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SOAH DOCKET NO. 473-19-6862
PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN
ELECTRIC POWER COMPANY FOR
CERTIFICATE OF CONVENIENCE
AND NECESSITY AUTHORIZATION
AND RELATED RELIEF FOR THE
ACQUISITION OF WIND
GENERATION FACILITIES

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BEFORE THE STATE OFFICE
OF
ADMINISTRATIVE HEARINGS

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DIRECT TESTIMONY AND ATTACHMENTS
OF
SCOTT NORWOOD
ON BEHALF OF
CITIES ADVOCATING REASONABLE DEREGULATION

JANUARY 14, 2020

**SOAH DOCKET NO. 473-19-6862
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DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

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DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

1 I. INTRODUCTION

2 Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

3 A. My name is Scott Norwood. I am President of Norwood Energy Consulting, L.L.C. My
4 business address is P.O. Box 30197, Austin, Texas 78755-3197.

5 Q. WHAT IS YOUR OCCUPATION?

6 A. I am an energy consultant specializing in the areas of electric utility regulation, resource
7 planning and energy procurement.

**8 Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND
9 PROFESSIONAL EXPERIENCE.**

10 A. I am an electrical engineer with over 35 years of experience in the electric utility industry.
11 I began my career as a power plant engineer for the City of Austin's Electric Utility
12 Department where I was responsible for electrical maintenance and design projects for the
13 City's three gas-fired power plants. In January 1984, I joined the staff of the Public Utility
14 Commission of Texas, where I was responsible for addressing resource planning, fuel, and
15 purchased power cost issues in electric rate and plant certification proceedings before the
16 Texas Commission. Since 1986 I have provided utility regulatory consulting, resource
17 planning, and power procurement services to public utilities, electric consumers, industrial
18 interests, municipalities, and state government clients. I have testified in over 200 utility
19 regulatory proceedings over the last 20 years, before state regulatory commissions in

1 Alaska, Arkansas, Florida, Georgia, Illinois, Iowa, Kentucky, Louisiana, Michigan,
2 Missouri, New Jersey, Ohio, Oklahoma, Texas, Virginia, Washington, and Wisconsin.¹

3 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?**

4 A. I am testifying on behalf of the Cities Advocating Reasonable Deregulation (“CARD”),
5 which is a coalition of municipalities that purchase electricity from Southwestern Electric
6 Power Company (“SWEPCO” or “Company”).

7 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

8 A. The purpose of my testimony is to present my evaluation and recommendations regarding
9 SWEPCO’s application for a Certificate of Convenience and Necessity (“CCN”) authorization and related relief for the Company’s proposed acquisition of a 54.5% (810
10 MW) ownership interest three new wind energy facilities located in central and north-central
11 Oklahoma, which I will hereinafter refer to as the Selected Wind Facilities (“SWFs” or
12 “Project”).
13

14 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?**

15 A. Yes. I have filed testimony in numerous past proceedings before the PUCT over the last 20
16 years, including cases before the Commission as a consultant and former member of the
17 Public Utility of Commission Staff. I have testified on behalf of CARD in several past
18 SWEPCO regulatory proceedings, including base rate cases, fuel reconciliation and fuel
19 factor cases, and proceedings involving the Company’s generating resource investments,
20 including PUC Docket No. 47461, which involved SWEPCO’s application for approval of
21 a CCN for ownership of the Wind Catcher wind generation project. I also filed testimony
22 in PUC Docket No. 46936, which involved Southwestern Public Service Company’s
23 (“SPS”) application for approval of a similar large wind energy project located in West
24 Texas. In addition, I have filed testimony before the Oklahoma Corporation Commission
25 (“OCC”) in a past case involving Public Service Company of Oklahoma’s (“PSO”) request
26 for approval of ownership (along with SWEPCO) of the Wind Catcher Project, and in PSO’s

1 See Attachment SN-1 for additional details on my background and experience.

1 pending proceeding before the OCC seeking approval of a 675 MW ownership interest in
2 the same SWFs Project. Through this past work, I am familiar with SWEPCO's system
3 operations, generating resources, resource planning, and ratemaking practices, and current
4 issues relevant to the ownership of wind resources such as SWEPCO's proposed SWFs.

5 **Q. HAVE YOU PREPARED ANY ATTACHMENTS TO SUPPORT YOUR**
6 **TESTIMONY?**

7 A. Yes. I have included 8 attachments with my testimony.

8 **II. SUMMARY OF TESTIMONY**

9 **Q. PLEASE SUMMARIZE YOUR TESTIMONY AND RECOMMENDATIONS.**

10 A. SWEPCO has requested approval and related other relief for acquisition of 810 MW of the
11 Project's wind generation for a total cost of approximately \$1.09 billion (~\$1,345/kW).²
12 The Project was selected through a competitive bidding process for wind energy resources
13 initiated by the Company in January of 2019. SWEPCO asserts that under its base-case
14 analysis, the Project is expected to reduce costs to customers by approximately \$567 million
15 on a Total Company net present value ("NPV") basis, and by \$2.03 billion on a nominal
16 basis, over the forecasted life of the Project.³ The Company is offering certain capital cost,
17 production tax credits ("PTC"), and performance guarantees for the SWFs, which it states
18 will "ensure customer benefits" from the Project.⁴

19 My major conclusions regarding SWEPCO's request for approval to acquire 810 MW of
20 the SWFs are as follows:

- 21 1) SWEPCO's December 2018 Integrated Resource Plan ("IRP") indicate that the
22 Company is expected to have excess capacity until 2026 even without the proposed
23 acquisition of 810 MW (nameplate) from the Project.

2 See SWEPCO witness Smoak's Direct Testimony, page 6.

3 See SWEPCO witness Torpey's Direct Testimony, page 5.

4 See SWEPCO witness Brice's Direct Testimony, page 17.

- 1 2) SWEPCO's proposed acquisition of 810 MW of wind energy from the Project would
2 increase from the current level of approximately 8% of total energy supply to
3 approximately 25% of the Company's total system energy requirement by 2022.⁵
- 4 3) The Company's competitive bidding and bid evaluation process, which led to
5 selection of the SWFs, generally appear to have been reasonable.
- 6 4) The SWFs would increase the diversity of energy supply and reduce carbon
7 emissions (when compared to acquisition of conventional fossil resources), and
8 therefore lower the Company's exposure to potential future carbon taxes and
9 volatility in natural gas and SPP market energy prices.
- 10 5) SWEPCO's cost/benefit analysis for the SWFs was conducted using industry
11 standard production cost models, and the modeling process and range of scenarios
12 evaluated generally appear to be reasonable.
- 13 6) The base-case gas prices SWEPCO used for its analysis are approximately 11%
14 lower than EIA's 2019 base gas-price forecast, but more than \$1/MMBtu higher
15 than NYMEX gas futures prices for the next four years.
- 16 7) The Company's sensitivity analyses of costs and benefits of the SWFs generally
17 appear to have reasonably accounted for the uncertainty in key input variables,
18 including forecasted commodity prices, Project performance, congestion costs and
19 carbon regulations.
- 20 8) SWEPCO's cost/benefit analysis indicates that ownership of the SWFs is expected
21 to produce average savings for Texas customers of approximately \$7.2 million/year
22 (1.1% of SWEPCO's forecasted Texas Retail revenue requirement for 2021) under
23 the base case scenario, and approximately \$3.5 million/year (0.5%) under low gas
24 price scenarios.
- 25 9) SWEPCO's proposed ownership of the SWFs is forecasted to provide lower
26 customer benefits when compared to the Company's previous Wind Catcher project,

5 See Attachment SN-2, SWEPCO response to CARD 1-7.

1 which was withdrawn in response to regulatory and customer concerns related to
2 economic risks of the Project.

3 10) SWEPCO's projected benefits of ownership of the SWFs are based on forecasted
4 congestion costs for the Project which are uncertain, and this uncertainty is not
5 addressed through the Company's proposed guarantees.

6 11) The cost and performance guarantees proposed by SWEPCO for the SWFs would
7 increase the likelihood of customer benefits; however, they are not as comprehensive
8 as the guarantees agreed to by the Company in the Wind Catcher case (before that
9 Project was cancelled), and would leave SWEPCO's customers exposed to risks of
10 higher than forecasted congestion costs and lower than anticipated future natural gas
11 prices.

12 12) The economic risk of the Project is somewhat mitigated by the fact that Texas retail
13 customers would be responsible for only 309 MW (~38%) of SWEPCO's proposed
14 810 MW ownership costs of the Project.⁶

15 Based on my concerns regarding the relatively small and uncertain forecasted energy
16 benefits, the relatively high capital cost of (\$1.09 billion) of the SWFs Project, and the fact
17 that SWEPCO's December 2018 IRP forecasts that the Company will have excess capacity
18 until at least 2026 even without the Project, I do not recommend approval of SWEPCO's
19 application. But if the Commission approves SWEPCO's application, I recommend that
20 any approval of SWEPCO's acquisition of 810 MW of the SWFs, at a minimum, be made
21 subject to the following conditions:

22 1) SWEPCO's proposed cost, performance and other guarantees for the SWFs should
23 be modified as described in my testimony to reflect the more favorable guarantee
24 provisions agreed to by the Company in the Wind Catcher Settlement proceeding
25 (PUC Docket No. 47461);

6 See SWEPCO witness Aaron's Errata Direct Testimony, page 8.

- 1 2) SWEPCO should be required to credit 100% of the Texas Retail portion of any
2 future net revenues (i.e., margins) earned from REC sales, SPP market energy or
3 ancillary service sales, or sales of excess capacity to reduce reconcilable fuel
4 expenses, to increase the prospect that customers will benefit from the Project; and
5 3) SWEPCO should be required to seek Commission pre-approval of any new
6 transmission lines that it seeks to construct in the future to mitigate congestion costs
7 associated with energy supplied from the SWFs.

8 **III. SUMMARY OF SWEPCO'S PROPOSAL**

9 **Q. PLEASE DESCRIBE THE SELECTED WIND FACILITIES ("SWFS") FOR**
10 **WHICH SWEPCO SEEKS APPROVAL IN THIS CASE.**

11 A. The SWFs consists of three wind-energy facilities to be located in North Central Oklahoma.
12 The SWFs are being developed by Invenergy LLC affiliates, and will be acquired by
13 SWEPCO under Purchase and Sale Agreements for a total base purchase price of \$1.86
14 billion. SWEPCO's testimony indicates that Invenergy LLC is North America's largest
15 independent, privately held renewable energy provider, which develops, owns, and operates
16 renewable energy facilities worldwide.⁷ The Company indicates that Invenergy has
17 developed 13,288 MW of wind energy projects worldwide, and operates approximately
18 4,850 MW of wind generation facilities, mostly in North America.⁸

19 As summarized in Table 1 below, the Traverse, Maverick and Sundance wind energy
20 facilities are expected to supply 1,485 MW (nameplate) of new wind generation, with
21 SWEPCO owning 810 MW (54.5%) of this total capacity while SWEPCO's affiliate PSO
22 would own the remaining 675 MW (45.5%) of the Project.⁹

7 See SWEPCO witness Godfrey's Direct Testimony, page 26.

8 See *Id.*, page 27.

9 See SWEPCO witness Torpey's Direct Testimony, page 5.

Table 1
Nameplate Capacity and Estimated In-Service Dates of SWFs ¹⁰

<u>Wind Facility</u>	<u>Total MW</u>	<u>SWEPCO Share</u>	<u>In-Service Date</u>
Traverse	999	544	DEC 2021
Maverick	287	157	DEC 2021
Sundance	199	109	DEC 2020
Total	1485	810	

The Traverse and Maverick facilities are expected to qualify for 80% of PTCs, while the Sundance facility will qualify for 100% of PTCs.

Q. WHAT IS THE ESTIMATED TOTAL CAPITAL COST OF THE SWFS?

A. The total estimated capital cost of the Project, including Owner's costs, AFUDC and contingencies is approximately \$1.996 billion (\$1,344/kW), as summarized in Table 2 below:

¹⁰ See SWEPCO witness Smoak's Direct Testimony, page 3.

Table 2
Estimated Capital Cost of SWFs¹¹

	<u>Traverse</u>	<u>Maverick</u>	<u>Sundance</u>	<u>Total Project</u>
Nameplate Capacity, MW	999	287	199	1485
Planned COD	2021	2021	2020	
PSA Base Purchase Price	\$1,208,376,087	\$371,577,337	\$280,954,690	\$1,860,908,114
PSA Price Adjustments:				\$0
O&M Mobilization	\$3,005,859	\$673,353	\$320,803	\$4,000,015
Capital- Spare Parts	\$3,406,000	\$822,000	\$2,078,000	\$6,306,000
Power Curve Testing	<u>\$750,000</u>	<u>\$0</u>	<u>\$0</u>	<u>\$750,000</u>
Subtotal PSA Adjustments:	\$7,161,859	\$1,495,353	\$2,398,803	\$11,056,015
Owner's Costs				\$0
Owner's Costs and Overheads	\$25,050,062	\$13,252,544	\$11,475,715	\$49,778,321
Contingency	\$42,293,163	\$13,005,207	\$9,833,414	\$65,131,784
AFUDC	<u>\$4,702,973</u>	<u>\$2,663,906</u>	<u>\$1,977,319</u>	<u>\$9,344,198</u>
Subtotal Owner's Costs:	\$72,046,198	\$28,921,657	\$23,286,448	\$124,254,303
Total Project Cost	\$1,287,584,144	\$401,994,347	\$306,639,941	\$1,996,218,432
Cost per kW (Nameplate)	\$1,289	\$1,401	\$1,541	\$1,344

Q. WHAT AMOUNT OF WIND ENERGY DOES SWEPCO ESTIMATE WILL BE DELIVERED FROM THE SWFS?

A. SWEPCO commissioned an independent analysis of the probable wind energy production level of the SWFs by Simon Wind, Inc., an experienced wind energy consulting firm.¹² That analysis indicates that on a total project basis, the SWFs are expected to produce 5,724 GWh per year, with SWEPCO's share of the Project energy expected to be 3,122 GWh per year assuming an 810 MW ownership level.¹³ This level of energy production equates to an average 44% capacity factor for the Project.

¹¹ See SWEPCO witness DeRuntz's Direct Testimony, Table 1 and Exhibit JGD-3.

¹² See SWEPCO witness Godfrey's Direct Testimony, page 23.

¹³ See *Id.*, page 24.

1 **Q. WHAT IS SWEPCO'S ESTIMATE OF THE NET BENEFITS OF THE SWFS TO**
2 **SWEPCO'S CUSTOMERS?**

3 A. As summarized in Table 3 below, under SWEPCO's base-case analysis, the Company
4 estimates that the SWFs will provide a total NPV benefit of \$567 million (Total Company)
5 to customers over the estimated 30-year life of the Project, and a total nominal benefit of
6 \$2.03 billion.

7 Table 3
8 SWEPCO Cumulative Net Benefits of SWFs
9 (30-year life, Total Company, \$Millions)¹⁴
10

<u>Benefit/Cost Category</u>	<u>Net Present Value</u>	<u>Nominal Value</u>
Production Cost Savings Excl Congestion	\$1,660	\$5,095
Congestion and Losses	-\$322	-\$893
Capacity Value	\$70	\$311
Production Tax Credits (grossed up, net of DTA)	\$507	\$750
SWFs Revenue Requirement	<u>-\$1,348</u>	<u>-\$3,233</u>
Total Net Customer Benefits:	\$567	\$2,030

11
12 **Q. WHAT IS THE ESTIMATED IMPACT OF THE SWFS ON SWEPCO'S TEXAS**
13 **RETAIL REVENUE REQUIREMENT?**

14 A. As summarized in Table 4 below, SWEPCO estimates that acquisition of the SWFs would
15 result in total customer net benefits of approximately \$16.6 million over the first four years
16 of commercial operations of the Project. This would represent a net benefit of
17 approximately 0.6% of SWEPCO's total projected Texas retail revenue requirement for this
18 period.¹⁵

14 Source is SWEPCO witness Torpey's Errata Direct Testimony, page 17, Table 3.

15 See SWEPCO witness Aaron's Errata Direct Testimony, Exhibit JOA-2.

Table 4
SWEPCO's Estimate of SWFs Impacts
on Texas Retail Revenues (2021-24)

	ProForma Revenue <u>without SWFs</u>	Estimated <u>Net Benefit</u>	<u>Net Benefit, %</u>
2021	\$629,816,738	\$401,944	0.1%
2022	\$645,245,779	\$3,921,902	0.6%
2023	\$655,632,937	\$5,988,615	0.9%
2024	<u>\$654,894,212</u>	<u>\$6,287,997</u>	<u>1.0%</u>
Total	\$2,585,589,666	\$16,600,458	0.6%

Q. HOW DO THE PROJECTED COSTS AND BENEFITS OF THE SWFS COMPARE TO SWEPCO'S WIND CATCHER PROJECT, WHICH SWEPCO CANCELLED LAST YEAR AFTER FAILING TO OBTAIN NECESSARY REGULATORY APPROVALS?

A. As summarized in Table 5 below, the estimated capital cost of SWEPCO's ownership of the SWFs is approximately \$2.1 billion (66%) lower than the capital cost of the Company's share of the cancelled Wind Catcher Project, and the projected total net benefit of the SWFs is approximately \$989 million (63.6%) lower than the projected benefit of the Wind Catcher Project.

Table 5
Forecasted Net Benefits of the SWFs and Wind Catcher Project¹⁶
(NPV over 30-year life, Total Company, \$Millions)

	<u>SWFs</u>	<u>Wind Catcher</u>
Nameplate Capacity Ownership	810	1400
Estimated Capital Cost	\$1,090	\$3,200
<u>Benefit/Cost Category</u>		
Production Cost Savings Excl Congestion	\$1,660	\$4,307
Congestion and Losses	(\$322)	(\$395)
Capacity Value	\$70	\$287
Production Tax Credits (grossed up, net of DTA)	\$507	\$1,268
Wind Facility Revenue Requirement	(\$1,348)	(\$2,730)
Tie-Line Revenue Requirement	<u>\$0</u>	<u>(\$1,181)</u>
Total Net Customer Benefits:	\$567	\$1,556
Net Benefit difference:	(\$989)	
	-63.6%	

Q. WHY IS THE PROJECTED NET BENEFIT OF THE SWFS APPROXIMATELY 64% LOWER THAN THE BENEFIT OF THE WIND CATCHER PROJECT?

A. The lower forecasted net benefits of the SWFs appear primarily attributable to four major factors. First, SWEPCO's ownership of the SWFs (810 MW) is 73% lower than the Company's proposed ownership of the Wind Catcher Project (1,400 MW). Second, only approximately 20% of the SWFs investment is expected to be eligible for 100% PTCs, while the entire Wind Catcher Project was eligible for 100% PTCs. Third, the expected average capacity factor of the SWFs (44%) is significantly lower than the expected average capacity factor of the Wind Catcher Project (51%), which was to be located in the wind rich Oklahoma panhandle. The fourth factor that explains why estimated net benefits of the SWFs is lower than forecasted benefits of the Wind Catcher Project is that SWEPCO's base-case forecast of natural gas prices used for the SWFs benefits analysis is approximately 31% lower than the gas price forecast used to estimate benefits for the Wind Catcher Project.¹⁷

¹⁶ See Attachment SN-3, SWEPCO's Response to CARD RFI No. 1-22.

¹⁷ See Attachment SN-4.

1 **Q. WHAT ISSUES REGARDING THE SWFS ARE ADDRESSED BY YOUR**
2 **TESTIMONY?**

3 A. My testimony focuses on four primary issues: 1) whether SWEPCO needs the capacity and
4 energy it proposes to acquire through ownership of 810 MW of the SWFs; 2) whether
5 SWEPCO's competitive bidding and bid evaluation process leading to selection of the
6 SWFs was reasonable; 3) whether SWEPCO's analysis of projected benefits of ownership
7 of the SWFs was reasonably conducted and supports the Company's proposal to acquire
8 810 MW of the Project; and 4) whether the guarantees offered by SWEPCO would
9 adequately protect the Company's customers from economic risks associated with
10 ownership of the SWFs.

11 **IV. SWEPCO'S NEED FOR SWFS**

12 **Q. WHAT INFORMATION HAS SWEPCO PROVIDED TO DEMONSTRATE THAT**
13 **THE COMPANY NEEDS THE CAPACITY AND ENERGY SUPPLIED BY THE**
14 **SWFS?**

15 A. SWEPCO witness Torpey's Direct Testimony discusses the forecasted need for new wind
16 generating capacity as reflected in the Company's December 2018 IRP, which was
17 completed one month before SWEPCO issued the 2019 Wind RFP.¹⁸ SWEPCO's 2018
18 IRP indicates that the Company is expected to have excess capacity until 2026 even without
19 the SWFs. The Preferred Plan presented in SWEPCO's 2018 IRP indicates that the
20 Company should add 600 MW (Nameplate) of new wind generation in 2022, followed by
21 another 600 MW of wind generation in 2023. With the proposed acquisition of 810 MW of
22 the SWFs, SWEPCO's IRP forecast indicates that the Company would have excess capacity
23 until 2028.

18 See SWEPCO witness Torpey's Direct Testimony, pages 9-11.

1 **Q. DOES SWEPCO'S 2018 IRP INDICATE THAT THE SWFS COULD BE**
2 **JUSTIFIED EVEN IF THE PROJECT IS NOT NEEDED FOR RESERVE**
3 **CAPACITY PURPOSES?**

4 A. Yes. SWEPCO's 2018 IRP analysis indicates that optimal resource plan for the Company
5 should include up to 2,000 MW of new wind energy resources over the next ten years.¹⁹
6 However, the base case gas price forecast used for SWEPCO's December 2018 IRP
7 Analysis was significantly higher than the 2019 base case forecast used by the Company to
8 quantify benefits of the SWFs Project.²⁰ This means that the Company's 2018 IRP analysis
9 overstated the level of energy savings produced from new wind energy facilities and
10 therefore likely overstates the optimal quantify of new wind energy that is justified for
11 SWEPCO's system.

12 **Q. ARE THERE OTHER NEEDS OF THE SWEPCO SYSTEM THAT COULD BE**
13 **MET BY SWEPCO'S ACQUISITION OF THE SWFS?**

14 A. Yes. SWEPCO's acquisition of 810 MW of the SWFs Project will increase the diversity of
15 SWEPCO's energy supply resources and reduce exposure to costs of future carbon
16 regulations, by increasing the Company's current level of energy supplied from renewable
17 resources (~8%) to approximately 25% of total energy requirements by 2022 when the
18 SWFs are placed in service. The Commission considered such energy and environmental
19 related benefits in approving a similar large wind energy project proposed by Southwestern
20 Public Service Company ("SPS") in PUC Docket No. 46936. Like in this case, SPS has
21 excess capacity, and the Company's proposed new wind generation resources were not
22 needed to meet system capacity reserve requirements, but were instead justified primarily
23 on forecasted energy and environmental benefits.

24 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE NEED FOR**
25 **SWEPCO'S ACQUISITION OF THE SWFS.**

26 A. SWEPCO's December 2018 IRP indicates that the Company will have excess capacity until
27 2026 without the proposed acquisition of the SWFs Project, but that the acquisition of up to

19 See SWEPCO witness Torpey's Direct Testimony, page 11, Table 2.

20 See Attachment SN-5.

1 1,200 MW (Nameplate capacity) of new wind generation in the general timeframe proposed
2 for acquisition of the SWFs, according to SWEPCO, is justified as part of an optimal
3 resource plan based on forecasted energy savings, energy supply diversity benefits, and
4 environmental benefits of wind generation. In consideration of the uncertainty of long-term
5 forecasts of natural gas and market energy prices and environmental compliance costs, and
6 the absence of a capacity need for the Project until at least 2026, I question whether
7 SWEPCO's proposed \$1.09 billion capital investment in the SWFs is justified, unless the
8 Company provides strong performance and cost guarantees to enhance the prospect that
9 Texas customers would receive benefits from the Project.

10 **V. REASONABLENESS OF SWEPCO'S 2019 WIND RFP**

11 **Q. WHAT INFORMATION HAS SWEPCO PROVIDED TO DEMONSTRATE THE**
12 **REASONABLENESS OF THE 2019 WIND RFP AND BID SELECTION PROCESS**
13 **THAT LED TO THE COMPANY'S ACQUISITION OF THE SWFS?**

14 A. SWEPCO issued an RFP for wind generation resources on January 7, 2019.²¹ The RFP
15 requested bids to purchase up to 1,000 MW of wind generation resources to be delivered on
16 a turnkey basis, with expressed preference given to projects physically located in Arkansas,
17 Louisiana, Texas, or Oklahoma, and that are interconnected to the SPP grid at delivery
18 points that are not currently experiencing or forecasted to experience significant congestion
19 or delivery constraints.²² In addition, the RFP requested proposals for projects that could
20 be placed in service by December, 15, 2021, and that qualified for at least 80% of full PTC
21 value.²³

21 See SWEPCO witness Godfrey's Direct Testimony, page 5 and Exhibit JFG-1.

22 See SWEPCO witness Godfrey's Direct Testimony, page 8.

23 See *Id.*

1 **Q. DID SWEPCO'S WIND RFP GENERATE SIGNIFICANT INTEREST FROM**
2 **POTENTIAL WIND DEVELOPERS?**

3 A. Yes. SWEPCO indicates that in response to the RFP, the Company received 35 bids
4 representing 19 unique wind projects totaling 5,896 MW.²⁴ None of these bids were by
5 the Company or from an AEP affiliate.²⁵

6 **Q. HOW DID SWEPCO EVALUATE THE BIDS IT RECEIVED?**

7 A. SWEPCO indicates that bids for 11 of 19 unique wind projects, totaling 3,265 MW, met the
8 RFP eligibility and threshold requirements and were subjected to further detailed analysis
9 by SWEPCO for potential selection. The detailed analysis evaluated both economic and
10 non-price factors of each proposal, and ranked each bid numerically, with 90% of the
11 ranking based on economic factors and 10% based on non-price factors.²⁶ The economic
12 ranking of bids was based on the Levelized Cost of Energy ("LCOE") in \$/MWh, plus the
13 cost of Transmission Congestion, also measured in \$/MWh. The cost of Transmission
14 Congestion considered both the current congestion costs and losses for energy delivered
15 from the proposed project to the AEP West load zone, plus the estimated cost of mitigating
16 future congestion through construction of a gen-tie line, if necessary.²⁷

17 **Q. HOW WAS THE NON-PRICE RANKING OF EACH BID DETERMINED?**

18 A. The non-price ranking considered issues such as project impact on wildlife and the
19 environment, exceptions to the PSA terms, exceptions to SWEPCO wind generation facility
20 standards, operating history of other wind projects developed by the bidder, and
21 development status of the project.²⁸

24 See SWEPCO witness Godfrey's Direct Testimony, page 12.

25 See *Id.*, page 13.

26 See *Id.*, pages 14-15.

27 See *Id.*, page 15.

28 See *Id.*, page 18.

1 **Q. WHAT WERE THE RESULTS OF SWEPCO'S ANALYSIS OF BIDS?**

2 A. The Company's bid analysis identified the Traverse, Maverick, and Sundance wind
3 facilities as the highest ranked proposals, with the next highest proposal scoring
4 approximately 16 percentage points lower than the lowest ranked selected bid.²⁹

5 **Q. DOES SWEPCO'S RFP REVIEW PROCESS AND BID EVALUATION ANALYSIS**
6 **APPEAR TO HAVE BEEN CONDUCTED IN A REASONABLE MANNER?**

7 A. Yes. The RFP process and bid evaluation appears to have been systematic, detailed and
8 objective to a large extent. The three selected bids had the highest overall score out of the
9 11 qualified bids that were subject to detailed analysis. In addition, SWEPCO retained an
10 Independent Evaluator ("IE") to oversee all phases of the bid administration and evaluation
11 process. SWEPCO indicates that the IE agreed that SWEPCO followed the procedures
12 outlined in the RFP and that the Company's bid evaluation and final project selections were
13 appropriate.³⁰

14 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING SWEPCO'S 2019**
15 **WIND RFP AND BID EVALUATION PROCESS.**

16 A. SWEPCO's 2019 Wind RFP and bid evaluation process generally appears to have been
17 reasonable; however, the Company's evaluation of bids only determined that the SWFs
18 Project was the highest ranked bid based on the established bid evaluation parameters. The
19 RFP bid evaluation process did not address whether the SWFs Project was likely to benefit
20 SWEPCO's customers. This determination was made through a separate cost/benefit
21 analysis conducted by SWEPCO as described in the testimony of Company witness Torpey,
22 as discussed later in my testimony.

29 See *Id.*, pages 19-20 and Table 3.

30 See *Id.*, pages 20-21.

VI. SWEPCO'S COST/BENEFIT ANALYSIS FOR SWFS

Q. HOW DID SWEPCO EVALUATE THE COSTS AND BENEFITS OF THE PROPOSED SWFS?

A. SWEPCO used the PLEXOS production cost simulation model as the primary tool for evaluating forecasted, production-cost benefits of the SWFs, under a range of commodity price- and congestion-cost scenarios. The Company's PLEXOS cost/benefit analysis for the SWFs is described by the Direct Testimony of SWEPCO witness John Torpey.³¹ Generally, SWEPCO used the PLEXOS model to quantify the total SWEPCO system production costs with and without the proposed SWFs over a 30-year period beginning in 2021, when SWEPCO estimates the Project will begin commercial operations, and ending in 2051. In addition, SWEPCO used the PROMOD and Aurora models to develop SPP locational marginal prices ("LMPs"), transmission congestion costs, and losses used for the PLEXOS analysis of production-cost benefits produced from the SWFs.³²

Q. DID SWEPCO'S COST/BENEFIT ANALYSIS REASONABLY CONSIDER UNCERTAINTY IN KEY VARIABLES THAT COULD IMPACT NET BENEFITS OF THE SWFS?

A. Yes. SWEPCO conducted the PLEXOS analysis under a base-case scenario for fuel and market-energy prices, and also evaluated a number of sensitivity cases that considered higher and lower fuel and market prices, scenarios that assumed no carbon taxes, varying levels of wind energy production, and a higher congestion-cost scenario including the addition of a gen-tie to mitigate congestion in 2026.³³

Q. ARE SWEPCO'S COMMODITY PRICE AND MARKET ENERGY PRICE ASSUMPTIONS UNDERLYING THE COST/BENEFIT ANALYSES FOR THE SWFS REASONABLE?

A. Yes. As summarized in Figure 1 below, the Company's base case cost/benefit analysis used AEP's 2019 base gas price forecast, which is approximately 11% lower than EIA's 2019

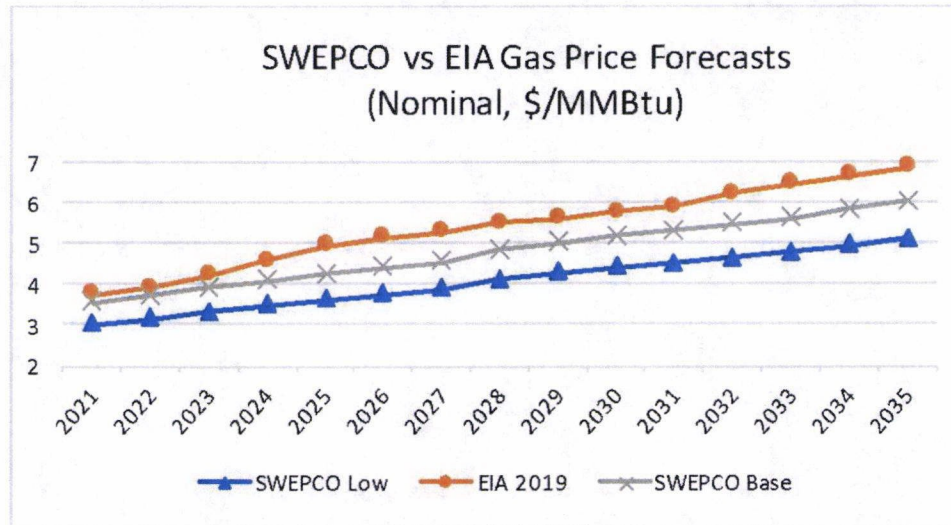
³¹ See SWEPCO witness Torpey's Direct Testimony, pages 14-22.

³² See SWEPCO witness Pfeifenberger's Direct Testimony, pages 39-42.

³³ See SWEPCO witness Torpey's Direct Testimony, pages 24-26.

1 long-term natural gas price forecast, but more than \$1/MMBtu higher than current NYMEX
2 Henry Hub futures prices over the next four years.³⁴

3 Figure 1



4
5 SWEPCO's base case forecast of SPP market energy prices used for the SWFs cost/benefit
6 analysis also generally appears to be reasonable and consistent with the Company's base
7 case gas price forecast.³⁵

8 **Q. WHAT ARE THE ESTIMATED NET BENEFITS OF THE SWFS FOR THE BASE**
9 **CASE AND SENSITIVITY CASES EVALUATED BY SWEPCO?**

10 **A.** The results of SWEPCO's cost/benefit analyses for the base case and other scenarios
11 evaluated by the Company are summarized in Table 6 below.

34 Sources are SWEPCO's Responses to CARD 1-11, EIA.gov and cmegroup.com.

35 See Attachment SN-6.

Table 6
SWEPCO's Estimates of Net Benefits of SWFs³⁶
(NPV over 30-year life, Total Company, \$Millions)

<u>Scenarios</u>	<u>NPV</u>	<u>Nominal</u>
1. Base Gas, Base Wind, With CO2	\$567	\$2,030
2. Base Gas, Base Wind, No CO2	\$396	\$1,453
3. Low Gas, Base Wind, With CO2	\$396	\$1,532
4. Low Gas, Base Wind, No CO2	\$236	\$971
5. High Gas, Base Wind, With CO2	\$718	\$2,501
6. Base Gas, Low Wind, With CO2	\$330	\$1,386
7. Base Gas, Low Wind, No CO2	\$181	\$883
8. Low Gas, Low Wind, With CO2	\$183	\$960
9. High Gas, Low Wind, With CO2	\$461	\$1,792
10. Base Gas, Base Wind, High Congestion, With CO2	\$541	\$2,025
11. Base Gas, Base Wind, High Congestion, No CO2	\$330	\$1,285
12. Base Gas, Low Wind, High Congestion, No CO2	<u>\$94</u>	<u>\$640</u>
Average:	\$369	\$1,455

Q. HOW ARE THE ESTIMATED BASE-CASE NET BENEFITS OF THE SWFS EXPECTED TO IMPACT SWEPCO'S TOTAL SYSTEM REVENUE REQUIREMENTS?

A. SWEPCO's base-case, NPV-benefits estimate for the SWFs totals approximately \$567 million on a Total Company basis over the 30-year life of the Project. This equates to average present value benefit of approximately \$18.9 million per year (\$567 million/30 years = \$18.9 million/year), and approximately 38% of this benefit (\$7.2 million/year) would be allocated to the Texas Retail jurisdiction. This average annual level of Texas Retail customer benefits from the SWFs represents approximately 1.1% of SWEPCO's forecasted annual Texas Retail revenue requirements for 2021, which is approximately \$630 million ($7.2/630 = 1.1\%$).³⁷ Moreover, the forecasted annual revenue requirement of the Project is approximately \$130 million³⁸ (Total Company basis), and much of this cost is

³⁶ Source is SWEPCO witness Torpey's Errata Exhibit JFT-4.

³⁷ Source for forecasted 2021 revenue requirements is SWEPCO witness Aaron's Errata Direct Testimony, Errata Exhibit JOA-2.

³⁸ Source for Project revenue requirements is SWEPCO witness Torpey's Errata Direct Testimony, Errata Exhibit JFT-3, page 1.

1 fixed, and therefore will be borne by ratepayers even if the forecasted benefits of the SWFs
2 do not materialize. This situation places undue risk on ratepayers unless SWEPCO's
3 proposed cost and performance guarantees are significantly enhanced.

4 **Q. DO SWEPCO'S ESTIMATES OF THE NET BENEFITS OF THE SWFS**
5 **GENERALLY APPEAR TO BE REASONABLE?**

6 A. Yes, generally. Although SWEPCO's base-case gas price forecast is somewhat higher than
7 NYMEX futures prices over the next four years, it is approximately 11% lower than EIA's
8 2019 long-term gas price forecast, and the analysis was conducted with commonly used
9 industry models and modeling methods. The Company's cost/benefit analyses for the SWFs
10 also cover a range of scenarios that generally appear to be reasonable, and which consider
11 the impact of uncertainty in key input variables, such as commodity prices, congestion costs
12 and wind generation levels, on predicted benefits.

13 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING SWEPCO'S**
14 **COST/BENEFIT ANALYSES FOR THE SWFS.**

15 A. SWEPCO's cost/benefit analyses for the SWFs generally appear to be reasonable. The
16 forecasted base-case net benefits are relatively small (approximately 1% of the total annual
17 revenue requirements of SWEPCO's system) but are positive in all cases evaluated by the
18 Company. The Company's base-case gas price forecast is more than \$1/MMBtu higher
19 than NYMEX futures prices for natural gas over the next four years, which suggests that
20 savings under the Company's low-gas price scenarios (rather than the base case analysis)
21 may be more indicative of likely Project benefits to customers. Under low gas-price
22 scenarios, the average annual savings are in the range of \$3.5 million per year for the Texas
23 Retail jurisdiction on a NPV basis over the 30-year life of the Project. This level of savings
24 would represent approximately 0.5% of SWEPCO's forecasted Texas Retail revenue
25 requirement for 2021.³⁹

39 See Attachment SN-7.

VII. COST AND PERFORMANCE GUARANTEES

Q. WHAT GUARANTEES HAS SWEPCO PROPOSED TO ADDRESS OWNERSHIP RISKS AND ENHANCE VALUE OF THE SWFS TO CUSTOMERS?

A. SWEPCO proposes three primary guarantees to increase value of the SWFs to customers. First, SWEPCO proposes that the Company's capital cost recovery for the SWFs be capped at \$1.09 billion, which is Company's share of the \$1.996 billion total project cost estimate, including Company overheads, AFUDC and contingency.⁴⁰ SWEPCO proposes that there be no exceptions to this cap, including no provision for Force Majeur events.

The second major guarantee offered by SWEPCO is that if PTCs are not received at the 100% level for the Sundance facility, and at the 80% level for the Traverse and Maverick wind facilities, because one or more of the facilities is determined to be ineligible for such credits, then it will make customers whole for the lost value of tax credits based upon the actual energy production of the facilities.⁴¹ The Company indicates that this PTC guarantee would be subject to changes in law that effect the federal PTC.

The third guarantee offered by SWEPCO is a Minimum Production Guarantee, which would make customers whole for any lost energy savings or PTCs that result if the aggregate average annual production from the SWFs (Total Project) falls below 4,959 GWh per year (38.1% capacity factor) over each five-year period, for a period of 10 years.⁴² SWEPCO proposes that this minimum production guarantee be subject to exceptions for Force Majeure and SPP curtailment of the resources.

Q. ARE SWEPCO'S PROPOSED GUARANTEES SUFFICIENT TO PROVIDE CUSTOMERS PROTECTIONS IF THE PROJECT DOES NOT PERFORM AS SWEPCO FORECASTS?

A. While the Company's proposed guarantees enhance the value of the SWFs to customers by lowering somewhat primary risks that otherwise could reduce net benefits of the Project,

⁴⁰ See SWEPCO witness Brice's Direct Testimony, page 16.

⁴¹ See *Id.*, pages 16-17.

⁴² See *Id.*, page 17.

1 the guarantees offered by SWEPCO in this case would provide less protection to customers
2 than the guarantees agreed to by AEP in the Oklahoma Wind Catcher case⁴³, despite the
3 fact that estimated benefits of the SWFs are approximately 64% lower than forecasted
4 benefits of the Wind Catcher project. In light of the fact that the SWFs are exposed to
5 similar if not greater costs and performance risks than the Wind Catcher Project, and are
6 expected to provide significantly lower net benefits to customers, it is important that the
7 performance and cost guarantees applicable to the SWFs be equivalent to or better than
8 guarantees offered in Oklahoma by AEP (PSO) for the Wind Catcher Project. This is
9 particularly true given the nominal average annual benefits of about \$4 million under
10 SWEPCO's low gas-price scenarios.

11 **Q. PLEASE DESCRIBE THE KEY DIFFERENCES BETWEEN THE COST AND**
12 **PERFORMANCE GUARANTEES OFFERED BY AEP IN THE WIND CATCHER**
13 **SETTLEMENT AGREEMENT IN OKLAHOMA AND THE GUARANTEES**
14 **OFFERED BY SWEPCO FOR THE SWFS IN THIS CASE?**

15 **A.** The primary differences between the guarantees offered by AEP in the Wind Catcher
16 Settlement Agreement in Oklahoma, and the guarantees offered by SWEPCO in this case
17 are as follows:

18 1) Capital Cost Cap - The Wind Catcher Settlement offer was 103% of total capital
19 investment including AFUDC, with no exceptions for force majeure or change in
20 law, and specified no recovery of amounts above the cap and no presumption of
21 prudence of costs below the cap. ⁴⁴ This guarantee is generally consistent with
22 SWEPCO's offer for the SWFs in this proceeding, which is a 100% of the expected
23 cost including AFUDC, also with no exceptions including force majeure or change
24 in law.

25 2) Net Benefits Guarantee - The Wind Catcher Settlement guaranteed that the
26 Project would provide net benefits to customers during the initial ten years of

43 See Attachment SN-8, the Wind Catcher Settlement Agreement, filed on April 24, 2018 in OCC Cause No. PUD 201700267.

44 See Attachment SN-8, Paragraph 1(a) of the Wind Catcher Settlement Agreement.

1 commercial operations of the Project.⁴⁵ SWEPCO has not offered a Net Benefits
2 Guarantee for SWFs in this case. If the Commission approves SWEPCO's
3 application, I recommend that this important new guarantee be provided as a
4 condition to approval of the SWFs.

5 3) PTC Guarantee - The Wind Catcher Settlement guaranteed the full PTC eligibility
6 level for the actual output of the WC wind facility, with an exception for change in
7 law that changes federal law pertaining to PTCs, to the extent not covered by the
8 Net Benefits Guarantee.⁴⁶ This Wind Catcher Settlement PTC guarantee is superior
9 to the PTC guarantee proposed by SWEPCO for the SWFs, since it mitigates
10 reductions to benefits resulting from a change of law through the Net Benefits
11 Guarantee provision, while SWEPCO's proposed PTC guarantee for the SWFs does
12 not make customers whole for any reduction in PTC credits resulting from a change
13 in law. If the Commission approves SWEPCO's application, I recommend that the
14 Wind Catcher Settlement PTC guarantee be applied to the SWFs as a condition to
15 approval of the SWFs.

16 4) Net Capacity Factor Guarantee – The Wind Catcher Settlement guaranteed a 46%
17 capacity factor over consecutive five-year periods over the entire 25-year estimated
18 operating life of the Project, *without exception for force majeure or SPP*
19 *curtailments*.⁴⁷ The 46% guaranteed capacity factor is 90% of the expected (i.e.,
20 P50) capacity factor (51%) of the Wind Catcher facilities. In contrast SWEPCO has
21 offered Minimum Production Guarantee that provides a 38.1% capacity factor
22 guarantee over two 5-year time periods covering only the first 10 years of the
23 expected 30-year operating lives of the SWFs in this case. The 38.1% guaranteed
24 capacity factor is approximately 87% of the expected (P50) capacity factor (44%)
25 for the SWFs. The benefits of the SWFs are highly sensitive to the capacity factors
26 (energy output) of the units; therefore, to protect customers the Minimum

45 See Attachment SN-8, Paragraph 1(d) and Attachment 2 of the Wind Catcher Settlement Agreement.

46 See Attachment SN-8, Paragraph 1(b) of the Wind Catcher Settlement Agreement.

47 See Attachment SN-8, Paragraph 1(c) and Attachment 1 of the Wind Catcher Settlement Agreement.

1 Production Guarantee for the SWFs should be modified to reflect the Wind Catcher
2 Settlement Capacity Factor Guarantee. This would result in a guaranteed minimum
3 average capacity factor of 39.6% ($90\% \times 44\% = 39.6\%$) measured over 6 5-year
4 periods that cover the entire expected 30-year operating lives of the SWFs. If the
5 Commission approves SWEPCO's application, I recommend that the Minimum
6 Production Guarantee for the SWFs be modified to incorporate the above changes,
7 including no exceptions for force majeure or SPP curtailments, to be consistent with
8 the Capacity Factor Guarantee provided in the Wind Catcher Settlement, as a
9 condition to approval of the SWFs.

10 5) Most Favored Nation - The Oklahoma Wind Catcher Settlement provided a Most
11 Favored Nation provision to ensure that the guarantees provided to SWEPCO's
12 customers would reflect any other better guarantees that were adopted for the Wind
13 Catcher Project by regulators in other jurisdictions.⁴⁸ SWEPCO has not offered a
14 Most Favored Nation guarantee for the SWFs. If the Commission approves
15 SWEPCO's application, I recommend that this new guarantee be provided as a
16 condition to approval of the SWFs.

17 6) Off-System Sales ("OSS") and REC's - The Oklahoma Wind Catcher Settlement
18 provided that customers would receive 100% of incremental OSS and REC sales
19 margins that would not have occurred but for the Wind Catcher Project.⁴⁹ To
20 increase the prospect that the Project will benefit customers, I recommend that the
21 Company be required to credit 100% of OSS and REC margins to customers in the
22 future.

23 **Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING**
24 **GUARANTEES THAT SHOULD BE REQUIRED FOR APPROVAL OF**
25 **SWEPCO'S PROPOSED ACQUISITION OF THE SWFS.**

26 **A.** If the Commission approves SWEPCO's application, I recommend that the Commission's
27 approval of SWEPCO's ownership of 810 MW of the SWFs be conditioned upon the

48 See Attachment SN-8, Paragraph 1(f) of the Wind Catcher Settlement Agreement.

49 See Attachment SN-8, Paragraph 1(e) of the Wind Catcher Settlement Agreement.

1 Company's agreement to provide cost, performance and ratemaking guarantees for the
2 Project that are consistent with the stronger guarantees offered by AEP in Oklahoma for the
3 Wind Catcher Project, as I have described above. These strengthened guarantees would be
4 necessary to assure SWEPCO's Texas customers will be protected from cost and
5 performance risks that might otherwise eliminate the relatively small benefits estimated for
6 the SWFs.

7 **VIII. CONCLUSIONS AND RECOMMENDATIONS**

8 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING SWEPCO'S** 9 **PROPOSED ACQUISITION OF THE SWFS?**

10 A. SWEPCO forecasts that under the base case scenario, the Company's proposed \$1.09 billion
11 acquisition of 810 MW of the SWFs wind generation Project in Oklahoma will produce
12 average annual Texas customer benefits of approximately \$7.2 million per year (Texas
13 Retail, NPV basis), which is approximately 1.1% of the Company's forecasted Texas Retail
14 revenue requirement for 2021. Because this benefits forecast relies upon the Company's
15 base case gas price forecast, which is approximately 11% lower than EIA's 2019 long-term
16 forecast, but more than \$1/MMBtu higher than NYMEX gas futures prices for the next four
17 years, I expect the actual savings from the Project to be significantly lower than indicated
18 by SWEPCO's base case analysis, and closer to the levels forecasted in SWEPCO's low gas
19 price scenarios, as summarized in Table 6 of my testimony. The annual benefit of the SWFs
20 for Texas customers under low gas price scenarios is approximately \$3.5 million/year, or
21 0.5% of the forecasted Texas Retail revenue requirement for 2021. The relatively small
22 projected benefits of the SWFs could even be lower due to uncertainty in other key modeling
23 assumptions, such as forecasted congestion costs, wind-unit generation levels, and Project
24 capital and operating costs. The SWFs would help to diversify SWEPCO's energy supply
25 mix, reduce carbon emissions, and potentially could serve as a long-term hedge to mitigate
26 the Company's exposure to volatility in natural gas and market energy prices. However,
27 these potential benefits alone do not justify the Project, which is not needed for SWEPCO
28 system reserve capacity purposes until 2026 or later. Based on my concerns regarding the
29 relatively low and uncertain forecasted benefits, and relatively high capital cost of the

1 Project, I do not recommend approval of SWEPCO's application. But if the Commission
2 approves SWEPCO's application, I recommend that any approval of SWEPCO's
3 acquisition of 810 MW of the SWFs, at a minimum, be made subject to the following
4 conditions:

5 1) I recommend that SWEPCO's proposed cost, performance and other guarantees for
6 the SWFs be modified as described in my testimony to reflect the more favorable
7 guarantee provisions agreed to by AEP in the Company's Oklahoma Wind Catcher
8 proceeding.

9 2) I recommend that SWEPCO be required to credit 100% of any future margins earned
10 from REC sales, sales of excess capacity, or from SPP market energy or ancillary
11 service sales as an offset to the Company's reconcilable fuel and purchased energy
12 charges.

13 3) I recommend that SWEPCO be required to seek Commission pre-approval of any
14 new transmission lines that it seeks to construct to mitigate congestion costs
15 associated with energy supplied from the SWFs.

16 **Q. DOES THAT CONCLUDE YOUR TESTIMONY?**

17 **A. Yes.**

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
ELECTRIC POWER COMPANY FOR	§	
CERTIFICATE OF CONVENIENCE	§	BEFORE THE STATE OFFICE
AND NECESSITY AUTHORIZATION	§	OF
AND RELATED RELIEF FOR THE	§	ADMINISTRATIVE HEARINGS
ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-1:

Background and Experience of Scott Norwood

DON SCOTT NORWOOD
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SUMMARY

Scott Norwood is an energy consultant with over 37 years of utility industry experience in the areas of regulatory consulting, resource planning and energy procurement. His clients include government agencies, publicly-owned utilities, public service commissions, municipalities and various electric consumer interests. Over the last 15 years Mr. Norwood has presented expert testimony on electric utility ratemaking, resource planning, and electric utility restructuring issues in over 200 regulatory proceedings in Arkansas, Georgia, Iowa, Illinois, Michigan, Missouri, New Jersey, Oklahoma, South Dakota, Texas, Virginia, Washington and Wisconsin.

Prior to founding Norwood Energy Consulting in January of 2004, Mr. Norwood was employed for 18 years by GDS Associates, Inc., a Marietta, Georgia based energy consulting firm. Mr. Norwood was a Principal of GDS and directed the firm's Deregulated Services Department which provided a range of consulting services including merchant plant due diligence studies, deregulated market price forecasts, power supply planning and procurement projects, electric restructuring policy analyses, and studies of power plant dispatch and production costs.

Before joining GDS, Mr. Norwood was employed by the Public Utility Commission of Texas as Manager of Power Plant Engineering from 1984 through 1986. He began his career in 1980 as Staff Electrical Engineer with the City of Austin's Electric Utility Department where he was in charge of electrical maintenance and design projects at three gas-fired power plants.

Mr. Norwood is a graduate of the college of electrical engineering of the University of Texas.

EXPERIENCE

The following summaries are representative of the range of projects conducted by Mr. Norwood over his 30-year consulting career.

Regulatory Consulting

Oklahoma Industrial Energy Consumers - Assisted client with technical and economic analysis of proposed EPA regulations and compliance plans involving control of air emissions and potential conversion of coal-to-gas conversion options.

Cities Served by Southwestern Electric Power Company – Analyzed and presented testimony regarding the prudence of a \$1.7 billion coal-fired power plant and related settlement agreements with Sierra Club.

New York Public Service Commission - Conducted inter-company statistical benchmarking analysis of Consolidated Edison Company to provide the New York Public Service Commission with guidance in determining areas that should be reviewed in detailed management audit of the company.

Oklahoma Industrial Energy Consumers - Analyzed and presented testimony on affiliate energy trading transactions by AEP in ERCOT.

Virginia Attorney General – Analyzed and presented testimony regarding distribution tap line undergrounding program proposed by Dominion Virginia Power Company.

Cities Served by Southwestern Electric Power Company – Analyzed and presented testimony regarding the prudence of the utility's decision to retire the Welsh Unit 2 coal-fired generating unit in conjunction with a litigation settlement agreement with Sierra Club.

Georgia Public Service Commission - Presented testimony before the Georgia Public Service Commission in Docket 3840-U, providing recommendations on nuclear O&M levels for Hatch and Vogtle and recommending that a nuclear performance standard be implemented in the State of Georgia.

Oklahoma Industrial Energy Consumers - Analyzed and presented testimony addressing power production and coal plant dispatch issues in fuel prudence cases involving Oklahoma Gas and Electric Company.

Georgia Public Service Commission - Analyzed and provided recommendations regarding the reasonableness of nuclear O&M costs, fossil O&M costs and coal inventory levels reported in GPC's 1990 Surveillance Filing.

City of Houston - Analyzed and presented comments on various legislative proposals impacting retail electric and gas utility operations and rates in Texas.

New York Public Service Commission - Conducted inter-company statistical benchmarking analysis of Rochester Gas & Electric Company to provide the New York Public Service Commission with guidance in determining areas which should be reviewed in detailed management audit of the company.

Virginia Attorney General – Analyzed and presented testimony regarding an accelerated vegetation management program and rider proposed by Appalachian Power Company.

Oklahoma Attorney General – Analyzed and presented testimony regarding fuel and purchased power, depreciation and other expense items in Oklahoma Gas & Electric Company's 2001 rate case before the Oklahoma Corporation Commission.

City of Houston - Analyzed and presented testimony regarding fossil plant O&M expense levels in Houston Lighting & Power Company's rate case before the Public Utility Commission of Texas.

City of El Paso - Analyzed and presented testimony regarding regulatory and technical issues related to the Central & Southwest/El Paso Electric Company merger and rate proceedings before the PUCT, including analysis of merger synergy studies, fossil O&M and purchased power margins.

Residential Ratepayer Consortium - Analyzed Fermi 2 replacement power and operating performance issues in fuel reconciliation proceedings for Detroit Edison Company before the Michigan Public Service Commission.

Residential Ratepayer Consortium - Analyzed and prepared testimony addressing coal plant outage rate projections in the Consumer's Power Company fuel proceeding before the Michigan Public Service Commission.

City of El Paso - Analyzed and developed testimony regarding Palo Verde operations and maintenance expenses in El Paso Electric Company's 1991 rate case before the Public Utility Commission of Texas.

City of Houston - Analyzed and developed testimony regarding the operations and maintenance expenses and performance standards for the South Texas Nuclear Project, and operations and maintenance expenses for the Limestone and Parish coal-fired power plants in HL&P's 1991 rate case before the PUCT.

City of El Paso - Analyzed and developed testimony regarding Palo Verde operations and maintenance expenses in El Paso Electric Company's 1990 rate case before the Public Utility Commission of Texas. Recommendations were adopted.

Energy Planning and Procurement Services

Virginia Attorney General – Review and provide comments or testimony regarding annual integrated resource plan filings made by Dominion Virginia Power and Appalachian Power Company.

Dell Computer Corporation – Negotiated retail power supply agreement for Dell's Round Rock, Texas facilities producing annual savings in excess of \$2 million.

Texas Association of School Boards Electric Aggregation Program – Serve as TASB's consultant in the development, marketing and administration of a retail electric aggregation program consisting of 2,500 Texas schools with a total load of over 300 MW. Program produced annual savings of more than \$30 million in its first year.

Oklahoma Industrial Energy Consumers - Analyzed and drafted comments addressing integrated resource plan filings by Public Service Company of Oklahoma and Oklahoma Gas and Electric Company.

S.C. Johnson - Analyzed and presented testimony addressing Wisconsin Electric Power Company's \$4.1 billion CPCN application to construct three coal-fired generating units in southeast Wisconsin.

Oklahoma Industrial Energy Consumers - Analyzed wind energy project ownership proposals by Oklahoma Gas and Electric Company and presented testimony addressing project economics and operational impacts.

City of Chicago, Illinois Attorney General, Illinois Citizens' Utility Board - Analyzed Commonwealth Edison's proposed divestiture of the Kincaid and State Line power plants to SEI and Dominion Resources.

Georgia Public Service Commission - Analyzed and presented testimony on Georgia Power Company's integrated resource plan in a certification proceeding for an eight unit, 640 MW combustion turbine facility.

South Dakota Public Service Commission - Evaluated integrated resource plan and power plant certification filing of Black Hills Power & Light Company.

Shell Leasing Co. - Evaluated market value of 540 MW western coal-fired power plant.

Community Energy Electric Aggregation Program – Served as Community Energy's consultant in the development, marketing and start-up of a retail electric aggregation program consisting of major charitable organizations and their donors in Texas.

Austin Energy – Conducted competitive solicitation for peaking capacity. Developed request for proposal, administered solicitation and evaluated bids.

Austin Energy - Provided technical assistance in the evaluation of the economic viability of the City of Austin's ownership interest in the South Texas Project.

Austin Energy - Assisted with regional production cost modeling analysis to assess production cost savings associated with various public power merger and power pool alternatives.

Sam Rayburn G&T Electric Cooperative - Conducted competitive solicitation for peaking capacity. Developed request for proposal, administered solicitation and evaluated bids.

Rio Grande Electric Cooperative, Inc. - Directed preparation of power supply solicitation and conducted economic and technical analysis of offers.

Virginia Attorney General – Review and provide comments or testimony regarding annual demand-side management program programs and rider proposals made by Dominion Virginia Power and Appalachian Power Company.

Austin Energy – Conducted modeling to assess potential costs and benefits of a municipal power pool in Texas.

Electric Restructuring Analyses

Electric Power Research Institute - Evaluated regional resource planning and power market dispatch impacts on rail transportation and coal supply procurement strategies and costs.

Arkansas House of Representatives – Critiqued proposed electric restructuring legislation and identified suggested amendments to provide increased protections for small consumers.

Virginia Legislative Committee on Electric Utility Restructuring – Presented report on status of stranded cost recovery for Virginia’s electric utilities.

Georgia Public Service Commission – Developed models and a modeling process for preparing initial estimates of stranded costs for major electric utilities serving the state of Georgia.

City of Houston – Evaluated and recommended adjustments to Reliant Energy’s stranded cost proposal before the Public Utility Commission of Texas.

Oklahoma Attorney General – Evaluated and advised the Attorney General on technical, economic and regulatory policy issues arising from various electric restructuring proposals considered by the Oklahoma Electric Restructuring Advisory Committee.

State of Hawaii Department of Business, Economics and Tourism – Evaluated electric restructuring proposals and developed models to assess the potential savings from deregulation of the Oahu power market.

Virginia Attorney General - Served as the Attorney General’s consultant and expert witness in the evaluation of electric restructuring legislation, restructuring rulemakings and utility proposals addressing retail pilot programs, stranded costs, rate unbundling, functional separation plans, and competitive metering.

Western Public Power Producers, Inc. - Evaluated operational, cost and regional competitive impacts of the proposed merger of Southwestern Public Service Company and Public Service Company of Colorado.

Iowa Department of Justice, Consumer Advocate Division - Analyzed stranded investment and fuel recover issues resulting from a market-based pricing proposal submitted by MidAmerican Energy Company.

Cullen Weston Pines & Bach/Citizens’ Utility Board - Evaluated estimated costs and benefits of the proposed merger of Wisconsin Energy Corporation and Northern States Power Company (Primergy).

City of El Paso - Evaluated merger synergies and plant valuation issues related to the proposed acquisition and merger of El Paso Electric Company and Central & Southwest Company.

Rio Grande Electric Cooperative, Inc. - Analyzed stranded generation investment issues for Central Power & Light Company.

Power Plant Management

City of Austin Electric Utility Department - Analyzed the 1994 Operating Budget for the South Texas Nuclear Project (STNP) and assisted in the development of long-term performance and expense projections and divestiture strategies for Austin's ownership interest in the STNP.

City of Austin Electric Utility Department - Analyzed and provided recommendations regarding the 1991 capital and O&M budgets for the South Texas Nuclear Project.

Sam Rayburn G&T Electric Cooperative - Developed and conducted operational monitoring program relative to minority owner's interest in Nelson 6 Coal Station operated by Gulf States Utilities.

KAMO Electric Cooperative, City of Brownsville and Oklahoma Municipal Power Agency - Directed an operational audit of the Oklaunion coal-fired power plant.

Sam Rayburn G&T Electric Cooperative - Conducted a management/technical assessment of the Big Cajun II coal-fired power plant in conjunction with ownership feasibility studies for the project.

Kamo Electric Power Cooperative - Developed and conducted operational monitoring program for client's minority interest in GRDA Unit 2 Coal Fired Station.

Northeast Texas Electric Cooperative - Developed and conducted operational monitoring program concerning NTEC's interest in Pirkey Coal Station operated by Southwestern Electric Power Company and Dolet Hills Station operated by Central Louisiana Electric Company.

Corn Belt Electric Cooperative/Central Iowa Power Cooperative - Perform operational monitoring and budget analysis on behalf of co-owners of the Duane Arnold Energy Center.

PRESENTATIONS

Quantifying Impacts of Electric Restructuring: Dynamic Analysis of Power Markets, 1997 NARUC Winter Meetings, Committee on Finance and Technology.

Quantifying Costs and Benefits of Electric Utility Deregulation: Dynamic Analysis of Regional Power Markets, International Association for Energy Economics, 1996 Annual North American Conference.

Railroad Rates and Utility Dispatch Case Studies, 1996 EPRI Fuel Supply Seminar.

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
ELECTRIC POWER COMPANY FOR	§	
CERTIFICATE OF CONVENIENCE	§	BEFORE THE STATE OFFICE
AND NECESSITY AUTHORIZATION	§	OF
AND RELATED RELIEF FOR THE	§	ADMINISTRATIVE HEARINGS
ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-2:

SWEPCO's Response to CARD 1-7

**SOAH DOCKET NO. 473-19-6862
PUC DOCKET NO. 49737**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO CITIES
ADVOCATING REASONABLE DEREGULATION'S FIRST SET OF REQUESTS FOR
INFORMATION**

Question No. 1-7:

Provide SWEPCO's system energy mix (i.e., gas, coal, wind, purchases, etc.) for the last three calendar years and as forecasted for the first ten years of commercial service of the proposed wind energy facilities.

Response No. 1-7:

See CARD_1_7_Attachment_1.

Prepared By: Jon R. Maclean
Prepared By: James F. Martin

Title: Resource Planning Mgr
Title: Regulatory Case Mgr

Sponsored By: John F. Torpey

Title: Mng Dir Res Plming&Op Anlysis

SOAH Docket No 473-19-6862
PUC Docket No 49737
CARD's 1st, Q # CARD 1-7
Attachment 1

SWEPCO
Source of Energy by Type
P50 Base Gas With CO2 With Project case

Type of Generation

	2016	2017	2018	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
GAS	4,486,030	3,482,444	3,540,321	1,952,116	1,679,216	1,673,707	1,581,236	1,528,330	1,575,839	1,804,437	3,948,257	3,807,685	3,727,472
COAL	14,096,804	14,780,967	14,252,419	14,200,499	12,685,680	12,584,636	13,020,162	11,434,955	12,466,142	12,920,268	8,912,326	8,214,096	7,987,299
SOLAR	0	0	0	20,886	20,892	22,791	22,827	24,690	26,590	394,290	766,223	1,499,281	2,236,589
WIND	1,768,926	1,729,872	1,809,821	2,224,326	4,908,728	4,908,728	5,766,007	5,749,916	5,749,916	5,749,916	5,766,007	7,984,288	7,958,379
NET PURCHASE POWER	262,240	207,717	2,827,439	2,095,252	1,318,172	1,465,924	322,249	2,013,758	965,418	42,408	1,494,429	-542,881	-898,138
TOTAL	20,614,000	20,201,000	22,430,000	20,493,079	20,612,688	20,655,786	20,712,481	20,751,649	20,783,905	20,826,503	20,887,242	20,962,469	21,011,601

SWEPCO
Source of Energy by Type
P50 Base Gas With CO2 Without Project case

Type of Generation

	2016	2017	2018	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
GAS	4,486,030	3,482,444	3,540,321	1,952,116	1,679,216	1,673,707	1,581,236	1,528,330	1,575,839	1,804,437	3,948,257	3,807,685	3,727,472
COAL	14,096,804	14,780,967	14,252,419	14,200,499	12,685,680	12,584,636	13,020,162	11,434,955	12,466,142	12,920,268	8,912,326	8,214,096	7,987,299
SOLAR	0	0	0	20,886	20,892	22,791	22,827	24,690	26,590	394,290	766,223	1,499,281	2,236,589
WIND	1,768,926	1,729,872	1,809,821	1,786,514	1,786,514	1,786,514	2,634,973	2,627,701	2,627,701	2,627,701	2,634,973	4,862,074	4,836,165
NET PURCHASE POWER	262,240	207,717	2,827,439	2,533,070	4,440,383	4,588,133	3,453,282	5,135,971	4,087,628	3,079,803	4,625,457	2,579,326	2,224,073
TOTAL	20,614,000	20,201,000	22,430,000	20,493,085	20,612,685	20,655,781	20,712,480	20,751,647	20,783,900	20,826,499	20,887,236	20,962,462	21,011,598

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
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ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-3:

SWEPCO's Response to CARD 1-22

**SOAH DOCKET NO. 473-19-6862
PUC DOCKET NO. 49737**

**SOUTHWESTERN ELECTRIC POWER COMPANY'S RESPONSE TO CITIES
ADVOCATING REASONABLE DEREGULATION'S FIRST SET OF REQUESTS FOR
INFORMATION**

Question No. 1-22:

Provide a comparison of the base case economic benefits of SWEPCO's share of the proposed wind energy facilities in this case to the forecasted base case benefits of SWEPCO's share of the previously proposed Wind Catcher project for each year of the base case analyses for these projects.

Response No. 1-22:

Both projects will or would have delivered significant benefits to SWEPCO and its customers. North Central and Wind Catcher are two very different projects, and are very different in size, location, scope, and risk; thus, any comparison between the two must be made with that understanding. SWEPCO would have received twice as much energy and 2.5 times as many PTC's from Wind Catcher. Wind Catcher's required tie-line was expected to cost \$1.6 billion, and it would have eliminated curtailment risk and lessened congestion risk; thus, any analysis of benefits must be undertaken with those considerations accounted for. SWEPCO's share of Wind Catcher was 1,400 MW vs 810 MW from North Central. All of Wind Catcher qualified for 100% PTCs. In comparison, 17% of North Central will qualify for 100% PTCs and the remainder will qualify for 80%. Additionally, any comparison of financial benefits is of limited usefulness without also considering the Company's guarantees. It is, however, the different fundamentals forecast that account for much of the difference in estimated benefits.

See CARD 1-22 Attachment 1 to this response for the requested comparison. To get the benefits summarized in that attachment, Wind Catcher would have been a \$3.2 billion investment for SWEPCO, while North Central is a smaller capital investment at \$1.09 billion. The net benefits between the two are fairly comparable per dollar of capital investment. Wind Catcher would have delivered \$2.07 in nominal benefits per \$1 invested and North Central \$1.92 per \$1 invested, based on the Company's fundamentals forecast at the applicable times.

Also see CARD 1-27 for a comparison of the forecast market energy prices between Wind Catcher and North Central. Forecast prices in the current filing's fundamental forecast average \$25/MWh (34%) lower than those from Wind Catcher. North Central is able to deliver sizable benefits to SWEPCO customers at far lower market energy prices than Wind Catcher, making this aspect of North Central's benefits stream less risky.

Prepared By: Jon R. Maclean

Title: Resource Planning Mgr

Prepared By: James F. Martin

Title: Regulatory Case Mgr

Sponsored By: Karl R. Bletzacker

Title: Dir Fundamental Analysis

SWEPCO Comparison of North Central (NC) to Wind Catcher (WC)

The written response to CARD 1-22 must be read with this analysis for context about the material differences and limited usefulness of a comparison between the two projects

See page 2 for SWEPCO's base case costs and benefits for NC

See page 3 for SWEPCO's base case costs and benefits for WC

SOAH Docket No. 473-19-6862

PUC Docket No. 49737

CARD's 1st, Q # CARD 1-22

Attachment 1

Page 1 of 3

Line Item	Comparison
1. Production Cost Savings Excluding Congestion/Losses	WC higher because SWEPCO would have received 1,400 MW at a 51% cap factor (~6,100 GWh annually), vs 810 MW of 44% capacity factor wind in NC (3,122 GWh annually). In addition power prices were higher in the WC fundamental forecast. See CARD 1-27 for market price difference.
2. Congestion and Losses	WC higher because it would have been twice as much wind energy as NC, although it would have been a lower cost per MWh due to the tie line.
3. Capacity Value	WC was higher because it was 1,400 MW vs 810 MW and also due to differences in assumed future resource requirements.
4. Production Tax Credits, Grossed Up	WC 2.5 times NC because it would have had double the energy and 100% of the project qualified for 100% PTC. 83% of NC will receive 80% PTC with the other 17% getting 100%.
5. Deferred Tax Asset Carrying Charges	WC 2.5 times higher because it generated far more PTC, creating a larger deferred tax asset.
6. Wind Facility Revenue Requirement	WC double NC primarily because it was 1,400 MW vs 810 MW.
7. Tie Line Revenue Requirement	WC higher because NC has no tie line.
8. Total Net Customer Benefits/(Cost)	WC Higher due to the combination of the factors above, primarily double the energy which would have been received and 100% PTC for the entire facility.

NORTH CENTRAL WIND FACILITIES - SWPCO 810 MW SHARE OF THE PROJECT
P50 15% CAPACITY CREDIT BASE GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS MARKET - No Tie Line
 \$ in Millions (Nominal unless otherwise indicated)

Year	NPV	Total 2021-2051 Nominal	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1 Production Cost Savings Excluding Congestion/Losses	\$1,660	\$5,095	\$12	\$86	\$89	\$93	\$97	\$101	\$105	\$143	\$143	\$147	\$151
2 Congestion and Losses	(\$322)	(\$893)	(\$3)	(\$18)	(\$19)	(\$20)	(\$22)	(\$25)	(\$27)	(\$30)	(\$32)	(\$32)	(\$32)
3 Capacity Value	\$70	\$311	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
4 Production Tax Credits, Grossed Up	\$630	\$963	\$15	\$88	\$91	\$92	\$95	\$95	\$98	\$98	\$102	\$102	\$87
5 Deferred Tax Asset Carrying Charges	(\$123)	(\$212)	(\$0)	(\$4)	(\$9)	(\$13)	(\$17)	(\$19)	(\$21)	(\$22)	(\$23)	(\$24)	(\$24)
6 Wind Facility Revenue Requirement	(\$1,348)	(\$3,233)	(\$17)	(\$132)	(\$130)	(\$130)	(\$128)	(\$127)	(\$126)	(\$124)	(\$123)	(\$121)	(\$119)
7 Tie Line Revenue Requirement	\$0	\$0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0	\$0.0
8. Total Net Customer Benefits/(Cost)	\$567	\$2,030	\$6	\$20	\$22	\$21	\$26	\$25	\$29	\$66	\$67	\$72	\$63

Year	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
1 Production Cost Savings Excluding Congestion/Losses	\$156	\$159	\$164	\$170	\$172	\$177	\$171	\$175	\$190	\$186	\$193	\$204	\$212
2 Congestion and Losses	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)
3 Capacity Value	\$0	\$0	\$0	\$0	\$0	\$1	\$54	\$55	(\$1)	\$56	\$55	(\$3)	(\$1)
4 Production Tax Credits, Grossed Up	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5 Deferred Tax Asset Carrying Charges	(\$20)	(\$12)	(\$3)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6 Wind Facility Revenue Requirement	(\$116)	(\$114)	(\$112)	(\$110)	(\$108)	(\$106)	(\$104)	(\$102)	(\$100)	(\$98)	(\$97)	(\$95)	(\$93)
7 Tie Line Revenue Requirement	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8. Total Net Customer Benefits/(Cost)	(\$13)	\$2	\$17	\$29	\$33	\$41	\$90	\$97	\$57	\$112	\$119	\$75	\$86

Year	2045	2046	2047	2048	2049	2050	2051
1 Production Cost Savings Excluding Congestion/Losses	\$220	\$225	\$227	\$233	\$239	\$242	\$211
2 Congestion and Losses	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$32)	(\$27)
3 Capacity Value	(\$0)	(\$1)	\$50	\$46	(\$3)	(\$2)	\$4
4 Production Tax Credits, Grossed Up	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5 Deferred Tax Asset Carrying Charges	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6 Wind Facility Revenue Requirement	(\$91)	(\$89)	(\$88)	(\$86)	(\$85)	(\$86)	(\$81)
7 Tie Line Revenue Requirement	\$0	\$0	\$0	\$0	\$0	\$0	\$0
8. Total Net Customer Benefits/(Cost)	\$97	\$104	\$157	\$161	\$119	\$122	\$108

FORECASTED SWEPCO SHARE OF WIND CATCHER - P50 WITH 30-60 Year Depreciation Lives-100% cost
P50 BASE GAS WITH CARBON - COSTS AND BENEFITS COMPARED TO BASELINE CASE
\$ in Millions (Nominal unless otherwise indicated)

Assumptions match NC - 90% OSS margin sharing, 100% construction cost, 30 year depreciation life on the wind, discounted using NC 7.09% discount rate

Year	NPV	Total 2021-2045 Nominal	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
1 Production Cost Savings Excluding Congestion/Losses	\$4,307	\$10,595	\$247	\$255	\$261	\$273	\$284	\$297	\$317	\$339	\$362	\$383	\$406
2 Congestion and Losses	(\$395)	(\$971)	(\$24)	(\$24)	(\$24)	(\$25)	(\$25)	(\$27)	(\$29)	(\$31)	(\$34)	(\$36)	(\$38)
3 Capacity Value	\$287	\$772	\$0	\$0	\$0	\$0	\$0	\$51	\$51	\$51	\$51	\$51	\$51
4 Production Tax Credits, Grossed Up	\$1,579	\$2,283	\$205	\$214	\$214	\$222	\$230	\$230	\$238	\$238	\$246	\$246	\$0
5 Deferred Tax Asset Carrying Charges	(\$311)	(\$518)	(\$6)	(\$17)	(\$28)	(\$36)	(\$43)	(\$49)	(\$53)	(\$57)	(\$58)	(\$58)	(\$51)
6 Wind Facility Revenue Requirement	(\$2,730)	(\$5,591)	(\$268)	(\$257)	(\$260)	(\$253)	(\$247)	(\$255)	(\$250)	(\$246)	(\$242)	(\$237)	(\$233)
7 Tie Line Revenue Requirement	(\$1,181)	(\$2,355)	(\$123)	(\$120)	(\$119)	(\$117)	(\$114)	(\$111)	(\$108)	(\$106)	(\$103)	(\$100)	(\$97)
8. Total Net Customer Benefits/(Cost)	\$1,556	\$4,214	\$32	\$50	\$43	\$64	\$85	\$136	\$164	\$188	\$222	\$249	\$37

Year	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
1 Production Cost Savings Excluding Congestion/Losses	\$429	\$474	\$488	\$503	\$511	\$521	\$496	\$505	\$515	\$523	\$535	\$546	\$557
2 Congestion and Losses	(\$41)	(\$42)	(\$43)	(\$44)	(\$45)	(\$46)	(\$47)	(\$47)	(\$48)	(\$49)	(\$50)	(\$50)	(\$51)
3 Capacity Value	\$51	(\$6)	(\$6)	(\$6)	(\$6)	(\$6)	\$56	\$56	\$56	\$56	\$56	\$56	\$56
4 Production Tax Credits, Grossed Up	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
5 Deferred Tax Asset Carrying Charges	(\$38)	(\$24)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
6 Wind Facility Revenue Requirement	(\$229)	(\$225)	(\$221)	(\$216)	(\$212)	(\$208)	(\$204)	(\$200)	(\$196)	(\$193)	(\$189)	(\$185)	(\$182)
7 Tie Line Revenue Requirement	(\$95)	(\$92)	(\$89)	(\$87)	(\$85)	(\$83)	(\$82)	(\$80)	(\$78)	(\$76)	(\$75)	(\$73)	(\$72)
8. Total Net Customer Benefits/(Cost)	\$77	\$86	\$129	\$150	\$163	\$179	\$219	\$234	\$248	\$260	\$277	\$293	\$308

Year	2045
1 Production Cost Savings Excluding Congestion/Losses	\$569
2 Congestion and Losses	(\$52)
3 Capacity Value	\$56
4 Production Tax Credits, Grossed Up	\$0
5 Deferred Tax Asset Carrying Charges	\$0
6 Wind Facility Revenue Requirement	(\$182)
7 Tie Line Revenue Requirement	(\$70)
8. Total Net Customer Benefits/(Cost)	\$321

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

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AND RELATED RELIEF FOR THE	§	ADMINISTRATIVE HEARINGS
ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-4:

Comparison of Base Gas Price Forecasts Used for Wind Catcher and SWFs Analyses

**SOAH DOCKET NO. 473-19-6862
PUC DOCKET NO. 49737**

APPLICATION OF SOUTHWESTERN)	
ELECTRIC POWER COMPANY FOR)	
CERTIFICATE OF CONVENIENCE)	BEFORE THE STATE OFFICE
AND NECESSITY AUTHORIZATION)	OF
AND RELATED RELIEF FOR THE)	ADMINISTRATIVE HEARINGS
ACQUISITION OF WIND)	
GENERATION FACILITIES)	

DIRECT TESTIMONY OF

SCOTT NORWOOD

ON BEHALF OF

CITIES ADVOCATING REASONABLE DEREGULATION

JANUARY 14, 2020

RESPONSIVE TESTIMONY OF SCOTT NORWOOD

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ATTACHMENTS:

SN-1 Background and Experience of Scott Norwood
SN-2 SWEPCO's Response to CARD 1-7
SN-3 SWEPCO's Response to CARD 1-22
SN-4 Comparison of Base Gas Price Forecasts Used for Wind Catcher and SWFs Analyses
SN-5 Base Gas Price Forecast used for SWEPCO's December 2018 IRP
SN-6 SWEPCO's SPP Market Energy Price Forecast for SWFs Analysis
SN-7 Texas Retail Savings for SWFs Under Low Gas Scenarios
SN-8 Oklahoma Wind Catcher Settlement Agreement Guarantee Terms

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.

A. My name is Scott Norwood. I am President of Norwood Energy Consulting, L.L.C. My business address is P.O. Box 30197, Austin, Texas 78755-3197.

Q. WHAT IS YOUR OCCUPATION?

A. I am an energy consultant specializing in the areas of electric utility regulation, resource planning and energy procurement.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I am an electrical engineer with over 35 years of experience in the electric utility industry. I began my career as a power plant engineer for the City of Austin's Electric Utility Department where I was responsible for electrical maintenance and design projects for the City's three gas-fired power plants. In January 1984, I joined the staff of the Public Utility Commission of Texas, where I was responsible for addressing resource planning, fuel, and purchased power cost issues in electric rate and plant certification proceedings before the Texas Commission. Since 1986 I have provided utility regulatory consulting, resource planning, and power procurement services to public utilities, electric consumers, industrial interests, municipalities, and state government clients. I have testified in over 200 utility regulatory proceedings over the last 20 years, before state regulatory commissions in Alaska, Arkansas, Florida, Georgia, Illinois,

Iowa, Kentucky, Louisiana, Michigan, Missouri, New Jersey, Ohio, Oklahoma, Texas, Virginia, Washington, and Wisconsin.¹

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?

A. I am testifying on behalf of the Cities Advocating Reasonable Deregulation (“CARD”), which is a coalition of municipalities that purchase electricity from Southwestern Electric Power Company (“SWEPCO” or “Company”).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The purpose of my testimony is to present my evaluation and recommendations regarding SWEPCO’s application for a Certificate of Convenience and Necessity (“CCN”) authorization and related relief for the Company’s proposed acquisition of a 54.5% (810 MW) ownership interest three new wind energy facilities located in central and north-central Oklahoma, which I will hereinafter refer to as the Selected Wind Facilities (“SWFs” or “Project”).

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE COMMISSION?

A. Yes. I have filed testimony in numerous past proceedings before the PUCT over the last 20 years, including cases before the Commission as a consultant and former member of the Public Utility of Commission Staff. I have testified on behalf of CARD in several past SWEPCO regulatory proceedings, including base rate cases, fuel reconciliation and fuel factor cases, and proceedings involving the Company’s generating resource investments, including PUC Docket No. 47461, which involved SWEPCO’s application for approval of a CCN for ownership of the Wind Catcher wind generation project. I also

¹ See Attachment SN-1 for additional details on my background and experience.

1 filed testimony in PUC Docket No. 46936, which involved Southwestern Public Service
2 Company's ("SPS") application for approval of a similar large wind energy project located
3 in West Texas. In addition, I have filed testimony before the Oklahoma Corporation
4 Commission ("OCC") in a past case involving Public Service Company of Oklahoma's
5 ("PSO") request for approval of ownership (along with SWEPCO) of the Wind Catcher
6 Project, and in PSO's pending proceeding before the OCC seeking approval of a 675 MW
7 ownership interest in the same SWFs Project. Through this past work, I am familiar with
8 SWEPCO's system operations, generating resources, resource planning, and ratemaking
9 practices, and current issues relevant to the ownership of wind resources such as
10 SWEPCO's proposed SWFs.

11 **Q. HAVE YOU PREPARED ANY ATTACHMENTS TO SUPPORT YOUR**
12 **TESTIMONY?**

13 **A.** Yes. I have included 8 attachments with my testimony.
14

15 **II. SUMMARY OF TESTIMONY**

16 **Q. PLEASE SUMMARIZE YOUR TESTIMONY AND RECOMMENDATIONS.**

17 **A.** SWEPCO has requested approval and related other relief for acquisition of 810 MW of
18 the Project's wind generation for a total cost of approximately \$1.09 billion
19 (~\$1,345/kW).² The Project was selected through a competitive bidding process for
20 wind energy resources initiated by the Company in January of 2019. SWEPCO asserts

2 See SWEPCO witness Smoak's Direct Testimony, page 6.

1 that under its base-case analysis, the Project is expected to reduce costs to customers by
2 approximately \$567 million on a Total Company net present value (“NPV”) basis, and
3 by \$2.03 billion on a nominal basis, over the forecasted life of the Project.³ The
4 Company is offering certain capital cost, production tax credits (“PTC”), and
5 performance guarantees for the SWFs, which it states will “ensure customer benefits”
6 from the Project.⁴

7 My major conclusions regarding SWEPCO’s request for approval to acquire 810
8 MW of the SWFs are as follows:

- 9 1) SWEPCO’s December 2018 Integrated Resource Plan (“IRP”) indicate that
10 the Company is expected to have excess capacity until 2026 even without the
11 proposed acquisition of 810 MW (nameplate) from the Project.
- 12 2) SWEPCO’s proposed acquisition of 810 MW of wind energy from the
13 Project would increase from the current level of approximately 8% of total
14 energy supply to approximately 25% of the Company’s total system energy
15 requirement by 2022.⁵
- 16 3) The Company’s competitive bidding and bid evaluation process, which led to
17 selection of the SWFs, generally appear to have been reasonable.
- 18 4) The SWFs would increase the diversity of energy supply and reduce carbon
19 emissions (when compared to acquisition of conventional fossil resources),

3 See SWEPCO witness Torpey’s Direct Testimony, page 5.

4 See SWEPCO witness Brice’s Direct Testimony, page 17.

5 See Attachment SN-2, SWEPCO response to CARD 1-7.

1 and therefore lower the Company's exposure to potential future carbon taxes
2 and volatility in natural gas and SPP market energy prices.

3 5) SWEPCO's cost/benefit analysis for the SWFs was conducted using industry
4 standard production cost models, and the modeling process and range of
5 scenarios evaluated generally appear to be reasonable.

6 6) The base-case gas prices SWEPCO used for its analysis are approximately
7 11% lower than EIA's 2019 base gas-price forecast, but more than
8 \$1/MMBtu higher than NYMEX gas futures prices for the next four years.

9 7) The Company's sensitivity analyses of costs and benefits of the SWFs
10 generally appear to have reasonably accounted for the uncertainty in key
11 input variables, including forecasted commodity prices, Project performance,
12 congestion costs and carbon regulations.

13 8) SWEPCO's cost/benefit analysis indicates that ownership of the SWFs is
14 expected to produce average savings for Texas customers of approximately
15 \$7.2 million/year (1.1% of SWEPCO's forecasted Texas Retail revenue
16 requirement for 2021) under the base case scenario, and approximately \$3.5
17 million/year (0.5%) under low gas price scenarios.

18 9) SWEPCO's proposed ownership of the SWFs is forecasted to provide lower
19 customer benefits when compared to the Company's previous Wind Catcher
20 project, which was withdrawn in response to regulatory and customer
21 concerns related to economic risks of the Project.

1 10) SWEPCO's projected benefits of ownership of the SWFs are based on
2 forecasted congestion costs for the Project which are uncertain, and this
3 uncertainty is not addressed through the Company's proposed guarantees.

4 11) The cost and performance guarantees proposed by SWEPCO for the SWFs
5 would increase the likelihood of customer benefits; however, they are not as
6 comprehensive as the guarantees agreed to by the Company in the Wind
7 Catcher case (before that Project was cancelled), and would leave
8 SWEPCO's customers exposed to risks of higher than forecasted congestion
9 costs and lower than anticipated future natural gas prices.

10 12) The economic risk of the Project is somewhat mitigated by the fact that Texas
11 retail customers would be responsible for only 309 MW (~38%) of
12 SWEPCO's proposed 810 MW ownership costs of the Project.⁶

13 Based on my concerns regarding the relatively small and uncertain forecasted
14 energy benefits, the relatively high capital cost of (\$1.09 billion) of the SWFs Project,
15 and the fact that SWEPCO's December 2018 IRP forecasts that the Company will have
16 excess capacity until at least 2026 even without the Project, I do not recommend
17 approval of SWEPCO's application. But if the Commission approves SWEPCO's
18 application, I recommend that any approval of SWEPCO's acquisition of 810 MW of the
19 SWFs, at a minimum, be made subject to the following conditions:

20 1) SWEPCO's proposed cost, performance and other guarantees for the SWFs
21 should be modified as described in my testimony to reflect the more

6 See SWEPCO witness Aaron's Errata Direct Testimony, page 8.

1 favorable guarantee provisions agreed to by the Company in the Wind
2 Catcher Settlement proceeding (PUC Docket No. 47461);

3 2) SWEPCO should be required to credit 100% of the Texas Retail portion of
4 any future net revenues (i.e., margins) earned from REC sales, SPP market
5 energy or ancillary service sales, or sales of excess capacity to reduce
6 reconcilable fuel expenses, to increase the prospect that customers will
7 benefit from the Project; and

8 3) SWEPCO should be required to seek Commission pre-approval of any new
9 transmission lines that it seeks to construct in the future to mitigate
10 congestion costs associated with energy supplied from the SWFs.
11

12 **III. SUMMARY OF SWEPCO'S PROPOSAL**

13 **Q. PLEASE DESCRIBE THE SELECTED WIND FACILITIES ("SWFs") FOR**
14 **WHICH SWEPCO SEEKS APPROVAL IN THIS CASE.**

15 A. The SWFs consists of three wind-energy facilities to be located in North Central
16 Oklahoma. The SWFs are being developed by Invenergy LLC affiliates, and will be
17 acquired by SWEPCO under Purchase and Sale Agreements for a total base purchase
18 price of \$1.86 billion. SWEPCO's testimony indicates that Invenergy LLC is North
19 America's largest independent, privately held renewable energy provider, which
20 develops, owns, and operates renewable energy facilities worldwide.⁷ The Company
21 indicates that Invenergy has developed 13,288 MW of wind energy projects worldwide,

7 See SWEPCO witness Godfrey's Direct Testimony, page 26.

and operates approximately 4,850 MW of wind generation facilities, mostly in North America.⁸

As summarized in Table 1 below, the Traverse, Maverick and Sundance wind energy facilities are expected to supply 1,485 MW (nameplate) of new wind generation, with SWEPCO owning 810 MW (54.5%) of this total capacity while SWEPCO's affiliate PSO would own the remaining 675 MW (45.5%) of the Project.⁹

Table 1
Nameplate Capacity and Estimated In-Service Dates of SWFs¹⁰

<u>Wind Facility</u>	<u>Total MW</u>	<u>SWEPCO Share</u>	<u>In-Service Date</u>
Traverse	999	544	DEC 2021
Maverick	287	157	DEC 2021
Sundance	199	109	DEC 2020
Total	1485	810	

The Traverse and Maverick facilities are expected to qualify for 80% of PTCs, while the Sundance facility will qualify for 100% of PTCs.

Q. WHAT IS THE ESTIMATED TOTAL CAPITAL COST OF THE SWFS?

A. The total estimated capital cost of the Project, including Owner's costs, AFUDC and contingencies is approximately \$1.996 billion (\$1,344/kW), as summarized in Table 2 below:

Table 2

⁸ See SWEPCO witness Godfrey's Direct Testimony, page 27.

⁹ See SWEPCO witness Torpey's Direct Testimony, page 5.

¹⁰ See SWEPCO witness Smoak's Direct Testimony, page 3.

Estimated Capital Cost of SWFs¹¹

	<u>Traverse</u>	<u>Maverick</u>	<u>Sundance</u>	<u>Total Project</u>
Nameplate Capacity, MW	999	287	199	1485
Planned COD	2021	2021	2020	
PSA Base Purchase Price	\$1,208,376,087	\$371,577,337	\$280,954,690	\$1,860,908,114
PSA Price Adjustments:				\$0
O&M Mobilization	\$3,005,859	\$673,353	\$320,803	\$4,000,015
Capital- Spare Parts	\$3,406,000	\$822,000	\$2,078,000	\$6,306,000
Power Curve Testing	<u>\$750,000</u>	<u>\$0</u>	<u>\$0</u>	<u>\$750,000</u>
Subtotal PSA Adjustments:	\$7,161,859	\$1,495,353	\$2,398,803	\$11,056,015
Owner's Costs				\$0
Owner's Costs and Overheads	\$25,050,062	\$13,252,544	\$11,475,715	\$49,778,321
Contingency	\$42,293,163	\$13,005,207	\$9,833,414	\$65,131,784
AFUDC	<u>\$4,702,973</u>	<u>\$2,663,906</u>	<u>\$1,977,319</u>	<u>\$9,344,198</u>
Subtotal Owner's Costs:	\$72,046,198	\$28,921,657	\$23,286,448	\$124,254,303
Total Project Cost	\$1,287,584,144	\$401,994,347	\$306,639,941	\$1,996,218,432
Cost per kW (Nameplate)	\$1,289	\$1,401	\$1,541	\$1,344

Q. WHAT AMOUNT OF WIND ENERGY DOES SWEPCO ESTIMATE WILL BE DELIVERED FROM THE SWFS?

A. SWEPCO commissioned an independent analysis of the probable wind energy production level of the SWFs by Simon Wind, Inc., an experienced wind energy consulting firm.¹² That analysis indicates that on a total project basis, the SWFs are expected to produce 5,724 GWh per year, with SWEPCO's share of the Project energy expected to be 3,122 GWh per year assuming an 810 MW ownership level.¹³ This level of energy production equates to an average 44% capacity factor for the Project.

¹¹ See SWEPCO witness DeRuntz's Direct Testimony, Table 1 and Exhibit JGD-3.

¹² See SWEPCO witness Godfrey's Direct Testimony, page 23.

¹³ See SWEPCO witness Godfrey's Direct Testimony, page 24.

Q. WHAT IS SWEPCO'S ESTIMATE OF THE NET BENEFITS OF THE SWFs TO SWEPCO'S CUSTOMERS?

A. As summarized in Table 3 below, under SWEPCO's base-case analysis, the Company estimates that the SWFs will provide a total NPV benefit of \$567 million (Total Company) to customers over the estimated 30-year life of the Project, and a total nominal benefit of \$2.03 billion.

Table 3
SWEPCO Cumulative Net Benefits of SWFs
(30-year life, Total Company, \$Millions)¹⁴

<u>Benefit/Cost Category</u>	<u>Net Present Value</u>	<u>Nominal Value</u>
Production Cost Savings Excl Congestion	\$1,660	\$5,095
Congestion and Losses	-\$322	-\$893
Capacity Value	\$70	\$311
Production Tax Credits (grossed up, net of DTA)	\$507	\$750
SWFs Revenue Requirement	<u>-\$1,348</u>	<u>-\$3,233</u>
Total Net Customer Benefits:	\$567	\$2,030

Q. WHAT IS THE ESTIMATED IMPACT OF THE SWFs ON SWEPCO'S TEXAS RETAIL REVENUE REQUIREMENT?

A. As summarized in Table 4 below, SWEPCO estimates that acquisition of the SWFs would result in total customer net benefits of approximately \$16.6 million over the first four years of commercial operations of the Project. This would represent a net benefit of

¹⁴ Source is SWEPCO witness Torpey's Errata Direct Testimony, page 17, Table 3.

approximately 0.6% of SWEPCO's total projected Texas retail revenue requirement for this period.¹⁵

Table 4
SWEPCO's Estimate of SWFs Impacts
on Texas Retail Revenues (2021-24)

	ProForma Revenue without SWFs	Estimated Net Benefit	Net Benefit, %
2021	\$629,816,738	\$401,944	0.1%
2022	\$645,245,779	\$3,921,902	0.6%
2023	\$655,632,937	\$5,988,615	0.9%
2024	<u>\$654,894,212</u>	<u>\$6,287,997</u>	<u>1.0%</u>
Total	\$2,585,589,666	\$16,600,458	0.6%

Q. HOW DO THE PROJECTED COSTS AND BENEFITS OF THE SWFs COMPARE TO SWEPCO'S WIND CATCHER PROJECT, WHICH SWEPCO CANCELLED LAST YEAR AFTER FAILING TO OBTAIN NECESSARY REGULATORY APPROVALS?

A. As summarized in Table 5 below, the estimated capital cost of SWEPCO's ownership of the SWFs is approximately \$2.1 billion (66%) lower than the capital cost of the Company's share of the cancelled Wind Catcher Project, and the projected total net benefit of the SWFs is approximately \$989 million (63.6%) lower than the projected benefit of the Wind Catcher Project.

Table 5
Forecasted Net Benefits of the SWFs and Wind Catcher Project¹⁶

¹⁵ See SWEPCO witness Aaron's Errata Direct Testimony, Exhibit JOA-2.

¹⁶ See Attachment SN-3, SWEPCO's Response to CARD RFI No. 1-22.

(NPV over 30-year life, Total Company, \$Millions)

	<u>SWFs</u>	<u>Wind Catcher</u>
Nameplate Capacity Ownership	810	1400
Estimated Capital Cost	\$1,090	\$3,200
<u>Benefit/Cost Category</u>		
Production Cost Savings Excl Congestion	\$1,660	\$4,307
Congestion and Losses	(\$322)	(\$395)
Capacity Value	\$70	\$287
Production Tax Credits (grossed up, net of DTA)	\$507	\$1,268
Wind Facility Revenue Requirement	(\$1,348)	(\$2,730)
Tie-Line Revenue Requirement	\$0	(\$1,181)
Total Net Customer Benefits:	\$567	\$1,556
Net Benefit difference:	(\$989)	
	-63.6%	

Q. WHY IS THE PROJECTED NET BENEFIT OF THE SWFs APPROXIMATELY 64% LOWER THAN THE BENEFIT OF THE WIND CATCHER PROJECT?

A. The lower forecasted net benefits of the SWFs appear primarily attributable to four major factors. First, SWEPCO's ownership of the SWFs (810 MW) is 73% lower than the Company's proposed ownership of the Wind Catcher Project (1,400 MW). Second, only approximately 20% of the SWFs investment is expected to be eligible for 100% PTCs, while the entire Wind Catcher Project was eligible for 100% PTCs. Third, the expected average capacity factor of the SWFs (44%) is significantly lower than the expected average capacity factor of the Wind Catcher Project (51%), which was to be located in the wind rich Oklahoma panhandle. The fourth factor that explains why estimated net benefits of the SWFs is lower than forecasted benefits of the Wind Catcher Project is that SWEPCO's base-case forecast of natural gas prices used for the SWFs

benefits analysis is approximately 31% lower than the gas price forecast used to estimate benefits for the Wind Catcher Project.¹⁷

Q. WHAT ISSUES REGARDING THE SWFs ARE ADDRESSED BY YOUR TESTIMONY?

A. My testimony focuses on four primary issues: 1) whether SWEPCO needs the capacity and energy it proposes to acquire through ownership of 810 MW of the SWFs; 2) whether SWEPCO's competitive bidding and bid evaluation process leading to selection of the SWFs was reasonable; 3) whether SWEPCO's analysis of projected benefits of ownership of the SWFs was reasonably conducted and supports the Company's proposal to acquire 810 MW of the Project; and 4) whether the guarantees offered by SWEPCO would adequately protect the Company's customers from economic risks associated with ownership of the SWFs.

IV. SWEPCO'S NEED FOR SWFs

Q. WHAT INFORMATION HAS SWEPCO PROVIDED TO DEMONSTRATE THAT THE COMPANY NEEDS THE CAPACITY AND ENERGY SUPPLIED BY THE SWFs?

A. SWEPCO witness Torpey's Direct Testimony discusses the forecasted need for new wind generating capacity as reflected in the Company's December 2018 IRP, which was completed one month before SWEPCO issued the 2019 Wind RFP.¹⁸ SWEPCO's 2018

¹⁷ See Attachment SN-4.

¹⁸ See SWEPCO witness Torpey's Direct Testimony, pages 9-11.

1 IRP indicates that the Company is expected to have excess capacity until 2026 even
2 without the SWFs. The Preferred Plan presented in SWEPCO's 2018 IRP indicates that
3 the Company should add 600 MW (Nameplate) of new wind generation in 2022,
4 followed by another 600 MW of wind generation in 2023. With the proposed acquisition
5 of 810 MW of the SWFs, SWEPCO's IRP forecast indicates that the Company would
6 have excess capacity until 2028.

7 **Q. DOES SWEPCO'S 2018 IRP INDICATE THAT THE SWFs COULD BE**
8 **JUSTIFIED EVEN IF THE PROJECT IS NOT NEEDED FOR RESERVE**
9 **CAPACITY PURPOSES?**

10 A. Yes. SWEPCO's 2018 IRP analysis indicates that optimal resource plan for the
11 Company should include up to 2,000 MW of new wind energy resources over the next
12 ten years.¹⁹ However, the base case gas price forecast used for SWEPCO's December
13 2018 IRP Analysis was significantly higher than the 2019 base case forecast used by the
14 Company to quantify benefits of the SWFs Project.²⁰ This means that the Company's
15 2018 IRP analysis overstated the level of energy savings produced from new wind
16 energy facilities and therefore likely overstates the optimal quantify of new wind energy
17 that is justified for SWEPCO's system.

18 **Q. ARE THERE OTHER NEEDS OF THE SWEPCO SYSTEM THAT COULD BE**
19 **MET BY SWEPCO'S ACQUISITION OF THE SWFs?**

19 See SWEPCO witness Torpey's Direct Testimony, page 11, Table 2.

20 See Attachment SN-5.

1 A. Yes. SWEPCO's acquisition of 810 MW of the SWFs Project will increase the diversity
2 of SWEPCO's energy supply resources and reduce exposure to costs of future carbon
3 regulations, by increasing the Company's current level of energy supplied from
4 renewable resources (~8%) to approximately 25% of total energy requirements by 2022
5 when the SWFs are placed in service. The Commission considered such energy and
6 environmental related benefits in approving a similar large wind energy project proposed
7 by Southwestern Public Service Company ("SPS") in PUC Docket No. 46936. Like in
8 this case, SPS has excess capacity, and the Company's proposed new wind generation
9 resources were not needed to meet system capacity reserve requirements, but were
10 instead justified primarily on forecasted energy and environmental benefits.

11 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE NEED FOR**
12 **SWEPCO's ACQUISITION OF THE SWFs.**

13 A. SWEPCO's December 2018 IRP indicates that the Company will have excess capacity
14 until 2026 without the proposed acquisition of the SWFs Project, but that the acquisition
15 of up to 1,200 MW (Nameplate capacity) of new wind generation in the general
16 timeframe proposed for acquisition of the SWFs, according to SWEPCO, is justified as
17 part of an optimal resource plan based on forecasted energy savings, energy supply
18 diversity benefits, and environmental benefits of wind generation. In consideration of
19 the uncertainty of long-term forecasts of natural gas and market energy prices and
20 environmental compliance costs, and the absence of a capacity need for the Project until
21 at least 2026, I question whether SWEPCO's proposed \$1.09 billion capital investment
22 in the SWFs is justified, unless the Company provides strong performance and cost

1 guarantees to enhance the prospect that Texas customers would receive benefits from the
2 Project.

3
4 **V. REASONABLENESS OF SWEPCO'S 2019 WIND RFP**

5 **Q. WHAT INFORMATION HAS SWEPCO PROVIDED TO DEMONSTRATE THE**
6 **REASONABLENESS OF THE 2019 WIND RFP AND BID SELECTION**
7 **PROCESS THAT LED TO THE COMPANY'S ACQUISITION OF THE SWFs?**

8 A. SWEPCO issued an RFP for wind generation resources on January 7, 2019.²¹ The RFP
9 requested bids to purchase up to 1,000 MW of wind generation resources to be delivered
10 on a turnkey basis, with expressed preference given to projects physically located in
11 Arkansas, Louisiana, Texas, or Oklahoma, and that are interconnected to the SPP grid at
12 delivery points that are not currently experiencing or forecasted to experience significant
13 congestion or delivery constraints.²² In addition, the RFP requested proposals for
14 projects that could be placed in service by December, 15, 2021, and that qualified for at
15 least 80% of full PTC value.²³

16 **Q. DID SWEPCO'S WIND RFP GENERATE SIGNIFICANT INTEREST FROM**
17 **POTENTIAL WIND DEVELOPERS?**

21 See SWEPCO witness Godfrey's Direct Testimony, page 5 and Exhibit JFG-1.

22 See SWEPCO witness Godfrey's Direct Testimony, page 8.

23 See SWEPCO witness Godfrey's Direct Testimony, page 8.

1 A. Yes. SWEPCO indicates that in response to the RFP, the Company received 35 bids
2 representing 19 unique wind projects totaling 5,896 MW.²⁴ None of these bids were by
3 the Company or from an AEP affiliate.²⁵

4 **Q. HOW DID SWEPCO EVALUATE THE BIDS IT RECEIVED?**

5 A. SWEPCO indicates that bids for 11 of 19 unique wind projects, totaling 3,265 MW, met
6 the RFP eligibility and threshold requirements and were subjected to further detailed
7 analysis by SWEPCO for potential selection. The detailed analysis evaluated both
8 economic and non-price factors of each proposal, and ranked each bid numerically, with
9 90% of the ranking based on economic factors and 10% based on non-price factors.²⁶
10 The economic ranking of bids was based on the Levelized Cost of Energy (“LCOE”) in
11 \$/MWh, plus the cost of Transmission Congestion, also measured in \$/MWh. The cost
12 of Transmission Congestion considered both the current congestion costs and losses for
13 energy delivered from the proposed project to the AEP West load zone, plus the
14 estimated cost of mitigating future congestion through construction of a gen-tie line, if
15 necessary.²⁷

16 **Q. HOW WAS THE NON-PRICE RANKING OF EACH BID DETERMINED?**

17 A. The non-price ranking considered issues such as project impact on wildlife and the
18 environment, exceptions to the PSA terms, exceptions to SWEPCO wind generation

24 See SWEPCO witness Godfrey’s Direct Testimony, page 12.

25 See SWEPCO witness Godfrey’s Direct Testimony, page 13.

26 See SWEPCO witness Godfrey’s Direct Testimony, pages 14-15.

27 See SWEPCO witness Godfrey’s Direct Testimony, page 15.

1 facility standards, operating history of other wind projects developed by the bidder, and
2 development status of the project.²⁸

3 **Q. WHAT WERE THE RESULTS OF SWEPCO'S ANALYSIS OF BIDS?**

4 A. The Company's bid analysis identified the Traverse, Maverick, and Sundance wind
5 facilities as the highest ranked proposals, with the next highest proposal scoring
6 approximately 16 percentage points lower than the lowest ranked selected bid.²⁹

7 **Q. DOES SWEPCO'S RFP REVIEW PROCESS AND BID EVALUATION**
8 **ANALYSIS APPEAR TO HAVE BEEN CONDUCTED IN A REASONABLE**
9 **MANNER?**

10 A. Yes. The RFP process and bid evaluation appears to have been systematic, detailed and
11 objective to a large extent. The three selected bids had the highest overall score out of
12 the 11 qualified bids that were subject to detailed analysis. In addition, SWEPCO
13 retained an Independent Evaluator ("IE") to oversee all phases of the bid administration
14 and evaluation process. SWEPCO indicates that the IE agreed that SWEPCO followed
15 the procedures outlined in the RFP and that the Company's bid evaluation and final
16 project selections were appropriate.³⁰

17 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING SWEPCO'S 2019**
18 **WIND RFP AND BID EVALUATION PROCESS.**

19 A. SWEPCO's 2019 Wind RFP and bid evaluation process generally appears to have been
20 reasonable; however, the Company's evaluation of bids only determined that the SWFs

28 See SWEPCO witness Godfrey's Direct Testimony, page 18.

29 See SWEPCO witness Godfrey's Direct Testimony, pages 19-20 and Table 3.

30 See SWEPCO witness Godfrey's Direct Testimony, pages 20-21.

1 Project was the highest ranked bid based on the established bid evaluation parameters.
2 The RFP bid evaluation process did not address whether the SWFs Project was likely to
3 benefit SWEPCO's customers. This determination was made through a separate
4 cost/benefit analysis conducted by SWEPCO as described in the testimony of Company
5 witness Torpey, as discussed later in my testimony.
6

7 **VI. SWEPCO'S COST/BENEFIT ANALYSIS FOR SWFs**

8 **Q. HOW DID SWEPCO EVALUATE THE COSTS AND BENEFITS OF THE**
9 **PROPOSED SWFs?**

10 A. SWEPCO used the PLEXOS production cost simulation model as the primary tool for
11 evaluating forecasted, production-cost benefits of the SWFs, under a range of
12 commodity price- and congestion-cost scenarios. The Company's PLEXOS cost/benefit
13 analysis for the SWFs is described by the Direct Testimony of SWEPCO witness John
14 Torpey.³¹ Generally, SWEPCO used the PLEXOS model to quantify the total SWEPCO
15 system production costs with and without the proposed SWFs over a 30-year period
16 beginning in 2021, when SWEPCO estimates the Project will begin commercial
17 operations, and ending in 2051. In addition, SWEPCO used the PROMOD and Aurora
18 models to develop SPP locational marginal prices ("LMPs"), transmission congestion
19 costs, and losses used for the PLEXOS analysis of production-cost benefits produced
20 from the SWFs.³²

31 See SWEPCO witness Torpey's Direct Testimony, pages 14-22.

32 See SWEPCO witness Pfeifenberger's Direct Testimony, pages 39-42.

1 **Q. DID SWEPCO'S COST/BENEFIT ANALYSIS REASONABLY CONSIDER**
2 **UNCERTAINTY IN KEY VARIABLES THAT COULD IMPACT NET**
3 **BENEFITS OF THE SWFs?**

4 A. Yes. SWEPCO conducted the PLEXOS analysis under a base-case scenario for fuel and
5 market-energy prices, and also evaluated a number of sensitivity cases that considered
6 higher and lower fuel and market prices, scenarios that assumed no carbon taxes, varying
7 levels of wind energy production, and a higher congestion-cost scenario including the
8 addition of a gen-tie to mitigate congestion in 2026.³³

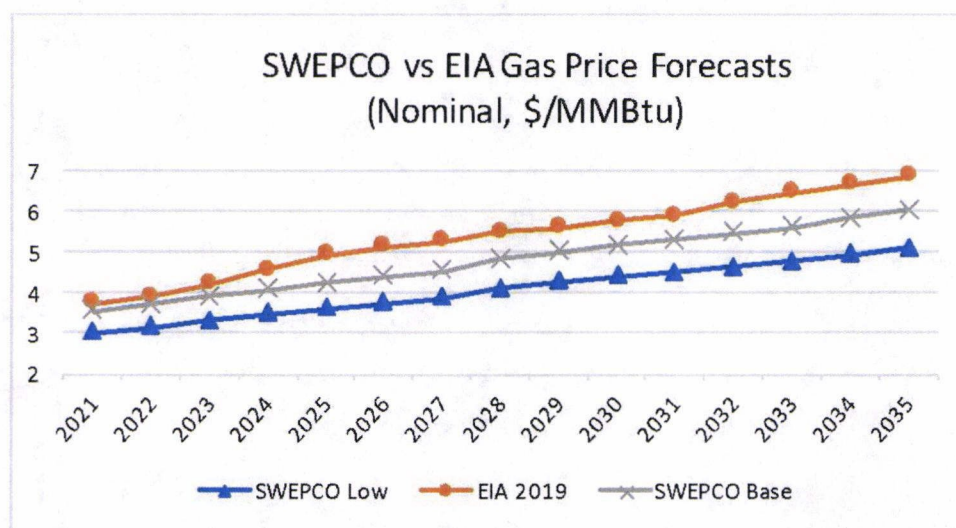
9 **Q. ARE SWEPCO'S COMMODITY PRICE AND MARKET ENERGY PRICE**
10 **ASSUMPTIONS UNDERLYING THE COST/BENEFIT ANALYSES FOR THE**
11 **SWFs REASONABLE?**

12 A. Yes. As summarized in Figure 1 below, the Company's base case cost/benefit analysis
13 used AEP's 2019 base gas price forecast, which is approximately 11% lower than EIA's
14 2019 long-term natural gas price forecast, but more than \$1/MMBtu higher than current
15 NYMEX Henry Hub futures prices over the next four years.³⁴

17 Figure 1

33 See SWEPCO witness Torpey's Direct Testimony, pages 24-26.

34 Sources are SWEPCO's Responses to CARD 1-11, EIA.gov and cmegroup.com.



SWEPCO's base case forecast of SPP market energy prices used for the SWFs cost/benefit analysis also generally appears to be reasonable and consistent with the Company's base case gas price forecast.³⁵

Q. WHAT ARE THE ESTIMATED NET BENEFITS OF THE SWFs FOR THE BASE CASE AND SENSITIVITY CASES EVALUATED BY SWEPCO?

A. The results of SWEPCO's cost/benefit analyses for the base case and other scenarios evaluated by the Company are summarized in Table 6 below.

Table 6
SWEPCO's Estimates of Net Benefits of SWFs³⁶
(NPV over 30-year life, Total Company, \$Millions)

³⁵ See Attachment SN-6.

³⁶ Source is SWEPCO witness Torpey's Errata Exhibit JFT-4.

<u>Scenarios</u>	<u>NPV</u>	<u>Nominal</u>
1. Base Gas, Base Wind, With CO2	\$567	\$2,030
2. Base Gas, Base Wind, No CO2	\$396	\$1,453
3. Low Gas, Base Wind, With CO2	\$396	\$1,532
4. Low Gas, Base Wind, No CO2	\$236	\$971
5. High Gas, Base Wind, With CO2	\$718	\$2,501
6. Base Gas, Low Wind, With CO2	\$330	\$1,386
7. Base Gas, Low Wind, No CO2	\$181	\$883
8. Low Gas, Low Wind, With CO2	\$183	\$960
9. High Gas, Low Wind, With CO2	\$461	\$1,792
10. Base Gas, Base Wind, High Congestion, With CO2	\$541	\$2,025
11. Base Gas, Base Wind, High Congestion, No CO2	\$330	\$1,285
12. Base Gas, Low Wind, High Congestion, No CO2	<u>\$94</u>	<u>\$640</u>
Average:	\$369	\$1,455

Q. HOW ARE THE ESTIMATED BASE-CASE NET BENEFITS OF THE SWFs EXPECTED TO IMPACT SWEPCO'S TOTAL SYSTEM REVENUE REQUIREMENTS?

A. SWEPCO's base-case, NPV-benefits estimate for the SWFs totals approximately \$567 million on a Total Company basis over the 30-year life of the Project. This equates to average present value benefit of approximately \$18.9 million per year (\$567 million/30 years = \$18.9 million/year), and approximately 38% of this benefit (\$7.2 million/year) would be allocated to the Texas Retail jurisdiction. This average annual level of Texas Retail customer benefits from the SWFs represents approximately 1.1% of SWEPCO's forecasted annual Texas Retail revenue requirements for 2021, which is approximately \$630 million ($7.2/630 = 1.1\%$).³⁷ Moreover, the forecasted annual revenue requirement

³⁷ Source for forecasted 2021 revenue requirements is SWEPCO witness Aaron's Errata Direct Testimony, Errata Exhibit JOA-2.

1 of the Project is approximately \$130 million³⁸ (Total Company basis), and much of this
2 cost is fixed, and therefore will be borne by ratepayers even if the forecasted benefits of
3 the SWFs do not materialize. This situation places undue risk on ratepayers unless
4 SWEPCO's proposed cost and performance guarantees are significantly enhanced.

5 **Q. DO SWEPCO'S ESTIMATES OF THE NET BENEFITS OF THE SWFs**
6 **GENERALLY APPEAR TO BE REASONABLE?**

7 A. Yes, generally. Although SWEPCO's base-case gas price forecast is somewhat higher
8 than NYMEX futures prices over the next four years, it is approximately 11% lower than
9 EIA's 2019 long-term gas price forecast, and the analysis was conducted with commonly
10 used industry models and modeling methods. The Company's cost/benefit analyses for
11 the SWFs also cover a range of scenarios that generally appear to be reasonable, and
12 which consider the impact of uncertainty in key input variables, such as commodity
13 prices, congestion costs and wind generation levels, on predicted benefits.

14 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING SWEPCO'S**
15 **COST/BENEFIT ANALYSES FOR THE SWFs.**

16 A. SWEPCO's cost/benefit analyses for the SWFs generally appear to be reasonable. The
17 forecasted base-case net benefits are relatively small (approximately 1% of the total
18 annual revenue requirements of SWEPCO's system) but are positive in all cases
19 evaluated by the Company. The Company's base-case gas price forecast is more than
20 \$1/MMBtu higher than NYMEX futures prices for natural gas over the next four years,

38 Source for Project revenue requirements is SWEPCO witness Torpey's Errata Direct Testimony, Errata Exhibit JFT-3, page 1.

1 which suggests that savings under the Company's low-gas price scenarios (rather than
2 the base case analysis) may be more indicative of likely Project benefits to customers.
3 Under low gas-price scenarios, the average annual savings are in the range of \$3.5
4 million per year for the Texas Retail jurisdiction on a NPV basis over the 30-year life of
5 the Project. This level of savings would represent approximately 0.5% of SWEPCO's
6 forecasted Texas Retail revenue requirement for 2021.³⁹

8 **VII. COST AND PERFORMANCE GUARANTEES**

9 **Q. WHAT GUARANTEES HAS SWEPCO PROPOSED TO ADDRESS** 10 **OWNERSHIP RISKS AND ENHANCE VALUE OF THE SWFs TO** 11 **CUSTOMERS?**

12 A. SWEPCO proposes three primary guarantees to increase value of the SWFs to
13 customers. First, SWEPCO proposes that the Company's capital cost recovery for the
14 SWFs be capped at \$1.09 billion, which is Company's share of the \$1.996 billion total
15 project cost estimate, including Company overheads, AFUDC and contingency.⁴⁰
16 SWEPCO proposes that there be no exceptions to this cap, including no provision for
17 Force Majeur events.

18 The second major guarantee offered by SWEPCO is that if PTCs are not received
19 at the 100% level for the Sundance facility, and at the 80% level for the Traverse and
20 Maverick wind facilities, because one or more of the facilities is determined to be

39 See Attachment SN-7.

40 See SWEPCO witness Brice's Direct Testimony, page 16.

ineligible for such credits, then it will make customers whole for the lost value of tax credits based upon the actual energy production of the facilities.⁴¹ The Company indicates that this PTC guarantee would be subject to changes in law that effect the federal PTC.

The third guarantee offered by SWEPCO is a Minimum Production Guarantee, which would make customers whole for any lost energy savings or PTCs that result if the aggregate average annual production from the SWFs (Total Project) falls below 4,959 GWh per year (38.1% capacity factor) over each five-year period, for a period of 10 years.⁴² SWEPCO proposes that this minimum production guarantee be subject to exceptions for Force Majeure and SPP curtailment of the resources.

Q. ARE SWEPCO'S PROPOSED GUARANTEES SUFFICIENT TO PROVIDE CUSTOMERS PROTECTIONS IF THE PROJECT DOES NOT PERFORM AS SWEPCO FORECASTS?

A. While the Company's proposed guarantees enhance the value of the SWFs to customers by lowering somewhat primary risks that otherwise could reduce net benefits of the Project, the guarantees offered by SWEPCO in this case would provide less protection to customers than the guarantees agreed to by AEP in the Oklahoma Wind Catcher case⁴³, despite the fact that estimated benefits of the SWFs are approximately 64% lower than forecasted benefits of the Wind Catcher project. In light of the fact that the SWFs are

⁴¹ See SWEPCO witness Brice's Direct Testimony, pages 16-17.

⁴² See SWEPCO witness Brice's Direct Testimony, page 17.

⁴³ See Attachment SN-8, the Wind Catcher Settlement Agreement, filed on April 24, 2018 in OCC Cause No. PUD 201700267.

1 exposed to similar if not greater costs and performance risks than the Wind Catcher
2 Project, and are expected to provide significantly lower net benefits to customers, it is
3 important that the performance and cost guarantees applicable to the SWFs be equivalent
4 to or better than guarantees offered in Oklahoma by AEP (PSO) for the Wind Catcher
5 Project. This is particularly true given the nominal average annual benefits of about \$4
6 million under SWEPCO's low gas-price scenarios.

7 **Q. PLEASE DESCRIBE THE KEY DIFFERENCES BETWEEN THE COST AND**
8 **PERFORMANCE GUARANTEES OFFERED BY AEP IN THE WIND**
9 **CATCHER SETTLEMENT AGREEMENT IN OKLAHOMA AND THE**
10 **GUARANTEES OFFERED BY SWEPCO FOR THE SWFs IN THIS CASE?**

11 A. The primary differences between the guarantees offered by AEP in the Wind Catcher
12 Settlement Agreement in Oklahoma, and the guarantees offered by SWEPCO in this case
13 are as follows:

14 1) Capital Cost Cap - The Wind Catcher Settlement offer was 103% of total
15 capital investment including AFUDC, with no exceptions for force majeure or
16 change in law, and specified no recovery of amounts above the cap and no
17 presumption of prudence of costs below the cap.⁴⁴ This guarantee is generally
18 consistent with SWEPCO's offer for the SWFs in this proceeding, which is a
19 100% of the expected cost including AFUDC, also with no exceptions including
20 force majeure or change in law.

44 See Attachment SN-8, Paragraph 1(a) of the Wind Catcher Settlement Agreement.

1 2) Net Benefits Guarantee - The Wind Catcher Settlement guaranteed that the
2 Project would provide net benefits to customers during the initial ten years of
3 commercial operations of the Project.⁴⁵ SWEPCO has not offered a Net
4 Benefits Guarantee for SWFs in this case. If the Commission approves
5 SWEPCO's application, I recommend that this important new guarantee be
6 provided as a condition to approval of the SWFs.

7 3) PTC Guarantee - The Wind Catcher Settlement guaranteed the full PTC
8 eligibility level for the actual output of the WC wind facility, with an exception
9 for change in law that changes federal law pertaining to PTCs, to the extent not
10 covered by the Net Benefits Guarantee.⁴⁶ This Wind Catcher Settlement PTC
11 guarantee is superior to the PTC guarantee proposed by SWEPCO for the SWFs,
12 since it mitigates reductions to benefits resulting from a change of law through
13 the Net Benefits Guarantee provision, while SWEPCO's proposed PTC
14 guarantee for the SWFs does not make customers whole for any reduction in PTC
15 credits resulting from a change in law. If the Commission approves SWEPCO's
16 application, I recommend that the Wind Catcher Settlement PTC guarantee be
17 applied to the SWFs as a condition to approval of the SWFs.

18 4) Net Capacity Factor Guarantee – The Wind Catcher Settlement guaranteed a
19 46% capacity factor over consecutive five-year periods over the entire 25-year
20 estimated operating life of the Project, *without exception for force majeure or*

45 See Attachment SN-8, Paragraph 1(d) and Attachment 2 of the Wind Catcher Settlement Agreement.

46 See Attachment SN-8, Paragraph 1(b) of the Wind Catcher Settlement Agreement.

1 *SPP curtailments.*⁴⁷ The 46% guaranteed capacity factor is 90% of the
2 expected (i.e., P50) capacity factor (51%) of the Wind Catcher facilities. In
3 contrast SWEPCO has offered Minimum Production Guarantee that provides a
4 38.1% capacity factor guarantee over two 5-year time periods covering only the
5 first 10 years of the expected 30-year operating lives of the SWFs in this case.
6 The 38.1% guaranteed capacity factor is approximately 87% of the expected
7 (P50) capacity factor (44%) for the SWFs. The benefits of the SWFs are highly
8 sensitive to the capacity factors (energy output) of the units; therefore, to protect
9 customers the Minimum Production Guarantee for the SWFs should be modified
10 to reflect the Wind Catcher Settlement Capacity Factor Guarantee. This would
11 result in a guaranteed minimum average capacity factor of 39.6% ($90\% \times 44\% =$
12 39.6%) measured over 6 5-year periods that cover the entire expected 30-year
13 operating lives of the SWFs. If the Commission approves SWEPCO's
14 application, I recommend that the Minimum Production Guarantee for the SWFs
15 be modified to incorporate the above changes, including no exceptions for force
16 majeure or SPP curtailments, to be consistent with the Capacity Factor Guarantee
17 provided in the Wind Catcher Settlement, as a condition to approval of the SWFs.

18 5) Most Favored Nation - The Oklahoma Wind Catcher Settlement provided a
19 Most Favored Nation provision to ensure that the guarantees provided to
20 SWEPCO's customers would reflect any other better guarantees that were

47 See Attachment SN-8, Paragraph 1(c) and Attachment 1 of the Wind Catcher Settlement Agreement.

adopted for the Wind Catcher Project by regulators in other jurisdictions.⁴⁸

SWEPCO has not offered a Most Favored Nation guarantee for the SWFs. If the Commission approves SWEPCO's application, I recommend that this new guarantee be provided as a condition to approval of the SWFs.

6) Off-System Sales ("OSS") and REC's - The Oklahoma Wind Catcher Settlement provided that customers would receive 100% of incremental OSS and REC sales margins that would not have occurred but for the Wind Catcher Project.⁴⁹ To increase the prospect that the Project will benefit customers, I recommend that the Company be required to credit 100% of OSS and REC margins to customers in the future.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING GUARANTEES THAT SHOULD BE REQUIRED FOR APPROVAL OF SWEPCO'S PROPOSED ACQUISITION OF THE SWFs.

A. If the Commission approves SWEPCO's application, I recommend that the Commission's approval of SWEPCO's ownership of 810 MW of the SWFs be conditioned upon the Company's agreement to provide cost, performance and ratemaking guarantees for the Project that are consistent with the stronger guarantees offered by AEP in Oklahoma for the Wind Catcher Project, as I have described above. These strengthened guarantees would be necessary to assure SWEPCO's Texas

⁴⁸ See Attachment SN-8, Paragraph 1(f) of the Wind Catcher Settlement Agreement.

⁴⁹ See Attachment SN-8, Paragraph 1(e) of the Wind Catcher Settlement Agreement.

1 customers will be protected from cost and performance risks that might otherwise
2 eliminate the relatively small benefits estimated for the SWFs.

3
4 **VIII. CONCLUSIONS AND RECOMMENDATIONS**

5 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING SWEPCO'S**
6 **PROPOSED ACQUISITION OF THE SWFs?**

7 A. SWEPCO forecasts that under the base case scenario, the Company's proposed \$1.09
8 billion acquisition of 810 MW of the SWFs wind generation Project in Oklahoma will
9 produce average annual Texas customer benefits of approximately \$7.2 million per year
10 (Texas Retail, NPV basis), which is approximately 1.1% of the Company's forecasted
11 Texas Retail revenue requirement for 2021. Because this benefits forecast relies upon the
12 Company's base case gas price forecast, which is approximately 11% lower than EIA's
13 2019 long-term forecast, but more than \$1/MMBtu higher than NYMEX gas futures prices
14 for the next four years, I expect the actual savings from the Project to be significantly
15 lower than indicated by SWEPCO's base case analysis, and closer to the levels forecasted
16 in SWEPCO's low gas price scenarios, as summarized in Table 6 of my testimony. The
17 annual benefit of the SWFs for Texas customers under low gas price scenarios is
18 approximately \$3.5 million/year, or 0.5% of the forecasted Texas Retail revenue
19 requirement for 2021. The relatively small projected benefits of the SWFs could even be
20 lower due to uncertainty in other key modeling assumptions, such as forecasted congestion
21 costs, wind-unit generation levels, and Project capital and operating costs. The SWFs
22 would help to diversify SWEPCO's energy supply mix, reduce carbon emissions, and

1 potentially could serve as a long-term hedge to mitigate the Company's exposure to
2 volatility in natural gas and market energy prices. However, these potential benefits alone
3 do not justify the Project, which is not needed for SWEPCO system reserve capacity
4 purposes until 2026 or later. Based on my concerns regarding the relatively low and
5 uncertain forecasted benefits, and relatively high capital cost of the Project, I do not
6 recommend approval of SWEPCO's application. But if the Commission approves
7 SWEPCO's application, I recommend that any approval of SWEPCO's acquisition of 810
8 MW of the SWFs, at a minimum, be made subject to the following conditions:

- 9
- 10 1) I recommend that SWEPCO's proposed cost, performance and other
11 guarantees for the SWFs be modified as described in my testimony to reflect
12 the more favorable guarantee provisions agreed to by AEP in the Company's
13 Oklahoma Wind Catcher proceeding.
- 14 2) I recommend that SWEPCO be required to credit 100% of any future margins
15 earned from REC sales, sales of excess capacity, or from SPP market energy
16 or ancillary service sales as an offset to the Company's reconcilable fuel and
17 purchased energy charges.
- 18 3) I recommend that SWEPCO be required to seek Commission pre-approval of
19 any new transmission lines that it seeks to construct to mitigate congestion
20 costs associated with energy supplied from the SWFs.

21 **Q. DOES THAT CONCLUDE YOUR TESTIMONY?**

22 **A. Yes.**

SOAH DOCKET NO. 473-19-6862

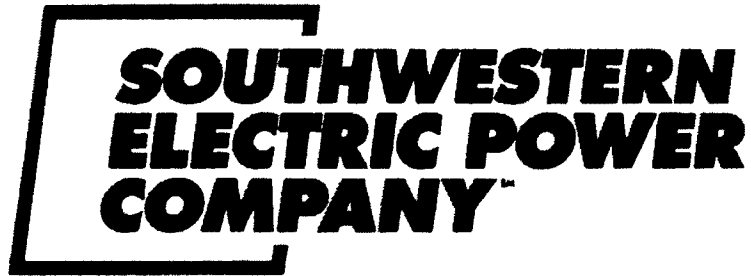
PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
ELECTRIC POWER COMPANY FOR	§	
CERTIFICATE OF CONVENIENCE	§	BEFORE THE STATE OFFICE
AND NECESSITY AUTHORIZATION	§	OF
AND RELATED RELIEF FOR THE	§	ADMINISTRATIVE HEARINGS
ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-5:

Base Gas Price Forecast used for SWEPCO's December 2018 IRP



An **AEP** Company

BOUNDLESS ENERGY™

INTEGRATED RESOURCE PLANNING REPORT
TO THE
ARKANSAS PUBLIC SERVICE COMMISSION

December 14, 2018

The graph displays four scenarios for natural gas prices from 2018 to 2037. The y-axis represents the price in dollars per million British thermal units (\$/mmBTU), ranging from 0 to 10. The x-axis shows the years from 2018 to 2037. All scenarios start at approximately \$3.5 in 2018. The 'Base' scenario shows a steady increase to about \$9.0 by 2037. The 'Higher Band' scenario shows a more rapid increase, reaching about \$8.0 by 2037. The 'Lower Band' scenario shows a more gradual increase, reaching about \$7.5 by 2037. The 'Status Quo' scenario shows the slowest increase, reaching about \$6.8 by 2037.

Year	Base	Higher Band	Lower Band	Status Quo
2018	3.5	3.5	3.5	3.5
2019	4.5	4.5	4.5	4.5
2020	5.2	5.2	5.2	5.2
2021	5.5	5.5	5.5	5.5
2022	5.8	5.8	5.8	5.8
2023	6.0	6.0	6.0	6.0
2024	6.2	6.2	6.2	6.2
2025	6.4	6.4	6.4	6.4
2026	6.6	6.6	6.6	6.6
2027	6.8	6.8	6.8	6.8
2028	7.2	7.2	7.2	7.2
2029	7.5	7.5	7.5	7.5
2030	7.8	7.8	7.8	7.8
2031	8.1	8.1	8.1	8.1
2032	8.4	8.4	8.4	8.4
2033	8.7	8.7	8.7	8.7
2034	9.0	9.0	9.0	9.0
2035	9.3	9.3	9.3	9.3
2036	9.6	9.6	9.6	9.6
2037	9.9	9.9	9.9	9.9

Year	Base (\$/mmBTU)	Higher Band (\$/mmBTU)	Lower Band (\$/mmBTU)	Status Quo (\$/mmBTU)
2018	3.0	2.7	2.5	3.5
2019	3.5	3.2	3.0	4.0
2020	4.2	3.6	3.4	4.7
2021	4.2	3.6	3.5	4.7
2022	4.2	3.6	3.6	4.8
2023	4.3	3.7	3.7	4.8
2024	4.3	3.7	3.7	4.9
2025	4.3	3.7	3.7	4.9
2026	4.3	3.7	3.7	4.9
2027	4.3	3.7	3.7	4.9
2028	4.6	4.0	3.8	5.2
2029	4.6	4.1	3.9	5.3
2030	4.7	4.2	4.0	5.4
2031	4.8	4.3	4.1	5.5
2032	4.9	4.4	4.2	5.6
2033	5.0	4.5	4.3	5.7
2034	5.1	4.6	4.4	5.8
2035	5.1	4.7	4.5	5.9
2036	5.2	4.8	4.6	6.0
2037	5.2	4.9	4.6	6.0

66

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
ELECTRIC POWER COMPANY FOR	§	
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AND RELATED RELIEF FOR THE	§	ADMINISTRATIVE HEARINGS
ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-6:

SWEPCO's SPP Market Energy Price Forecast for SWFs Analysis

Attachment SN-5

SWEPSCO SPP Market Price Forecasts
SWFS Analysis vs Wind Catcher Analysis
(\$/MWh)

	SWP Base Gas for SWFs (\$/MMBtu)	SWP Base SPP Mkt Price (\$/MWh)	SPP Implied Mkt HR MMBtu/MWh	SWP Base Mkt Price for WC (\$/MWh)	SWP SWFs Mkt Pric vs WC Base % Diff
2021	3.54	26.96	7.61	47.03	-43%
2022	3.71	28.02	7.54	48.83	-43%
2023	3.89	29.20	7.50	50.17	-42%
2024	4.08	30.50	7.47	54.39	-44%
2025	4.24	31.68	7.47	57.33	-45%
2026	4.40	33.02	7.51	61.51	-46%
2027	4.55	34.29	7.54	65.35	-48%
2028	4.84	44.07	9.10	69.58	-37%
2029	5.01	44.45	8.87	75.03	-41%
2030	5.17	45.76	8.85	80.30	-43%
2031	5.30	47.06	8.87	85.52	-45%
2032	5.45	48.74	8.94	88.79	-45%
2033	5.62	50.03	8.91	91.20	-45%
2034	5.82	51.55	8.86	93.33	-45%
2035	6.02	53.68	8.92	96.15	-44%
2036	6.14	53.88	8.77	97.14	-45%
2037	6.39	55.47	8.67	99.21	-44%
2038	6.64	57.35	8.64	101.43	-43%
2039	6.84	59.01	8.63	102.43	-42%
2040	7.02	59.84	8.53	103.07	-42%
2041	7.32	61.17	8.36	105.42	-42%
2021-31 Avg	\$5.33	\$45.03	8.36	\$79.68	-43%

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
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ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-7:

Texas Retail Savings for SWFs Under Low Gas Scenarios

Attachment SN-7

**SWEPCO Average Benefit of SWFs for Low Gas Scenarios
(\$Millions)**

<u>Scenarios</u>	<u>NPV</u>	<u>Nominal</u>
Low Gas, Base Wind, With CO2	\$396	\$1,532
Low Gas, Base Wind, No CO2	\$236	\$971
Low Gas, Low Wind, With CO2	<u>\$183</u>	<u>\$960</u>
Average:	\$272	\$1,154
Average/Yr:	\$9.1	\$38
Tx Retail Alloc at 38.1%:	\$3.5	\$15
Tx Retail Rev 2021:	\$629.8	
Tx Retail Benefit, %/Rev:	0.5%	

SOAH DOCKET NO. 473-19-6862

PUC DOCKET NO. 49737

APPLICATION OF SOUTHWESTERN	§	
ELECTRIC POWER COMPANY FOR	§	
CERTIFICATE OF CONVENIENCE	§	BEFORE THE STATE OFFICE
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ACQUISITION OF WIND	§	
GENERATION FACILITIES	§	

DIRECT TESTIMONY AND ATTACHMENTS OF SCOTT NORWOOD

Attachment SN-8:

Oklahoma Wind Catcher Settlement Agreement Guarantee Terms

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)

FILED
APR 24 2018
COURT CLERK'S OFFICE - OKC
CORPORATION COMMISSION
OF OKLAHOMA

CAUSE NO. PUD 201700267

JOINT STIPULATION AND SETTLEMENT AGREEMENT

COME NOW Public Service Company of Oklahoma ("PSO" or the "Company") and the undersigned parties to the above entitled cause and present the following Joint Stipulation and Settlement Agreement ("Joint Stipulation") for Oklahoma Corporation Commission ("Commission") review and approval as their compromise and settlement of all issues in this proceeding between the parties to this Joint Stipulation ("Stipulating Parties"). The Stipulating Parties represent to the Commission that this Joint Stipulation represents a fair, just and reasonable settlement of these issues, that the terms and conditions of the Joint Stipulation are in the public interest, and the Stipulating Parties urge the Commission to issue an Order in this Cause adopting and approving this Joint Stipulation.

It is hereby stipulated and agreed by and between the Stipulating Parties as follows:

TERMS OF THE JOINT STIPULATION AND SETTLEMENT AGREEMENT

Effective with the Commission's order approving of all elements of this Joint Stipulation, the Stipulating Parties request that the Commission issue an order finding that the Company's 30% ownership share of the Wind Catcher Energy Connection Project which, on a total Project basis consists of a 2000 MW wind generation facility located in the Oklahoma panhandle and an approximately 350-mile generation interconnection tie-line to deliver the wind energy to the grid near Tulsa, reasonably meets the Company's need for a low-cost, diverse source of energy. The Stipulating Parties further request that the Commission approve the Company's request to include any PTCs deferred for ratemaking purposes in a regulatory liability that is included in rate base, or earns interest at the Company's pre-tax Weighted Average Cost of Capital (WACC) from when

the Project commences commercial operation. The Stipulating Parties further request that the Commission approve the Company's request to include any unrealized PTCs in a deferred tax asset included in rate base in the event the PTCs cannot be fully utilized in a given year.

The Stipulating Parties request that the Commission defer any decision on final cost recovery to a cause opened by an application filed by the company pursuant to Chapter 70 of the Commission's rules or otherwise subsequent to the incurrence of such costs of the Project. In the foregoing application, the Company should submit amounts subject to recovery for Commission audit and review.

1. Terms

- (a) Cost Cap. The Company commits to a total Company cost cap on capital investment for the Wind Facility, the Gen-Tie and all SPP-assigned generation interconnection costs (collectively the "Project") which shall be the lesser of (i) 103% of estimated cost, which is \$1.399 billion, including AFUDC, and (ii) \$2,331/kW (the "Cost Cap"). Costs above the Cost Cap shall not be recoverable in rates and costs below the Cost Cap shall have no presumption of prudence.
- (b) PTC Guarantee. The Company will provide a guarantee, for cost recovery purposes, that the Project will be eligible to receive 100% of the value of the Federal Production Tax Credits ("PTCs") for the actual output from the Wind Facility. Except as provided in Attachment 2, the Stipulating Parties agree that the Company will be excused from this PTC Guarantee to the extent that it is prevented by any change in law which shall be defined as changes in federal law pertaining to PTC's, including changes to the Internal Revenue Code.
- (c) Net Capacity Factor Guarantee. The Company shall guarantee, for rate making purposes, a minimum net average capacity factor at the western bus-bar of 46% for each of the five consecutive five-year periods during the twenty five-year period of Project commercial operation. This means that, subject to ratable adjustment pursuant to the micro-siting process set forth below, the minimum net average capacity factor (46%) for PTCs measured at the western bus-bar is 12,105 GWh during each such five-year period and this amount will be adjusted downward to account for actual line losses for energy delivery at the eastern bus-bar.

Any make whole payment due from the Company at the end of each of the five consecutive five-year periods during the twenty-five year period of Project commercial operation will include incremental replacement energy costs and PTCs which will flow to customers through the Fuel Cost Adjustment Rider, and the calculation for determining amounts due to customers under this guarantee shall be as set out in Attachment 1 hereto.

If the number of turbines comprising the completed Wind Farm is reduced as a result of the micro-siting process, the Stipulating Parties agree that the number of turbines comprising the Wind Farm will not decline by more than twenty turbines

and that the nameplate capacity of the completed Wind Farm will not decline by more than fifty megawatts.

- (d) Net Benefits Guarantee. The Company will provide a net benefits guaranty as set forth in Attachment 2 hereto.
- (e) Incremental Off-System Energy Sales Margins. One hundred percent of the incremental off-system energy sales margins that would not have occurred but for the Project and net proceeds from the sale of RECs associated with the Project will flow to customers through the Company's Fuel Cost Adjustment Rider, notwithstanding any provision of the Company's Fuel Cost Adjustment Rider that would otherwise allocate a portion of such incremental off-system energy sales to the Company. The calculation for determining incremental off-system energy margins from the Project shall be as set out in Attachment 3 hereto.
- (f) Most Favored Nations. The Company shall notify the Stipulating Parties if terms more favorable to all customer classes related to (i) the Net Capacity Factor Guarantee, (ii) the PTC Guarantee, (iii) the Cost Cap percentage, (iv) the Net Benefits Guaranty, (v) the Company's share of any cumulative annual deferred tax asset balance cap for the Project or (vi) such other terms, not described above, that are agreed to by Southwestern Electric Power Company ("SWEPCO") in any of its regulatory proceedings in Arkansas, Louisiana or Texas seeking approval of the Project, whether through settlement or order issued by any such jurisdiction under which SWEPCO will proceed to construct the Project, and the respective terms of this Joint Stipulation shall be deemed to be modified to incorporate those more favorable terms to the extent that they are not unique to SWEPCO jurisdictions. With respect to this Most Favored Nations provision as it applies to any Net Benefits Guarantee, it will be limited to the formulas used to calculate net customer benefits and not to any inputs. The Company's notice to the Stipulating Parties as set forth above will include a copy of the terms that SWEPCO agreed to in the other jurisdictions and, if applicable, a copy of any regulatory orders issued in the other jurisdictions under which SWEPCO is proceeding construct the Project, and a discussion by the Company of their applicability to this Joint Stipulation.
- (g) Retail Customers. This Joint Stipulation is applicable only to the Company's retail customers and all references to "customers" herein shall mean the Company's retail customers.
- (h) Allocation of Revenue Requirement to Customer Classes. The revenue requirement of the Project will be allocated among the Company's customer classes based on demand. For demand metered customer classes, the class revenue requirement will be billed to customers on a kW demand basis.
- (i) Oklahoma Allocation. The Stipulating Parties agree that the Oklahoma jurisdictional share of the costs of the Project will not increase if any jurisdictions in which SWEPCO operates do not participate in the Project.

- (j) Deferred Tax Asset Balance Cap. The Company may earn a return on any deferred tax asset balance related to the Project over the first thirteen calendar years. The Company will earn a return on the deferred tax asset balance using a combination of (i) its then approved weighted average cost of capital on sixty percent of any deferred tax asset balance and (ii) its then applicable cost of long term debt on forty percent of any deferred tax asset balance. The deferred tax asset balance shall not exceed a cumulative annual average of two hundred forty million dollars in any calendar year which is 30% of the Project cumulative deferred tax asset balance cap. The Company shall not earn a return on any deferred tax asset balance after the thirteenth calendar year. The Stipulating Parties acknowledge that the Company does not earn a return of any deferred tax asset balance.
- (k) Development Costs. The Company agrees that it will not seek recovery of development costs associated with the Project unless the Commission approves this Joint Stipulation.

2. Additional Regulatory Provisions.

The Stipulating Parties agree to the additional regulatory provisions set forth in Attachments 4, 5, 6 and 7 hereto.

3. Discovery.

As between and among the Stipulating Parties, all requests for discovery are deemed satisfied.

4. General Reservations.

The Stipulating Parties represent and agree that, except as specifically otherwise provided herein:

- (a) This Joint Stipulation represents a negotiated settlement for the purpose of compromising and settling all issues which were raised relating to this proceeding.
- (b) Each of the undersigned counsel of record affirmatively represents that he or she has full authority to execute this Joint Stipulation on behalf of his or her client(s).
- (c) None of the signatories hereto shall be prejudiced or bound by the terms of this Joint Stipulation in the event the Commission does not approve this Joint Stipulation.
- (d) Nothing contained herein shall constitute an admission by any party that any allegation or contention in these proceedings as to any of the foregoing matters is true or valid and shall not in any respect constitute a determination by the Commission as to the merits of any allegations or contentions made in this proceeding.

- (e) The Stipulating Parties agree that the provisions of this Joint Stipulation are the result of extensive negotiations, and the terms and conditions of this Joint Stipulation are interdependent. The Stipulating Parties agree that settling the issues in this Joint Stipulation is in the public interest and, for that reason, they have entered into this Joint Stipulation to settle among themselves the issues in this Joint Stipulation. This Joint Stipulation shall not constitute nor be cited as a precedent nor deemed an admission by any Stipulating Party in any other proceeding except as necessary to enforce its terms before the Commission or any state court of competent jurisdiction. The Commission's decision, if it enters an order consistent with this Joint Stipulation, will be binding as to the matters decided regarding the issues described in this Joint Stipulation, but the decision will not be binding with respect to similar issues that might arise in other proceedings. A Stipulating Party's support of this Joint Stipulation may differ from its position or testimony in other causes. To the extent there is a difference, the Stipulating Parties are not waiving their positions in other causes. Because this is a stipulated agreement, the Stipulating Parties are under no obligation to take the same position as set out in this Joint Stipulation in other dockets.
- (f) The Company, Wal-Mart Stores East, LP and Sam's East, LP agree that the Joint Stipulation and Settlement Agreement entered into by them and dated March 5, 2018 is hereby terminated and of no further force and effect.

4. Non Severability.

The Stipulating Parties stipulate and agree that the agreements contained in this Joint Stipulation have resulted from negotiations among the Stipulating Parties and are interrelated and interdependent. The Stipulating Parties hereto specifically state and recognize that this Joint Stipulation represents a balancing of positions of each of the Stipulating Parties in consideration for the agreements and commitments made by the other Stipulating Parties in connection therewith. Therefore, in the event that the Commission does not approve and adopt the terms of this Joint Stipulation in total and without modification or condition (provided, however, that the affected party or parties may consent to such modification or condition), this Joint Stipulation shall be void and of no force and effect, and no Stipulating Party shall be bound by the agreements or provisions contained herein. The Stipulating Parties agree that neither this Joint Stipulation nor any of the provisions hereof shall become effective unless and until the Commission shall have entered an Order approving all of the terms and provisions as agreed by the parties to this Joint Stipulation and such order becomes final and non-appealable.

Signatures appear on the following page

WHEREFORE, on this 20th day of April, 2018, the Stipulating Parties hereby agree to this Joint Stipulation and Settlement Agreement as their negotiated settlement of this proceeding with respect to all issues which were raised with respect to this Application, and respectfully request the Commission to issue an Order approving this Joint Stipulation and Settlement Agreement.

**PUBLIC UTILITY DIVISION
OKLAHOMA CORPORATION COMMISSION**

By: _____
Brandy Wreath, Director of Public Utility Division

PUBLIC SERVICE COMPANY OF OKLAHOMA

By: Jack P. Fite
Jack P. Fite
Joann S. Worthington
Attorney for Public Service Company of Oklahoma

**Michael Hunter
ATTORNEY GENERAL OF THE
STATE OF OKLAHOMA**

By: _____
Dara Derryberry
Assistant Attorney General

OKLAHOMA INDUSTRIAL ENERGY CONSUMERS

By: Thomas P. Schroedter
Thomas P. Schroedter
Hall, Estill, Hardwick, Gable, Golden & Nelson

**WAL-MART STORES EAST, LP and SAM'S EAST,
INC.**

By: Rick D. Chamberlain
Rick D. Chamberlain

ONETA POWER, LLC

By: _____
Cheryl Vaught

**PLAINS AND EASTERN CLEAN LINE
OKLAHOMA, LLC**

By: _____
James A. Roth

OKLAHOMA MUNICIPAL POWER AUTHORITY

By: _____
Randall Elliott

WINDFALL COALITION, LLC

By: _____
David E. Keglovits

NOVUS WINDPOWER, LLC

By: _____
Patrice Douglas

KIOWA POWER PARTNERS, LLC

By: _____
Kenneth H. Blakely

TRI-COUNTY ELECTRIC COOPERATIVE, INC.

By: _____
James R. Fletcher

**GOLDEN SPREAD ELECTRIC COOPERATIVE,
INC.**

By: _____
J. Eric Turner

SOUTH CENTRAL MCN L.L.C.

By: _____
Deborah Thompson

ATTACHMENT 1

Details for Determining the Net Capacity Factor Guarantee

Following the fifth, tenth, fifteenth, twentieth and twenty-fifth years after the Project reaches commercial operation, the Company will sum the total energy output from the Wind Facility for the previous five years.

- If the Company's 30% share of that energy equals or exceeds a minimum net average capacity factor at the Project's western bus-bar of 46% ("Minimum Net Average Capacity Factor"), no other calculations are made and no net capacity factor guarantee payment is necessary.
- If the Company's 30% share of that energy is less than the Minimum Net Average Capacity Factor, the following ratio will be taken: (the Company's 30% share of the energy equivalent of the output of the Project at the Minimum Net Average Capacity Factor – the Company's 30% share of the actual energy output at the Project's western bus-bar)/the Company's 30% share of the actual energy output at the Project's western bus-bar. This ratio will be rounded to 5 decimal places. The Company's 30% share of the hourly actual MWh energy output of the Wind Facility, as measured at the eastern bus-bar of the Gen-Tie after accounting for actual line losses for each hour of the five-year period, will be multiplied by this ratio to determine the additional energy for the customer credit. These hourly MWh energy values will be individually multiplied by the hourly, day-ahead Locational Marginal Price (LMP) at this location. The hourly dollar amounts will then be summed for the total five-year period to arrive at the energy value portion of the customer credit. In addition, the five-year total GWh shortfall energy at the western bus-bar of the Gen-Tie will be multiplied by the average, grossed up, PTC credit, provided, however, that the PTCs will be grossed up only for the first ten Calendar Years that the Project is in commercial operation when it is producing PTCs, and not for subsequent periods.

ATTACHMENT 2

Details for Determining Project Net Benefit for Customers During the Initial Ten Years of Project Commercial Operation

To perform an evaluation of the Project's net benefits during the initial ten years of commercial operation, the Company will perform the calculation set forth below annually until the Project has been in base rates for ten years. The ten-year period starts on the date the Project is placed in base rates and ends exactly ten years after that date.

$$\text{Net Benefit for Customers} = \text{Fuel Savings} + \text{Project Capacity Value} + \text{PTCs} + \text{Minimum Net Capacity Factor Guarantee Payments} + \text{RECs Value} + \text{Carbon Savings} - \text{Project Revenue Requirement}$$

Net Benefits for Customers: If the net benefit for customers at the end of the ten-year period is positive, that means that customers have received net savings and, therefore, the Company does not owe customers any compensation under this customer net benefit guarantee. If the net benefit for customers at the end of the ten-year period is negative due to any reason or combination of reasons including but not limited to low market energy prices or changes in law that result in a reduction to or elimination of the value of the PTCs, that means that customers have incurred a net cost and, therefore, the Company will compensate customers for such net cost under this customer net benefit guarantee. A regulatory liability will be established if customers are owed a credit under this calculation. The regulatory liability will be amortized in retail rates over the remaining period of commercial operation (years 11-25).

Fuel Savings: The Oklahoma retail portion of the fuel and energy savings achieved by the Project during the first ten years based upon a comparison of a Base Case to a Modified Base Case for each hour of the period. The Base Case shall represent the thermal and non-thermal generating units set forth on Table 1 hereto, which represents for purposes hereof the thermal and non-thermal generating units that the Company currently owns or controls under power purchase agreements, or is projected to own and control (collectively, the Company's Existing and Forecasted Generation"), and including the Company's share of energy from the Project. In the Modified Base Case, the Company will remove the Project and re-dispatch the Company's Existing and Forecasted Generation to replace the removed Project generation. The difference in costs (including all variable unit production costs) between the Base Case and Modified Base Case will be used to determine the fuel savings attributable to the Project. Both the Base Case and the Modified Base Case will incorporate the following assumptions:

- Unit operating characteristics, constraints and limits including such inputs as heat rate coefficients, unit availability, start-up costs, tolling fees, non-fuel operating and maintenance costs, and fuel prices. The inputs used in this analysis will be the same type of inputs that the Company uses in its generation market offers submitted to the SPP Integrated Marketplace.
- Actual integrated hourly operating reserve requirements.

- To the extent that the Company's Existing and Forecasted Generation in the Modified Base Case is insufficient to replace the Project generation, the Company will assume in its calculations that the marginal unit is used to serve the insufficiency.

Project Capacity Value: \$4.3 million annually over the ten-year period, as filed.

PTCs: The Company's portion of the PTCs grossed up for taxes, either passed through or held in a regulatory liability and determined annually, and any credits to customers resulting from the Company's PTC guarantee.

Net Capacity Factor Guarantee: Any payments made by the Company for the net capacity factor guarantee for each of the two five-year periods of commercial operation during the period of PTC eligibility.

RECs Value: Any Company renewable energy credit value received, or inventory value at the prevailing market price, resulting from the Project.

Carbon Savings: Any costs on the production of carbon that actually would have been incurred by the Company's fossil generation fleet as a result of a Federal mandate imposing a cost on the production of carbon from fossil generation but for the Project.

Project Revenue Requirement: The Company's Revenue Requirement of the Project, including both the Wind Farm and Gen-Tie line that are in rates.

Table 1 – Company's Existing and Forecasted Generation

Unit Name ^(B)	State	Fuel Type	Capacity MW	2021-2030 Period	
				Additions	Retirements ^(A)
458 CC PSO 1	OK	CC-Gas	375	1/1/2022	
458 CC PSO 2	OK	CC-Gas	375	1/1/2025	
458 CC PSO 3	OK	CC-Gas	375	1/1/2027	
Comanche 1	OK	CC-Gas	260		
Northeastern 1	OK	CC-Gas	472		
Northeastern 2	OK	ST-Gas	440		
Northeastern 3	OK	Coal	462		12/31/2026
Oklunion 1	TX	Coal	105		
Riverside 1	OK	ST-Gas	453		
Riverside 2	OK	ST-Gas	454		
Riverside 3	OK	CT-Gas	80		
Riverside 4	OK	CT-Gas	80		
Southwestern 1	OK	ST-Gas	75		12/31/2021
Southwestern 2	OK	ST-Gas	79		12/31/2023
Southwestern 3	OK	ST-Gas	311		
Southwestern 4	OK	CT-Gas	85		
Southwestern 5	OK	CT-Gas	85		
Tulsa 2	OK	ST-Gas	162		
Tulsa 4	OK	ST-Gas	157		

Weleetka 4	OK	CT-Gas	65	12/31/2022
Weleetka 5	OK	CT-Gas	60	12/31/2022
Weleetka 6	OK	CT-Gas	60	12/31/2022
Calpine 1	OK	PPA	260	
Exelon 1	OK	PPA	519	2/28/2022
Exelon 2	OK	PPA	261	2/28/2022
Balko	OK	Wind PPA	199.8	
Blue Canyon V	OK	Wind PPA	99	10/31/2029
Elk City	OK	Wind PPA	98.9	1/31/2030
Goodwell	OK	Wind PPA	200	
Minco	OK	Wind PPA	99.2	12/31/2030
Seiling	OK	Wind PPA	198.9	
Sleeping Bear	OK	Wind PPA	94.5	
Weatherford	OK	Wind PPA	147	12/31/2025
Wind Catcher	OK	Wind PPA	570	

Notes:

- A. Units without retirement dates indicated are assumed on-line through the 2021-2030 period.
- B. Units listed will be utilized independent of future modifications to retirement dates of existing units or commercial operation dates of new units.

ATTACHMENT 3

Incremental Off-System Energy Sales Margins

Incremental off-system energy sales margins should be determined as follows:

- When total off-system energy sales are less than or equal to the Project generation in any given hour, the total off-system energy sales margins will be 100% to the benefit of customers.
- When off-system energy sales are greater than the Project generation in any given hour the off-system energy sales margins for the MWh equivalent to the Project generation in an hour will be 100% to the benefit of customers and the incremental off-system energy sales margins above that level will be treated as existing off-system energy sales with margin sharing at the then current allocation.

ATTACHMENT 4
Oklahoma Regulatory Provisions

- A. WCECA Rider. The Stipulating Parties request that the WCECA Rider attached hereto as Attachment 7 be adopted and become effective with a Commission Order approving this Stipulation, which Rider shall include the following provisions:
1. As set forth in the Company's application, the Stipulating Parties agree to include any PTCs deferred for rate-making purposes in a regulatory liability that is included in rate base and which earns a return at the company's pre-tax weighted average cost of capital (WACC), including during the period the Rider is in effect after the Project commences commercial operation.
 2. The revenue requirement for Rider WCECA will not include ARO costs. Recovery of ARO costs shall be addressed in the Company's next general rate case.
 3. The depreciation rate for the Wind Facility shall be 3.815% until such time that it is modified in the Company's next general rate case.
 4. The depreciation rate for the Gen-Tie Line shall be 2% until such time that it is modified in the Company's next general rate case.
 5. The Company shall submit a depreciation study to support any depreciation rate change requests related to the Project in the Company's next general rate case, and shall submit a comprehensive dismantlement study to justify any requested dismantlement costs, whether related to an ARO or included in any such changed depreciation rates for the Wind Facility, Gen-Tie or any other account.
 6. Amounts collected through the Rider WCECA are subject to refund based upon the Commission's final determination of prudence.
- B. Reporting Provisions.
1. The Company shall report semi-annually to the Stipulating Parties on the status of Project construction and on any anticipated delay in the Project commencing commercial operation.
 2. The Company shall notify the Stipulating Parties when the Project commences commercial operation.
 3. The Company shall report to PUD during the construction phase on the Project's impact on employment in Oklahoma.
- C. Base Rate Case. The Company shall file a base rate case within one-hundred eighty days of the Project reaching commercial operation.
- D. Renewable Energy Credits. The Stipulating Parties agree with the modifications to the Green Energy Choice Tariff set forth in Attachment 6.

ATTACHMENT 5

[Reserved]

ATTACHMENT 6

Revised Green Energy Choice Tariff

AVAILABILITY

This Green Energy Choice Tariff (GECT) (or WindChoice) is available to customers taking service under the Company's standard rate schedules who wish to support the Company's procurement of beneficial environmental attributes also known as Renewable Energy Certificates (RECs) derived from Oklahoma-based renewable wind energy resources. Participation in this program is limited by the availability of RECs from renewable resources currently available to the Company. If the total kWh under contract under this tariff equals or exceeds the availability of RECs from existing resources available to the Company, the Company may suspend the availability of this tariff to new participants. Subscribing customers pay for the value of RECs, and related administrative, advertising, education and participant recruitment costs. All other provisions of the standard pricing schedules shall apply.

CONDITIONS OF SERVICE

Customers choosing to support the generation of electricity from Oklahoma-based renewable wind energy resources may purchase REC's equivalent to a percentage of total monthly billed usage (kWh). Customers may only purchase in whole percentages up to 100 percent of their monthly load.

A REC or beneficial environmental attribute shall be defined as a unit of non-power attribute related to the environment benefit of an offset of emissions or pollutants to the air associated with one MWh of renewable electrical generation.

Green energy kWh subscriptions shall be determined at the time the customer enters service under this Tariff and can be updated for each contract year, or twice within the contract period.

Customers may apply for this schedule at any time. In the event of over subscription, the Company will maintain a waiting list of customers requesting subscription. Customers on the waiting list will only be provided service under this schedule if and when additional GECT kWh are made available through the discontinuation of a current subscriber, or an increase in available kWh under the tariff.

Customers may not enroll if they have a time-payment agreement in effect, have received two or more final disconnect notices, or have been disconnected for non-payment within the last 12 months. The Company may terminate service under this tariff to participating customers who become delinquent in any amount owed to the Company with a 30 day notice.

MONTHLY RATE

Monthly charges for energy and demand to serve the customer's total load shall be determined according to the Company's standard rate schedule under which the customer would otherwise be served. In addition to the monthly charges under the applicable standard rate schedule under which the customer takes service, the customer shall also pay the following rate for each kWh under contract. Over subscription in any month does not carry over.

Rate per Subscribed kWh

\$0.0038

The rate will be updated on an annual basis in an administrative approval process to be effective with the first billing cycle of the January billing month. The REC price in the annual GECT rate calculation will be the most recent 12-month weighted average, REC transactional market price. The Company will provide customers at least 30-days' advance notice of any change in the rate. At such time, the customer may modify or cancel their automatic monthly purchase agreement. Any cancellation will be effective at the end of the current billing period when notice is provided.

BILLING ADJUSTMENTS

Fuel Cost Adjustment:

All kWh shall be subject to the monthly FA Rider.

Tax Adjustment:

The additional monthly charges computed under this tariff shall be subject to adjustment under the provisions of the Company's Tax Adjustment Rider.

TERM AND CONTRACT

The term for all subscribers is a minimum of one year. Subscription to this tariff shall be automatically renewed at the end of each term unless termination from the program is specifically requested with at least 30 days' notice to the customer. If for any reason the subscriber is no longer eligible to subscribe or cancels the subscription during the term of the contract, they will not be eligible to reapply for subscription for one year.

The Company may terminate service under this tariff to participating customers who become delinquent in any amount owed to the Company with a 30 day notice of termination.

SPECIAL TERMS AND CONDITIONS

This tariff is subject to the Company's Terms and Conditions of Service and all provisions of the standard rate schedule under which the customer takes service, including all payment provisions.

Service under this tariff provides for the purchase of renewable attributes of renewable energy currently available to the Company. Subscribers have the sole right to make claim to the renewable attributes they purchase under this tariff. The Company will retire all renewable attributes purchased under this tariff on behalf of Subscribers.

Effective with commercial operation of the Wind Catcher Energy Connection Project ("Project") customers in Service Levels 1 through 3 may elect to receive RECs generated specifically from the Project, up to the Project prorated allocation for these service levels, at a rate equivalent to the most recent 12-month weighted average, REC transactional market price. Upon request, the Company will provide an attestation setting forth that the RECs provided under this special term are not double-counted and are retired internally by the Company.

ATTACHMENT 7

Rider WCECA

PURPOSE

The Wind Catcher Energy Connection Asset (WCECA) Rider is designed to recover return on and of the wind asset facility and operation and maintenance expenditures after the facility commences commercial operation as approved in Cause No. PUD 201700XXX.

This schedule is applicable to and becomes part of each PSO jurisdictional rate schedule. This schedule is applicable to energy consumption of retail customers and to facilities, premises and loads of such retail customers.

The WCECA Factors will include the Oklahoma jurisdictional portion of the project once it is placed in commercial operation and will be determined using the most recently approved production allocation factors for PSO. The WCECA Factors will be calculated in accordance with the following methodology and will be applied to each kWh sold.

ANNUAL DETERMINATION

The initial period for the WCECA Factors shall be the forecasted initial 12 months of operation after the commercial operation date of the wind project.

A True-up Adjustment shall be calculated and reflected in the following year's WCECA Factor calculation. The True-up Adjustment shall be defined as the difference between the actual WCECA costs for the prior year and the revenue received from the WCECA Factors.

WCECA Factors shall be submitted to the Director of the PUD and shall be accompanied by a set of workpapers sufficient to fully document the calculations of the WCECA Factors including any potential True-up Adjustment.

Amounts collected through the Rider WCECA are subject to refund based upon the Commission's final determination of prudence

The WCECA Factors shall be calculated as shown below:

WCECARR	=	$((WCAP - ADEP) * ROR + DEPX + O\&M) * RBAF - (PTC * RBAF) + TU/Forecasted \text{ Base Revenues or kWh Sales by Major Rate Class, as appropriate.}$
WCAP	=	Average project plant in service balance for the forecasted calendar year
ADEP	=	Average accumulated depreciation balance for the forecasted calendar year based on the depreciation rates in effect for PSO
DEPX	=	Depreciation expense for the forecast period based on the depreciation rates PURPOSE

- O&M = Operations and Maintenance expense for the forecasted period
- ROR = Return on plant in service which includes interest on debt, shareholder return and related income taxes based on a pre-tax rate of return specific to the WCECA Rider of X.XX%, with the weighted equity component rate grossed-up by the gross conversion factor specific to income taxes currently in effect
- RBAF = Production Demand Allocation Factor for each major rate class from the Company's cost allocation study provided in the most recent rate case. The allocators are as follows:

<u>Major Rate Class</u>	<u>Production Allocators</u>
Residential - Secondary	XX.XX%
Commercial -Secondary *	XX.XX%
SL 3 - Primary	XX.XX%
SL 2 – Primary Sub	X.XX%
SL 1 - Transmission	X.XX%
*Includes Lighting	

- PTC = Federal Production Tax Credits
- TU = The true-up amount to correct for any variance between the actual WCECA costs for the prior year and the revenue received from the WCECA Factors. The calculation will be done on an annual basis, and will determine the true-up for the following year.

ANNUAL REVIEW

The Company will submit to the Director of the PUD the requested WCECA Annual Factors approximately 90 days preceding the requested effective date. The requested WCECA Factors will become effective, upon PUD approval, with the first billing cycle of the requested billing month.

TERM

The WCECA Factors will be determined on an annual basis until the generating facility is included in retail base rates of the Company.in effect PSO.