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CORPORATION COMMISSION
OF OKLAHOMA

BEFORE THE CORPORATION COMMISSION OF THE STATE OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY)
OF OKLAHOMA ("PSO") FOR APPROVAL OF THE)
COST RECOVERY OF THE WIND CATCHER)
ENERGY CONNECTION PROJECT; A)
DETERMINATION THERE IS A NEED FOR THE)
PROJECT; APPROVAL FOR FUTURE INCLUSION IN) CAUSE NO. PUD 201700267
BASE RATES COST RECOVERY OF)
PRUDENT COSTS INCURRED BY PSO FOR THE)
PROJECT; APPROVAL OF A TEMPORARY COST)
RECOVERY RIDER; APPROVAL OF CERTAIN)
ACCOUNTING PROCEDURES REGARDING)
FEDERAL PRODUCTION TAX CREDITS; WAIVER)
OF OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)
THE COMMISSION DEEMS PSO IS ENTITLED)

RESPONSIVE TESTIMONY OF

FRANK MOSSBURG

ON BEHALF OF

THE OKLAHOMA CORPORATION COMMISSION STAFF

DECEMBER 4, 2017

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I. QUALIFICATIONS

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

A. My name is Frank Mossburg. I am a Managing Director with Bates White Economic Consulting (Bates White). My business address is 1300 Eye Street, NW, Suite 600, Washington, DC 20005.

Q. What is your relationship to the Oklahoma Corporation Commission Public Utility Division Staff (Staff)?

A. Bates White was hired to assist Staff by providing expert witness services regarding the application of Public Service Company of Oklahoma (PSO, or, the Company) for certain requested relief related to the Wind Catcher Energy Connection Project (the Wind Catcher Project, or, the Project). The views expressed herein are my own.

Q. Please summarize your educational background.

A. I earned my MBA from the University of Virginia's Darden School of Business and my undergraduate degree in economics, *cum laude*, with a concentration in finance from the Wharton School of the University of Pennsylvania.

Q. Please summarize your relevant professional experience.

A. I have extensive experience providing advice to state commissions on resource choice decisions, with a specialty in the design, implementation and monitoring of competitive procurements for both traditional and renewable fuels. My experience covers the full

1 range of tasks including resource planning, bid evaluation, and contract negotiation. The
2 majority of my experience was with Boston Pacific Company, Inc. (Boston Pacific). On
3 November 1, 2016 Boston Pacific entered into a strategic combination with Bates White.

4
5 On behalf of the Oregon Public Utility Commission, I helped lead efforts to serve as the
6 Independent Evaluator (IE) for five request for proposals (RFPs) from PacifiCorp (2012
7 Baseload, 2008 and 2012 All Source, 2008R-1 and 2009R Renewable RFPs) and am
8 currently leading our work as the IE for PacifiCorp's 2017R Renewables RFP. This
9 work included the review of dozens of proposed wind projects and, in the current RFP,
10 wind projects plus a planned transmission expansion. In each of these engagements I
11 participated in the entire RFP process, including: (a) reviewing the design of the RFP; (b)
12 qualifying, reviewing, and scoring both third-party and company-sponsored bids; (c)
13 recommending initial and final shortlists of bids; and (d) monitoring negotiations of
14 power purchase agreements and asset purchase agreements. For each of these
15 engagements I authored or co-authored reports and appeared before the Oregon
16 Commission to make recommendations regarding RFP design, bid evaluation, selection
17 of winning bids, and contract negotiations.

18
19 On behalf of the Maryland Public Service Commission, I served as the day-to-day lead in
20 efforts to: (a) analyze the reliability outlook in the state and identify resources best suited
21 to mitigate reliability issues; (b) design a RFP targeted to attracting those resources; (c)
22 conduct a procurement for new locally-sited, long-term resources; (d) evaluate and rank
23 proposals received; and (e) negotiate a final contract with the winning bidder. When the

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1 procurement was challenged in Federal District Court I prepared an expert report
2 regarding the design and conduct of the procurement.
3

4 I have led our work serving as IE on behalf of the California Public Utilities Commission
5 for transactions from Pacific Gas & Electric (PG&E), including the Renewable Auction
6 Mechanism V and VI request for offers seeking long-term supply from renewable
7 resources. I currently lead our work serving as the IE for San Diego Gas & Electric
8 (SDG&E)'s 2017 Fall Green Tariff Shared Renewables Solicitation.
9

10 I also have extensive experience in the design and monitoring of full requirements
11 procurements. I lead or have led efforts as independent evaluators in multiple
12 engagements on behalf of commissions in: (a) Ohio since 2009 as the commission
13 consultant for Standard Service Offer procurements by FirstEnergy, Duke Energy Ohio,
14 Dayton Power & Light, and American Electric Power Ohio; (b) New Jersey as the Board
15 Advisor for the Statewide Basic Generation Service Auctions since 2007; (c) D.C. as the
16 commission's Technical Monitor for Standard Offer Service (SOS) Procurements since
17 2007; (d) Maryland as the commission's Technical Advisor for SOS procurements by all
18 Maryland Electric Distribution Companies from 2009 through 2016; (e) Delaware as the
19 commission's Monitor for Delmarva Power & Light's SOS RFPs from 2007-2009; and
20 (f) Pennsylvania as the Independent Evaluator for West Penn Power's 2009 RFP for
21 Provider of Last Resort Service.
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1 Q. Have you previously testified before the Oklahoma Corporation Commission (the
2 Commission)?

3 A. Yes. I previously submitted testimony to the Commission regarding PSO's 2013 Wind
4 RFP where I led efforts as the IE for Staff and the Oklahoma Attorney General. I also
5 submitted testimony regarding Oklahoma Gas & Electric's (OG&E) purchase of the
6 Crossroads wind farm. The subject of my testimony was a comparison of the price and
7 risk protections of the proposed project versus comparable Power Purchase Agreements.
8 In addition, I also led our work serving as IE for PSO's 2016 Wind RFP, though because
9 of PSO's recent cancellation of that RFP, the effort never resulted in filed testimony.
10

11 Q. Have you testified elsewhere?

12 A. Yes, I have also appeared formally and informally before commissioners and staff in
13 New Jersey, Delaware, Maryland, Minnesota, Oregon, Ohio, Pennsylvania and the
14 District of Columbia. I have addressed an array of topics related to resource choice,
15 including RFP design, contract negotiation, resource planning, costs of conventional and
16 renewable generating technologies and procurement results. A full list of my testimonies
17 and publications is attached as Exhibit FJM-1.
18

II. PURPOSE AND SUMMARY OF TESTIMONY

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to present my review of PSO's application to construct the proposed Wind Catcher Energy Connection Project, including both the Wind Catcher Facility (wind farm) and the transmission line –the Wind Catcher Generation Tie Line or “Gen-Tie” line -- which will deliver power from the facility.

Q. Do you have any initial impressions of PSO's proposal?

A. Broadly speaking, the Project represents a massive investment in wind generation. The Project will consist of a 2,000 MW wind farm costing \$2.9 billion, the largest wind farm in the United States. The wind farm will be paired with a 350-380-mile, 765 kV “Gen-Tie” line, the only 765 kV line in the Southwest Power Pool (SPP), which will cost \$1.6 billion and is expected to span a large part of the State of Oklahoma. All told, this is a \$4.5 billion investment and PSO ratepayers will be asked to pay over \$1.4 billion. The Project is projected to increase PSO's rate base by 68.2%.¹

The size and scope of the Project bring unique risks. The Project is actually two mega-projects in one – the largest wind farm in the United States and the first 765 kV transmission line in SPP – and *both* must be fully functional in order to deliver promised benefits to ratepayers. The cost and regulation of the Project is spread out over several

¹ PSO Response to data request JCN 2-1.

1 jurisdictions, raising issues of subsidization and the risk of a default in one jurisdiction
2 leading to additional cost burdens for other jurisdictions.
3

4 The goal of the Project is almost entirely to lower costs to ratepayers, not to keep the
5 lights on. The Project is therefore driven by an “economic” need, not a “reliability” need.
6 PSO projects rate reductions of 1.07% to 2.65% for a typical residential customer in the
7 first three years of the Project’s operating life.²
8

9 The Project makes at least four big bets on the future: (i) that the wind farm can fully
10 qualify for the expiring Federal Production Tax Credit (PTC), (ii) that congestion and
11 curtailment costs associated with third party wind projects will continue to grow and
12 persist, making the hedge provided by the Gen-Tie line valuable, (iii) that market prices
13 will be driven by increasing costs for natural gas and significant decreases in new
14 renewable construction, resulting in savings to ratepayers from this Project, and (iv) that
15 American Electric Power (AEP) and their counterparties can deliver the entire Project
16 with the price and performance promised.
17

18 Q. How did you approach your review?

19 A. PSO asks that the Commission determine that there “is a need for low-cost energy
20 delivered into the Tulsa area that can be satisfied by the Project.”³ In addition, among

² Direct Testimony of John O. Aaron for Public Service Company of Oklahoma, July 31, 2017, (Aaron Direct), page 7, lines 1 to 6.

³ Direct Testimony of Paul Chodak for Public Service Company of Oklahoma, July 31, 2017, (Chodak Direct), page 10, lines 7 to 8.

1 other things, PSO seeks waiver of the Commission's Electric Utility Rules under the
2 Oklahoma Code;⁴ PSO states that it did not conduct a competitive procurement to choose
3 the Project, stating that "an RFP would not result in any more favorable alternatives and,
4 thus, would not be in the best interest of customers."⁵

5
6 Accordingly, I divide my review into two parts. First, I assess the need for an additional
7 600 MW of wind-generated power for PSO's ratepayers. Second, I assess the proposed
8 transactions as compared to what might be obtained from the competitive market.
9

10 Q. What are your conclusions?

11 A. I make the following conclusions:

- 12 • PSO's analysis shows that adding wind to its portfolio could lower costs for
13 ratepayers relative to its "Baseline Case," but contains assumptions regarding
14 future gas prices and wind additions that may overstate the benefits of new
15 renewable supply. Just by using gas prices more reflective of current market
16 conditions PSO's projected benefits drop from between \$784 million and \$1.2
17 billion to between \$107 million and \$784 million on a net present value basis.
18
- 19 • PSO's analysis fails to adequately address broader strategic planning issues
20 including changes in the cost of resource options, changes in the planning

⁴ PSO specifically requests a waiver of OAC 165:35-38-5(e). See Direct Testimony of Steven L. Fate for Public Service Company of Oklahoma, July 31, 2017, (Fate Direct), page 5, lines 15 to 16.

⁵ Fate Direct, page 12, lines 7 to 9.

environment, and alternative investments to solve the issues raised, such as SPP-sponsored transmission projects.

- By assuming competitive supply would come from two dozen developments scattered throughout SPP and that no action would be taken to address congestion costs, PSO's "Generic Wind" case fails to accurately reflect the results and methods of PSO's own competitive procurements and fails to justify a waiver of Oklahoma's competitive bidding guidelines.

- PSO's own analysis of bids in its 2016 Wind RFP demonstrates that comparable or better offers were available from competitive procurement and that the Project would charge a considerable premium, roughly \$■/MWh to \$■/MWh, or over ■%, to avoid congestion and curtailment costs.

- Approving the Project now could harm the competitive market by allowing Oklahoma utilities to avoid competitive bidding requirements by proposing multi-jurisdictional mega-projects and by granting PSO an undue advantage in future procurements via control over a pre-paid method to avoid congestion costs – an advantage which may be subject to challenges at the Federal Energy Regulatory Commission (FERC).

- The Project contains risks that are not present in typical third-party wind power purchase agreements such as the risk of construction and operation and

1 maintenance (O&M) cost overruns and asset underperformance. While the
2 Membership Interest Purchase Agreement (MIPA) and Gen-Tie Agreement
3 contain several good protections for ratepayers to help manage these risks, the
4 Project still presents risky elements, including: the risk of cost overruns on (or
5 complete failure of) the Gen-Tie line, the failure of the Project to qualify for the
6 full Production Tax Credit, and risk of non-performance by other AEP companies.
7

8 Q. Do you have any recommendations?

9 A. I make the following recommendations:

- 10 • The Commission should not grant PSO's request because PSO has not shown that
11 acquiring 600 MW of additional wind is a reasonable procurement strategy and
12 has not justified a waiver from competitive bidding requirements.
13
- 14 • If PSO wishes to establish the reasonableness of its strategy it should conduct
15 additional analysis of the benefits of new wind generation with more market-
16 reflective gas prices and new wind entry assumptions. PSO's analysis should also
17 address strategic planning issues by looking at additional alternatives, including
18 alternative transmission investments.
19
- 20 • If and when the Commission believes that PSO has demonstrated that acquiring
21 600 MW of wind generated power is a reasonable path forward, PSO should
22 conduct a competitive procurement to test the Project against market alternatives.
23

- If and when then Commission approves the Wind Catcher Project, PSO should be required to provide additional risk protections for ratepayers in the form of guarantees regarding project cost, full PTC viability, and other items.

III. ANALYSIS OF THE NEED FOR 600 MW OF NEW WIND GENERATION

A. **PSO'S ANALYSIS FAILS TO CONSIDER LARGER STRATEGIC ISSUES SURROUNDING A LONG-TERM COMMITMENT TO INCREASING THE COMPANY'S SUPPLY OF WIND-GENERATED POWER**

Q. How did you begin assessing PSO's application?

A. In assessing the Company's application the first question I asked was: does PSO need an additional 600 MW of wind-generated power in its resource portfolio?

Q. Why do you speak in terms of 600 MW as opposed to 2,000 MW?

A. I speak in terms of needing 600 MW, as opposed to the Project capacity of roughly 2,000 MW, because that represents PSO's share of the Project. At issue in this proceeding is PSO's acquisition of and investment in the Wind Catcher Project and associated Gen-Tie line and its impact on PSO ratepayers in Oklahoma, not AEP's or SWEPCO's investment in the Project in SWEPCO's states (e.g., Louisiana, Arkansas, and Texas). To the extent that the size of the Project forces PSO ratepayers to accept a suboptimal alternative, that could indicate that PSO ratepayers are subsidizing AEP ratepayers in other jurisdictions.

1 Assessing PSO as a standalone entity is also in line with PSO's Integrated Resource Plan
2 (IRP) process, which looks at PSO on a standalone basis.
3

4 Q. How does PSO justify the Project?

5 A. In order to assess the benefits of the Project, PSO first creates a "Baseline" case where no
6 new wind generation is added to its portfolio. It then compares this case against a
7 "Project" case that includes the Wind Catcher Project. PSO projects changes in
8 generation and purchased power costs over a 25-year period from 2021 to 2045 via a
9 two-step process, first creating an SPP-wide dispatch of resources for the years 2020 and
10 2025 in PROMOD. Based on these results PSO extrapolates market prices for the other
11 years in the study period. PSO then uses these prices as inputs in its PLEXOS dispatch
12 model to determine annual generation, as well as transmission congestion and loss costs
13 for the entire study period.
14

15 Q. What does PSO conclude?

16 A. PSO calculates that the Project – compared with the Baseline Case – will create total
17 benefits of \$996 million dollars on a Net Present Value (NPV) basis.
18

19 Q. Does PSO conduct any sensitivity analyses in comparing the Project to the Baseline
20 Case?

21 A. PSO examines the effect of different natural gas prices on total benefits by calculating
22 benefits in both "low" and "high" gas price scenarios. Under the "low" scenario benefits

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1 drop to \$784 million on a NPV basis and in the “high” scenario benefits increase to
2 \$1,215 million on a NPV basis.

3
4 Q. What rate impact do these benefits translate into?

5 A. PSO witness Aaron forecasts a rate reduction for a typical residential customer of 1.07%
6 in 2021. This reduction climbs to 2.16% in 2022 and 2.65% in 2023.⁶ PSO does not
7 provide a long-range rate prediction, but presumably forecasted rate reductions would be
8 a bit higher since total nominal benefits are expected by PSO to increase in 2024 and
9 beyond.

10
11 Q. How does the Project generate value?

12 A. According to PSO’s modeling, the Project offers \$74 million in capacity cost savings by
13 deferring investment in a natural-gas fired combined cycle plant by one year – from 2024
14 to 2025 – and delays the addition of another natural-gas fired combined cycle plant from
15 2035 to 2036;⁷ however, the chief value of the Project comes from replacing more
16 expensive market purchases and PSO generation. Therefore, the “need” for this project is
17 “economic”— it is not driven by a need for new capacity to keep the lights on. I would
18 also note that this value is highly dependent on realization of the full value of the PTC,
19 which, according to PSO, accounts for \$837 million, or approximately 84% of the total
20 estimated net benefit in their base case.

⁶ Aaron Direct, page 7 lines 1 to 6.

⁷ Direct Testimony of Kelly D. Pearce on Behalf of Public Service Company of Oklahoma, July 31, 2017 (Pearce Direct), page 9 lines 6 to 10. PSO’s analysis also appears to show deferrals in the years 2044 and 2045.

1

2 Q. Does PSO's analysis make a convincing case for adding new wind generation?

3 A. While the analysis does show that wind power could lower ratepayer bills it has flaws
4 that make it hard to draw any definitive conclusions regarding the amount of new supply
5 that PSO should acquire. These flaws can be categorized as a) flaws in strategic planning
6 and b) flaws in the analysis itself.

7

8 Q. What do you mean by "flaws in strategic planning"?

9 A. PSO's analysis does not consider the larger planning environment. It does not look at
10 other generation alternatives beyond wind power. It does not address other risks beyond
11 a change in natural gas prices. This might be acceptable if PSO had conducted a
12 strategic, collaborative, IRP process prior to pursuing the Project but in this context it
13 calls into question whether PSO considered any larger strategic issues regarding the
14 Project.

15

16 Q. Why is it necessary to consider these issues?

17 A. It is necessary to consider these questions because PSO is proposing a significant
18 increase in its commitment to wind generation and, in the process, making several
19 important bets about the future; including a) that wind farms can capture the full value of
20 the PTC, b) that market prices will stay high enough to make the power supplied by wind
21 farms valuable and c) that additional wind will not cause significant reliability issues on
22 the transmission system.

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- Q. What issues should PSO consider in such an analysis?
- A. One key issue is the potential alternatives to wind generation, (for example, a new combustion turbine located near load). This should include consideration of the potential change in the cost of wind and other generating technologies. If a given technology becomes less expensive it obviously becomes a better choice. This has happened across the country with renewable technologies. For example, the cost of wind generation has been dropping rapidly over the past several years. The DOE reports that the average levelized PPA price for “Interior” wind was \$46.21/MWh in 2010. In 2016 that number was \$21.35/MWh.⁸ This improvement has been driven by competitive forces which have forced technical advances in turbine size and efficiency.
- Another potential strategic issue is changes in load. This can take at least two forms. First, utilities can under- or over-estimate economic growth, as many planners did prior to the 2007-2009 recession. Second, depending on the regulatory regime, utilities can lose customers to third-party suppliers or self-generation alternatives such as distributed generation.
- Another issue is changes in law. The legal environment can have a large impact on resource choice. PSO themselves claim that this procurement was driven by the extension of the PTC in late 2015. Just over a year ago, many utilities were struggling to adapt to the mandates of the Clean Power Plan. Now the Clean Power Plan appears dead,

⁸ U.S. Department of Energy, “2016 Wind Technologies Market Report,” data file Figure 49.

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1 but other items are in question. Most relevant to this case, the House tax reform bill (HR-
2 1) includes substantial changes to the PTC qualification process, and removes the
3 inflation adjustment from the PTC calculation, which could drastically change the value
4 proposition of new wind generation—the value of the PTC at its current, inflation-
5 adjusted 2016 value would decrease by almost 35 percent.⁹

6
7 Another topic could be “scenarios” or potential combinations of events that add up to a
8 given future. For example, take the risk of price collapse driven by new entry. If all
9 utilities have the same outlook as PSO then they, too will try and acquire as much PTC
10 qualified wind as possible, leading to a steep drop in prices. This risk ties to PSO’s
11 assumptions about new entry, which I discuss later in this testimony. For example
12 Empire Electric District Company, which serves electricity customers in Oklahoma,
13 Kansas, Arkansas, and Missouri, announced on November 1, 2017 that it plans to expand
14 its wind portfolio by 800 MW by the end of 2020, with projected savings between \$150
15 million and \$300 million over a twenty-year period.¹⁰

16
17 Q. Are there other issues that a strategic plan would consider?

18 A. A strategic plan could consider not just generation alternatives, but also alternative
19 transmission investments.

⁹ The value of the wind PTC in 2016 is 2.3 cents per kWh. Removing the inflation adjustment would revert the PTC to its base level of 1.5 cents per kWh, a reduction of 34.8 percent. See U.S. Department of Energy, “Renewable Electricity Production Tax Credit (PTC),” available at <https://energy.gov/savings/renewable-electricity-production-tax-credit-ptc>. See also U.S. House of Representatives, “Tax Cuts and Jobs Act H.R. 1,” Subtitle F – Energy Credits, Sec. 3501.

¹⁰ See Fact Sheet, News Release, and FAQ here: <https://www.empiredistrict.com/Wind>.

1

2 Q. Why would it be important to consider alternative transmission investment?

3 A. PSO makes it clear that the transmission capability provided by the Gen-Tie line has its
4 own value. PSO witness Bradish describes the potential use of the Gen-Tie after the 25-
5 year life of the Wind Facility has expired, stating that “one potential and obvious use of
6 the Gen-Tie would be to interconnect other existing, re-powered or new wind facilities
7 located in this wind-resource rich region of SPP.”¹¹ Witness Bradish goes on to describe
8 how, in AEP’s experience, increased transmission availability induces independent power
9 producers (IPPs) to advance generation projects to take advantage of new transmission
10 capacity.¹²

11

12 In this way, the Gen-Tie line is very similar to a merchant transmission project with the
13 key difference being that the cost responsibilities – and risks – would be ultimately borne
14 by PSO ratepayers. If there is substantial potential net value to PSO ratepayers from
15 increased transmission capability from the Oklahoma panhandle to the east, there are
16 clear alternatives to pursuing that value that entail substantially less risk being pushed
17 onto ratepayers.

18

19 Q. What are other ways for PSO to secure these benefits?

¹¹ Direct Testimony of Robert W. Bradish on Behalf of Public Service Company of Oklahoma, July 31, 2017 (Bradish Direct), page 15 lines 15 to 17.

¹² Bradish Direct, page 19 lines 3 to 10.

1 A. One avenue available to PSO is to request that SPP undertake a “high priority study” of
2 transmission enhancements targeted at realizing the benefits identified by PSO of moving
3 increased quantities of power from the Oklahoma panhandle to the east. As specified in
4 Attachment O of the SPP Tariff, stakeholders may request that SPP “study potential
5 upgrades or other investments necessary to integrate any combination of resources,
6 whether demand resources, transmission, or generation, identified by the stakeholders.”¹³
7 Such a study would include quantification of benefits and costs, as well as an analysis of
8 the sensitivity of study results to changes in assumptions. Based on the results of the
9 study, SPP may recommend associated system upgrades for inclusion in the SPP
10 Transmission Expansion Plan.

11
12 Q. Would this reduce the costs of the line for PSO customers?

13 A. Yes. Allocation of high-voltage transmission costs (300kV and greater) under SPP’s
14 Highway/Byway methodology would be to all utilities in the SPP region based on their
15 historical use of the transmission system, which would substantially reduce the costs
16 borne by PSO ratepayers for a transmission project comparable to the proposed Gen-Tie.

17
18 Q. Are there other alternatives available?

19 A. PSO has an additional alternative to pursuing enhanced west-east transmission, which is
20 to advance the project as a Sponsored Upgrade. Attachment O provides that any entity
21 may request that a Sponsored Upgrade be built, as long as the entity is “willing to assume
22 the cost of such Sponsored Upgrade, study costs, and any cost associated with such

¹³ SPP Tariff, Attachment O, Section IV(2)(c).

1 necessary mitigation.”¹⁴ SPP would directly assign the upgrade costs to PSO (and
2 SWEPCO if jointly sponsoring the project), but those costs may be recoverable, with
3 interest, through revenue credits based on new point-to-point or network integration
4 service that would not have been possible without the Sponsored Upgrade.¹⁵ PSO might
5 itself take transmission service on the line to purchase wind generation from facilities in
6 the Oklahoma panhandle, and other parties could do the same, thereby potentially
7 providing revenue credits to offset the directly assigned upgrade costs.

8
9 Q. Did PSO consult SPP in considering these alternatives to proposing to build the Gen-Tie
10 line?

11 A. I have seen no evidence that PSO consulted SPP in considering these alternatives to
12 proposing to build the Gen-Tie line. PSO has noted in several responses to data requests
13 that it has had limited contact with SPP.¹⁶

14
15 Q Did PSO consider these issues in its 2017 IRP Update?

16 A. Not in a very detailed sense. PSO’s update was filed after the decision was made to
17 proceed with the Project. While it does look at the cost and use of some generation
18 resources (solar and reciprocating engines for example) and test portfolio selection under
19 a few commodity price scenarios it does not even consider alternative transmission
20 investments or even attempt to measure congestion costs, the very costs that are

¹⁴ SPP Tariff, Attachment O, Section IV(1).

¹⁵ SPP Tariff, Attachment Z2.

¹⁶ See, for example, PSO Responses to data requests JCN 1-1, JCN 1-2, JCN 1-3, JCN 1-4, and AG 5-4.

1 apparently driving PSO to seek the Gen-Tie solution, nor does it carefully examine any
2 more complicated scenarios regarding the future.

3
4 Q. Would a strategic review have made a difference in this case?

5 A. It is hard to say. By considering these risks, perhaps PSO would have a different
6 outcome, choosing a different transmission solution, waiting to make further generation
7 acquisitions in order to let other technologies mature, or scaling down its wind
8 acquisition in order to have more flexibility to adapt to changes in the planning
9 environment. The point is that we do not know because PSO never did the analysis.

10
11 Q Is there an additional point you would like to make regarding PSO's planning process as
12 it relates to Wind Catcher?

13 A. Yes. As alluded to above, PSO's process to reach this decision has not followed a
14 traditional planning path. PSO claims that the Project was driven by the extension of the
15 PTC and the extension of the construction timeframe for PTC eligibility. Had PSO
16 followed a standard planning process we would have expected them to then; a) update
17 their IRP to incorporate this new information, b) adjust their targeted wind acquisition as
18 necessary and issue an RFP for new generation, possibly including the Project as a self-
19 build option, and c) select a resource or resources via this competitive process. Instead,
20 after the aforementioned PTC extensions, PSO: a) issued a RFP in late 2016 for only 100-
21 300 MW, b) selected no winning projects in that RFP, c) filed for approval of the Project,
22 and d) updated its IRP. PSO confirmed that it "completed its analysis of the Project on or
23 about July 28, 2017," and completed its IRP update two months later on September 28,

2017.¹⁷ Such a process opens up the danger that the utility is simply fitting their IRP to their resource acquisition rather than the other way around.

B. PSO'S ANALYSIS CONTAINS ASSUMPTIONS WHICH MAY OVERSTATE THE NET BENEFITS OF THE PROJECT

Q. Do you have issues with specific choices made in the PSO analysis?

A. Yes, beyond the concerns noted above I have concerns that two sets of inputs, specifically the prices of natural gas and the level of new wind generation appearing in future years, could serve to overstate the net benefits of the Project.

Q. Why are assumptions about natural gas prices important?

A. Natural gas prices are an important determinant of the value of new wind. PSO's own analysis shows that the value of the Project moves from \$784 million to \$1.215 billion depending solely on the path of gas prices used.¹⁸

Q. How did PSO develop its natural gas price forecasts?

A. PSO uses gas price projections from AEP's market fundamentals group. The group creates a "long-term, weather normalized commodity market forecast"¹⁹ which is

¹⁷ PSO Response to data request JCN 4-9.

¹⁸ Pearce Direct, Exhibits KDP-1 and KDP-2.

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1 available to all AEP operating companies. According to PSO witnesses it is “often
2 referenced for purposes such as fixed asset impairment accounting, capital improvement
3 analysis, resource planning, and strategic planning.”²⁰

4
5 Q. Why do you take issue with these forecasts?

6 A. The price projections used are generally higher than current market prices, and current
7 estimates from authoritative sources. Table One below shows PSO’s projected gas prices
8 at Henry Hub²¹ along with the average monthly cost of futures on the NYMEX platform²²
9 as of November 14th of this year. Note that as of this date the NYMEX prices only
10 reported through 2029.

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¹⁹ Direct Testimony of Karl R. Bletzacker on Behalf of Public Service Company of Oklahoma, July 31, 2017, (Bletzacker Direct), page 3 lines 9 to 10.

²⁰ Bletzacker Direct, page 3 lines 12 to 13.

²¹ PSO response to data request AG 1-17.

²² http://www.cmegroup.com/trading/energy/natural-gas/natural-gas_contract_specifications.html

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TABLE ONE
PSO GAS PRICE FORECASTS VERSUS MARKET COSTS
(\$/MMBtu)

Year	Base	Low	High	NYMEX
2018	\$ 4.89	\$ 4.69	\$ 5.14	\$ 3.05
2019	\$ 5.13	\$ 4.72	\$ 5.65	\$ 2.91
2020	\$ 5.26	\$ 4.63	\$ 6.05	\$ 2.86
2021	\$ 5.39	\$ 4.75	\$ 6.21	\$ 2.87
2022	\$ 5.53	\$ 4.87	\$ 6.36	\$ 2.89
2023	\$ 5.67	\$ 4.99	\$ 6.52	\$ 2.93
2024	\$ 5.90	\$ 5.19	\$ 6.79	\$ 2.99
2025	\$ 6.14	\$ 5.41	\$ 7.06	\$ 3.06
2026	\$ 6.40	\$ 5.63	\$ 7.35	\$ 3.13
2027	\$ 6.66	\$ 5.86	\$ 7.65	\$ 3.20
2028	\$ 6.93	\$ 6.10	\$ 7.97	\$ 3.29
2029	\$ 7.21	\$ 6.35	\$ 8.30	\$ 3.41
2030	\$ 7.51	\$ 6.61	\$ 8.63	
2031	\$ 7.82	\$ 6.88	\$ 8.99	
2032	\$ 8.14	\$ 7.16	\$ 9.36	
2033	\$ 8.41	\$ 7.40	\$ 9.67	
2034	\$ 8.68	\$ 7.64	\$ 9.99	
2035	\$ 8.93	\$ 7.86	\$ 10.26	
2036	\$ 9.12	\$ 8.03	\$ 10.49	
2037	\$ 9.32	\$ 8.21	\$ 10.72	
2038	\$ 9.53	\$ 8.39	\$ 10.96	
2039	\$ 9.74	\$ 8.57	\$ 11.20	
2040	\$ 9.95	\$ 8.76	\$ 11.45	
2041	\$ 10.17	\$ 8.95	\$ 11.70	
2042	\$ 10.39	\$ 9.15	\$ 11.95	
2043	\$ 10.62	\$ 9.35	\$ 12.22	
2044	\$ 10.86	\$ 9.55	\$ 12.49	
2045	\$ 11.10	\$ 9.76	\$ 12.76	
2046	\$ 11.34	\$ 9.98	\$ 13.04	

As is clear from the table, market prices are far below even PSO's "low" gas price case. For example, in 2021, when the Project begins to operate, the Company projects gas

1 prices between \$4.75 and \$6.21/MMBtu at Henry Hub. For the same year, current
2 NYMEX futures prices are under \$3.00/MMBtu on average.

3
4 Q. Does PSO address this discrepancy?

5 A. PSO claims that NYMEX prices are not “a reliable forecast of future, weather-
6 normalized, long-term energy market fundamentals.”²³ When asked if by “fundamentals”
7 he meant “prices,” Witness Beltzacker stated: “For clarification, Witness Bletzacker
8 offers the following: ‘NYMEX energy-complex futures contract prices are not a reliable
9 forecast of the future, weather-normalized, long-term energy market prices that would be
10 derived from conventional fundamentals analysis.’”²⁴

11
12 Q. Do you agree?

13 A. While they are not a forecast, per se, futures prices represent what people are actually
14 paying for future natural gas deliveries right now. For example, in February of next year
15 bidders in New Jersey’s Basic Generation Service (BGS) Auctions will offer fixed-price
16 energy commitments through May of 2021 that are, in part, based off of NYMEX prices.
17 If market participants, most of whom are savvy enough to employ their own
18 fundamentals forecasts, are agreeing on these prices then these prices must have some
19 validity. If all parties had the same conclusions as PSO then the logical response would
20 be to purchase high quantities of futures and profit when prices rise. At a bare minimum,

²³ Bletzacker Direct, page 7 lines 4 to 5.

²⁴ PSO Response to data request no. JCN 5-17.

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any forecaster should consider why their “fundamentals” forecasts differ so greatly from the market.

Q. Beyond NYMEX Futures prices, are there other forecasts of gas prices with which you can compare PSO’s?

A. Yes. While most forecasts do not run beyond a few years we can still look at other forecasts to see what other parties are predicting for gas prices. Table Two below compares price forecasts from the World Bank²⁵ and the IMF²⁶ to NYMEX and PSO prices at Henry Hub.

TABLE TWO
HENRY HUB PRICE FORECASTS (\$/MMBtu)

Year	Base	Low	High	NYMEX	World Bank	IMF
2018	\$ 4.89	\$ 4.69	\$ 5.14	\$ 3.05	\$ 3.10	\$ 2.99
2019	\$ 5.13	\$ 4.72	\$ 5.65	\$ 2.91	\$ 3.20	\$ 2.81
2020	\$ 5.26	\$ 4.63	\$ 6.05	\$ 2.86	\$ 3.40	\$ 2.78
2021	\$ 5.39	\$ 4.75	\$ 6.21	\$ 2.87	\$ 3.50	\$ 2.81
2022	\$ 5.53	\$ 4.87	\$ 6.36	\$ 2.89	\$ 3.70	\$ 2.85
2023	\$ 5.67	\$ 4.99	\$ 6.52	\$ 2.93	\$ 3.80	
2024	\$ 5.90	\$ 5.19	\$ 6.79	\$ 2.99	\$ 3.90	
2025	\$ 6.14	\$ 5.41	\$ 7.06	\$ 3.06	\$ 4.10	
2026	\$ 6.40	\$ 5.63	\$ 7.35	\$ 3.13		
2027	\$ 6.66	\$ 5.86	\$ 7.65	\$ 3.20		
2028	\$ 6.93	\$ 6.10	\$ 7.97	\$ 3.29		
2029	\$ 7.21	\$ 6.35	\$ 8.30	\$ 3.41		
2030	\$ 7.51	\$ 6.61	\$ 8.63		\$ 5.00	

²⁵ World Bank Commodities Price Forecast, October 26, 2017, available at <http://pubdocs.worldbank.org/en/678421508960789762/CMO-October-2017-Forecasts.pdf>.

²⁶ IMF Natural Gas Price Forecast (US, domestic market), available at <https://knoema.com/ncszerf/natural-gas-prices-forecast-long-term-2017-to-2030-data-and-charts>.

1

2 As can be seen, the World Bank and IMF forecasts are closer to the NYMEX prices and
3 lower than PSO's "low" case. EIA, in its 2017 Annual Energy Outlook, did forecast
4 prices more in line with the company's "low" case.²⁷ However, that was published in
5 January of this year.

6

7 Q. Does PSO provide a reason for their forecast being higher than other sources?

8 A. Beyond the statement that "[t]he combination of both heating degree day departure and
9 above- or below-normal natural gas storage inventory levels are primary factors affecting
10 any nearby deviation from a weather-normalized forecast value,"²⁸ PSO provides no clear
11 explanation as to why prices are expected to increase to its forecast levels. PSO predicts
12 that "[a]bundant, relatively low-cost natural gas reserves and productive capacity will
13 continue to grow domestically and globally as shale gas extraction technology becomes
14 more widespread" and that "the long-term environmental impacts of shale gas will
15 ultimately be manageable."²⁹

16

17 Q. Does PSO provide any other sensitivities regarding gas prices?

18 A. While not an official analysis, PSO produced in a response to a data requests an analysis
19 of benefits using what they described as "ultra low" gas prices, which were set at half of
20 their "low" case gas prices. Table Three below shows the summary of these results.

²⁷ U.S. Energy Information Administration, "Annual Energy Outlook 2017," January 5, 2017, available at <https://www.eia.gov/outlooks/aeo/>.

²⁸ Bletzacker Direct, page 6 lines 4 to 7.

²⁹ Bletzacker Direct, page 9 lines 1 to 5.

TABLE THREE
NET BENEFITS WITH “ULTRA LOW” GAS PRICES (\$/Millions)³⁰

Category	2020 NPV
Adjusted Production Cost Savings	\$1,133
Congestion and Loss Cost	(\$236)
Capacity Value	\$74
Wind Facility Revenue Requirement	(\$1,163)
Production Tax Credits	\$837
Gen-Tie Revenue Requirement	(\$538)
Total Benefits/(Cost)	\$107

This analysis shows benefits of just \$107 million on a net present value basis. However, the bulk of this benefit, \$74 million, comes from the above-mentioned capacity benefits driven by a one-year deferral (from 2024 to 2025) of investment in a combined-cycle and a delayed addition of a combined cycle from 2035 to 2036. plus some future deferrals in 2035, 2044 and 2045. Note also that this supposed benefit does not appear to quite match with PSO’s IRP update, which shows new combined cycles being added in 2022 and 2027.

Q. Is this a compelling case for the Project?

A. No. Given the risks of the Project (which I explain below), should gas prices be at or near the “ultra low” level there does not appear to be a compelling case for moving forward with the Project. PSO would essentially be asking ratepayers to take on all the risks of the Project and spend over \$1.4 billion primarily to defer the addition of new generation for a year. While these “ultra low” prices are below current futures market

³⁰ PSO Response to data request OIEC 5-8, Attachment 1.

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1 prices and independent third-party forecasts, it is also unclear how compelling the Project
2 would be at market-reflective prices, which sit between the low and ultra low numbers.
3

4 Q. Turning to your second concern, why are assumptions about new entry important?

5 A. The level of new wind additions is important because it both affects the baseline
6 projection of market prices as well as the benefits produced by additional wind
7 generation. More wind generation will tend to lower prices, but as more wind-based
8 supply gets added, the effect on prices will tend to decrease. This is particularly
9 important here because PSO gives the Project credit for decreasing SPP market prices.
10

11 Q. What did PSO assume regarding new wind entry?

12 A. Recall that PSO predicted market prices in SPP in part via two PROMOD runs for the
13 years 2020 and 2025. According to PSO these runs assumed 2,750 MW of new wind in
14 2020 and an additional 420 MW in 2025.³¹
15

16 Q. What is your opinion of this estimate?

17 A. This is a very conservative estimate. While predicting new entry involves uncertainty,
18 SPP's current interconnection queue shows considerably more wind is predicted to come
19 on-line in the coming years. Table Four shows the interconnection queue for SPP wind
20 projects as of November 15, 2017.
21

³¹ PSO Response to data request AG 6-4.

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TABLE FOUR
SPP INTERCONNECTION QUEUE

Status	Total MW
IA FULLY EXECUTED/COMMERCIAL OPERATION	16,204
IA FULLY EXECUTED/ON SCHEDULE	5,794
IA FULLY EXECUTED/ON SUSPENSION	1,700
IA PENDING	1,333
FACILITY STUDY STAGE	10,304
DISIS STAGE	23,759
FEASIBILITY STUDY STAGE	865
PISIS STAGE	0
Total	59,960

To focus only on “on schedule” and “IA pending” projects, there is 5,794 MW of wind generation “on schedule” with full Interconnection Agreements and 1,333 MW of wind projects with an IAs pending. At earlier levels of development, SPP’s queue shows over 10,000 MW at the facility study stage and over 23,000 MW at the system impact study stage.

To be clear, a good portion of this new supply is in Oklahoma. Table Five shows the queue for Oklahoma wind only.

TABLE FIVE
SPP QUEUE – OKLAHOMA WIND ONLY

Status	Total MW
IA FULLY EXECUTED/COMMERCIAL OPERATION	7,039
IA FULLY EXECUTED/ON SCHEDULE	2,255
IA FULLY EXECUTED/ON SUSPENSION	609
IA PENDING	250
FACILITY STUDY STAGE	4,943
DISIS STAGE	7,006
FEASIBILITY STUDY STAGE	0
PISIS STAGE	0
Total	22,102

Over 2,200 MW is on-schedule in Oklahoma alone, with another nearly 12,000 MW at the facility or system impact study stage.

Even if just a portion of these projects in Oklahoma and other SPP states come on-line the likely result is far more than 3,170 MW of new wind in 2025. This is particularly true if, as discussed earlier, other utilities are looking at analysis similar to PSO and coming to the same conclusion that they must up their purchases of wind-based power prior to PTC expiration. The resulting rush to lock in low-priced wind deals would bring about a wave of new entry and, presumably, have the effect of depressing market prices and lowering the benefits of additional development.

I would also note that PSO’s witness – Mr. Pfeifenberger – agrees with my position regarding PSO’s assumptions for future wind additions in SPP. He describes the assumptions regarding non-AEP wind additions in SPP to be “very conservative” through 2020 and 2025.³²

³² PSO Response to data request JCN 5-8.

1

2 Q. Given your concerns, what additional steps should PSO take in order demonstrate a need
3 for 600 MW of new wind supply?

4 A. PSO should conduct additional analysis of the benefits of new wind generation with more
5 market-reflective gas prices and new wind entry assumptions. PSO's analysis should
6 also address strategic issues by looking at additional alternatives, including a)
7 incremental purchases of wind generation, b) potential for changes in technology prices
8 and c) alternative transmission investments.

9

10 **IV. ANALYSIS OF THE PROJECT**

11 **A. PSO'S ANALYSIS DOES NOT DEMONSTRATE THAT THE PROJECT IS**
12 **SUPERIOR TO WHAT COULD BE OBTAINED FROM THE COMPETITIVE**
13 **MARKET**

14

15 Q. What is the second question you review?

16 A. My second, broad question is: assuming the Commission agrees with PSO that 600
17 additional MW of wind-generated energy is a reasonable addition to PSO's portfolio, is
18 the Project a reasonable way of providing that supply?

19

20 Q. What other ways could the Company acquire 600 MW of wind?

21 A. The primary alternative would be a competitive RFP. Oklahoma Administrative Code
22 allows utilities to conduct a competitive procurement for long-term electric generation or

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1 PPA's in order to obtain a "presumption of prudence."³³ This allows the utility to show
2 that the resource it proposes to use to fill a need is the best the market could offer at the
3 time. Utilities are allowed to submit self-build or purchase options in the competitive
4 procurement process.

5
6 Q. Did PSO conduct a competitive procurement in this case?

7 A. No. PSO did not conduct a competitive procurement for the Project and states that "due
8 to the uniqueness of the Project, and the time constraints imposed by the need to proceed
9 to maintain the Project's eligibility for full PTCs, an RFP would not result in any more
10 favorable alternatives."³⁴

11
12 Q. Did PSO provide any evidence to support this claim?

13 A. PSO attempts to compare the Project to what a competitive procurement would provide
14 by creating a "Generic Wind" case to compare to the Project Case. In the Generic Wind
15 Case the company purchases 1,900 MW of wind from a total of 24 projects scattered
16 throughout SPP, including locations in New Mexico, Nebraska, and several other SPP
17 states. PSO states that it used this method because SPP and its stakeholders had
18 identified these points as being "feasible and likely interconnection locations for such
19 future wind."³⁵

20

³³ OAC 165:35-34-1.

³⁴ Fate Direct, page 12 lines 5 to 8.

³⁵ Direct Testimony of Johannes P. Pfeifenberger on Behalf of Public Service Company of Oklahoma, July 31, 2017 (Pfeifenberger Direct) page 13 lines 11 to 12.

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1 PSO assumes that the purchases would come via Power Purchase Agreements and would
2 cost about \$18.62/MWh in 2021 and escalate at 2.25% annually for 25 years. To account
3 for congestion and transmission losses, PSO used PROMOD to model to estimate these
4 costs in 2020 and 2025, interpolating the result for the intervening years and
5 extrapolating the result through 2045. PSO further adds additional curtailment costs to
6 the Generic Wind Case to reflect their belief that Generic Wind projects would be more
7 susceptible to these costs. Specifically, PSO assumes that 5 percent of all energy from
8 the assumed wind facilities in the Generic Wind Case will be curtailed.

9
10 PSO calculates that the Generic Wind Case would cost \$452 million more than the
11 Project Case on a NPV basis.³⁶ The primary factor in this difference is the additional
12 \$463 million of congestion and loss costs incurred by the Generic Wind projects.

13
14 Q. Does the Generic Wind Case reflect what would be expected from a competitive
15 procurement?

16 A. No. As I demonstrate below, PSO received sufficient *Oklahoma-based* wind bids far in
17 excess of 600 MW at prices below \$18.62/MWh from projects across the state of
18 Oklahoma—not only from highly-congested areas near the panhandle.

19
20 Q. Please describe the impact of the PSO's assumption.

21 A. The primary result of this assumption is that it overstates congestion, which, as I noted
22 above, is the primary driver of the Project Case's advantage over the Generic Wind Case.

³⁶ Pearce Direct, Exhibit KDP-3.

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1 PSO compounds this by assuming that SPP will take no action regarding congestion costs
2 beyond projects that have already been approved.
3

4 Q. Why do you believe these assumptions are not reflective of the results of a competitive
5 procurement?

6 A. These assumptions are a poor comparison to the competitive market because they do not
7 reflect the results and methods of PSO's actual, recent, competitive bidding processes.
8

9 Q. To what recent processes do you refer?

10 A. In 2016 PSO issued its 2016 Wind RFP, which sought 100 to 300 MW of new wind
11 resources. Projects were required to be located in Oklahoma, and all had to offer a 20-
12 year PPA starting in 2019. Bates White was the Independent Evaluator for this RFP on
13 behalf of the Oklahoma Commission.
14

15 Q. What response did the RFP receive?

16 A. PSO received qualifying offers from [REDACTED] Projects representing over [REDACTED] MW of
17 capacity at first-year prices ranging from \$[REDACTED]/MWh to \$[REDACTED]/MWh.³⁷ These
18 projects were located [REDACTED], often in places where congestion costs were
19 [REDACTED]. The winning project, in fact, was located in an area where prices were [REDACTED] than
20 PSO's load center, resulting in a [REDACTED].
21

³⁷ PSO Response to data request AG 11-2.

REDACTED

1 Q. What methods were used to evaluate congestion costs in the 2016 Wind RFP?

2 A. PSO also conducted PROMOD modeling to assess the cost of congestion for each offer
3 in 2019 (when the bids were to begin operation). However, instead of assuming a
4 constant or growing level of congestion over the life of the contract, PSO assumed that
5 SPP would take action to alleviate the cost of congestion over time. Therefore, in the
6 analysis of offers, PSO degraded congestion costs to zero over the twenty-year PPA term.
7 Again, this differs considerably from PSO's Wind Catcher application, which assumes in
8 the Generic Wind Case that congestion in SPP will persist throughout the life of the wind
9 projects.

10
11 Q. How did the 2016 RFP offers compare to the Project?

12 A. PSO own analysis of final shortlist of bids shows that there were several offers superior
13 to the Project available in the 2016 RFP.

14
15 Q. How did you reach this conclusion?

16 A. I start by looking at the basic economics of the Project. According to PSO the Project
17 will produce power at a levelized cost net of PTCs of \$10.90/MWh over the 25-year
18 study period.³⁸ Adding the cost of the Gen-Tie line increases this cost to \$28.90/MWh.³⁹
19 So, in other words, PSO is asking ratepayers to pay \$18.00/MWh to avoid congestion and
20 loss costs.

³⁸ Pearce Direct page 11, line 6.

³⁹ PSO Response to data request Clean Line 1-4 (Pearce Workpapers) and Pearce Direct Exhibit KDP-1.

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I next consulted the most up to date analysis that PSO made of the final shortlisted bids in the 2016 RFP. PSO analyzed bids in both a “high” and “low” congestion case. This analysis was from the beginning of June of this year. Again, note that PSO degraded congestion costs to zero over the lifetime of the PPA.

TABLE SIX
FINAL SHORTLIST OFFERS FROM THE 2016 PSO WIND RFP⁴⁰

			Levelized Congestion Costs (\$/MWh)		Cost With Congestion (\$/MWh)	
Nameplate Rating MW	Levelized Cost of Electricity \$/MWh		High Case	Low Case	High Case	Low Case
Project Name						

This list represents of [REDACTED] MW of supply, all located in Oklahoma. With congestion costs included PSO estimated costs range from just above \$ [REDACTED] /MWh to under \$ [REDACTED] /MWh, in all cases below the levelized cost of the Project.

⁴⁰ PSO Responses to data requests AG 11-2 and OIEC 3-20.

REDACTED

1 Q. Are these offers superior to the Project?

2 A. Clearly from these offers, PSO could have taken 600 MW of supply at better prices than
3 the Project. The first three Projects alone comprise █████ MW at weighted average
4 costs (including congestion) of \$████/MWh to \$████/MWh.

5

6 Q. Are there other costs that should be included in these offers?

7 A. These offers do not include any costs of transmission upgrades required to integrate with
8 the SPP network. PSO calculated this cost for the bids to range from \$████ to
9 \$████/MWh. In addition, these do not include the curtailment and loss costs that PSO
10 adds in the Generic Wind Case. In 2016 these were roughly \$█/MWh on average for
11 PSO's own actual wind fleet.⁴¹

12

13 In sum, even if we conservatively add another \$█/MWh to cover integration, curtailment
14 and loss costs we still have bids costing about \$████/MWh to \$████/MWh. This means
15 that with the Project PSO is asking ratepayers to pay an additional \$█ to \$█/MWh, or
16 over a █% price premium, just to avoid congestion and loss costs. While congestion is
17 a real risk, this seems to be quite a steep premium for this type of insurance.

18

19 Q. Are there other considerations to be made in this comparison?

20 A. Importantly, so far in my testimony, I have yet to address the issue of risk. The wind bids
21 received in the 2016 Wind RFP were for pay for performance third-party PPAs, which

⁴¹ PSO Response to data request JCN 2-2.

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1 are far less risky for PSO ratepayers than the Windcatcher project since they only pay a
2 set rate and only when power is generated. Such PPAs would allow ratepayers to avoid a
3 larger array of risks including: the risks of cost overruns and delays, failure to claim the
4 PTC, risks in increases in O&M costs, risks associated with asset underperformance and
5 the potential risks to PSO's balance sheet.

6
7 Q. Did PSO accept any of these offers?

8 A. PSO did pursue negotiations with [REDACTED]. In my role leading Bates White's work as
9 Independent Evaluator for the 2016 Wind RFP, I did question PSO prior to rejecting
10 other final shortlist offers as to whether they wished to acquire additional supply beyond
11 the RFP target of 100-300 MW. PSO claimed they were considering other issues and
12 wished to keep their options open. I note that this all occurred after the extension of the
13 PTC, which PSO claims was the driving force in PSO seeking 600 MW of wind in this
14 case, meaning these offers were in hand and were turned away by PSO. As to Project A,
15 PSO exchanged several edits of the final contract agreement with the bidder but finally
16 terminated negotiations in August.

17
18 **B. IF PSO WISHES TO PURSUE THE PROJECT IT SHOULD COMPETE IT**
19 **AGAINST MARKET OFFERS IN A COMPETITIVE PROCUREMENT**
20

21 Q. If the Commission agrees that an additional 600 MW of wind generation is a reasonable
22 acquisition, how should PSO move forward with this Project?

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1 A. If PSO wishes to pursue the Project, and if the Commission agrees that an additional 600
2 MW of new wind generation would be beneficial to PSO ratepayers, then I recommend
3 that PSO offer the Project as a self-build alternative in a competitive procurement.

4
5 Q. Would a competitive procurement receive similar offers to the 2016 Wind RFP?

6 A. Based on my experience I would say yes. I say this because many developers made
7 investments at the end of 2016 in order to ensure that their projects would qualify for the
8 full PTC amount. Wind Catcher is the most obvious example of just such a project. As
9 another example, Bates White is currently serving as the IE for the Oregon Commission
10 for PacifiCorp's 2017R wind RFP. We are currently reviewing and evaluating offers and
11 these offers appear to be making use of the full PTC. Besides Oregon, we would note the
12 example of Empire Electric District, which I note above, which is seeking rate base
13 recovery for 800 MW of new PTC-compliant wind generation.

14
15 Q. Would it be possible to conduct a competitive procurement and still have these offers
16 qualify for the full PTC?

17 A. I believe so. Current rules require a project to be in service no later than the end of 2020
18 in order to qualify for the entire PTC. With the 2016 Wind RFP the Company has a
19 document that is nearly "ready to issue" and can proceed relatively quickly. That RFP
20 was issued September 28, 2016 and targeted award group identification by December 16,
21 2016. While, based on experience, having SPP evaluate the network integration costs of
22 the offers will likely extend the timeline, the fact is that the process could still be done in
23 time. For example, the RFP could be issued in March and resolved in the fall, leaving the
24 winner about two years to finish their project. A typical wind project can comfortably

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1 make that timeline. Even the Wind Catcher Project will not start pouring foundations for
2 its turbines until December of 2018.⁴²

3
4 Q. Are there any other benefits to a competitive procurement?

5 A. Yes. A competitive process will allow for the input of SPP, which can open more ways
6 to share costs for transmission expansion with upgrade beneficiaries.

7
8 Q. Is it possible to “market test” in a competitive procurement the congestion and loss
9 insurance of \$■/MWh to \$■/MWh that PSO is asking its ratepayers to shoulder?

10 A. Yes. It is certainly possible to “market test” the congestion and loss insurance that the
11 Gen-Tie line provides by asking developers what they would require to absorb congestion
12 and loss costs to deliver power to PSO’s load. Furthermore, by testing the price and
13 performance of the Project against actual offers we can firmly establish price and
14 performance guarantees for the Project, thereby protecting PSO ratepayers from the risk
15 of cost overruns and/or underperformance.

16
17 **C. APPROVING THE PROJECT NOW COULD CREATE POLICY CONCERNS**
18 **GOING FORWARD**

19
20 Q. Do you have any other concerns with the Project?

⁴² Direct Testimony of Michael L. Bright on Behalf of Public Service Company of Oklahoma, July 31, 2017 (Bright Direct), page 10 lines 8 to 10.

A. Approval of the Project at this stage is concerning because it may set a precedent to ignore or sidestep competitive procurement. Competition is the force that has helped drive improvements in turbine cost and performance, which has helped bring down the cost of wind power over the years. As an example, above I noted that the DOE found wind PPA prices in the “interior” region had declined from \$46.21/MWh in 2010 to \$21.35/MWh in 2016.

It is important to see that the Project does not utilize any unique technologies or present any benefits that could not be provided by the competitive market. Just a few years ago (in 2013) PSO held a RFP and acquired 600 MW of supply, the same as it proposes to do here. If project size, or size paired with transmission, becomes a rationale for avoiding competitive procurement then it is certainly possible that in the future Oklahoma utilities will look to large, multi-jurisdictional projects (e.g. a 1,800 MW combined-cycle facility) and present them to regulators as being “unique.”

Furthermore, approving the Gen-Tie line would also allow PSO to have a leg up in future RFPs. As we understand it, PSO would have sole discretion over which projects could interconnect to the Gen-Tie line. This could give PSO a major advantage in future RFPs since they would have a cost-free way to minimize congestion charges. In fact, if PSO does not allow access to the line it could be in violation of FERC’s open access principles.⁴³

⁴³ PSO notes that “AEP/PSO/SWEPCO will retain functional control” of the Gen-Tie line, not SPP. PSO Response to data request JCN 1-5.

1

2 Q. How so?

3 A. FERC Order No. 807, issued in March 2015, limited the ability of third parties to seek
4 access to available transfer capability over a generation tie line.⁴⁴ The rationale behind
5 the order was to provide some protection to generation developers shouldering the costs
6 and risks of developing projects that include transmission to allow for delivery of power
7 to load. FERC determined that its Final Rule would promote competition, and would
8 specifically relieve developers from the obligation to file an Open Access Transmission
9 Tariff and become a transmission service provider.⁴⁵

10

11 A key part of FERC's rationale in Order No. 807 was that generation developers bear
12 substantial costs and risks in advancing a project with a large transmission component,
13 and that it is unfair for third parties to demand access while having avoided the
14 development risk. However, in this case most of the risk would be forced onto PSO
15 ratepayers, not PSO. Therefore, a developer could challenge a decision by PSO to block
16 access to the gen-tie line. In Order No. 807, FERC reminded all public utility
17 transmission providers (of which PSO is one) that under existing FERC regulations, they
18 remain "prohibited from engaging in unduly preferential or discriminatory behavior" and
19 remain subject to FERC's Standards of Conduct which require the "transmission provider
20 to treat all customers, affiliated and non-affiliated, on a not unduly discriminatory basis,

⁴⁴ "Open Access and Priority Rights on Interconnection Customer's Interconnection Facilities," 150 FERC ¶ 61,211 (FERC Order No. 807), available at <https://www.ferc.gov/whats-new/comm-meet/2015/031915/E-1.pdf>.

⁴⁵ FERC Order No. 807, paragraphs 33 to 34.

REDACTED

1 and prohibits the transmission provider from making or granting any undue preference or
2 advantage to any person with respect to the transmission or sale of electric energy.”⁴⁶
3

4 **D. THE PROJECT CONTRACTS FEATURE SOME POSITIVE RISK**
5 **PROTECTIONS, BUT ADDITIONAL GUARANTEES SHOULD BE MADE IF**
6 **THE PROJECT IS TO MOVE FORWARD**
7

8 Q. Did you review the Project documents?

9 A. Yes, I reviewed the Membership Interest Purchase Agreement (MIPA)⁴⁷ and the
10 engineering, procurement, and construction (EPC) contract for the Gen-Tie line (Gen-Tie
11 Agreement).⁴⁸
12

13 Q. What is your opinion of these documents?

14 A. Generally speaking, these agreements do allocate a good deal of risk toward experienced
15 contractors. They are pay for performance contracts which require the contractor to
16 perform the action before receiving payment. These are superior from a risk standpoint
17 to a utility-built “cost plus” construction schedule. In addition, they contain several
18 specific risk protections.
19

⁴⁶ FERC Order No. 807, paragraph 166.

⁴⁷ PSO Response to data request AG 5-9.

⁴⁸ PSO Response to data request OIEC 6-9.

1 Q. What are some specific risk protections in the documents?

2 A. There are several specific risk protections, some examples are:

3

4 • Both contracts contain liquidated damages for delays. The MIPA provides for up
5 to \$[REDACTED] in delay liquidated damages. The Gen-Tie Agreement provides
6 for damages in the amount of \$[REDACTED] per day up to [REDACTED]% of contract value.

7

8 • The MIPA provides for a reduction in payments if not all wind turbines are
9 completed by the Guaranteed Completion date and subsequent delay liquidated
10 damages on “remainder turbines” supplied after closing.

11

12 • The MIPA requires credit support in the forms of a Seller Parent Guaranty as well
13 as a Letter Of Credit (LOC) for \$[REDACTED] dollars. I note here than the LOC
14 amount of \$[REDACTED] per MW is XXXX that required in the form Renewable
15 Energy Purchase Agreement (REPA) which accompanied the 2016 Wind RFP.
16 The Gen-Tie Agreement has similar protections.

17

18 • The MIPA gives PSO the ability to enact an early closing and take possession of
19 the Project (aka step-in rights). This might be especially useful if the Project is
20 running behind schedule due to developer error.

21

22 • Both agreements have “Several” liability, meaning that PSO is generally (with an
23 exception noted below) not responsible for SWEPCO’s actions and vice-versa.

1

2 Q. How do these agreements compare to what is available in the competitive market?

3 A. While the agreements are pay-for-performance, the risk protections are not as strong as a
4 standard wind energy PPA. These contracts require the contractors to develop the Project
5 and the Gen-Tie line and feature some shorter-term warranties on equipment. By contrast
6 a PPA generally only pays the seller if they actually generate energy. The seller cannot
7 ask for a price increase due to rising O&M costs, the resource not performing as well as
8 predicted, construction cost overruns, legal changes, or other items which increase costs.
9 Moreover, the PPA supplier is penalized not only if they fail to deliver the project on
10 time, but also if they fail to keep their asset available to generate supply each year. For
11 example, the pro forma REPA in PSO's 2016 Wind RFP required a supplier to have 90%
12 availability for their facility or to pay liquidated damages.

13

14 Q. Do you have concerns regarding specific areas of the contracts?

15 A. Yes. First, the MIPA does not require completion of the Gen-Tie line. Instead, the
16 Project merely has to interconnect through the Gridliance Interconnection, a 50 MW
17 interconnection in the panhandle.

18

19 Second, it is not clear if there would be any additional penalties for the failure of either
20 party to fully capitalize on the PTC. Such failure, absent a change in law, would likely
21 come from not achieving full deliverability by the end of 2020. While parties may pay
22 liquidated damages in this situation it is unlikely that they will fully compensate for the
23 lost benefit of the PTC.

1
2 Third, the Gen-Tie agreement, in particular, has a number of actions which may increase
3 the cost of the line. In particular, section 1.97 defines a number of “Potential Relief
4 Events” which may allow for both an increase in cost and a change in schedule. These
5 actions include:

- 6 • PSO failure to secure Right of Way or permits
- 7 • Material changes to the route. (Note that the line does not yet have a final
8 route).⁴⁹
- 9 • Material changes to the project caused by new permitting requirements
- 10 • Increases in cost caused by PSO work or failure of PSO to meet milestones of
11 issue notices to proceed.
- 12 • While many of these actions relate to PSO actions, that does not mean that PSO
13 will not seek recovery of such costs before the Commission.

14 This risk is particularly concerning because of the probability of such overruns. Consider
15 the case of recent transmission projects in SPP. A 2015 article noted that noted that “[o]f
16 the 30 [transmission] projects to which SPP committed for near-term and 10-year
17 planning, costs of 23 are coming in higher than the acceptable 30%-above-estimate
18 level.”⁵⁰ Notably, AEP’s “Hobart-Roosevelt Tap-Snyder renovation in Oklahoma, which

⁴⁹ PSO states that “PSO and [the transmission developer] are holding open house meetings with landowners to receive public input regarding the Proposed Route for the Gen-Tie line. Upon completion of the open houses, public input received will be reviewed and all known siting risks will be evaluated, such that a Final Route is selected by December 22, 2017.” PSO Response to data request JCN 2-4.

⁵⁰ Herman K. Trabish, “Cost overruns in SPP transmission projects draw ire of RTO’s leaders,” *Utility Dive*, July 22, 2015, (Transmission Cost Overrun Article) available at <https://www.utilitydive.com/news/cost-overruns-in-spp-transmission-projects-draw-ire-of-rtos-leaders/402680/>.

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1 is a rebuild of a 10-mile, 69-kV line from Hobart to Roosevelt and of an 18.7 mile, 69-kV
2 line from Roosevelt to Snyder, was estimated by a third-party engineer at \$14.3 million
3 but is now expected to cost \$36 million, a 152% estimate inaccuracy.”⁵¹

4 The article went on to note that “[t]ypical of the causes of transmission cost overruns,
5 the Hobart-Roosevelt Tap-Snyder project required unanticipated right-of-way
6 acquisitions, increased license and permit costs, added substation builds, and extra
7 construction expenses in crossing the protected Mountain Park Wildlife Management
8 Area.”⁵²

9
10 Fourth, while the Agreements do have “several” liability, under the MIPA if SWEPCO
11 fails to perform its obligations at closing it could create a situation in which PSO is in
12 default as well. Specifically, Section 2.7 of the MIPA states that [REDACTED]

13 [REDACTED]
14 [REDACTED]
15 [REDACTED].

16
17 Finally, in what is likely an oversight, the MIPA appears to flip the shares of PSO and
18 SWEPCO. The definition of “Buyer’s Share” is “with respect to PSO 70%, and with
19 respect to SWPECO 30%.”⁵³ Section 2.7 of the MIPA states that “Each of PSO and
20 SWEPCO shall pay its respective Buyer’s Share of the Purchase Price under this

⁵¹ Transmission Cost Overrun Article .

⁵² Transmission Cost Overrun Article.

⁵³ PSO Response to data request AG 5-9, Highly Sensitive Confidential Attachment 1, page 4.

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1 Agreement.” This means that, contractually (unless otherwise amended), PSO will pay
2 70 percent of the purchase price for 30 percent of the benefit. I presume that this can and
3 will be amended prior to final approval of the contract.
4

5 Q. How can the Commission address these concerns?

6 A. If the Commission is satisfied that PSO has both demonstrated the need for this project
7 and justified a waiver of competitive bidding rules I would recommend that the
8 Commission take action to protect ratepayers from the risks associated with this project.
9 Specifically, I would recommend that the Commission require PSO to
10

- 11 • Limit recovery of capital and O&M costs to the projected numbers contained in
12 their filing;
13
- 14 • Take the risk of failure to capture the full PTC by absorbing any costs increases
15 related to failure to achieve the full projected PTC value shown in Exhibit KDP-1;
16
- 17 • Guarantee completion of the entire Project, by absorbing any additional
18 congestion costs required to deliver power from the Project to load, in the event of
19 the Gen-Tie not being completed;
20
- 21 • Absorb any costs related to SWEPCO defaults or costs imposed by actions of
22 other jurisdictions; and
23

- Pledge availability guarantees for the facility and pay liquidated damages in line with competitive PPAs should this guarantee not be met.

V. RECOMMENDATIONS

Q. What are your recommendations?

A. I make the following recommendations:

- The Commission should not grant PSO's request because PSO has not shown that acquiring 600 MW of additional wind is a reasonable procurement strategy and has not justified a waiver from competitive bidding requirements.
- If PSO wishes to establish the reasonableness of its strategy it should conduct additional analysis of the benefits of new wind generation with more market-reflective gas prices and new wind entry assumptions. PSO's analysis should also address strategic issues by looking at additional alternatives, including alternative transmission investments.
- If the Commission believes that PSO has demonstrated that acquiring 600 MW of wind generated power is a reasonable path forward, PSO should conduct a competitive procurement to compete the Project against market alternatives and ensure the ratepayers are getting the best resource possible.

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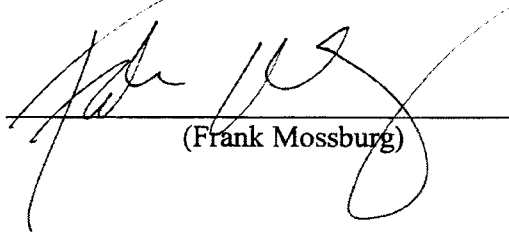
- 1 • If the Commission approves the Wind Catcher Project PSO should be required to
2 provide additional risk protections for ratepayers in the form of guarantees
3 regarding project cost, PTC viability, and other items I explain in the body of my
4 Responsive Testimony.

5

6 Q. Does this conclude your testimony?

7 A. Yes.

I state, under penalty of perjury under the laws of Oklahoma, that the foregoing is true and correct to the best of my knowledge and belief.

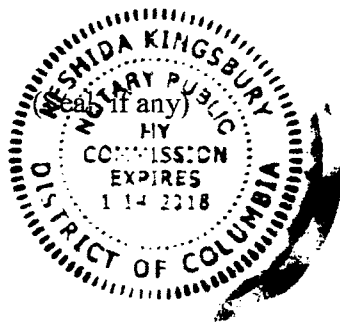

(Frank Mossburg)

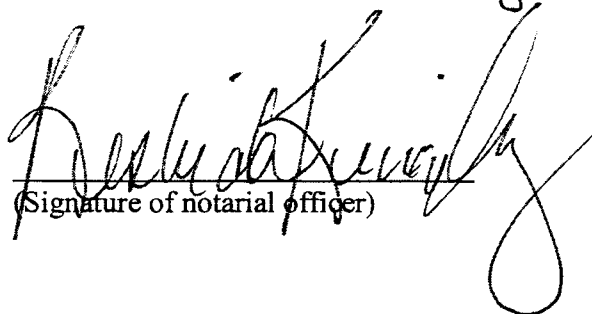
December 4, 2017, Washington, DC

State of
County of

Signed or attested before me on December 4, 2017 by Frank Mossburg

Dated




(Signature of notarial officer)

Executive Assistant for Bate White
Title (and Rank)

My commission expires:)

My commission no.)

RESHIDA KINGSBURY
NOTARY PUBLIC DISTRICT OF COLUMBIA
My Commission Expires January 14, 2018

**LIST OF TESTIMONY AND PUBLICATIONS BY
FRANK MOSSBURG**

**LIST OF TESTIMONY AND OTHER PUBLICATIONS
FOR FRANK MOSSBURG**

TESTIMONY

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REFERENCED PSO RESPONSES TO DATA REQUESTS

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY)	
OF OKLAHOMA ("PSO") FOR APPROVAL OF)	
THE COST RECOVERY OF THE WIND CATCHER)	
ENERGY CONNECTION PROJECT; A)	
DETERMINATION THERE IS A NEED FOR THE)	
PROJECT; APPROVAL FOR FUTURE)	
INCLUSION IN BASE RATES COST RECOVERY)	CAUSE NO. PUD 201700267
OF PRUDENT COSTS INCURRED BY PSO FOR)	
THE PROJECT; APPROVAL OF A TEMPORARY)	
COST RECOVERY RIDER; APPROVAL OF)	
CERTAIN ACCOUNTING PROCEDURES)	
REGARDING FEDERAL PRODUCTION TAX)	
CREDITS; WAIVER OF OAC 165:35-38-5(e); AND)	
SUCH OTHER RELIEF THE COMMISSION)	
DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-1 DATA REQUESTS**

Question No. JCN 1-1:

At any point in time, during any stage of planning and/or analysis of the Wind Catcher Energy Connection Project, did American Electric Power ("AEP"), American Electric Power Service Corporation ("AEPSC"), PSO, or Southwestern Electric Power Company ("SWEPCO") involve or engage the Southwest Power Pool ("SPP"), regarding potential impacts to the transmission system at the generation interconnection point in the Oklahoma Panhandle? If so, please provide all supporting documents, including communications between AEP, AEPSC, PSO, and/or SWEPCO and SPP. If not, please explain.

Response No. JCN 1-1:

The Company did not engage the SPP in discussions about an interconnection point in the Oklahoma Panhandle or any other interconnection points in the SPP. The Company recognized the severe and growing congestion issues on the SPP Transmission system and the importance of minimizing, or eliminating, PSO's and SWEPCO's exposure to such cost. The Company's system planning team determined the interconnection point that would deliver the benefits of the Wind Catcher Wind Facility to PSO's and SWEPCO's customers. Using this guidance, Invenergy, as the developer of the facility, then engaged SPP through the submission of interconnection requests for the Wind Catcher Wind Facility at the Tulsa North Substation. For the reasons stated above, the Company did not contact SPP.

Prepared By: Robert W. Bradish

Title: VP Trans Grid Development

Date Response Provided: 10/2/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
APPROVAL OF THE COST RECOVERY OF)	
THE WIND CATCHER ENERGY CONNECTION)	
PROJECT; A DETERMINATION THERE IS A)	
NEED FOR THE PROJECT; APPROVAL FOR)	
FUTURE INCLUSION IN BASE RATES COST)	CAUSE NO. PUD 201700267
RECOVERY OF PRUDENT COSTS INCURRED)	
BY PSO FOR THE PROJECT; APPROVAL OF A)	
TEMPORARY COST RECOVERY RIDER;)	
APPROVAL OF CERTAIN ACCOUNTING)	
PROCEDURES REGARDING FEDERAL)	
PRODUCTION TAX CREDITS; WAIVER OF)	
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)	
THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-1 DATA REQUESTS**

Question No. JCN 1-2:

At any point in time, during any stage of planning and/or analysis of the Wind Catcher Energy Connection Project, did AEP, AEPSC, PSO, or SWEPCO involve or engage SPP, regarding potential impacts to the transmission system at the point of interconnection with PSO's proposed North Tulsa location? If so, please provide all supporting documents and communications between AEP, AEPSC, PSO, and/or SWEPCO and SPP. If not, please explain.

Response No. JCN 1-2:

Please see the response to JCN 1-1.

Prepared By: Robert W. Bradish

Title: VP Trans Grid Development

Date Response Provided: 10/2/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
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FUTURE INCLUSION IN BASE RATES COST)	CAUSE NO. PUD 201700267
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APPROVAL OF CERTAIN ACCOUNTING)	
PROCEDURES REGARDING FEDERAL)	
PRODUCTION TAX CREDITS; WAIVER OF)	
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)	
THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-1 DATA REQUESTS**

Question No. JCN 1-3:

At any point in time, during any stage of planning and/or analysis of the Wind Catcher Energy Connection Project, did AEP, AEPSC, PSO, or SWEPCO involve or engage SPP, regarding potential impacts to the entire SPP transmission system? If so, please provide all supporting documents and communications between AEP, AEPSC, PSO, and/or SWEPCO and SPP. If not, please explain.

Response No. JCN 1-3:

Please see the response to JCN 1-1.

Prepared By: Robert W. Bradish

Title: VP Trans Grid Development

Date Response Provided: 10/2/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
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PROJECT; A DETERMINATION THERE IS A)	
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FUTURE INCLUSION IN BASE RATES COST)	CAUSE NO. PUD 201700267
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TEMPORARY COST RECOVERY RIDER;)	
APPROVAL OF CERTAIN ACCOUNTING)	
PROCEDURES REGARDING FEDERAL)	
PRODUCTION TAX CREDITS; WAIVER OF)	
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)	
THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-1 DATA REQUESTS**

Question No. JCN 1-4:

At any point in time, during any stage of the planning and/or analysis of the Wind Catcher Energy Connection Project, did AEP, AEPSC, PSO, or SWEPCO involve or engage SPP, regarding potential impacts to the Integrated Marketplace or potential pricing impacts for other generation sources? If so, please provide all supporting documents and communications between AEP, AEPSC, PSO, and/or SWEPCO and SPP. If not, please explain.

Response No. JCN 1-4:

Please see the response to JCN 1-1.

Prepared By: Robert W. Bradish

Title: VP Trans Grid Development

Date Response Provided: 10/2/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

**APPLICATION OF PUBLIC SERVICE COMPANY)
OF OKLAHOMA ("PSO") FOR APPROVAL OF THE)
COST RECOVERY OF THE WIND CATCHER)
ENERGY CONNECTION PROJECT; A)
DETERMINATION THERE IS A NEED FOR THE)
PROJECT; APPROVAL FOR FUTURE INCLUSION)
IN BASE RATES COST RECOVERY OF PRUDENT)
COSTS INCURRED BY PSO FOR THE PROJECT;)
APPROVAL OF A TEMPORARY COST RECOVERY)
RIDER; APPROVAL OF CERTAIN ACCOUNTING)
PROCEDURES REGARDING FEDERAL)
PRODUCTION TAX CREDITS; WAIVER OF OAC)
165:35-38-5(e); AND SUCH OTHER RELIEF THE)
COMMISSION DEEMS PSO IS ENTITLED)**

CAUSE NO. PUD 201700267

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA ATTORNEY GENERAL'S FIFTH DATA REQUESTS
AG-PSO-5**

Question No. 5-4:

Please refer to the Direct Testimony of Robert W. Bradish, Page 3, which describes the SPP generation interconnection agreement (GIA) and explains that transmission planning is time consuming and complex.

- a. Has PSO communicated with the SPP Regional State Committee to determine the cost allocations that would be applicable to the Gen-Tie if it were included in the SPP under the SPP Highway/Byway Plan (Attachment J of the Southwest Power Pool, Inc. Open Access Transmission Tariff, Sixth Revised Volume No. 1)?
- b. Has PSO conducted its own internal analysis of the benefits and costs of including the Gen-Tie in the FERC-approved PSO formula rate?
- c. Please provide all emails between PSO and the SPP regarding the Gen-Tie.

Response No. 5-4:

- a. No.
- b. The Gen-Tie is not a transmission asset that would be recovered through PSO's FERC-approved formula rate. See the response to AG 5-11, part c.
- c. There are no pertinent emails between SPP and PSO regarding the Gen-Tie. Invenenergy, as developer of the Wind Facility, submitted the Interconnection Request with SPP.

Prepared By: Robert W. Bradish

Title: VP Trans Grid Development

Date Response Provided: 10/3/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
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THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS' FIFTH DATA REQUESTS**

Question No. 8:

Provide the breakeven cost of natural gas below which the proposed wind energy resources would not be beneficial.

Response No. 8:

The Company prepared a new "Ultra-Low" gas analysis for both the Baseline case and the Project case. In this case the gas price forecast used in the Low Gas scenarios, which was provided in Attachment 1 to Company's response to OIEC 3-14, was reduced by 50 percent for all years from 2021 through 2045. This case resulted in an average real price over the 2021-2045 period in 2021 dollars of \$2.73 per MMBTU. The Company performed this analysis only as a "one-off" indicative assessment in part since it believes the likelihood of future gas prices at or near these levels sustained through 2045 is very remote.

Market prices for energy were computed by Brattle using this lower gas price in PROMOD to dispatch all of the generation in SPP in 2020 and 2025. These market prices were then interpolated between those values for 2021-2024 and extrapolated out through 2045 and used in Plexos to dispatch the Company's resources. This process, which is described in the testimony of Company witness Pfeifenberger, matches the process used in the scenarios which had already been prepared.

The results of this Ultra-Low gas analysis indicate a reduced -- but still significantly positive -- benefit to PSO's customers of \$107 million in net present value 2020 dollars, providing an

indication that a so called gas breakeven price where the net benefits precisely equal zero is potentially lower than this much lower, artificially reduced gas price.

Refer to OIEC_5_8_Attachment_1 for this analysis, which does not include any shaping of the PTC benefit.

Prepared By: Kelly D. Pearce
Prepared By: Johannes P. Pfeifenberger
Prepared By: Karl R. Bletzacker

Title: Dir Contract & Analysis
Title: Principal, The Brattle Group
Title: Dir Fundamental Analysis

Date Response Provided: 9/7/2017

**FORECASTED PSO SHARE OF WIND CATCHER PROJECT
COSTS AND BENEFITS COMPARED TO BASELINE CASE - ULTRA LOW GAS**
\$ in Millions (Nominal unless otherwise indicated)

Project Less Baseline Case									
Year	2020 NPV	Total Nominal	2021	2022	2023	2024	2025	2026	2027
1. Adjusted Production Cost Savings	\$1,133	\$2,854	\$65	\$67	\$70	\$57	\$57	\$86	\$89
2. Congestion and Loss Cost	(\$236)	(\$579)	(\$15)	(\$15)	(\$15)	(\$16)	(\$16)	(\$17)	(\$18)
3. Capacity Value	\$74	\$222	\$0	\$0	\$0	\$49	(\$1)	(\$1)	(\$1)
4. Wind Facility Revenue Requirement	(\$1,163)	(\$2,368)	(\$127)	(\$118)	(\$116)	(\$111)	(\$106)	(\$108)	(\$106)
5. Production Tax Credits	\$837	\$1,217	\$111	\$113	\$116	\$118	\$120	\$123	\$125
6. Gen-Tie Line Revenue Requirement	(\$538)	(\$1,044)	(\$62)	(\$59)	(\$59)	(\$57)	(\$55)	(\$53)	(\$51)
7. Total Benefits/(Cost)	\$107	\$302	(\$28)	(\$12)	(\$5)	\$40	(\$1)	\$29	\$38

Project Less Baseline Case									
Year	2028	2029	2030	2031	2032	2033	2034	2035	2036
1. Adjusted Production Cost Savings	\$94	\$103	\$111	\$114	\$123	\$126	\$133	\$100	\$141
2. Congestion and Loss Cost	(\$19)	(\$21)	(\$22)	(\$23)	(\$24)	(\$25)	(\$26)	(\$26)	(\$26)
3. Capacity Value	(\$1)	(\$1)	(\$1)	(\$1)	(\$1)	(\$1)	(\$1)	\$59	(\$2)
4. Wind Facility Revenue Requirement	(\$104)	(\$102)	(\$100)	(\$98)	(\$96)	(\$94)	(\$92)	(\$90)	(\$88)
5. Production Tax Credits	\$128	\$130	\$133	\$0	\$0	\$0	\$0	\$0	\$0
6. Gen-Tie Line Revenue Requirement	(\$49)	(\$47)	(\$45)	(\$43)	(\$41)	(\$39)	(\$37)	(\$36)	(\$35)
7. Total Benefits/(Cost)	\$49	\$62	\$76	(\$50)	(\$40)	(\$33)	(\$23)	\$7	(\$9)

Project Less Baseline Case									
Year	2037	2038	2039	2040	2041	2042	2043	2044	2045
1. Adjusted Production Cost Savings	\$141	\$145	\$150	\$155	\$156	\$161	\$165	\$121	\$125
2. Congestion and Loss Cost	(\$26)	(\$27)	(\$27)	(\$28)	(\$28)	(\$29)	(\$30)	(\$30)	(\$31)
3. Capacity Value	(\$2)	(\$2)	(\$2)	(\$2)	(\$2)	(\$2)	(\$2)	\$70	\$70
4. Wind Facility Revenue Requirement	(\$86)	(\$84)	(\$82)	(\$80)	(\$79)	(\$77)	(\$75)	(\$74)	(\$73)
5. Production Tax Credits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6. Gen-Tie Line Revenue Requirement	(\$34)	(\$33)	(\$32)	(\$32)	(\$31)	(\$30)	(\$29)	(\$29)	(\$27)
7. Total Benefits/(Cost)	(\$7)	(\$1)	\$6	\$13	\$16	\$23	\$29	\$59	\$64

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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INCLUSION IN BASE RATES COST RECOVERY)	CAUSE NO. PUD 201700267
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THE PROJECT; APPROVAL OF A TEMPORARY)	
COST RECOVERY RIDER; APPROVAL OF)	
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CREDITS; WAIVER OF OAC 165:35-38-5(e); AND)	
SUCH OTHER RELIEF THE COMMISSION)	
DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-2 DATA REQUESTS**

Question No. JCN 2-1:

If the Project (including the Gen-Tie line) is approved as proposed, please provide:

- a. The impact on PSO's rate base, both in dollar and percentage terms.
- b. The expected return on investment PSO will collect from ratepayers on its investment in the Project in all years of its life (25 years for the wind project and 50 years for the transmission project).

Response No. JCN 2-1:

- a. The impact on PSO's rate base is a \$1.382 billion increase (68.2%) based on PSO's \$2.025 billion rate base approved in Cause No. PUD 201500208. Based on PSO's current base rate case (Cause No. PUD 201700151), the impact on PSO's rate base is a \$1.382 billion increase (54.7%) to the requested rate base of \$2.527 billion.
- B. PUD JCN 2-1 Attachment 1 provides the projected rate base and return on rate base for the 25-year period 2021 through 2045 for the Wind Facility and the Gen-Tie line. PSO has not calculated the requested data beyond 25-years for the Gen-tie line. PSO does not have projected future rate base amounts for PSO, thus the percentage impact on rate base is not available.

Prepared By: John O. Aaron

Title: Reg Pricing & Analysis Mgr

Date Response Provided: 10/27/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
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PROCEDURES REGARDING FEDERAL)	
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**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-4 DATA REQUESTS**

Question No. JCN 4-9:

On July 31, 2017, PSO filed this Cause with the Oklahoma Corporation Commission and provided 60-day notice to this Commission that PSO was updating its 2015 IRP pursuant to OAC 165:35-37-5(a). Please provide dates for the following:

- On what date did PSO complete the analysis for the Project?
- On what date did PSO complete the analysis for its 2017 Update to the 2015 IRP?

Response No. JCN 4-9:

PSO completed its analysis of the Project on or about July 28, 2017.

PSO's 2017 IRP update was substantially complete on Thursday, September 28, 2017.

Prepared By: Steven L. Fate
Prepared By: Kelly D. Pearce

Title: VP Regulatory & Finance
Title: Dir FERC Regulatory & Analysis

Date Response Provided: 10/31/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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165:35-38-5(e); AND SUCH OTHER RELIEF THE)
COMMISSION DEEMS PSO IS ENTITLED)**

CAUSE NO. PUD 201700267

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA ATTORNEY GENERAL'S FIRST DATA REQUESTS**

Question No. 1-17:

Natural Gas Forecasts: Please provide all documents supporting the forecasted natural gas prices in Excel-compatible format with formulas intact for all sensitivities studied. The documents should include the following:

- (a) Monthly and annual natural gas prices at Henry Hub
- (b) Derivation of any "basis" differential between Henry Hub gas price and delivered natural gas prices

Response No. 1-17:

The Wind Catcher Energy Connection forecasted energy values are included in the following commodity price forecasts.

2016H2 Base Case (AG_1_017 Attachment 1)
2016H2 Low Case (AG_1_017 Attachment 2)
2016H2 High Case (AG_1_017 Attachment 3)

- a. Annual Henry Hub natural gas prices are located in the Excel worksheet "Annual_Prices-Nominal" (column Z)
- b. Annual basis differentials can be derived from Henry Hub natural gas prices and the locational natural gas prices in the Excel worksheet "Annual_Prices-Nominal" (columns AA-AE)

Prepared By: Karl R. Bletzacker

Title: Dir Fundamental Analysis

Date Response Provided: 9/15/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-5 DATA REQUESTS**

Question No. JCN 5-17:

Witness Bletzacker states: "NYMEX energy-complex futures contract prices are not a reliable forecast of future, weather-normalized, long-term energy market fundamentals." (page 7) By "fundamentals," does Witness Bletzacker mean "prices?"

Response No. JCN 5-17:

For clarification, Company witness Bletzacker offers the following: "NYMEX energy-complex futures contract prices are not a reliable forecast of the future, weather-normalized, long-term energy market prices that would be derived from conventional fundamentals analysis."

Prepared By: Karl R. Bletzacker

Title: Dir Fundamental Analysis

Date Response Provided: 11/16/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY) OF OKLAHOMA ("PSO") FOR APPROVAL OF) THE COST RECOVERY OF THE WIND CATCHER) ENERGY CONNECTION PROJECT; A) DETERMINATION THERE IS A NEED FOR THE) PROJECT; APPROVAL FOR FUTURE) INCLUSION IN BASE RATES COST RECOVERY) OF PRUDENT COSTS INCURRED BY PSO FOR) THE PROJECT; APPROVAL OF A TEMPORARY) COST RECOVERY RIDER; APPROVAL OF) CERTAIN ACCOUNTING PROCEDURES) REGARDING FEDERAL PRODUCTION TAX) CREDITS; WAIVER OF OAC 165:35-38-5(e); AND) SUCH OTHER RELIEF THE COMMISSION) DEEMS PSO IS ENTITLED)	CAUSE NO. PUD 201700267
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**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA ATTORNEY GENERAL'S SIXTH DATA REQUESTS
AG-PSO-6**

Question No. 6-4:

On March 8, 2017, Southwestern Public Service Company filed an application with the Public Utility Commission of Texas for a Certificate of Convenience and Necessity to recognize acquisition of approximately 1,230 MW of wind generation located in Hale County, TX and Roosevelt County, NM. Please describe if, and how, these projects were recognized in the development of the Base, Project and Generic Wind cases.

Response No. 6-4:

The Company utilized datasets developed by SPP and its stakeholders for SPP's 2017 Integrated Transmission Planning 10-Year Assessment for analysis of the Wind Catcher Project. The modifications made to these datasets are detailed in the Direct Testimony of Hannes Pfeifenberger in Exhibit JPP-1. The SPP developed models assumed 2,750MW of new wind in 2020 and an additional 420MW in 2025 and these new wind assumptions were not modified. The cited 1,230MW of wind generation was not specifically included in the models developed for the analysis of the Wind Catcher Project. However, the impacts of interconnecting up to 3,170MW of SPP assumed new wind generation to the SPP transmission system were captured in the Companies' analyses.

Prepared By: Kelly D. Pearce
Prepared By: Johannes P. Pfeifenberger

Title: Dir Contract & Analysis
Title: Principal, The Brattle Group

Date Response Provided: 10/4/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-5 DATA REQUESTS**

Question No. JCN 5-8:

Witness Pfeifenger states that "The Project can avoid the potentially significant congestion charges between wind sites and the AEP load zone that would be incurred in the Generic Wind case" (page 20) and "The Project, with its dedicated Gen-Tie to Tulsa, can avoid the potentially significant future congestion charges between wind sites and the Companies' load that would be incurred in the Generic Wind Case." (page 5) (emphasis added)

- a. Is it Witness Pfeifenger's testimony that all savings related to congestion that are included in PSO's net benefits analysis are hypothetical?
- b. If the answer to (a) is "no," please explain Witness Pfeifenger's confidence in forecasting congestion costs over the 25-year life of the Project and the Generic Wind Case.

Response No. JCN 5-8:

- a. No. The savings related to congestion included in PSO's net benefits analysis are expected to be realized if the Project is built instead of its alternatives (i.e., instead of the Base Case or the Generic Wind Case), and similar future system conditions as modeled by the companies manifest.
- b. Witness Pfeifenger reviewed the Companies' PROMOD simulation results for 2020 and 2025 and found that the results—specifically, the market prices for PSO and SWEPCO gen hubs, market prices at PSO and SWEPCO's SPP load zones, and the marginal congestion and loss charges at AEP's existing wind resource locations and the

- c. generic wind locations—to be reasonable. Furthermore, the Companies' PROMOD simulations were based on SPP's 2017 ITP10 PROMOD models, with only minor modifications (as described in Exhibit JPP-2), which provided further confidence in the overall reasonableness of the results, given that the models were developed by SPP through extensive stakeholder engagements in developing key inputs and assumptions related to future system conditions, and also since the models were calibrated by SPP's benchmarking assessment.

Additionally, witness Pfeifenberger believes that the forecasted congestion costs—especially those associated with the generic wind locations—are conservative. This is because of the following:

The Congestion and marginal loss costs estimated in the Companies' analysis are based on PROMOD models that include all SPP-approved transmission projects expected to be in-service by 2020 and 2025, but reflect SPP's very conservative assumptions on (non-AEP) future wind development through 2020 and 2025. The SPP PROMOD models also do not simulate any transmission outages, which will understate congestion. These assumptions yield conservatively low estimates of likely future congestion and losses, particularly for generic wind resources that rely entirely on SPP's transmission system rather than their own dedicated transmission infrastructure to deliver their energy to the Companies' load zone.

The estimates for congestion and loss costs for 2020 and 2025 are interpolated and extrapolated over 25 years based on the assumption that the conservative balance between assumed future wind development and future transmission additions reflected in the 2020 and 2025 models will continue to persist even beyond 2025. If more wind resources were to develop in SPP (relative to transmission) than those conservatively assumed in SPP's PROMOD models, the estimated congestion and loss costs would increase further. Such potential increases have not been accounted for in the results of this analysis, and if they were, the Project's congestion related benefits relative to the Generic Wind case could be higher.

In addition, Production Cost models assume that system operators would have perfect foresight of actual system conditions when making generation unit commitment decisions on a day-ahead basis. This ignores the considerable uncertainties that exist with actual system load, wind generation outputs and actual transmission outages beyond those assumed under planning criteria such as N-1 contingency conditions. By not simulating actual future system uncertainties, especially the actual transmission outages— which would create more severe transmission constraints, the Project's estimated benefits (including impact on locational prices) relative to the Base Case and the Generic Wind case are conservative.

Prepared By: Johannes P. Pfeifenberger

Title: Principal, The Brattle Group

Date Response Provided: 11/16/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY)	
OF OKLAHOMA ("PSO") FOR APPROVAL OF THE)	
COST RECOVERY OF THE WIND CATCHER)	
ENERGY CONNECTION PROJECT; A)	
DETERMINATION THERE IS A NEED FOR THE)	
PROJECT; APPROVAL FOR FUTURE INCLUSION)	
IN BASE RATES COST RECOVERY OF PRUDENT)	CAUSE NO. PUD 201700267
COSTS INCURRED BY PSO FOR THE PROJECT;)	
APPROVAL OF A TEMPORARY COST RECOVERY)	
RIDER; APPROVAL OF CERTAIN ACCOUNTING)	
PROCEDURES REGARDING FEDERAL)	
PRODUCTION TAX CREDITS; WAIVER OF OAC)	
165:35-38-5(e); AND SUCH OTHER RELIEF THE)	
COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA ATTORNEY GENERAL'S ELEVENTH DATA REQUESTS**

Question No. 11-2:

Please provide all correspondence, including electronic mail messages, between and among the following entities regarding PSO's Requests for Proposal for wind generation facilities issued in 2016 ("2016 Wind RFP"): PSO, affiliated entities including American Electric Power Company, Inc. ("AEP") and its direct or indirect subsidiaries, and any entity who submitted a bid response to the 2016 Wind RFP.

Response No. 11-2:

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1300 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

See AG 11-2 HIGHLY CONFIDENTIAL SENSITIVE Attachments 1 and 2.

Prepared By: Jay F. Godfrey

Title: Mng Dir Enrgy Mktng&Renewables

Date Response Provided: 10/19/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY) OF OKLAHOMA ("PSO") FOR APPROVAL OF THE) COST RECOVERY OF THE WIND CATCHER) ENERGY CONNECTION PROJECT; A) DETERMINATION THERE IS A NEED FOR THE) PROJECT; APPROVAL FOR FUTURE INCLUSION) IN BASE RATES COST RECOVERY OF PRUDENT) COSTS INCURRED BY PSO FOR THE PROJECT;) APPROVAL OF A TEMPORARY COST RECOVERY) RIDER; APPROVAL OF CERTAIN ACCOUNTING) PROCEDURES REGARDING FEDERAL) PRODUCTION TAX CREDITS; WAIVER OF OAC) 165:35-38-5(e); AND SUCH OTHER RELIEF THE) COMMISSION DEEMS PSO IS ENTITLED)	CAUSE NO. PUD 201700267
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**PUBLIC SERVICE COMPANY OF OKLAHOMA'S SUPPLEMENTAL RESPONSE TO
PLAINS AND EASTERN CLEAN LINE LLC'S FIRST DATA REQUESTS**

Question No. 4:

Please provide all work papers, documents, and communications used to prepare exhibits or support amounts included or referenced in witnesses' testimony. Where possible provide the work papers in Excel compatible format with fully functional formulas.

Response No. 4:

Please see attachments CL_1_004 Attachment_1_Aaron.zip, CL_1_004 Attachment_2_Chodak.zip, CL_1_004 Attachment_3_Godfrey.zip, CL_1_004 Attachment_4_Hawkins.zip, CL_1_004 Attachment_5_Pearce.zip, CL_1_004 Attachment_6_Pfeifenberger.zip, CL_1_004 Attachment_7_Pfeifenberger.zip, CL_1_004 Attachment_8_Pfeifenberger.zip, CL_1_004 Attachment_9a_Pfeifenberger.zip, CL_1_004 Attachment_9b_Pfeifenberger.zip, CL_1_004 Attachment_10_Pfeifenberger.zip and CL_1_004 Attachment_11_Bright.zip for the requested information.

Prepared By: John O. Aaron	Title: Reg Pricing & Analysis Mgr
Prepared By: Michael L. Bright	Title: Mng Dir Projects
Prepared By: Renee V. Hawkins	Title: Mng Dir Corporate Finance
Prepared By: Kelly D. Pearce	Title: Dir Contract & Analysis
Prepared By: Johannes F. Pfeifenberger	Title: Principal, The Brattle Group
Prepared By: Paul Chodak	Title: EVP Utilities
Prepared By: Jay F. Godfrey	Title: Mng Dir Enrgy Mktng&Renewables

Date Response Provided: 8/29/2017

Supplemental Response No. 4:

Please see CL_1_004_SUPPLEMENTAL_Attachment_5_Pearce and
CL_1_004_SUPPLEMENTAL_HIGHLY SENSITIVE CONFIDENTIAL_Attachment_5_Pearce.

These files represent a portion of two sensitivity analyses; the supplemented files are the PLEXOS portion of the analyses. These analyses, which include one component of a low gas Generic Wind sensitivity and no carbon sensitivities for the Project and Base cases, were not carried through the full modeling process in order to determine customer net benefits, revenue requirements, or customer bill impacts.

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1310 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

Prepared By: Kelly D. Pearce

Title: Dir FERC Regulatory & Analysis

Date Response Provided: 11/3/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
APPROVAL OF THE COST RECOVERY OF)	
THE WIND CATCHER ENERGY CONNECTION)	
PROJECT; A DETERMINATION THERE IS A)	
NEED FOR THE PROJECT; APPROVAL FOR)	
FUTURE INCLUSION IN BASE RATES COST)	CAUSE NO. PUD 201700267
RECOVERY OF PRUDENT COSTS INCURRED)	
BY PSO FOR THE PROJECT; APPROVAL OF A)	
TEMPORARY COST RECOVERY RIDER;)	
APPROVAL OF CERTAIN ACCOUNTING)	
PROCEDURES REGARDING FEDERAL)	
PRODUCTION TAX CREDITS; WAIVER OF)	
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)	
THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS' THIRD DATA REQUESTS**

Question No. 20:

Provide a summary of bids and the bid evaluation analysis PSO's new wind PPA resulting from PSO's 2016 Wind RFP as referenced in PSO witness Fate's testimony.

Response No. 20:

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1300 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

Subsequent to the filing of this application PSO decided to not proceed with a PPA from the 2016 Wind RFP so there is no Purchased Power Agreement. See Highly Sensitive Confidential OIEC 3-20 Attachment 1 for the bid summary and Highly Sensitive Confidential OIEC 3-20 Attachment 2 for the bid evaluation.

Prepared By: Steven L. Fate

Title: VP Regulatory & Finance

Date Response Provided: 9/5/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY)
OF OKLAHOMA ("PSO") FOR APPROVAL OF)
THE COST RECOVERY OF THE WIND CATCHER)
ENERGY CONNECTION PROJECT; A)
DETERMINATION THERE IS A NEED FOR THE)
PROJECT; APPROVAL FOR FUTURE)
INCLUSION IN BASE RATES COST RECOVERY)
OF PRUDENT COSTS INCURRED BY PSO FOR)
THE PROJECT; APPROVAL OF A TEMPORARY)
COST RECOVERY RIDER; APPROVAL OF)
CERTAIN ACCOUNTING PROCEDURES)
REGARDING FEDERAL PRODUCTION TAX)
CREDITS; WAIVER OF OAC 165:35-38-5(e); AND)
SUCH OTHER RELIEF THE COMMISSION)
DEEMS PSO IS ENTITLED)

CAUSE NO. PUD 201700267

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-2 DATA REQUESTS**

Question No. JCN 2-2:

Please provide, for 2016:

- a. PSO's annual wind curtailment costs.
- b. PSO's annual congestion cost for wind.
- c. PSO's annual loss cost for wind.
- d. The total, in MWh, in wind energy purchased by PSO.

Response No. JCN 2-2:

Please see JCN_2_2_HIGHLY_SENSITIVE_AND_CONFIDENTIAL_ATTACHMENT_1.

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1300 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

Prepared By: Kelly D. Pearce
Prepared By: Jay F. Godfrey

Title: Dir FERC Regulatory & Analysis
Title: Mng Dir Enrgy Mktng&Renewables

Date Response Provided: 10/27/2017

APPLICATION OF PUBLIC SERVICE)
COMPANY OF OKLAHOMA ("PSO") FOR)
APPROVAL OF THE COST RECOVERY OF)
THE WIND CATCHER ENERGY CONNECTION)
PROJECT; A DETERMINATION THERE IS A)
NEED FOR THE PROJECT; APPROVAL FOR)
FUTURE INCLUSION IN BASE RATES COST) CAUSE NO. PUD 201700267
RECOVERY OF PRUDENT COSTS INCURRED)
BY PSO FOR THE PROJECT; APPROVAL OF A)
TEMPORARY COST RECOVERY RIDER;)
APPROVAL OF CERTAIN ACCOUNTING)
PROCEDURES REGARDING FEDERAL)
PRODUCTION TAX CREDITS; WAIVER OF)
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)
THE COMMISSION DEEMS PSO IS ENTITLED)

Question No. JCN 1-5:

Response No. JCN 1-5:

Prepared By: Robert W. Bradish Title: V P Trans Grid Development

Date Response Provided: 10/2/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY)
OF OKLAHOMA ("PSO") FOR APPROVAL OF THE)
COST RECOVERY OF THE WIND CATCHER)
ENERGY CONNECTION PROJECT; A)
DETERMINATION THERE IS A NEED FOR THE)
PROJECT; APPROVAL FOR FUTURE INCLUSION)
IN BASE RATES COST RECOVERY OF PRUDENT)
COSTS INCURRED BY PSO FOR THE PROJECT;)
APPROVAL OF A TEMPORARY COST RECOVERY)
RIDER; APPROVAL OF CERTAIN ACCOUNTING)
PROCEDURES REGARDING FEDERAL)
PRODUCTION TAX CREDITS; WAIVER OF OAC)
165:35-38-5(e); AND SUCH OTHER RELIEF THE)
COMMISSION DEEMS PSO IS ENTITLED)

CAUSE NO. PUD 201700267

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA ATTORNEY GENERAL'S FIFTH DATA REQUESTS
AG-PSO-5

Question No. 5-9:

Please refer to the Direct Testimony of Steven L. Fate, Page 2, lines 17-23. Mr. Fate discusses the Membership Interests Purchase Agreement ("MIPA") with States Edge Wind I Holdings LLC (Invenergy) for the purchase of 100% equity interest of States Edge Wind I LLC.

- a. Please provide a copy of the MIPA.
- b. Please provide any available itemization or breakdown of the \$2.694 billion for the MIPA purchase price referenced in the Direct Testimony of Michael L. Bright, Exhibit MLB-1.

Response No. 5-9:

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1300 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

- a. Please see AG 5_9_HIGHLY SENSITIVE CONFIDENTIAL ATTACHMENT 1. A redacted copy is being provided as well.
- b. There is no itemization or breakdown of the fixed MIPA purchase price.

Prepared By: Jay F. Godfrey

Title: Mng Dir Energy Mktng&Renewables

Date Response Provided: 10/3/2017

MEMBERSHIP INTERESTS PURCHASE AGREEMENT

Dated as of July 26, 2017

by and between

**Public Service Company of Oklahoma and
Southwestern Electric Power Company**

as Buyer

American Electric Power Service Corporation

as Buyer Agent

and

States Edge Wind I Holdings LLC

as Seller

“Buyer Confidential Information” is defined in Section 9.2(a).

“Buyer GridLiance Completion Infrastructure” means all 345 kV infrastructure in the Badlands Substation switchyard, including, but not limited to (a) breakers, switches, buswork, insulators, arresters, and instrument transformers, (b) all substation grounding, shielding, and lightning, and (c) the control building, including all protection, control, and communication equipment.

“Buyer Indemnified Parties” is defined in Section 10.2(a).

“Buyer Indemnity Cap” means an amount equal [REDACTED].

“Buyer’s Knowledge”, or **“Knowledge”** with respect to Buyer, means the actual knowledge of any of the individuals listed on Schedule 1.1(a) after reasonable inquiry by such individuals of their direct reports.

“Buyer’s Share” means with respect to PSO 70%, and with respect to SWEPCO 30%.

“Buyer Permits” is defined in Section 5.14.

“Buyer’s Site Representative” is defined in Section 3.2(b).

“Buyer Subsequent Payment Conditions” is defined in Section 7.2.

“Buyer Timely Completion Notice” is defined in Section 3.11(c).

“Change in Law” means the occurrence, after the Effective Date, of any of the following: (a) the adoption or taking effect of any Law; and (b) any change in any Law.

“CimTexCo” means CimTexCo Wind Energy LLC, a Delaware limited liability company.

“CimTexCo Agreements” means the following agreements, each dated as of the Effective Date: (i) that certain Consent, Release and Unwind Agreement by and among Wind Star Energy Corporation, Seller Parent, Seller and the Company (ii) that certain transmission easement letter agreement by and among CimTexCo, Seller Parent, States Edge Invenergy, and the Company, (iii) the CimTexCo Company Sublease, and (iv) the CimTexCo Company Build-Out Agreement.

“CimTexCo Company Sublease” means that certain Amended and Restated Reserved Rights Sublease Agreement (PSO/SWEPCO) (States Edge I Project) by and among CimTexCo, Seller Parent and the Company dated as of the Effective Date.

“CimTexCo Company Build-Out Agreement” means that certain Amended and Restated Build-Out Agreement (PSO/SWEPCO) (States Edge I Project) by and among CimTexCo, Seller Parent and the Company dated as of the Effective Date.

“Closing” is defined in Section 2.3.


“Closing Date” is defined in Section 2.3.

respect to each unresolved objection. Buyer will provide the Independent Accountant access to the books and records relating to the Project or the Company. The Independent Accountant will limit its review solely to matters in dispute and have thirty (30) days to carry out a review of the unresolved objections and prepare a written statement of its determination regarding each unresolved objection. The determination of the Independent Accountant will be set forth in writing and will be conclusive and binding upon the Parties. Buyer will revise the Post-Closing Statement and the applicable Post-Subsequent Payment Statement, as applicable, as appropriate to reflect the resolution of any objections pursuant to this Section 2.5(d).

(e) Final Payment. Once any disputes in accordance with Section 2.5(d) have been resolved between the Parties or determined by the Independent Accountant, then the amount due pursuant to the Post-Closing Statement and/or the applicable Post-Subsequent Payment Statement will be paid within fifteen (15) days of such resolution to the Party entitled to receive it, together with interest at the Interest Rate from the Closing Date to the date of payment of the Post-Closing Adjustment and/or from the applicable Subsequent Payment Date to the date of payment of the Post-Subsequent Payment Adjustment (as applicable).

Section 2.6 Purchase Price Allocation. No later than ninety (90) days after the Closing Date or the Subsequent Payment Date, as applicable, Buyer shall prepare a draft allocation of the Purchase Price and the liabilities of the Company (to the extent treated as consideration for U.S. federal income tax purposes) among the Company's assets consistent with section 1060 of the Code and the Treasury Regulations thereunder and shall deliver such draft allocation to Seller. Within ninety (90) days after delivery thereof, Seller and Buyer shall agree on a final allocation of the Purchase Price and the liabilities of the Company (to the extent treated as consideration for U.S. federal income tax purposes) among the Company's assets consistent with section 1060 of the Code and the Treasury Regulations thereunder. Seller and Buyer agree that the agreed allocation shall be used by Seller and Buyer as the basis for reporting asset values and other items for purposes of all federal, state, and local Tax Returns, and that neither Seller nor Buyer or their respective Affiliates will take positions inconsistent with such allocation in notices to any Authority, in audits or other proceedings with respect to Taxes, or in other documents or notices relating to the transactions contemplated by this Agreement.

Section 2.7 Buyer Several Liability. Each of PSO and SWEPCO shall pay its respective Buyer's Share of the Purchase Price under this Agreement. The payment and other obligations of PSO and SWEPCO under this Agreement shall be several, not joint, and neither of them shall have any liability for any liabilities or obligations of the other under this Agreement or for the breach by the other of any of its representations, warranties, covenants, agreements, payment obligations, or other obligations under this Agreement



BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
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THE WIND CATCHER ENERGY CONNECTION)	
PROJECT; A DETERMINATION THERE IS A)	
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PROCEDURES REGARDING FEDERAL)	
PRODUCTION TAX CREDITS; WAIVER OF)	
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)	
THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS' SIXTH DATA REQUESTS**

Question No. 9:

Describe the contractual provisions and estimated compensation to PSO and SWEPCO if Quanta does not meet the guaranteed completion date of the Gen-Tie line in 2020 and as a result of such delays the project does not fully quantify for PTCs.

Response No. 9:

Please refer to Section 33.4 of the EPC Contract as provided in OIEC_6_09_HIGHLY_SENSITIVE_CONFIDENTIAL_Attachment 1 for the contractual provision requested; a redacted version of the attachment is being provided.

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1300 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

Prepared By: Brian D. Weber

Title: Mng Dir Trans Development

Date Response Provided: 9/13/2017

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE)	
COMPANY OF OKLAHOMA ("PSO") FOR)	
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APPROVAL OF CERTAIN ACCOUNTING)	
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PRODUCTION TAX CREDITS; WAIVER OF)	
OAC 165:35-38-5(e); AND SUCH OTHER RELIEF)	
THE COMMISSION DEEMS PSO IS ENTITLED)	

**PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO
PUBLIC UTILITY DIVISION'S DATA REQUEST JCN-2 DATA REQUESTS**

Question No. JCN 2-4:

Please describe the siting risks related to the 350-mile "gen-tie" line to be constructed by Quanta Energy. For all risks, please explain how PSO has protected ratepayers.

Response No. JCN 2-4:

Currently, PSO and Quanta are holding open house meetings with landowners to receive public input regarding the Proposed Route for the gen-tie line. Upon completion of the open houses, public input received will be reviewed and all known siting risks will be evaluated, such that a Final Route is selected by December 22, 2017.

Further, as discussed on page 3 of the direct testimony of company witness Paul Chodak, the Companies completed an interim draft of the siting feasibility study in December 2016 for the Gen-Tie line based upon the data known to date. An update draft of the siting feasibility was done on February 2, 2017 and is provided here as HIGHLY SENSITIVE AND CONFIDENTIAL JCN 2-4 Attachment 1. Table 4-2 in the attached feasibility study report provides a summary of major constraints, opportunities and risks for seven potential routes that were initially identified for the Gen-Tie line based on field reconnaissance and desktop studies. The summary matrix in Table 4-2 groups the constraints, opportunities and risks into seven distinct categories: Natural Resources, Land Use, Aesthetics/Recreation, Cultural, Opportunity Features, Constructability, and Cost and Schedule Risk. Quanta, as developer of the Proposed Route and constructor for the Gen-Tie line (as codified in the fixed-price EPC Contract), will complete the siting feasibility study as part of their scope under the EPC Contract. Exhibit T of the EPC Contract provides the routing criteria that Quanta shall employ as developer of the

Proposed Route for the Gen-Tie line, including consideration of many of the risks identified in the draft feasibility study.

One primary mitigation for siting risk is the location of the final route. The work to develop the final route will balance many of the risks as it is determined. As a mitigation to customer risk, Section 13.1.2 of the EPC Contract specifies that the Companies and Quanta have agreed that the Contract Price is based on a mutual assumption that the total mileage of the Final Route shall equal 380 miles. However, once a Final Route is determined, an adjustment to the Contract Price, based upon a pre-determined dollar per mile adjustment value, shall be executed based on the actual mileage of the Final Route regardless of the structure type and final configuration of the line. As such, the EPC Contract preserves significant value for the Company's customers, and can realize additional value should the Final Route be less than 380 miles. For context, the February draft feasibility study, the routes identified ranged from 352 miles to 392 miles with the majority of the routes below 380 miles.

Additionally, as described on page 13 of the direct testimony of company witness Brian D. Weber, the EPC Contract also affords additional protections from Contractor caused delays due to siting risks through the Delay Liquidated Damages provisions outlined in Section 33.4. Mr. Weber also outlines on page 10 in his direct testimony the inclusion of an allowance for potential variable costs for known and unknown risks, which would include costs arising from siting constraints.

In addition, with its viable construction plan, including anticipated state regulatory approvals received by April 30, 2018, it is the intent of the Company to meet the December 31, 2020 safe harbor date to be deemed to have met the continuous construction requirement and assure realization of the full value of the PTCs. However, in the event of a delay, the IRS has published, through Sections 4.06(2) and 5.02(2) of Notice 2013-29 and revised in Notice 2016-31 Sections 4.02(2), a list, non-exclusive, of excusable disruptions. These disruptions include:

- (a) severe weather conditions;
- (b) natural disasters;
- (c) delays in obtaining permits or licenses from federal, state, local, or Indian tribal governments, including, but not limited to, delays in obtaining permits or licenses from the Federal Energy Regulatory Commission (FERC), the Environmental Protection Agency (EPA), the Bureau of Land Management (BLM), and the Federal Aviation Agency (FAA);
- (d) delays at the written request of a federal, state, local, or Indian tribal government regarding matters of public safety, security, or similar concerns;
- (e) interconnection-related delays, such as those relating to the completion of construction on a new transmission line or necessary transmission upgrades to resolve grid congestion issues that may be associated with a project's planned interconnection;
- (f) delays in the manufacture of custom components;

- (g) labor stoppages;
- (h) inability to obtain specialized equipment of limited availability;
- (i) the presence of endangered species;
- (j) financing delays; and
- (k) supply shortages.

Further, the Company has contracted with Invenergy to execute an alternative interconnection with Gridliance that will allow for commissioning, completion and interconnection of completed wind facilities in the unlikely event that a potential delay is not covered under the IRS rules.

The information responsive to this request is CONFIDENTIAL and HIGHLY SENSITIVE under the terms of the Protective Order. The Highly Sensitive information is available for review at the Oklahoma City offices of Public Service Company of Oklahoma (PSO), 1601 North West Expressway, Suite 1400, Oklahoma City Oklahoma 73118, (405) 841-1300 during normal business hours, by parties to this case whom have agreed to be bound by the Protective Order.

Prepared By: Robert W. Bradish
Prepared By: Brian D. Weber

Title: VP Trans Grid Development
Title: Mng Dir Trans Development

Date Response Provided: 10/27/2017

CERTIFICATE OF SERVICE

I, the undersigned, do hereby certify that on the 4th day of December, 2017, a true and correct copy of the above and foregoing was sent **electronically**, addressed to the following:

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Chase Snodgrass
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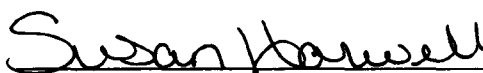
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