

EXHIBIT NO. _____

BEFORE
THE PUBLIC UTILITIES COMMISSION OF OHIO

In the Matter of the Long-Term)	
Forecast Report of Ohio Power Company)	
And Related Matters)	Case No. 18-501-EL-FOR

DIRECT TESTIMONY OF
KAMRAN ALI
ON BEHALF OF
OHIO POWER COMPANY

Filed: September 19, 2018

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KAMRAN ALI

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BEFORE
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DIRECT TESTIMONY OF
KAMRAN ALI
ON BEHALF OF
OHIO POWER COMPANY

1 **PERSONAL DATA**

2 **Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

3 A. My name is Kamran Ali, and my business address is 8500 Smiths Mill Road, New
4 Albany, Ohio 43054.

5 **Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?**

6 A. I am employed by the American Electric Power Service Corporation (AEPSC) as
7 Director of Transmission Planning. AEPSC supplies engineering, financing, accounting,
8 planning, advisory, and other services to the subsidiaries of the American Electric Power
9 (AEP) system, one of which is Ohio Power Company (“AEP Ohio” or “the Company”).

10 **Q. WOULD YOU PLEASE DESCRIBE YOUR EDUCATIONAL AND**
11 **PROFESSIONAL BACKGROUND?**

12 A. Yes. I received a Bachelor of Science – Electrical Engineering degree from the
13 University of Alabama in Tuscaloosa, Alabama and a Master of Science – Electrical
14 Engineering degree from Kansas State University in Manhattan, Kansas. I also received
15 a Master of Business Administration degree from Ohio University in Athens, Ohio. I was
16 employed by SMC Electrical in 2004 as an electrical engineer. In 2006, I joined AEP as
17 a Substation Engineer. In 2007, I transferred to Transmission Planning, where I
18 advanced through increasing levels of responsibility. In June 2016, I assumed the
19 position of Director of Transmission Planning.

1 **Q. WHAT ARE YOUR RESPONSIBILITIES AS DIRECTOR OF TRANSMISSION**
2 **PLANNING?**

3 A. My responsibilities include organizing and managing all activities related to assessing the
4 adequacy of AEP's transmission network in the PJM Interconnection, LLC (PJM)
5 Regional Transmission Organization (RTO) region to meet the needs of its customers in a
6 reliable, cost-effective, and environmentally compatible manner. Additionally, I support
7 regulatory reporting requirements, such as the Company's annual Long-Term Forecast
8 Report (LTFR) and Electric Service and Safety Standards Report.

9 **Q. HAVE YOU PREVIOUSLY SUBMITTED TESTIMONY IN ANY REGULATORY**
10 **PROCEEDINGS?**

11 A. Yes. I have submitted testimony before the Indiana Utility Regulatory Commission, the
12 Michigan Public Service Commission, the Kentucky Public Service Commission, and the
13 Pennsylvania Public Utility Commission on behalf of various other electric operating
14 companies of the AEP system.

15 **PURPOSE OF TESTIMONY**

16 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

17 A. The purpose of my testimony is to 1) explain the framework and the results of an analysis
18 that the Company performed to determine the impact new renewable generation projects
19 would have on Locational Marginal Pricing (LMPs); 2) provide an overview of how the
20 AEP Transmission system is planned and operated; and 3) support certain information
21 included with this amended LTFR filing to meet the requirements as set forth in Ohio
22 Adm. Code 4901:5-5-04(D).

1 **LOCATIONAL MARGINAL PRICING ANALYSIS**

2 **Q. PLEASE PROVIDE A GENERAL OVERVIEW OF LMPS AND HOW THEY**
3 **ARE USED.**

4 A. Locational Marginal Pricing is a method of pricing the cost of congestion into electricity
5 prices with the aim of encouraging the efficient use of the transmission system by
6 assigning costs to users based on the way that energy is actually delivered. PJM uses
7 LMPs to set prices for energy purchases and sales in the PJM market and to price
8 transmission congestion costs. Congestion occurs when heavy use of the transmission
9 grid causes parts of the grid to operate at their limits, resulting in the lowest-priced
10 energy being prevented from freely flowing to a specific area of the grid. Therefore,
11 LMPs form the basis for payments to generators and payments by buyers in the PJM
12 electricity market and other such markets in the US. Generators are paid the LMP at their
13 node for electric energy produced, and buyers pay the LMP at their node for electric
14 energy consumed.

15 **Q. WOULD ADDING NEW GENERATION IN OHIO IMPACT THE COMPANY'S**
16 **TRANSMISSION SYSTEM AND THE LMP?**

17 A. Adding a new generation resource could potentially impact the transmission system in a
18 number of ways. For example, the existing transmission system may need to be modified
19 to accommodate the new generation resource. These modifications could take the form
20 of adding new transmission facilities, modifying existing transmission facilities, or a
21 combination of these options. However, as I described earlier, AEP Transmission is
22 responsible for reviewing these types of impacts and planning accordingly to ensure the
23 reliability of the Company's transmission system. The tool that AEP Transmission uses

1 to determine the economic and market efficiency impact of a new generation resource,
2 utilizing LMP analysis, is described below. The same tool is used by PJM to assess
3 performance market efficiency improvements.

4 **Q. PLEASE DESCRIBE THE ANALYTICAL FRAMEWORK EMPLOYED FOR**
5 **EVALUTION OF LOCATIONAL MARGINAL PRICING.**

6 A. The analytical framework utilizes the latest PROMOD[®] model to perform simulations of
7 the PJM region using PJM transmission, generation resources, and load data developed as
8 part of PJM's Market Efficiency Analysis. PROMOD is fundamental electric market
9 simulation software which incorporates future demand, generating unit operating
10 characteristics, transmission grid topology and constraints. PROMOD produces a
11 security-constrained unit commitment and economic dispatch while optimizing
12 production cost bids. For over 40 years, the energy industry has relied on PROMOD for
13 a variety of applications including LMP forecasting. PROMOD analysis is a critical
14 component of the PJM Regional Transmission Expansion Process (RTEP) and drives the
15 Market Efficiency RTEP Planning Component. The Market Efficiency component
16 includes the analysis of the economic efficiency of PJM's energy and capacity markets
17 associated with determining RTEP market efficiency upgrades. The PROMOD model
18 determines the hourly LMPs for both generation and load based on the incremental
19 energy cost of the last MWhs produced and the congestion-related cost resulting from
20 any transmission capacity limitations. This method provides a good forecast of the
21 impact that adding renewable projects will have on PJM LMPs, including LMPs specific
22 to PJM's load.

PJM's Market Efficiency data model is initially seeded with a base release of the PROMOD Simulation Ready Data NERC (North American Electric Reliability Corporation) Database for the Eastern Interconnection. This will provide for a fully loaded PROMOD Database of the Eastern Interconnection set-up with generation and load and a corresponding bus level transmission representation that can be run within PROMOD. This base release model is then modified by PJM to provide a more current view of PJM market fundamentals and to provide an updated transmission model.

Q. PLEASE DESCRIBE HOW THE RENEWABLES IMPACT WAS COMPUTED.

A. To evaluate the impact of new renewable projects on LMPs, the Company utilized an analytical framework comprising two cases. The first case represents the base case, which is an unmodified version of the model developed by PJM for Market Efficiency Analysis. The second case, referred to as the Study Case, models three new renewable projects (one wind and two solar projects). The new renewable projects have characteristics similar to existing projects in the model, of similar technology (wind or solar), geographically closest to the proposed locations. This case shows the change in LMPs for years 2021, 2024, and 2027 resulting from adding 650 MW of renewable projects in Ohio. Figure 1 shows the reduction in LMPs for the AEP zone as well as the reduction in total yearly energy cost for the AEP zone.

Figure 1

AEP Zone	2021	2024	2027
LMP Savings (\$/MWh)	0.050	0.043	0.062
Average Energy Use (GWh)	133,952	136,721	138,989
LMP Savings/Yr (\$)	6,716,561	5,877,571	8,599,389

1 The LMP Savings/Yr values in the last row are obtained by multiplying the LMP Savings
2 in the second row and the Average Energy Use in the third row of Figure 1. Average
3 Energy Use was obtained directly from the PROMOD model provided by PJM.

4 **Q. PLEASE SUMMARIZE THE RESULTS OF YOUR ANALYSIS.**

5 A. Applying the methodology outlined above, my analysis shows that adding renewable
6 resources to the Company's system (Study Case) has the effect of lowering LMPs when
7 compared to the base case. Company witness Torpey used this information to perform an
8 analysis that shows the impact that lower LMPs have on the PJM market over the life of
9 the renewable projects. In addition, Company witness Torpey calculated the expected
10 savings to the AEP Ohio load resulting from these lower LMPs.

11 **THE COMPANY'S TRANSMISSION SYSTEM**

12 **Q. PLEASE DESCRIBE THE COMPANY'S TRANSMISSION SYSTEM.**

13 A. The AEP eastern transmission system (eastern zone) consists of the transmission facilities
14 of the ten eastern AEP operating or Transmission companies (APCo, Ohio Power
15 Company, Indiana Michigan Power, Kentucky Power Company, Wheeling Power
16 Company, Kingsport Power Company, AEP Indiana Michigan Transmission Company,
17 AEP Kentucky Transmission Company, AEP Ohio Transmission Company, and AEP
18 West Virginia Transmission Company). This portion of the transmission system is
19 composed of approximately 14,600 miles of circuitry operating at or above 100kV. The
20 eastern zone includes over 2,100 miles of 765kV transmission lines overlaying 3,500
21 miles of 345kV lines and over 8,700 miles of 138kV circuitry. This expansive system
22 allows the economical and reliable delivery of electric power to approximately

1 21,660MW of customer demand connected to the AEP eastern transmission system that
2 takes transmission service under the PJM open access transmission tariff.

3 As a result of the AEP eastern transmission system's geographical location and
4 expanse as well as its numerous interconnections, the eastern transmission system can be
5 influenced by both internal and external factors. Facility outages, load changes, or
6 generation re-dispatch on neighboring companies' systems, in combination with power
7 transactions across the interconnected network, can affect power flows on AEP's
8 transmission facilities. As a result, the AEP eastern transmission system is designed and
9 operated to perform adequately even with the outage of its most critical transmission
10 elements or the unavailability of generation. The eastern transmission system conforms
11 to the NERC Reliability Standards and applicable ReliabilityFirst Corporation (RFC)
12 standards and performance criteria.

13 The system is a highly networked grid that delivers electricity from generation
14 sources to the retail and wholesale consumers served by AEP Ohio. In Ohio, AEP Ohio
15 and AEP Ohio Transmission Company, Inc. have approximately 8,400 circuit miles that
16 range in voltage levels from 23 kV to 765 kV. These facilities can be divided into three
17 categories based on voltage level: extra high voltage (EHV), transmission, and sub-
18 transmission. The transmission system stretches over 10,000 square miles of the
19 Company's service territory, crisscrossing much of the state, including central Ohio.

20 Because the transmission maps as required by Ohio Adm. Code 4901:5-5-04
21 (D)(2)(a), (b), and (c) contain critical energy infrastructure information, they will be

made available upon request at AEP Ohio's offices pursuant to the Commission's LTFR rules.¹

TRANSMISSION PLANNING AND OPERATION PROCESS

Q. HOW IS THE COMPANY'S TRANSMISSION SYSTEM PLANNED AND OPERATED?

A. The Company's transmission system is part of the AEP eastern transmission system. Planning and operation of the system is integrated through the coordinated efforts of the AEP Transmission Department (AEP Transmission), a business unit of AEPSC, and PJM. AEP Transmission works closely with neighboring utilities, other interconnected entities, and PJM to plan and operate the transmission grid. RTOs align the transmission planning and operating requirements set out in each RTO's protocols and operating criteria, as further defined through NERC requirements. The Company has input into the RTO planning process through AEP Transmission. Additional details related to AEP's transmission planning criteria are available on AEP's website.²

Forms FE-T1 through T-8 as well as Forms FE T-9 and FE-T10 included in the Company's LTFR provide information regarding various aspects of the Company's transmission forecast.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

¹ Ohio Adm. Code 4901:5-5-04(A)

²

http://www.aep.com/about/codeofconduct/OASIS/TransmissionStudies/docs/2018/4%20AEP_East%20FERC%20715_2018_Final_Part%204.pdf

CERTIFICATE OF SERVICE

In accordance with Rule 4901-1-05, Ohio Administrative Code, the PUCO's e-filing system will electronically serve notice of the filing of this document upon the following parties. In addition, I hereby certify that a service copy of the foregoing *Direct Testimony of Kamran Ali* was sent by, or on behalf of, the undersigned counsel to the following parties of record this 19th day of September, 2018.

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This foregoing document was electronically filed with the Public Utilities

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Case No(s). 18-0501-EL-FOR

Summary: Testimony - Direct Testimony of Kamran Ali submitted by Ohio Power Company electronically filed by Mr. Steven T Nourse on behalf of Ohio Power Company