	AEP	85	85	47.4	Capacity	Generation Interconnection	Solar	5/31/2019
AC2-111	College Corner 138kV	OH	Preble	Active	AEP	80	80	30.4	Capacity	Generation Interconnection	Solar	7/1/2019
AD1-015	Frazeysburg 138 kV	OH	Muskingum	Active	AEP	150	150	57	Capacity	Generation Interconnection	Solar	6/1/2019
AD1-072	Biers Run-Circleville 138 kV	OH	Ross	Active	AEP	147	20	13.7	Capacity	Generation Interconnection	Solar	6/1/2020
AD1-073	Buckskin 69 kV	OH	Ross	Active	AEP	120	20	13.2	Capacity	Generation Interconnection	Solar	6/1/2020
AD1-101	Continental 69 kV	OH	Putnam	Active	AEP	49.9	49.9	18.96	Capacity	Generation Interconnection	Solar	10/31/2020
AD1-106	North Waldo-Wild Creek 138 kV	OH	Marion	Active	AEP	60	60	22.8	Capacity	Generation Interconnection	Solar	6/12/2019
AD1-119	Payne 69 kV	OH	Paulding	Active	AEP	49.9	49.9	18.96	Capacity	Generation Interconnection	Solar	10/31/2020
AD1-130	Hardin Switch 345 kV	OH	Hardin	Active	AEP	170	170	115	Capacity	Generation Interconnection	Solar	12/31/2019
AD1-141	S. Lucasville-Wakefield 138 kV	OH	Scioto	Active	AEP	50	50	30	Capacity	Generation Interconnection	Solar	12/1/2019
AD2-014	Steubenville-Tidd 138 kV	OH	Jefferson	Active	AEP	53.3	53.325	22.4	Capacity	Generation Interconnection	Solar	12/31/2019
AD2-016	Biers Run-Circleville 138 kV	OH	Ross	Active	AEP	274	127	62.5	Capacity	Generation Interconnection	Solar	12/31/2020
AD2-067	Centerburg 138kV	OH	Licking	Active	AEP	150	150	57	Capacity	Generation Interconnection	Solar	11/1/2021
AD2-086	Marysville-East Lima 345kV	OH	Hardin	Active	AEP	230	230	138	Capacity	Generation Interconnection	Solar	12/31/2020
AD2-092	Marysville 345kV	OH	Union	Active	AEP	175	175	105	Capacity	Generation Interconnection	Solar	12/31/2020
AD2-093	Marysville 345kV	OH	Union	Active	AEP	225	225	135	Capacity	Generation Interconnection	Solar	12/31/2020
AD2-162	Biers Run-Circleville 138kV	OH	Pickaway	Active	AEP	110	110	73.81	Capacity	Generation Interconnection	Solar	12/1/2021
AE1-008	College Corner 138 kV	OH	Preble	Active	AEP	100	20	7.6	Capacity	Generation Interconnection	Solar	7/1/2019
AE1-090	Hardin Switch 345 kV	OH	Hardin	Active	AEP	50	50	21.56	Capacity	Generation Interconnection	Solar	12/31/2021
AE1-091	West Newton-Lynn 138 kV	OH	Hardin	Active	AEP	110	110	46.93	Capacity	Generation Interconnection	Solar	12/31/2021
AE1-102	Maddox Creek 345 kV	OH	Van Wert	Active	AEP	26	26	15.6	Capacity	Generation Interconnection	Solar	12/31/2021
AE1-146	Ebersole #2-Fostoria Central 138 kV	OH	Hancock	Active	AEP	120	120	81.8	Capacity	Generation Interconnection	Solar	5/1/2020
AE1-227	Cumberland 69 kV	OH	Guernsey	Active	AEP	49.5	49.5	30.69	Capacity	Generation Interconnection	Solar	9/30/2021

PJM Interconnection, L.L.C.
Rate Schedule FERC No. 44

RELIABILITY ASSURANCE AGREEMENT

Among

LOAD SERVING ENTITIES

in the

PJM REGION

ARTICLE 2 -- PURPOSE

This Agreement is intended to ensure that adequate Capacity Resources, including planned and Existing Generation Capacity Resources, planned and existing Demand Resources, and Energy Efficiency Resources will be planned and made available to provide reliable service to loads within the PJM Region, to assist other Parties during Emergencies and to coordinate planning of such resources consistent with the Reliability Principles and Standards. Further, it is the intention and objective of the Parties to implement this Agreement in a manner consistent with the development of a robust competitive marketplace. To accomplish these objectives, this Agreement is among all of the Load Serving Entities within the PJM Region. Unless this Agreement is terminated as provided in Section 3.3, every entity which is or will become a Load Serving Entity within the PJM Region is to become and remain a Party to this Agreement or to an agreement (such as a requirements supply agreement) with a Party pursuant to which that Party has agreed to act as the agent for the Load Serving Entity for purposes of satisfying the obligations under this Agreement related to the load within the PJM Region of that Load Serving Entity. Nothing herein is intended to abridge, alter or otherwise affect the emergency powers the Office of the Interconnection may exercise under the Operating Agreement and PJM Tariff.

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Case No(s). 18-0501-EL-FOR, 18-1392-EL-RDR, 18-1393-EL-ATA

Summary: Text Direct Testimony of Frank Lacey electronically filed by Ms. Rebekah J. Glover on behalf of Direct Energy, LP