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APPLICATION OF SOUTHWESTERN ELECTRIC POWER COMPANY FOR CERTIFICATE OF CONVENIENCE AND NECESSITY AUTHORIZATION AND RELATED RELIEF FOR THE WIND CATCHER ENERGY CONNECTION PROJECT	§ § § § § § §	BEFORE THE STATE OFFICE OF ADMINISTRATIVE HEARINGS

TEXAS INDUSTRIAL ENERGY CONSUMERS' INITIAL BRIEF

(REDACTED)

March 12, 2018

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GLOSSARY OF ACRONYMS

AEO	Annual Energy Outlook
AEPSC	American Electric Power Service Corporation
AFUDC	Allowance For Funds Used During Construction
CCN	Certificate of Convenience and Necessity
CPP	Clean Power Plan
CWA	Clean Water Act
DTA	Deferred Tax Asset
EHV	Extra High Voltage
EIA	Energy Information Administration
EPC	Engineering, Procurement, and Construction
ESA	Endangered Species Act
GE	General Electric
GIA	Generation Interconnection Agreement
IRS	Internal Revenue Service
LMP	Locational Marginal Prices
MBTA	Migratory Bird Treaty Act
MIPA	Membership Interest Purchase Agreement
MW	Megawatt
NCF	Net Capacity Factor
NEPA	National Environmental Policy Act
NGCC	Natural Gas Combined Cycle
OCC	Oklahoma Corporation Commission
PSO	Public Service Company of Oklahoma
PTC	Production Tax Credit
SPP	Southwest Power Pool
SPS	Southwestern Public Service Company
SWEPCO	Southwestern Electric Power Company
TCJA	Tax Cut and Jobs Act
TIEC	Texas Industrial Energy Consumers

WACC	Weighted Average Cost of Capital

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I. Introduction

It is conceivable that at the time Southwestern Electric Power Company (SWEPCO) and Public Service Company of Oklahoma (PSO) began their discussions with Invenergy in 2016, a large wind farm in western Oklahoma might have appeared marginally economical, even when burdened with the need for a new transmission line across Oklahoma to connect to the grid. At that time, the Clean Power Plan (CPP) was still in place, raising the prospect of a carbon tax or equivalent burden on fossil fuel generation in the mid-to-late 2020s. Natural gas price projections in 2016 were still high compared to today's projections, which meant that the projected prices for power in the Southwest Power Pool (SPP) were also higher. And the corporate tax rate was 35%, which made Production Tax Credits (PTCs) both more valuable and more likely to be used as accrued than they are today.

Even by the time AEP signed the joint development agreement with Invenergy in November 2016, however, external events were threatening the economics of the Oklahoma wind farm. Donald Trump campaigned on a platform that included ending the Clean Power Plan, and, upon taking office in January 2017, proceeded to do so.[1] The elimination of the prospect of what SWEPCO refers to as a CPP-like carbon burden reduces the projected benefits of SWEPCO's share of the project by $550 million (NPV).[2] And there is no indication that a carbon tax is likely in some other form, given that Congress has never passed one and shows no inclination to do so.[3] Indeed, if there were future measures to encourage renewable generation, it

[1] Direct Testimony and Exhibits of Jeffry C. Pollock, TIEC Ex. 1 (Pollock Dir.) at 32.

[2] Tr. at 534:2-25 (Pollock Redir.) (Feb. 15, 2018); Unless specifically noted, all numbers in this brief are on a SWEPCO-only basis.

[3] Tr. at 506:21-507:10 (Pollock Cross) (Feb. 15, 2018).

is just as likely—if not more so—that they would take the form of another extension of PTCs to a new generation of renewable facilities, which would have the effect of further reducing the value of the Oklahoma wind farm project.[4]

A second factor conspiring to eliminate any possible economic value to the Oklahoma wind farm was the continuing decline in natural gas prices and projections. Natural gas is generally the marginal fuel in the SPP, and the price of natural gas therefore directly affects the price SWEPCO would receive for the output of the proposed Oklahoma wind farm.[5] Even by 2015, SWEPCO's natural gas forecasts had dropped precipitously from the levels just a few years earlier.[6] The trend of declining forecasts did not end in 2016, even though that is the vintage of the natural gas forecast that SWEPCO is using in this proceeding.[7] The Energy Information Administration (EIA) reference forecast, for example, has dropped approximately 20% since 2016, and it was below SWEPCO's forecast to begin with.[8] Using more realistic price forecasts based on more current projections reduces the NPV of SWEPCO's share by $1.49 billion.[9]

If there was a final nail in the coffin for the Oklahoma wind farm, it was probably the enactment of the Tax Cut and Jobs Act (TCJA) in December 2017. The lower tax rate reduced the grossed-up value of PTCs, reducing the value of SWEPCO's share of the project by approximately $245 million.[10] Then, SWEPCO realized in mid-January that it would not be able to timely use the PTCs, resulting in an additional cost of at least $300 million in the form of higher base rates to cover the carrying costs for a proposed deferred tax asset.[11]

To further compound the deteriorating economics of the project, the last two years have seen a surge in the development of other renewable projects to take advantage of the PTCs before they expire, projects that were not burdened by the need for a $1.6 billion transmission

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[4] *Id.*

[5] TIEC Ex. 1, Pollock Dir. at 17.

[6] Supplemental Direct Testimony and Exhibits of Jeffry Pollock, TIEC Ex. 2 (Pollock Supp. Dir.) at Ex. JP-2.

[7] Tr. at 338:20-25 (Bletzacker Cross) (Feb. 14, 2018).

[8] *Id.* at 343:5-345:24; *see also* TIEC Ex. 40. The change between 2016 and 2018 EIA forecasts for 2020 was $3.96/$4.90, or 81%; for 2025, it was $4.93/$6.27, or 79%.

[9] *See infra* Section III.C.1.

[10] Rebuttal Testimony and Exhibits of Kelly D. Pearce, SWEPCO Ex. 25 (Pearce Reb.) at 10.

[11] *Id.* at 11. The true cost of deferring PTCs is $388 million, explained in Section III.C.2 below.

line.[12] Those projects include the much-discussed SPS 1000-MW wind projects that have now been submitted for approval to both the New Mexico and Texas Commissions.[13] While SWEPCO based the projected economics of the Oklahoma wind project on an assumption that there would be only 16,000-17,000 MW of wind generation in the SPP, it now appears that the number is likely to be close to double that.[14] Conservative estimates of the effect of the additional wind generation would significantly reduce the value of the output of SWEPCO's share of the Oklahoma wind farm by at least $460 million on a nominal basis.[15]

The above developments alone reduce the value of SWEPCO's share of the project by over $2 billion, rendering it uneconomical even if it cost no more to construct than the estimates for the project SWEPCO prepared last July (and has not yet updated), and even if the project performs at the level SWEPCO claims in its filing. As discussed below, however, there are many reasons to believe that the project is likely to cost more than what SWEPCO estimated last year and to perform at less than its projected level.[16]

There is no indication that we have seen an end to developments that would diminish the value of the project. For example, towers for both the transmission line and wind turbines are made of steel,[17] and the adoption of tariffs on imported steel will increase the cost of the facilities by an as-yet-unknown amount. The Oklahoma legislature recently considered applying a $1.00/MWh tax on the output of Oklahoma wind facilities, as has been done in at least one other state.[18] While the measure fell short of passage during the hearing in this case, there is no guarantee that Oklahoma will not take it up in the future.[19] The proposed tax would have added approximately $157 million (nominal) to SWEPCO's share of the cost of the output of the

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[12] TIEC Ex. 1, Pollock Dir. at 26.

[13] *See* TIEC Ex. 65; *Application of Southwestern Public Service Company for Approval of Transactions with ESI Energy, LLC, Invenergy Wind Development North America LLC, to Amend a Certificate of Convenience and Necessity for Wind Generation Projects and Associated Facilities in Hale County, Texas and Roosevelt County, New Mexico and for Related Approvals*, Docket No. 46936, Unopposed Stipulation (Feb. 27, 2018).

[14] TIEC Ex. 1, Pollock Dir. at 26-27 & Ex. JP-4.

[15] *See infra* Section III.B.2.c.

[16] *See infra* Sections III.A, III.B.3.

[17] *See* Highly Sensitive and Voluminous Exhibits JFG-2, SWEPCO Ex. 4A (HS Godfrey Dir.) at Ex. JFG-2 at 944; Direct Testimony and Exhibits of Robert W. Bradish, SWEPCO Ex. 5 (Bradish Dir.) at 14.

[18] Tr. at 106:8-11 (Chodak Cross) (Feb. 13, 2018); *see* Wyo. Stat. § 39-22-103 (2017).

[19] Tr. at 122:21-123:1 (Chodak Redir.) (Feb. 13, 2018); Tr. at 132:11-21 (Chodak Re-Cross) (Feb. 13, 2018).

facility.[20] And there is always the possibility that Congress could take further action to reduce the value of PTCs, as the U.S. House of Representatives attempted to do in December.

Despite the above factors, SWEPCO and PSO remain undeterred in pursuing this facility. Their parent company has touted the additional earnings that the facility would bring in its recent earnings calls, and SWEPCO's president has committed that, despite her concerns about the facility, "we will be all Wind Catcher—all the time."[21] If ever there were a situation that called for a thorough Commission review of a utility proposal, it is this one.

TIEC does not fault SWEPCO, PSO, and their parent for pursuing a strategy to improve shareholder value. Nor does it impugn their motives. TIEC members and other companies have a fiduciary obligation to their shareholders and pursue strategies to increase earnings all the time. The difference is that most companies operate in a competitive market, which will ruthlessly punish companies that invest in money-losing facilities. Utilities, however, earn a return on their Commission-approved facilities whether or not the facilities are economical. So a project like the Oklahoma wind farm, which would never be built by a merchant generator in a competitive market, still holds the promise of over $2 billion in return on investment for SWEPCO.[22] It is this difference between competitive and monopoly enterprises that requires the Commission to thoroughly review any proposed large utility investment to insure that it is the type that would be built in a competitive market. As explained in the first chapter of PURA:

> Public utilities traditionally are by definition monopolies in the areas they serve. As a result, the normal forces of competition that regulate prices in a free enterprise society do not operate. Public agencies regulate utility rates, operations, and services as a substitute for competition.[23]

There is no reason that TIEC, OPUC, Cities, or Staff would oppose a project that would actually deliver lower rates to ratepayers. In fact, other wind projects have shown the likelihood to deliver ratepayer savings, and the same ratepayer groups opposing SWEPCO's project have joined in supporting them.[24] Unlike SWEPCO, however, which stands to charge higher base

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[20] 8,951,100MWh x 70% x $1.00/MWh x 25 years = $156,644,250. *See* Direct Testimony of Jay F. Godfrey, SWEPCO Ex. 4 (Godfrey Dir.) at 14.

[21] TIEC Ex. 4.

[22] Second Supplemental Direct Testimony and Exhibits of Jeffry Pollock, TIEC Ex. 3 (Pollock Second Supp. Dir.) at 16.

[23] PURA § 11.002(b).

[24] *See* Docket No. 46936, Unopposed Stipulation.

rates and create additional earnings whether or not the project is economical, the concern of ratepayer groups is simple and straightforward—will this project actually reduce rates for Texas ratepayers? The answer to that question for this project is a resounding no.

II. Certificate of Convenience and Necessity Standard of Review

SWEPCO has the burden of proving that its proposed wind project is necessary for the service, accommodation, convenience, or safety of the public.[25] Typically, in generation CCN-amendment proceedings, the utility attempts to prove that it needs the additional capacity that the facility would provide, and that its proposal is the best alternative to meet that need.[26] In this case, however, SWEPCO's is attempting to demonstrate "need" on a purely economic basis.[27] If SWEPCO's application is granted, ratepayers would be forced into making a massive bet that the savings generated by the wind project would exceed its substantial cost, even though the project is not currently needed from a capacity or reliability standpoint. SWEPCO's shareholders, on the other hand, stand to profit from the inclusion of the project in rate base regardless of whether it provides the advertised savings. Under these circumstances, it is particularly critical that the Commission fully consider the risks to ratepayers and hold SWEPCO to its burden of proof.

III. Analysis of Economics of Wind Catcher (P.O. Issue Nos. 10, 12, 14, 25, 26)

A. Project Description and Cost

The unprecedented magnitude of the proposed wind project ("Wind Catcher") cannot be overstated. SWEPCO is seeking to construct not only what would be the largest wind farm ever built in North America, but also a 765-kV transmission line spanning nearly the entire length of Oklahoma that itself will be more expensive than the capped amount of SWEPCO's last significant capital addition, the Turk Plant.[28] Combined, Wind Catcher will come with a

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[25] PURA § 37.056; 16 T.A.C. § 25.101.

[26] *Application of Southwestern Electric Power Company for Certificate of Convenience and Necessity Authorization for a Coal Fired Power Plant in Arkansas,* Docket No. 33891, Final Order at FoFs 24-37 (Aug. 12, 2008); *Application of Entergy Texas, Inc. to Amend its Certificate of Convenience of Necessity to Construct Montgomery County Power Station in Montgomery County,* Docket No. 46416, Final Order at FoFs 30-34 (July 20, 2017).

[27] Direct Testimony of Venita McCellon-Allen adopted by Thomas P. Brice, SWEPCO Ex. 2 (McCellon-Allen Dir.) at 20-22.

[28] *Compare* Direct Testimony and Exhibits of Brian D. Weber, SWEPCO Ex. 6 (Weber Dir.) at 10 (explaining that the Gen-Tie is projected to cost $1.6 billion) *with* Docket No. 33891, Final Order at Ordering Paragraph 2.

currently estimated price tag of $4.624 billion, of which SWEPCO's share is $3.168 billion.[29] If SWEPCO completes the project on budget, it would increase the rate base established in SWEPCO's most recent rate proceeding by over 72%,[30] ultimately resulting in a base rate increase in Texas of at least $150 million in 2021, and varying amounts for the twenty-five years thereafter.[31]

Importantly, the wind project is composed of two components that, while distinct, are highly dependent upon the other. The Wind Facilities are an 800-turbine, 2000-MW wind farm located in the Oklahoma panhandle that would be constructed and delivered to SWEPCO by a third-party developer, Invenergy, under a turnkey contract called the Membership Interest Purchase Agreement (MIPA).[32] The Gen-Tie is a 350- to 380-mile long 765-kV transmission line that would be designed and constructed by a contractor, Quanta, under an Engineering, Procurement, and Construction contract (EPC).[33] Under SWEPCO's plan for the project, without the Gen-Tie, there is no way to deliver the output of the Wind Facilities to SWEPCO's load, and without the Wind Facilities, there is no electricity to transmit along the Gen-Tie.[34]

Individually, each project is a major undertaking with substantial risks; together, the potential downsides are untenable. One of the primary risks of Wind Catcher is that it is time-sensitive.[35] In order to qualify for the safe harbor that will guarantee that SWEPCO can fully realize the PTCs that will be generated by the Wind Facilities, both the Wind Facilities and the Gen-Tie must be in commercial operation by December 31, 2020.[36] However, under the planned construction schedule, SWEPCO is expecting to complete the Wind Facilities on September 30,

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[29] SWEPCO Ex. 2, McCellon-Allen Dir. at 5; TIEC Ex. 1, Pollock Dir. at 5.

[30] *See Application of Southwestern Electric Power Company for Authority to Change Rates*, Docket No. 46449, Commission Number Run Based on December 14, 2017 Open Meeting Discussion at Schedule III (Dec. 20, 2017) (establishing rate base of $4.376 billion). $3.168/$4.376 = 72.39%.

[31] The $150 million figure is under SWEPCO's case as filed. TIEC Ex. 1, Pollock Dir. at 47. Note that this calculation does not include SWEPCO's proposal to treat PTCs as a base rate offset.

[32] SWEPCO Ex. 4, Godfrey Dir. at 6-7.

[33] SWEPCO Ex. 6, Weber Dir. at 4-6.

[34] Tr. at 74:10-25 (Chodak Cross) (Feb. 13, 2018); *see also* SWEPCO Ex. 2, McCellon-Allen Dir. at 8-9. In the first scenario, SWEPCO could use the 50 MW Gridliance interconnection to deliver some energy to load, but at the cost of severely reducing project benefits, as discussed below. Rebuttal Testimony and Exhibits of Michael L. Bright, SWEPCO Ex. 17 (Bright Reb.) at 7.

[35] Tr. at 205:21-206:1 (Godfrey Cross) (Feb. 13, 2018).

[36] Tr. at 174:16-22 (Bright Cross) (Feb. 13, 2018).

2020, and the Gen-Tie on December 15, 2020.[37] In other words, SWEPCO has given itself only sixteen days of leeway to meet the safe-harbor deadline.[38]

If SWEPCO does not meet that deadline, qualification for the PTCs will depend upon whether SWEPCO can demonstrate continuous construction under a "facts and circumstances" analysis, which could result in a protracted controversy with the Internal Revenue Service (IRS).[39] Thus, delays for either the Wind Facilities or the Gen-Tie could significantly harm the economics of the entire enterprise, which SWEPCO has a duty to monitor in an ongoing fashion.[40] Despite this interdependence and time sensitivity, neither the MIPA nor the EPC are formulated in a way that would allow SWEPCO to terminate one contract based on problems with the other project.[41] For instance, under the terms of the MIPA, neither SWEPCO's step-in nor its termination rights can be exercised in a situation where only the Gen-Tie falls behind schedule.[42] This limitation means that even if it becomes readily apparent at any point in the construction schedule that Quanta cannot finish the Gen-Tie on time or in an economic manner, SWEPCO would have no recourse but to take the Wind Facilities. Indeed, when posed with this scenario on the stand, SWEPCO witness Mr. Godfrey simply responded that SWEPCO would close on the MIPA and take the Wind Facilities.[43]

The risks imposed by this arrangement are evident. First, it presents the very real possibility that SWEPCO could find itself in the beginning of 2021 with either a wind farm that cannot deliver energy to load or a transmission line to nowhere. Second, it creates an incentive for SWEPCO to finish Wind Catcher at almost any cost, because even if it would be prudent to cancel one of the individual projects, SWEPCO would still be bound by contract to take the other project.

The impact of cost overruns and delays on the economics of the project are substantial.

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[37] *Id.* at 174:23-175:5.

[38] *Id.* at 175:6-10.

[39] TIEC Ex. 13; Tr. at 174:10-176:10 (Bright Cross) (Feb. 13, 2018); Tr. at 909:10-16 (Finn Cross) (Feb. 20, 2018).

[40] *See, e.g.*, *Application of Southwestern Electric Power Company for Authority to Change Rates*, Docket No. 40443, Order on Rehearing at 5 (Mar. 6, 2014) ("[A] company has a duty to its ratepayers to continue to evaluate the project during construction.").

[41] Tr. at 210:2-4 (Godfrey Cross) (Feb. 13, 2018); Tr. at 237:23-238-2 (Weber Cross) (Feb. 13, 2018).

[42] Tr. at 208:17-210:4 (Godfrey Cross) (Feb. 13, 2018).

[43] *Id.* at 208:20-209:6.

For every 1% capital cost overrun, the NPV of the project's net benefits for SWEPCO decreases by $30 million.[44] Moreover, delays would increase the allowance for funds used during construction (AFUDC),[45] as well as risking eligibility for PTCs, as discussed in further detail below.

SWEPCO has presented highly optimistic cost estimates and timelines for developing the Wind Facilities and the Gen-Tie in its application. Under a more realistic analysis that stress tests for project development risks, the economics of Wind Catcher are greatly diminished.

1. Wind Facilities

The Wind Facilities are to be developed by Invenergy and delivered to SWEPCO/PSO under the MIPA at a purchase price of $2.694 billion, subject to various escalators.[46] On top of the purchase price, SWEPCO expects to incur several categories of additional costs that raise its total estimate for the Wind Facilities to $2.902 billion on a total project basis.[47] The largest of these costs is a contingency allowance, for which SWEPCO has allocated $93.3 million.[48] However, this amount represents merely 3.2% of the total project cost,[49] as compared to the [redacted] in contingency allowance for the Gen-Tie.[50] As a result, there is little leeway for cost overruns and delays before they exceed SWEPCO's estimated project cost and timeline.

Although it was not factored into SWEPCO's economic analysis, the potential for significant cost overruns certainly exists. While the Wind Facilities will be far and away the largest wind farm ever developed by Invenergy,[51] the estimated cost SWEPCO provides in its application would be one of the lowest for a wind farm on a per-kW basis.[52] In fact, the estimated cost of $1,451/kW for the Wind Facilities is approximately 12% lower than the

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[44] Tr. at 1049:14-17 (Pearce Cross) (Feb. 20, 2018).

[45] Tr. at 745:4-12 (Chodak Cross) (Feb. 15, 2018).

[46] SWEPCO Ex. 4, Godfrey Dir. at 7.

[47] Direct Testimony of Michael L. Bright, SWEPCO Ex. 3 (Bright Dir.) at 14-15.

[48] *Id.* at 15-16.

[49] $93.3/$2,902 = 3.2%.

[50] Highly Sensitive Direct Testimony of Brian D. Weber and Highly Sensitive and Voluminous Exhibit BDW-2, SWEPCO Ex. 6A (HS Weber Dir.) at 10.

[51] TIEC Ex. 1, Pollock Dir. at 40; SWEPCO Ex. 17, Bright Reb. at 4-5 (noting that the largest wind farm ever developed by Invenergy had 156 turbines, which is slightly less than a fifth of the 800 turbines that will be a part of the Wind Facilities).

[52] TIEC Ex. 1, Pollock Dir. at 39.

$1,655/kW average for recently installed wind farms.[53] And contrary to SWEPCO's suggestions, a fixed-price contract does not mean that the cost for the Wind Facilities is fully guaranteed.[54] Indeed, in SWEPCO's last CCN proceeding for the Turk Plant, it made the same claim that almost all of its costs were under fixed-price contracts, yet the cost estimate for that plant was not only revised upward from $1.347 billion to $1.522 billion during the course of the proceeding,[55] but ultimately exceeded even the updated estimate by 16%.[56]

One of the ways in which the cost of the Wind Facilities could exceed the contractual purchase price is the possibility of changes in SWEPCO's scope of work.[57] Under SWEPCO's step-in rights in the MIPA, SWEPCO is entitled to take over the Wind Facilities if Invenergy falls behind schedule and fails to implement a remedial plan.[58] If SWEPCO steps in, it would be responsible for completing the project at its own cost, as well as all contractor liabilities incurred up until that point.[59] In such a scenario, the cost of the Wind Facilities could ultimately exceed the fixed purchase price of the MIPA.

Another project risk identified by SWEPCO is environmental mitigation.[60] SWEPCO has yet to complete either the environmental studies for the Wind Facilities site or the necessary wildlife plan.[61] The results of these studies could ultimately require an environmental mitigation plan that could increase development costs or even delay the project.

Finally, SWEPCO's projected September 30, 2020, in-service date is only three months before the safe harbor date for PTC eligibility.[62] This narrow window is particularly concerning given the fact that utilities around the country are also vying to install wind generation before the PTCs expire, which will increase demand for labor and equipment and place additional stress on turbine manufacturers like General Electric (GE).[63] Delays in the project schedule past the PTC

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[53] *Id.*

[54] *Id.* at 40.

[55] *Compare* Docket No. 33891, PFD at 35-36 (Jan. 18, 2008) *with id.*, Order at 7 (Aug. 12, 2008).

[56] Tr. at 1234:12-19 (Pollock Surreb.) (Feb. 21, 2018).

[57] SWEPCO Ex. 3, Bright Dir. at 15.

[58] Tr. at 207:5-11 (Godfrey Cross) (Feb. 13, 2018).

[59] *Id.* at 207:12-208:15.

[60] SWEPCO Ex. 3, Bright Dir. at 15.

[61] Tr. at 179:18-180:6 (Bright Cross) (Feb. 13, 2018).

[62] TIEC Ex. 1, Pollock Dir. at 37.

[63] *Id.* at 37-38.

safe-harbor date would require SWEPCO to prove to the IRS that the project had met the continuous construction requirement under a "facts and circumstances" analysis, and could potentially threaten SWEPCO's PTC eligibility.[64] And because SWEPCO loses safe-harbor eligibility even if it misses the December 31, 2020 date by one day, the delay liquidated damages provision, [redacted],[65] is not sufficient to mitigate that risk.

2. Gen-Tie

SWEPCO/PSO have contracted with Quanta to develop the Gen-Tie at a purchase price of [redacted] again subject to escalators.[66] In total, SWEPCO projects the Gen-Tie to cost $1.624 billion on a total project basis, including $148 million of AFUDC.[67] This cost equates to $4.45 million per mile, which is more than 20% lower than the $5.6 million per mile estimated for the Reynolds-to-Greentown line, the only other 765-kV transmission line that is currently under construction.[68] SWEPCO expects Construction of the 350- to 380-mile Gen-Tie to take slightly less than two years deadline for SWEPCO to issue the final notice to proceed on December 18, 2018, to the estimated commercial operation date of December 15, 2020.[69] Completing the Gen-Tie on budget and on schedule will be, as SWEPCO itself admits, a "significant undertaking,"[70] and the risk of SWEPCO exceeding its comparatively low cost estimate and compressed timeline is considerable for a number of reasons.

For one, SWEPCO has just begun the preliminary consultation process for acquiring the permits for which it is responsible (the "Owner's Permits"),[71] which, if needed, must be obtained before the final notice to proceed can be issued.[72] These permits include Endangered Species Act (ESA) permits for the American Burying Beetle and the Lesser Prairie Chicken, approval under the National Environmental Policy Act (NEPA) and the Migratory Bird Treaty Act

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[64] TIEC Ex. 13; Tr. at 174:10-176:10 (Bright Cross) (Feb. 13, 2018); Tr. at 909:10-16 (Finn Cross) (Feb. 20, 2018).

[65] SWEPCO Ex. 4A, HS Godfrey Dir. at Ex. JFG-2 at 15.

[66] SWEPCO Ex. 6A, HS Weber Dir. at 8.

[67] *Id.* at 8.

[68] TIEC Ex. 1, Pollock Dir. at 41.

[69] SWEPCO Ex. 6, Weber Dir. at 12; Tr. at 663:12-16 (Weber Cross) (Feb. 15, 2018).

[70] SWEPCO Ex. 6, Weber Dir. at 8.

[71] Tr. at 231:17-232:18 (Weber Cross) (Feb. 13, 2018); TIEC Ex. 22.

[72] Tr. at 661:12-662:11 (Weber Cross) (Feb. 15, 2018).

(MBTA), and a Clean Water Act (CWA) Section 404 permit.[73] Delays in obtaining these permits or unexpected restrictions and conditions on the permits could result in corresponding delays to the construction schedule or changes to the scope of work that increase the EPC contract price.[74]

Moreover, SWEPCO has yet to acquire any of the necessary right-of-way along the path of the Gen-Tie.[75] The EPC requires SWEPCO to obtain 65% of the right-of-way for each of the three Gen-Tie segments before the December 18, 2018 notice to proceed date.[76] While construction can commence without SWEPCO having secured the entire right-of-way by that date, SWEPCO must acquire all of the right-of-way at some point. Setbacks in that process would also translate to delays and cost overruns.[77] While SWEPCO has allocated [redacted] for easement acquisition,[78] that amount is far from guaranteed. This risk is especially salient because obtaining landowner consent for the entire 350 to 380 miles of the Gen-Tie may be more difficult and more costly for a highly publicized and politicized construction project of this magnitude, particularly given the opposition that it has already faced in Oklahoma. For instance, the Oklahoma Attorney General has opposed the project before the Oklahoma Corporation Commission (OCC). And at a public hearing before the OCC on January 4, 2018, the Speaker of the Congress for the Osage Nation—whose traditional reservation boundaries covers about a fifth of the Gen-Tie route[79]—spoke out strongly against the Gen-Tie Line.[80]

Cost overruns and delays can also be caused by adverse weather conditions and other force majeure events, as demonstrated by the last transmission line built by both SWEPCO and PSO, which ran from Valliant, Oklahoma to Texarkana, Texas.[81] The Valliant-to-Texarkana line was a 76.6 mile line, or about one-fifth of the length of the Gen-Tie.[82] SWEPCO and PSO were directed to construct the line by SPP in June 2010, at an estimated cost of $131 million and with

[73] *Id.* at 655:8-656:15; *see also* SWEPCO Ex. 6A, HS Weber Dir. at Ex. BDW-2 at 340-42 (HSPM).

[74] Tr. at 657:2-9 (Weber Cross) (Feb. 15, 2018).

[75] Tr. at 233:17-23 (Weber Cross) (Feb. 13, 2018).

[76] Tr. at 239:10-16 (Weber Redir.) (Feb. 13, 2018).

[77] Tr. at 668:3-15 (Weber Cross) (Feb. 15, 2018).

[78] SWEPCO Ex. 6A, HS Weber Dir. at 10.

[79] Tr. at 669:1-25 (Weber Cross) (Feb. 15, 2018).

[80] *Id.* at 674:10-25.

[81] TIEC Ex. 23.

[82] TIEC Ex. 24.

an estimated in-service date of October 2014.[83] However, construction on the Valliant-to-Texarkana line ran into trouble due at least in part to flooding along the Red River,[84] and it ultimately was not completed until December 2016 at a cost of $157 million,[85] representing a delay of more than two years and a cost overrun of 20%. If similar circumstances occurred with the Gen-Tie, it would not be completed until mid-2023 and would cost $1.95 billion.[86]

As noted, if SWEPCO does not place the Wind Facilities in service prior to the safe-harbor deadline, it faces the risk of trying to prove up continuous construction to the IRS.[87] And although SWEPCO has a backup plan to qualify for PTC eligibility through the temporary 50 MW Gridliance interconnection,[88] it is entirely unclear whether this would be sufficient. For its position that a 50-MW interconnection would be sufficient to qualify an entire 2,000 MW wind farm for PTCs, SWEPCO relies on a single IRS private letter ruling from 2013.[89] However, that ruling is non-precedential with respect to other taxpayers.[90] It also has the relevant information redacted, including the nameplate capacity of the generation unit at issue and the size of the interconnection.[91] Accordingly, the letter ruling provides no reliable support for SWEPCO's notion that an interconnection representing 2.5% of nameplate capacity would be sufficient to place all of the wind turbines in service for purposes of qualifying for PTCs.

Moreover, even if would be sufficient, using the 50-MW interconnection would significantly reduce the amount of PTCs that SWEPCO can generate. After the Wind Facilities become commercially operational and initially qualify for PTCs, they can only generate PTCs for the following ten years.[92] Until the Gen-Tie becomes commercially operational, SWEPCO would only be able to generate 2.5% of the projected PTCs,[93] and that lost period of PTC eligibility cannot be recovered later. So if the Gen-Tie is not operational until a year after the

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[83] *Id.*

[84] Tr. at 223:11-22 (Bradish Cross) (Feb. 13, 2018).

[85] TIEC Ex. 23.

[86] $1.624 x 120% = $1.95.

[87] TIEC Ex. 13; Tr. at 174:10-176:10 (Bright Cross) (June 13, 2018); Tr. at 909:10-16 (Finn Cross) (Feb. 20, 2018).

[88] SWEPCO Ex. 17, Bright Reb. at 7.

[89] Tr. at 913:5-13 (Finn Cross) (Feb. 20, 2018).

[90] *Id.* at 910:3-5.

[91] *Id.* at 913:5-915:6; *see also* TIEC Ex. 84.

[92] Tr. at 133:1-8 (Chodak Cross) (Feb. 13, 2018).

[93] Tr. at 186:14-21 (Bright Cross) (Feb. 13, 2018).

Wind Facilities are finished, SWEPCO would only be able to generate $5.1 million of PTCs during that first year rather than its projected $205 million,[94] representing a $185.9 million (NPV) decrease in project benefits.[95] If the Gen-Tie is delayed as long as the Valliant-to-Texarkana line was, SWEPCO would lose out on additional $180.2 million (NPV) in PTCs.[96] Thus, even if delays on the Gen-Tie do not cause SWEPCO to lose PTC eligibility entirely, it will still cause SWEPCO to irrevocably lose the vast majority of potential PTCs for the length of the delay.

Finally, on top of overlooking development risks, SWEPCO has understated the revenue requirement impact of the Gen-Tie by assuming a 50-year useful life rather than the 25 years concomitant with the life of the Wind Facilities.[97] As explained above, there is no need for the Gen-Tie without the Wind Facilities. While SWEPCO raises the possibility of other potential uses for the Gen-Tie after year 25, such as integration into the SPP network,[98] it has not even begun to demonstrate that the Gen-Tie will be used and useful at that time. Depreciating the Gen-Tie over the same useful life as the Wind Facilities would increase the costs over that period by $102 million (NPV).[99]

3. Other Costs—Ancillary Services

SWEPCO's economic analysis ignores the increase in ancillary services costs attributable to Wind Catcher, and in particular costs related to contingency reserves. Wind Catcher would increase contingency reserve costs in SPP because the contingency reserve requirement is calculated based on the largest generating unit and one-half of the second largest unit, and Wind Catcher would become the new largest unit in SPP.[100] SWEPCO concedes that it did not account for increased ancillary services costs in its analysis, but contends that the impact is

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[94] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-2R. 2.5% of $205 million is $5.1 million.

[95] $200 million/1.076 = $185.9 million. The discount rate is the weighted average cost of capital (WACC) of 7.6%. Direct Testimony and Exhibits of Renee V. Hawkins, SWEPCO Ex. 10 (Hawkins Dir.) at 7.

[96] SWEPCO projects $214 million in PTCs to be generated in the second year, and 2.5% of that amount is $5.35 million. $214 million-$5.35 million = $208.65 million. That amount discounted by 7.6% for two years is $180.2 million.

[97] SWEPCO Ex. 5, Bradish Dir. at 15.

[98] *Id.* at 15.

[99] Tr. at 1052:1-6 (Pearce Cross) (Feb. 20, 2018).

[100] Tr. at 283:18-23 (Pearce Cross) (Feb. 14, 2018); TIEC Ex. 36.

minimal.[101] However, SWEPCO's estimate of increases in contingency-reserves costs was based on SPP setting the requirement on an hourly basis rather than a daily basis.[102] And as Mr. Pearce admitted at the hearing, SPP currently sets the requirement on a daily basis.[103]

SWEPCO did not provide a quantification of contingency-reserve costs calculated on a daily basis. TIEC, however, presented a calculation of those costs in a demonstrative exhibit admitted during the cross-examination of Mr. Pearce, which shows that the increased contingency-reserve costs from Wind Catcher would be approximately $2.2 million per year to SWEPCO, and $14.2 million per year to SPP participants other than SWEPCO and PSO.[104] Mr. Pearce agreed that, under TIEC's assumptions, the calculation was correct.[105] However, he did not confirm those assumptions. [106] In particular, he did not agree that the determination of the largest generating unit should turn on the nameplate capacity of the plant as opposed to its output.[107] But there is nothing in the relevant SPP protocols indicating that the determination of the "largest unit" should be made on the output of the plant as opposed to its nameplate capacity.[108] And in any event, SWEPCO admits that it has not provided any calculation based on setting the reserve requirement consistent with SPP's current practices.

B. Economic Evaluation Methodology and Assumptions

SWEPCO relies on an economic analysis that purports to show that Wind Catcher will deliver net benefits in excess of its massive costs. As an initial matter, SWEPCO's economic analysis understates the risks associated with the costs of the project, as discussed above. Moreover, SWEPCO's analysis of the benefits Wind Catcher would provide is skewed and based on overly optimistic assumptions. In this section, TIEC addresses SWEPCO's methodology and assumptions for projecting production cost savings and, in particular, SWEPCO's flawed

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[101] Tr. at 279:17-280:7 (Pearce Cross) (Feb. 14, 2018).

[102] TIEC Ex. 36.

[103] Tr. at 282:9-13, 293:17-19 (Pearce Cross) (Feb. 14, 2018).

[104] TIEC Ex. 57; *see generally* Tr. at 279-297 (Pearce Cross) (Feb. 14, 2018). Thus the impact over 25 years on a nominal basis would be $55 million for SWEPCO and $355 million for SPP participants other than SWEPCO and PSO.

[105] Tr. at 279:7-19 (Pearce Cross) (Feb. 14, 2018).

[106] *E.g., id.* at 289:9-290:13.

[107] *Id.* at 294:2-295:6.

[108] TIEC Ex. 36 at section 6.3.

modeling of future locational marginal prices (LMPs) in the SPP.[109]

1. Evaluation Methodology

A core problem with SWEPCO's economic evaluation of Wind Catcher is that it assumes unrealistically high future LMPs, which in turn overstate the production cost savings that the project would provide. This is significant because, at a total of over $3.8 billion (NPV), SWEPCO's projected production cost savings form by far the largest component of the projected benefits of the project.[110]

(a) Impact of LMPs on SWEPCO's production cost savings analysis

To understand the impact future LMPs would have on Wind Catcher's economics, it is helpful to begin with a discussion of the SPP integrated marketplace in which SWEPCO's generation sales occur. Unlike under the traditional utility model, in the SPP, generation owners like SWEPCO do not determine when and how often their plants will run.[111] Instead, the SPP determines the dispatch of all operating generation based on economic merit.[112] Each generator submits a price offer curve for its plants to SPP. SPP then places the offers in merit order in the bid stack from lowest cost to highest cost. The price offered by the specific generator that satisfies the SPP system need for power sets the market clearing price or "LMP."[113] All plant offers below the market clearing LMP are paid that LMP regardless of the amount of the actual bid.[114] This system governs all generation sales in SPP, including off-system sales. Specifically, to the extent that a utility's plants are selected to sell energy in excess of that utility's load requirements, the utility is considered to have made an off-system sale.[115]

LMPs dictate the economics of plants in the SPP marketplace, and therefore drive the economic analysis of Wind Catcher. Indeed, of SWEPCO's $3.8 billion (NPV) in projected cost

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[109] TIEC addresses SWEPCO's projected PTC and capacity value benefits in Sections III.C.2 and III.C.3 below.

[110] This number nets out estimated congestion costs and includes 100% of OSS margins to customers. Rebuttal Testimony and Exhibits of Kelly D. Pearce, SWEPCO Ex. 25 (Pearce Reb.) at Ex. KDP-2R.

[111] TIEC Ex. 1, Pollock Dir. at 20.

[112] *Id.*

[113] *Id.*

[114] *Id.*

[115] *Id.* at 18-20.

savings, approximately $2.9 billion is directly attributable to SWEPCO's projected LMPs.[116] Notably, nearly $2.6 billion of those savings are from projected incremental off-system sales.[117] These projected off-system sales are not sales from Wind Catcher's output itself, but are rather increased sales from SWEPCO's other plants, which SWEPCO posits would be "freed up" by Wind Catcher to sell off-system.[118] SWEPCO's projected additional off-system sales are set out in the following table, which was included in Mr. Pollock's testimony:[119]

Table 5
SWEPCO's Projected
Additional Off-System Sales Revenues
Base Case
2021 to 2046

Description	Project Case	Baseline Case	Difference
Sales (Millions)	$11,105.0	$5,039.6	$6,065.4
Sales (GWh)	156,353	66,520	89,839
Avg. LMP (¢/kWh)	7.10¢	7.58¢	(0.48¢)
NPV Sales (Millions)	$4,516.8	$1,949.9	$2,566.9

Whether SWEPCO's generating plants will make off-system sales is not merely a question of whether SWEPCO will have excess generating capacity to offer into the market. Rather, SWEPCO's plants will only make off-system sales if it is economical for them to do so given the then-current LMPs. As can be seen in the table above, SWEPCO's projected off-system sales revenues are based on average LMPs of 7.1¢/kWh. To place this in perspective, LMPs in SPP averaged only $2.2¢/kWh in 2016.[120] Accordingly, LMPs would have to more than triple for SWEPCO's projected off-system sales revenues to materialize. This illustrates the extent to which SWEPCO's economic evaluation of Wind Catcher turns on the projected LMPs used in the analysis. It also illustrates that SWEPCO's projected LMPs are inflated, as discussed below.

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[116] *Id.* at 17-18. This figure includes $100 million in OSS savings.

[117] *Id.* This figure includes $100 million in OSS savings.

[118] Tr. at 1058:13-1059:2 (Pearce Reb.) (Feb. 20, 2018).

[119] TIEC Ex. 1, Pollock Dir. at 18.

[120] *Id.*

(b) SWEPCO's methodology for deriving Production Cost Savings

SWEPCO derived its projected production cost savings from a multi-step process that is rooted in assumptions taken from AEP's "Fundamentals Forecast." Specifically, SWEPCO used the PLEXOS model to project SWEPCO's and PSO's operating costs with and without Wind Catcher.[121] PLEXOS simulates the dispatch of the SWEPCO/PSO generating fleet based on a number of assumptions, including projected loads, generation characteristics, and prices of commodities such as coal and natural gas.[122] However, PLEXOS is not capable of modeling the entire SPP region and capturing all factors that impact LMPs within the AEP Load Zone (the service area of SWEPCO/PSO).[123] For example, PLEXOS is not capable of modeling changes in the SPP transmission network that impact power flows throughout SPP, and it does not model resource additions/retirements beyond those in the SWEPCO/PSO system.[124] Instead, PLEXOS treats SPP as discrete capacity resource with hourly LMPs that must be derived from outside the model.[125] Thus, to come up with the LMPs used in the economic analysis, SWEPCO was required to go outside the PLEXOS model.

To accomplish this, SWEPCO used a combination of the PROMOD model and the AEP Fundamentals Forecast. PROMOD is a regional costing model that is capable of modeling the entire SPP region, including transmission congestion and changes in the generation bid stack.[126] Notably, to run PROMOD, SWEPCO used the commodity prices—including the natural gas prices—assumed in the Fundamentals Forecast.[127] SWEPCO then ran PROMOD for two years: 2020 and 2025.[128] This resulted in projected LMPs for those years, which SWEPCO used as a starting point for deriving LMPs for the entire 25-year study period. Specifically, to come up with LMPs for the years 2021 to 2024, SWEPCO interpolated the 2020 and 2025 PROMOD-derived LMPs.[129] For the years after 2025, SWEPCO calculated its LMPs by applying the

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[121] *Id.*

[122] *Id.* at 18-19.

[123] *Id.* at 19.

[124] *Id.*

[125] *Id.*

[126] Direct Testimony and Exhibits of Johannes P. Pfeifenberger, SWEPCO Ex. 8 (Pfeifenberger Dir.) at 10-11.

[127] *Id.* at 18-19.

[128] TIEC Ex. 1, Pollock Dir. at 20-21.

[129] *Id.*

escalation rate from the LMPs predicted by the Fundamentals Forecast.[130] All of the LMPs SWEPCO calculated through this process were then input into PLEXOS to model net production costs with and without Wind Catcher.[131] It is through this process that SWEPCO derived its estimated $3.8 billion (NPV) in production cost savings.

As is evident from the above, the reliability of SWEPCO's economic evaluation depends on the assumptions used in the various steps of the analysis. A critical assumption, as SWEPCO has acknowledged, is the natural gas prices assumed in the PROMOD model runs.[132] The higher the assumed natural gas price, the higher the assumed LMPs, and the greater the projected savings a wind plant will provide.[133] Moreover, because SWEPCO only modeled two years of SPP LMPs in PROMOD, it relies on the predicted escalation rate for LMPs from the Fundamentals Forecast for the final 20 years of the 25-year study period (2026-2045). Consequently, SWEPCO's analysis also turns on the assumptions in the Fundamentals Forecast throughout that period, which include not only excessively high natural gas prices, but also that an unprecedented carbon tax that SWEPCO assumes will be first implemented in 2024 and rapidly escalated thereafter.[134] SWEPCO's assumed escalation rate thus results in extraordinarily high LMPs—and extraordinarily high production cost savings—in the later years of the analysis. For example, SWEPCO's projected production cost savings from the last year of the analysis (2045) are 2.3 times higher than those in the first year (2021) under the base case.[135] As discussed in the next section, SWEPCO's assumptions inflate its LMPs to unrealistic levels, rendering its economic analysis unreliable.

2. Assumptions Impacting Locational Marginal Prices

(a) Natural Gas Prices

(i) SWEPCO's projected gas prices are inflated in both the near and long term.

SWEPCO uses the natural gas prices from the 2016 AEP Fundamentals Forecast, which

[130] *Id.*

[131] *Id.*

[132] Tr. at 254:21-23 (Pearce Cross) (Feb. 14, 2018).

[133] *Id.* at 254:24-255:3.

[134] *Id.* at 265:5-12.

[135] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-2R. $569/$247 = 230%.

was developed by Karl Bletzacker, AEPSC's director of Fundamentals Analysis.[136] The base-case natural gas assumptions are as follows:[137]

Year	Henry Hub	Year	Henry Hub
2018	4.89	2032	8.14
2019	5.13	2033	8.41
2020	5.26	2034	8.68
2021	5.39	2035	8.93
2022	5.53	2036	9.12
2023	5.67	2037	9.32
2024	5.90	2038	9.53
2025	6.14	2039	9.74
2026	6.40	2040	9.95
2027	6.66	2041	10.17
2028	6.93	2042	10.39
2029	7.21	2043	10.62
2030	7.51	2044	10.86
2031	7.82	2045	11.10

SWEPCO's projections are outliers even in the very near term. For example, SWEPCO projects natural gas prices of $4.89 per MMBtu in 2018, while the recently released 2018 EIA Annual Energy Outlook (AEO) reference-case projection is $3.13 per MMBtu.[138] As a further point of reference, actual Henry Hub spot prices during the hearing were in the $2.60 per MMBtu range.[139] The trend continues in the following years, with SWEPCO's projections of 2019 and 2020 prices of $5.13 and $5.26 per MMBtu, respectively, substantially outpacing EIA's 2018 reference-case projections of $3.55 and $3.96 per MMBtu for those years.[140] In fact, SWEPCO's own retained natural gas witness, Robert Smead, explicitly testified that Mr. Bletzacker's projections are overstated compared to current conditions and the short-term outlook in the industry.[141] Mr. Smead's testimony is that "[a]t least for the next four to five years, known demand growth and producer supply capability can balance prices at around $3.00 per MMBtu."[142] Given that Mr. Bletzacker's 2020 natural gas price is a critical input into one of only two PROMOD runs SWEPCO conducted, this is reason enough to reject SWEPCO's projected economic benefits of the wind project.

136 Direct Testimony of Karl R. Bletzacker, SWEPCO Ex. 9 (Bletzacker Dir.) at 1.

137 TIEC Ex. 38.

138 TIEC Ex. 39.

139 Tr. at 390:6-8 (Bletzacker Cross) (Feb. 14, 2018).

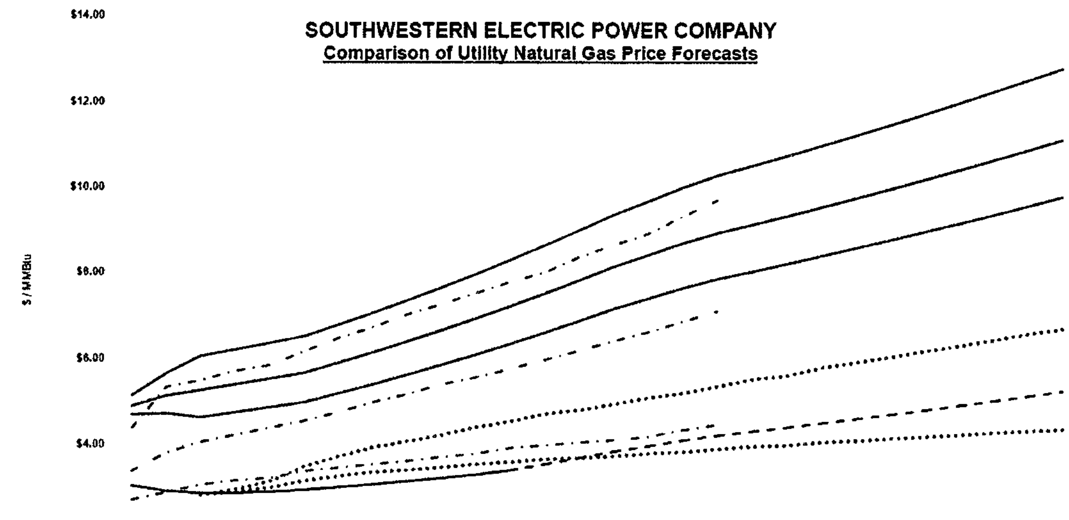
140 TIEC Ex. 39.

141 Rebuttal Testimony and Exhibits of Richard G. Smead, SWEPCO Ex. 22 (Smead Reb.) at 7.

142 *Id.* at 8.

Mr. Bletzacker's longer-term projections are also unreasonably high. The evidence demonstrates that his projections are substantially higher than, among other things, the projections of (i) other Texas utilities presented in recent Commission CCN cases; (ii) the third-party consultants that Mr. Bletzacker himself relies on in developing his Fundamentals Forecast, and (iii) the EIA.

First, Mr. Bletzacker's projections are higher than those presented by SPS and ETI in their recent Commission proceedings. SPS's forecast was presented in SPS's pending wind-project CCN application.[143] ETI's forecast was presented in its application to construct the Montgomery County Power Station, which was filed in late 2016, when gas price forecasts were higher.[144] The discrepancy between SWEPCO's projections and SPS's and ETI's projections is shown in Mr. Pollock's Exhibit JP-1, which is reproduced here:[145]



	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
SWE High	$5.14	$5.65	$6.05	$6.21	$6.36	$6.52	$6.79	$7.06	$7.38	$7.65	$7.97	$8.30	$8.63	$8.99
SWE Base	$4.89	$5.13	$5.26	$5.39	$5.53	$5.67	$5.90	$6.14	$6.40	$6.66	$6.93	$7.21	$7.51	$7.82
SWE Low	$4.69	$4.72	$4.63	$4.75	$4.87	$4.99	$5.19	$5.41	$5.63	$5.86	$6.10	$6.35	$6.61	$6.88
ETI High	$4.38	$5.33	$5.49	$5.70	$5.84	$6.17	$6.47	$6.73	$7.02	$7.26	$7.53	$7.78	$8.01	$8.36
ETI Base	$3.38	$3.80	$4.06	$4.23	$4.39	$4.55	$4.76	$4.99	$5.17	$5.40	$5.57	$5.75	$5.97	$6.19
ETI Low	$2.70	$2.88	$3.05	$3.16	$3.21	$3.38	$3.48	$3.54	$3.62	$3.72	$3.78	$3.93	$3.99	$4.08
SPS UBase			$2.81	$2.95	$3.13	$3.43	$3.72	$3.90	$4.07	$4.23	$4.41	$4.56	$4.72	$4.81
SPS ULow			$2.81	$2.89	$2.99	$3.15	$3.27	$3.34	$3.41	$3.47	$3.56	$3.60	$3.67	$3.69
NYMEX	$3.03	$2.91	$2.85	$2.87	$2.90	$2.96	$3.01	$3.08	$3.16	$3.23	$3.31	$3.41	$3.55	$3.70

	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
SWE High	$9.36	$9.67	$9.99	$10.25	$10.49	$10.72	$10.96	$11.20	$11.45	$11.70	$11.95	$12.22	$12.49	$12.76
SWE Base	$8.14	$8.41	$8.68	$8.93	$9.12	$9.32	$9.53	$9.74	$9.95	$10.17	$10.39	$10.62	$10.86	$11.10
SWE Low	$7.16	$7.40	$7.64	$7.88	$8.03	$8.21	$8.39	$8.57	$8.76	$8.95	$9.15	$9.35	$9.55	$9.76
ETI High	$8.65	$8.91	$9.32	$9.69										
ETI Base	$6.41	$6.62	$6.86	$7.10										
ETI Low	$4.11	$4.19	$4.35	$4.47										
SPS UBase	$4.95	$5.09	$5.20	$5.36	$5.52	$5.61	$5.79	$5.91	$6.04	$6.17	$6.30	$6.43	$6.56	$6.69
SPS ULow	$3.74	$3.79	$3.83	$3.90	$3.96	$3.99	$4.06	$4.10	$4.14	$4.19	$4.23	$4.28	$4.32	$4.36
NYMEX	$3.85	$3.98	$4.11	$4.22	$4.32	$4.41	$4.51	$4.61	$4.71	$4.81	$4.92	$5.03	$5.14	$5.25

Source: S&P Global Market Intelligence, TIEC 1-13, Attachment JSA-2-U and JSA-3-U (Docket No. 46936 - SPS), TIEC 3-8 (Docket 46416 - ETI)
NYMEX Futures through 2029 from S&P Global Market Intelligence than escalated at same rate as SWEPCO base forecast

Mr. Pollock also calculated the levelized prices of the various forecasts in Table 2 of his Direct Testimony:[146]

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[143] TIEC Ex. 1, Pollock Dir. at 12.

[144] *Id.*

[145] *Id.* at Ex. JP-1.

[146] TIEC Ex. 1, Pollock Dir. at 12.

Table 2 Comparison of Projected Levelized Natural Gas Price Forecasts ($/MMBtu)			
Utility	**CCN Docket No.**	**Sensitivity**	**Amount**
SWEPCO	47461	High	$8.45
		Base	$7.35
		Low	$6.46
ETI	46416	High	$7.19
		Base	$5.32
		Low	$3.68
SPS Update	46936	Base	$4.48
		Low	$3.55
NYMEX Trended			$3.58

As can be seen, even SWEPCO's low case is on a levelized basis nearly $2 per MMBtu higher than SPS's *base* case, and over $1 per MMBtu higher than ETI's 2016 *base* case. On an apples-to-apples basis, SWEPCO's base case is nearly $3 per MMBtu higher than SPS's base case, and over $2 per MMBtu higher than ETI's 2016 base case. There can be no doubt that SWEPCO's gas forecast is an outlier compared to those presented by its peer utilities in recent Commission proceedings.

[redacted][147] In fact, Mr. Bletzacker reviewed the 2015 versions of these forecasts when developing the gas price projections he presents in this case.[148] Mr. Pollock compared those 2015 IHS-CERA and PIRA forecasts, along with updated 2017 versions, to SWEPCO's projected gas prices in his supplemental direct testimony:[149]

[147] Supplemental Direct Testimony and Exhibits of Jeffry Pollock, TIEC Ex. 2 (Pollock Supp. Dir.) at 3.

[148] TIEC Ex. 42 at 2.

[149] Highly Sensitive Portion of the Supplemental Direct Testimony and Exhibits of Jeffry Pollock, TIEC Ex. 2A (HS Pollock Supp. Dir.) at 3.

Table 8 Comparison of Levelized Henry Hub Natural Gas Price Forecasts Base Case ($/MMBtu)		
Utility	**Year**	**Amount**
SWEPCO	2016	$7.05[150]
IHS/CERA	2015	[redacted]
	2017	[redacted]
PIRA	2015	[redacted]
	2017	[redacted]

[redacted]

SWEPCO's forecasts are also significantly higher than the forecasts produced by the EIA, despite the fact that Mr. Bletzacker reviews and relies on the EIA's forecasts in developing his own.[151] SWEPCO's base case is 34% higher than the recently released 2018 EIA AEO reference case.[152] In fact, SWEPCO's base case is higher than all of the 2018 EIA cases except for the outlier Low-Tech case,[153] and it is 22% higher than the average of all 2018 EIA cases.[154] Moreover, even SWEPCO's low case is higher than the average of all 2018 EIA cases for every year until 2042.[155]

(ii) Prior AEP Fundamentals Forecasts have consistently overstated future natural gas prices.

SWEPCO's inflated projections presented in this case are simply the latest example of the Fundamentals Forecast exaggerating future gas prices. As set out in Mr. Pollock's Exhibit

[150] Note that the 7.05% levelized figure for SWEPCO's base case differs from the $7.35 figure presented in Mr. Pollock's direct testimony because the comparison to the third-party forecasts covers a different period of years. TIEC Ex. 2A (HS Pollock Supp. Dir.) at 3, Ex. JP-SD-3.

[151] Tr. at 340:10-15 (Bletzacker Cross) (Feb. 14, 2018).

[152] *Compare* TIEC Ex. 38 (average nominal Henry Hub price from 2020-2045 of $8.31) *with* TIEC Ex. 39 (average nominal Henry Hub price from 2020-2045 of $6.22). $8.31/$6.22 = 134%.

[153] *Compare* TIEC Ex. 38 *with* TIEC Ex. 78 (average nominal Henry Hub price from 2020-2045 of $10.30 for the low-tech case, and $7.71 for the second-highest case).

[154] *Compare* TIEC Ex. 38 *with* TIEC Ex. 78 (average nominal Henry Hub price from 2020-2045 for all cases of $6.80). $8.31/$6.80 = 122%.

[155] SWEPCO Ex. 31.

JP-SD-1, Mr. Bletzacker's prior forecasts have consistently overstated actual future natural gas prices[156]:

SOUTHWESTERN ELECTRIC POWER COMPANY
Forecast Versus Actual Henry Hub Natural Gas Prices
($/MMBtu)

Line	Description	2012	2013	2014	2015	2016
		(1)	(2)	(3)	(4)	(5)
	Past SWEPCO Forecasts					
1	2007 Q4	$6.60	$6.75	$6.91	$7.07	$7 23
2	2H2009	$5.83	$6.78	$8.07	$8.26	$8.45
3	2010 2H	$4.87	$5.14	$5.44	$5.65	$6.12
4	2011 2H	$4.48	$4.94	$5.38	$5.52	$5.99
5	2012 2H		$4.84	$5.26	$5.44	$5 97
6	2013 2H		$4.04	$5.05	$5.47	$5 83
7	2015 1H					$4.34
8	**Actual Henry Hub Gas Prices**	$2.75	$3.73	$4.37	$2.63	$2 52
	Percentage Variance					
9	2007 Q4	240%	181%	158%	269%	287%
10	2H2009	211%	182%	185%	314%	336%
11	2010 2H	177%	138%	124%	215%	243%
12	2011 2H	163%	132%	123%	210%	238%
13	2012 2H		130%	120%	207%	237%
14	2013 2H		108%	115%	208%	232%
15	2015 1H					172%

Dating back to 2007, each of these forecasts has missed the mark on the high side, and often by substantial margins. On the whole, the forecasts are 1.2 to over 3 times the actual Henry Hub natural gas prices.[157] Mr. Bletzacker's answer to this has been to point out that the Fundamentals Forecast is weather-normalized, and that certain of the years covered in the above comparison were unusually warm.[158] But Mr. Bletzacker has made no effort whatsoever to quantify the impact of weather on the results of his prior forecasts.[159] Moreover, Mr. Bletzacker's uses a 30-year period for weather-normalization, which the Commission rejected in favor of a 10-year period in both of SWEPCO's last two rate cases.[160] Indeed, as Mr. Smead testified at the hearing with respect to Mr. Bletzacker's methodology, 30-year normal weather "is pretty cold."[161] Mr.

[156] TIEC Ex. 2, Pollock Supp. Dir. at Ex. JP-SD-1.

[157] TIEC Ex. 1, Pollock Dir. at 15.

[158] Rebuttal Testimony of Karl R. Bletzacker, SWEPCO Ex. 21 (Bletzacker Reb.) at 12-14.

[159] Tr. at 370:9-14 (Bletzacker Cross) (Feb. 14, 2018).

[160] Docket No. 40443, Order on Rehearing at FoFs 257-58; Docket No. 46449, Order at FoFs 272-73.

[161] Tr. at 843:23-844:4 (Smead Cross) (Feb. 16, 2018).

Bletzacker's use of weather as an excuse for consistently—and substantially—overstating future natural gas prices for over a decade is without merit.

It is worth noting that Mr. Bletzacker does not analyze the results of his prior forecast to see how they fared in comparison to the actual commodity prices that came to fruition. If his concern is weather, he could perform such an analysis on a weather-normalized basis. But analyzing the results of his prior forecasts in comparison to actual prices, on a weather-normalized basis or otherwise, is simply not part of Mr. Bletzacker's process.[162] It is thus unsurprising that Mr. Bletzacker has not made any changes to the methodology of the Fundamentals Forecast since 2005 when he started at AEP despite the fact that his projections have been consistently overstated.[163]

(iii) Mr. Bletzacker's forecasting methodology does not demonstrate that his forecasts are reliable.

Much of SWEPCO's defense of its natural gas projections is spent on stressing that they are the result of a model-driven, "fundamentals-based" methodology,"[164] as if this could excuse consistently inflated results. The evidence, however, shows that Mr. Bletzacker's methodology is opaque and does not buttress the credibility of his forecast.

While Mr. Bletzacker uses the AURORA model to conduct the Fundamentals Forecast, the results depend heavily on his judgment. As he put it, natural gas prices are both an input and an output of this model.[165] He begins the process by inputting the results of his prior Fundamentals Forecast into the model.[166] He makes numerous—potentially hundreds—of runs of that model to measure changes in electric demand at a given price of natural gas.[167] At the end of each model run, he manually changes the price of natural gas based on an assumed price-elasticity ratio.[168] Mr. Bletzacker's elasticity ratio measures changes in demand over changes in

[162] Mr. Bletzacker testified that, as to analyzing his prior forecasts on a weather-normalized basis, he has "gone through some of those exercises, but really just in a cursory fashion." Tr. at 368:1-9 (Bletzacker Cross) (Feb. 14, 2018).

[163] *Id.* at 368:24-369:8.

[164] SWEPCO Ex. 21, Bletzacker Reb. at 6; SWEPCO Ex. 22, Smead Reb. at 35.

[165] Tr. at 357:16-21 (Bletzacker Cross) (Feb. 14, 2018).

[166] *Id.* at 358:15-18.

[167] *Id.* at 358:19-359:24, 364:13-365:1.

[168] *Id.* at 365:12-17.

price.[169] He assumes that supply will equal demand, and thus need not be separately accounted for.[170] There are no written parameters or calculations that govern when the model runs are complete.[171] Rather, Mr. Bletzacker simply decides in his judgment when he believes that the process has run its course.[172]

The price-elasticity ratio that Mr. Bletzacker employs is not an output of any model, but is externally derived based on his judgment and review of research information, such as EIA data.[173] For this case, he used a ratio of "roughly" 0.8 to 1.0.[174] That single ratio was applied to all sectors of the economy in all of North America.[175] Mr. Bletzacker applied a different elasticity ratio within that range in each year of his forecast, but he does not keep a record of the ratio that was used in any particular year.[176] Nor does he preserve the results of the model runs he makes in his iterative process.[177] And he does not save the elasticity ratios he used in prior forecasts, which means that they cannot be evaluated after-the-fact as to whether they proved to be accurate in light of the actual demand and price changes that came to pass.[178]

As the foregoing makes clear, Mr. Bletzacker's methodology for arriving at his natural gas projections is based almost exclusively on his judgment, and is almost completely lacking in any paper trail. SWEPCO's references to the process Mr. Bletzacker follows do not demonstrate that the Fundamentals Forecast gas prices are reasonable.

(iv) Mr. Smead's testimony does not demonstrate that SWEPCO's projected natural gas prices are reasonable.

SWEPCO retained Mr. Smead to opine on the reasonableness of the Fundamentals Forecast in an effort to bolster the credibility of Mr. Bletzacker's projections. But Mr. Smead's testimony accomplishes no such thing.

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[169] *Id.* at 359:25-360:8.

[170] *Id.* at 360:9-361:2

[171] TIEC Ex. 46.

[172] *Id.*; Tr. at 357:22-358:11 (Bletzacker Cross) (Feb. 14, 2018).

[173] TIEC Ex. 44; TIEC Ex. 47.

[174] Tr. at 363:8-10 (Bletzacker Cross) (Feb. 14, 2018).

[175] *Id.* at 366:9-18.

[176] *Id.* at 364:2-12.

[177] TIEC Ex. 44.

[178] TIEC Ex. 45.

In his prefiled testimony, Mr. Smead testifies that be believes that SWEPCO uses a "reasoned methodology" in the Fundamentals Forecast.[179] However, at the hearing he could only testify to that methodology in general terms.[180] In fact, he was not even aware of what price-elasticity ratios Mr. Bletzacker used, which, as described, are among the most important assumptions used in developing the Fundamentals Forecast:

> Q. And do you know what elasticities Mr. Bletzacker used in his fundamentals forecast?
>
> A. I don't in any detail. I think they're sourced out of EIA data, though.
>
> Q. Okay. So you didn't evaluate what elasticity he applied in any given year for his analysis?
>
> A. No.[181]

Mr. Smead's testimony also reveals that he did not evaluate the changes that Mr. Bletzacker makes to the forecast between model runs, and that Mr. Smead is not aware of how Mr. Bletzacker decides when the process is complete:

> Q. Okay. And did you have any way to evaluate the changes that Mr. Bletzacker made between runs on his model?
>
> A. No.
>
> Q. And do you have a rough sense of how many runs he makes?
>
> A. No. I -- I understand informally that it's a lot.
>
> Q. Okay. And do you have any sense of how Mr. Bletzacker knows when it's time to stop running his model and that the fundamentals forecast is complete?
>
> A. I think it has to do with how tired he looks.
>
> (Laughter)
>
> A. No, I don't know how they make that decision.[182]

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[179] SWEPCO Ex. 22, Smead Reb. at 7.

[180] Tr. at 843:23-844:24 (Smead Cross) (Feb. 16, 2018).

[181] *Id.* at 844:25-845:6.

Additionally, Mr. Smead testified that he did not review the results of prior Fundamentals Forecasts in performing his analysis in this case.[183] Mr. Smead's testimony that Mr. Bletzacker's methodology is reasonable lacks any reliable basis.

Mr. Smead's tepid support of Mr. Bletzacker's projections themselves is equally unconvincing. As noted, with respect to near-term projections, Mr. Smead affirmatively testified that Mr. Bletzacker's projections are higher than the industry outlook.[184] As to the longer-term, Mr. Smead's testimony was that the "fundamentals are in place to keep prices reasonable and stable."[185] While Mr. Smead warned of "negative surprises" that could occur and change current market dynamics, he emphasized that he did not have any opinion as to whether these negative factors might actually occur.[186] Nevertheless, he testified that "SWEPCO's natural gas prices analysis is reasonable for the purposes for which it is intended."[187]

To demonstrate that the Fundamentals Forecast projections are reasonable, Mr. Smead relies primarily on his analysis that they are in the range of EIA cases.[188] But, as noted, under the 2018 EIA AEO, SWEPCO's base case is higher than all cases except for EIA's single highest case.[189] Thus, Mr. Smead's testimony appears to be that, as long as there is a single EIA case higher than a given natural gas forecast, that forecast is reasonable.[190] At the same time, however, Mr. Smead testified that EIA's highest and lowest cases are outliers compared to its other cases.[191] And he testified that EIA's lowest case has been the most accurate in recent years,[192] which means that the highest case has been the least accurate. Thus, it is difficult to see how the mere fact that SWEPCO's base case is lower than an single outlying EIA side case demonstrates that SWEPCO's projections are reasonable. Mr. Smead's testimony simply does not demonstrate that SWEPCO's use of Mr. Bletzacker's natural gas projections is reasonable.

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182 *Id.* at 845:7-20.

183 *Id.* at 847:11-15.

184 SWEPCO Ex. 22, Smead Reb. at 8.

185 *Id.* at 26.

186 *Id.* at 28-29, 34.

187 *Id.* at 7, 34

188 *Id.* at 11-12.

189 *Compare* TIEC Ex. 38 *with* TIEC Ex. 78.

190 Tr. at 837:7-25 (Smead Cross) (Feb. 16, 2018).

191 *Id.* at 833:1-11.

192 *Id.* at 833:20-24. EIA's lowest case is the "High-Resource, High-Tech" case. SWEPCO Ex. 22, Smead Reb. at 11.

(v) Mr. Bletzacker's total disavowal of the predictive value of natural gas futures contracts is meritless.

Mr. Bletzacker spends most of his rebuttal testimony attacking the predictive value of NYMEX futures.[193] His testimony is that futures prices have no predictive value as to what an actual future price of natural gas will be.[194] Notably, both SPS and ETI utilized NYMEX futures prices to some extent in their above-described forecasts.[195] It is thus evident that neither SPS nor ETI—both of which had the same incentive to put forth high-side gas price projections in their cases as SWEPCO has in this case[196]—share Mr. Bletzacker's extreme view on futures markets. In fact, SPS used futures as part of its forecasting methodology throughout its forecast period.[197]

Mr. Bletzacker's arguments that futures provide no valuable information whatsoever as to the future price of natural gas are without merit. He focuses on the fact that there are hedging and spreading activities in the futures market,[198] and notes that futures contracts have certain features such as uniform flow rates.[199] But as he admits, participants in futures markets are aware of these activities and features.[200] Indeed, as Mr. Pollock testified, futures prices are "highly visible because they are widely disseminated by the various financial and commodity exchanges."[201] Thus, futures contracts, which, of course, require a willing buyer and seller in an actual market, do in fact provide valuable price discovery, notwithstanding activities such as hedging.[202]

Mr. Bletzacker also argues that futures contracts are illiquid beyond the near term, which he defined as three to five years.[203] As an initial matter, this is a strange criticism considering that Mr. Bletzacker believes that futures have no predictive value at all.[204] Moreover, this

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[193] SWEPCO Ex. 21, Bletzacker Reb. at 2-6.

[194] Tr. at 351:7-17 (Bletzacker Cross) (Feb. 16, 2018).

[195] TIEC Ex. 1, Pollock Dir. at 12.

[196] *Id.* at 15.

[197] From years 2022 through the end of the period, SPS's forecast was based 25% on escalated NYMEX futures and 75% on three third-party consultants' forecasts. *Id.* at 13.

[198] SWEPCO Ex. 21, Bletzacker Reb. at 2.

[199] *Id.*

[200] Tr. at 1019:25-1020:13 (Bletzacker Cross) (Feb. 20, 2018).

[201] TIEC Ex. 1, Pollock Dir. at 13.

[202] *Id.* at 13-14.

[203] Tr. at 1021:20-25 (Bletzacker Cross) (Feb. 20, 2018).

[204] Tr. at 351:7-354:3 (Bletzacker Cross) (Feb. 14, 2018).

contention does nothing to explain why futures cannot be a useful predictive tool at least in that near term when there is liquidity. Nor does it explain why futures prices could not be escalated into out years to provide some market-driven data point to compare to a theoretically derived, "fundamentals-based" forecast.

Mr. Bletzacker also notes that the price of a futures contract can fluctuate widely during its 12-year life.[205] But this is entirely unsurprising. As a futures contract approaches its expiration date, conditions change and so do market participants' views as to the likely future price of natural gas. Indeed, in the last decade natural gas prices have fallen substantially, and so have average futures prices, as demonstrated by Mr. Bletzacker's own rebuttal charts.[206] Moreover, natural gas forecasts can also change substantially over different vintages. But this does not mean that an older vintage forecast never provided any valuable information even when it was the most current version.[207]

In the end, Mr. Bletzacker's contentions that futures provide no information whatsoever as to the actual future price of natural gas are merely an attempt to distract from his history of providing inflated projections. They should be rejected.

(vi) SWEPCO is using a stale 2016 forecast.

SWEPCO's natural gas forecast suffers from an additional flaw: it is stale. Mr. Bletzacker developed the Fundamentals Forecast he presents in this case in October 2016,[208] and he has not updated it. Since that time, other natural gas price forecasts have dropped significantly. For example, the average reference-case natural gas projection from the 2018 EIA AEO is 20% lower than the same projection from the 2016 EIA AEO.[209] [redacted][210] Nevertheless, Mr. Bletzacker's testimony is that "there have been no changes in the long-term drivers of long-term North American energy market fundamentals sufficient

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[205] SWEPCO Ex. 21, Bletzacker Reb. at 5.

[206] *Id.* at 3-4, Figs. 1 & 2.

[207] Tr. at 1022:15-24 (Bletzacker Cross) (Feb. 20, 2018).

[208] Tr. 338:22-25 (Bletzacker Cross) (Feb. 14, 2018).

[209] *See supra* note 8 and accompanying text.

[210] TIEC Ex. 2A, HS Pollock Supp. Dir. at 3. [redacted]

enough to justify" undertaking a new forecast.[211] Notably, 2017 is only the second year since 2010 in which Mr. Bletzacker decided that it was unnecessary to conduct a Fundamentals Forecast.[212] SWEPCO's decision to use a stale forecast in its economic analysis of a $4.5 billion capital addition is dubious. And given the above-described evidence, the Commission should consider that even Mr. Bletzacker's inflated estimates would likely be lower if he were to run a new Fundamentals Forecast today.

(b) Cost of Carbon

SWEPCO assumes that an unprecedented carbon tax will be imposed beginning in 2024.[213] This assumption is set out in Mr. Bletzacker's testimony:

> The 2016 Fundamentals Forecast employed a CO2 dispatch burden (allowance price) on all existing fossil fuel-fired generating units that escalates from $2.92 per ton in 2024 to $26.31 per ton in 2032 in order to achieve national mass-based emission targets similar to those proposed in the Clean Power Plan.[214]

As SWEPCO acknowledges, the escalating carbon-tax assumption increases the LMPs in its modeling, which in turn increases the projected net benefits of the wind project.[215]

SWEPCO's carbon-tax assumption is without merit. SWEPCO did not present any witness on environmental policy or, for that matter, electoral politics, to testify on the likelihood that a carbon tax would be imposed as SWEPCO assumes. In fact, SWEPCO did not even make a statistical assessment of the probability that a carbon tax would be imposed.[216] SWEPCO simply assumed a 100% probability that a carbon tax at the above levels would be adopted and implemented by 2024. Mr. Bletzacker's testimony was that the decision to include the carbon impact was reached by consensus of unnamed AEP personnel who are not witnesses in this case.[217] As Mr. Pollock concluded, SWEPCO's carbon assumption is "sheer speculation."[218]

SWEPCO's carbon-tax assumption is also stale. The assumption is embedded in the 2016 Fundamentals Forecast, and is patterned off of the CPP. However, in November of 2016,

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[211] Tr. at 336:10-17 (Bletzacker Cross) (Feb. 14, 2018).

[212] *Id.* at 346:22-25.

[213] Tr. at 265:5-25 (Pearce Cross) (Feb. 14, 2018).

[214] SWEPCO Ex. 9, Bletzacker Dir. at 9.

[215] Tr. at 382:17-23 (Bletzacker Cross) (Feb. 14, 2018).

[216] CARD Ex. 78.

[217] Tr. at 380:15-381:5 (Bletzacker Cross) (Feb. 14, 2018); CARD Ex. 78.

[218] TIEC Ex. 1, Pollock Dir. at 32.

President Trump was elected, and the Environmental Protection Agency (EPA) has proposed to repeal the CPP.[219] Moreover, the CPP did not include a carbon tax, but rather set national emissions limits.[220] SWEPCO's carbon-tax assumption is thus based on a tax that was not included in a regulatory scheme that is not law.[221] Nevertheless, Mr. Bletzacker testified that he does not believe that his carbon-tax assumption should be removed from the analysis or even delayed to begin at a later date than 2024, the date chosen prior to the 2016 election.[222]

The U.S. government has never adopted a carbon tax like the one assumed by SWEPCO.[223] Instead, in those instances in which Congress has acted on carbon emissions at all, it has done so by incenting renewable-energy generation, rather than penalizing carbon-emitting generation.[224] As Mr. Pollock testified:

> [T]he fact of the matter is, carbon tax has been difficult -- impossible to implement, but extending production tax credits and other incentives seems to be a much more doable and viable option and a more acceptable option. And so if -- if policymakers want to continue to do that and feel it is their need to do that, I think the more likely scenario is that you're going to continue with some sort of tax credits rather than a tax on fossil fuel generation.[225]

Notably, if new tax credits for renewable energy sources were enacted, or PTCs such as the ones at issue in this case were extended,[226] this would have the opposite impact on LMPs as SWEPCO's assumed carbon tax; it would lower them rather than raising them.[227] But SWEPCO did not include any assumption of additional (or extended) production tax credits in its economic analysis.[228]

Given the difficulty that Congress has had in coalescing around a carbon tax in the last

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[219] *Id.*; *Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units*, 82 Fed. Reg. 48,035 (Oct. 16, 2017).

[220] Tr. at 265:15-25 (Pearce Cross) (Feb. 14, 2018).

[221] 82 Fed. Reg. 48,035; *Chamber of Commerce v. EPA*, 136 S. Ct. 999 (Feb. 9, 2016) (mem. op.) (staying the CPP).

[222] Tr. at 381:15-382:4 (Bletzacker Cross) (Feb. 14, 2018).

[223] Tr. at 265:5-25 (Pearce Cross) (Feb. 14, 2018).

[224] Tr. at 507:24-508:8 (Pollock Cross) (Feb. 15, 2018).

[225] *Id.*

[226] The PTCs are currently scheduled to expire in 2020. 26 U.S.C. § 45(d)(1).

[227] Tr. at 536:20-537:4 (Pollock Redir.) (Feb. 15, 2018); TIEC Ex. 1, Pollock Dir. at 32.

[228] Tr. at 537:5-8 (Pollock Redir.) (Feb. 15, 2018).

decade, Mr. Pollock testified that the imposition of a carbon tax is unlikely.[229] He also testified that the need for a carbon tax is diminishing with time, as many carbon-emitting resources are declining based on their own economic merit.[230] Simply put, the evidence does not support SWEPCO's assumption that an unprecedented carbon tax would be imposed (and that no further credits for renewable generation would be adopted), and that assumption should not be considered in evaluating the economics of the wind project.

The impact of SWEPCO's carbon assumption is significant, though SWEPCO did not even quantify it, apparently believing that it was not important for the Commission to understand the degree to which the assumption impacts SWEPCO's economic analysis.[231] Mr. Pollock and Mr. Norwood, however, testified that the impact is to reduce SWEPCO's projected net benefits for the wind project by approximately $550 million (NPV).[232]

This NPV quantification of the carbon impact is consistent with the nominal impact shown in TIEC Exhibits 32 and 33, which were admitted during the cross-examination of Mr. Pearce. As Mr. Pearce confirmed, TIEC Exhibit 32 contains no-carbon sensitives provided by SWEPCO in discovery in this case.[233] The third page of that exhibit is the project no-carbon case, i.e., the case with the wind project included and no carbon-tax assumed.[234] This case shows total net production costs of $18.2 billion from 2021 to 2045 with the wind project.[235] The second page of the exhibit is the baseline, no-carbon case, i.e., the case without the wind project included.[236] This case shows total net production costs of $26.2 billion from 2021 to 2045 without the wind project.[237] Thus, the total net production cost savings from the wind project in the no-carbon sensitivity is $8 billion.[238] As shown on TIEC Ex. 33, which is a workpaper from Mr. Pearce's rebuttal Wind Catcher model, SWEPCO's projected production

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229 Tr. at 508:9-16 (Pollock Cross) (Feb. 15, 2018).

230 *Id.* at 510:18-511:1.

231 Tr. at 277:25-278:11 (Pearce Cross) (Feb. 14, 2018); TIEC Ex. 31.

232 Tr. at 534:2-25 (Pollock Redir.) (Feb. 15, 2018); Tr. at 587:20-588:4 (Norwood Redir.) (Feb. 15, 2018).

233 Tr. at 271:11-24 (Pearce Cross) (Feb. 14, 2018).

234 *Id.* at 271:11-272:4.

235 *Id.* at 272:8-272:25; TIEC Ex. 32 at 3.

236 Tr. at 273:2-17 (Pearce Cross) (Feb. 14, 2018); TIEC Ex. 32 at 2.

237 Tr. at 273:13-25 (Pearce Cross) (Feb. 14, 2018); TIEC Ex. 32 at 2.

238 Tr. at 274:6-19 (Pearce Cross) (Feb. 14, 2018).

cost savings from the wind project with the carbon assumption included, is $9.8 billion.[239] Thus, the impact of the carbon assumption on SWEPCO's net production cost savings is $1.8 billion on a nominal basis.[240] Mr. Pollock testified at the hearing that the NPV of this nominal impact is approximately $550 million.[241]

Mr. Pollock's quantification of the carbon-impact is also consistent with Mr. Pfeifenberger's rebuttal testimony. By way of background, in Mr. Pollock's direct testimony, he stated that SWEPCO's economic analysis shows increasing implied heat rates in future years,[242] which Mr. Pollock attributed to a failure to account for evolving technology and the new entry of more efficient generation.[243] However, in his rebuttal testimony, Mr. Pfeifenberger testified that the implied heat rate increase was due to SWEPCO's carbon assumption.[244] Mr. Pfeifenberger also submitted a workpaper that shows his calculation of the impact of the carbon tax per MMBtu of gas burned to generate electricity, and also the market heat rates with and without the carbon tax.[245] Mr. Pollock accepted Mr. Pfeifenberger's point on the stand at the hearing.[246] Mr. Pollock then testified that he had reviewed Mr. Pfeifenberger's calculation of the impact of the carbon tax, and that, based on the output of the wind project, the impact was $685 million.[247] However, Mr. Pollock also acknowledged that there would need to be an offset to account for the fact that SWEPCO's other plants would be burdened by the carbon assumption.[248] Thus, the carbon impact would be somewhat less than the $685 million figure, which is consistent with Mr. Pollock's quantification of $550 million.

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239 *Id.* at 277:12-15; TIEC Ex. 33.

240 As this line of cross-examination reached its conclusion, Mr. Pearce began to argue that the no-carbon sensitivity workpapers in TIEC Ex. 32 were not fully vetted. *See* Tr. at 274:8-12; 277:16-24 (Pearce Cross) (Feb. 14, 2018). However, these are the sensitivities that SWEPCO provided when TIEC requested an economic analysis without the carbon assumption. TIEC Ex. 31, 32. And other than that they had not gone through the full "vetting" process, Mr. Pearce did not provide any reason to doubt their accuracy. Moreover, SWEPCO is the party with the burden of proof, and having failed to quantify the impact of its carbon-tax assumption, it should not be heard to object that its own discovery responses on the subject have not been "vetted."

241 Tr. at 534:13-19 (Pollock Redir.) (Feb. 15, 2018).

242 The implied heat rates were derived by dividing SWEPCO's projected average LMP by the corresponding projected annual average natural gas price. TIEC Ex. 1, Pollock Dir. at 33-34.

243 *Id.* at 33-34 & Ex. JP-7.

244 Rebuttal Testimony of Johannes P. Pfeifenberger, SWEPCO Ex. 24 (Pfeifenberger Reb.) at 28-29.

245 Workpapers to the Rebuttal Testimony of Johannes P. Pfeifenberger, SWEPCO Ex. 24A (Pfeifenberger Reb. Workpapers), JPP-WP-R3, Tab "From Pollock Workpapers."

246 Tr. at 480:15-481:13 (Pollock Dir.) (Feb. 15, 2018).

247 Tr. at 533:16-24 (Pollock Redir.) (Feb. 15, 2018).

248 *Id.* at 533:16-534:25.

In sum, SWEPCO's carbon-tax assumption is unwarranted and has a substantial impact on the economic analysis of the wind project.

(c) Other Assumptions

In addition to using exaggerated natural gas prices and assuming the imposition of a carbon tax, SWEPCO's analysis contains another major flaw that inflates its assumed LMPs. As SWEPCO itself concedes, its modeling does not adequately account for wind projects that are already deep in the SPP-planning stages.[249] This is significant because an increase in wind generation puts downward pressure on LMPs.[250] As noted, the market-clearing LMP price is established by the highest-priced generator in the bid stack that satisfies the system need. A generator's offer curve submitted to SPP generally reflects the generator's marginal cost.[251] As such, wind generators typically bid negative prices because wind plants have little to no variable costs, and PTCs reduce the bid to below zero.[252] Consequently, as more wind is offered into the SPP market, less efficient generation gets pushed higher in the bid stack and becomes less likely to be selected for dispatch, thereby reducing LMPs.[253]

As set out in Mr. Pollock's testimony, SPP is experiencing a substantial wind build-out, for which SWEPCO's modeling fails to adequately account.[254] Specifically, SWEPCO used SPP's 2017 Integrated Transmission Plan (ITP) 10, "Future 3" planning scenario in its PROMOD runs.[255] Future 3 assumes total nameplate wind capacity in SPP of 16,605 MW in 2020 and 17,025 MW in 2025.[256] However, as Mr. Pollock testified, a more realistic (and current)[257] appraisal would show that 30,785 MW of wind capacity is expected by 2022, which represents an increase of 16,600 MW relative to 2016.[258] Mr. Pollock arrived at this estimate by considering the status of wind projects in the active SPP Generation Interconnection Queue as of November 21, 2017, as shown in his exhibit JP-4:

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[249] SWEPCO Ex. 24, Pfeifenberger Reb. at 3.

[250] TIEC Ex. 1, Pollock Dir. at 28.

[251] *Id.*

[252] *Id.*

[253] *Id.*

[254] *Id.* at 26-27.

[255] *Id.* at 22.

[256] SWEPCO Ex. 24, Pfeifenberger Reb. at 4-5 & n.3.

[257] The 2017 ITP 10 report was completed in January 2017. TIEC Ex. 1, Pollock Dir. at 21.

[258] *Id.* at 26-27.

SOUTHWESTERN ELECTRIC POWER COMPANY
Summary of Wind and Solar Capacity Additions
in the 11/21/17 SPP Generation Interconnection Queue
(MW)

Line	Development Stage	Wind	Solar	Total
		(1)	(2)	(3)
1	Projects With Pending or Completed Interconnection Agreements	6,057.5	170.0	6,227.5
2	Total Above Plus Projects in the Facility Study Stage	16,361.9	1,269.3	17,631.2
3	Total Above Plus Projects in the Definitive Interconnection System Impact Study Stage*	40,440.3	8,059.3	48,499.6

Source: https://studies.spp.org/SPPGeneration/GI_ActiveRequests.cfm
* Includes SPS's and SWEPCO's proposed wind projects.

As can be seen, over 6,000 MW of planned wind capacity already has a pending or completed Generation Interconnection Agreement (GIA), which means that these projects are nearly certain to be completed.[259] Moreover, over 10,000 MW of additional wind projects are in the SPP Facility Study Stage, which is the last step prior to executing a GIA.[260] And approximately 24,000 MW of additional wind-project capacity is in the Definitive Interconnection System Impact Study stage, which, as a point of reference, includes projects such as Wind Catcher and the proposed SPS wind projects.[261] Given that a total of over 40,000 MW of additional wind capacity is in the active generation queue, Mr. Pollock's assumption that 16,600 MW will be added to SPP by 2022 is conservative, and his estimate that there will be approximately 30,785 MW of wind capacity in SPP by 2022, rather than the 16,605 to 17,025 MW assumed in Futures 3 for that time frame, is reasonable.

SWEPCO witness Mr. Pfeifenberger acknowledges both that Futures 3 undercounts the amount of wind that will be developed in the SPP footprint during the relevant time frame, and

[259] *Id.* at 27.
[260] *Id.*
[261] *Id.*

that including more wind would tend to reduce LMPs.[262] Nevertheless, Mr. Pfeifenberger attempts to downplay both the amount of wind that should be added to the analysis and the impact it would have. First, Mr. Pfeifenberger argues that Futures 3 understates the amount of wind by only approximately 6,000 MW in the 2020-2025 timeframe, which is based on his assertion that only the wind projects with pending or executed GIAs—the first line on Mr. Pollock's exhibit JP-4—should be counted.[263] However, as Mr. Pfeifenberger reluctantly conceded at the hearing, assuming only those projects will be constructed excludes not only Wind Catcher itself, but also the SPS proposed wind projects, which are the subject of a settlement agreement that has been widely discussed in this case.[264] It would, of course, also exclude all of the projects on line 2 of JP-4, despite the fact that these projects are only one step away from obtaining a GIA. SWEPCO is the party with the burden of proof, and Mr. Pfeifenberger has simply not offered any credible rationale for excluding each and every wind project—all 34,000 MW of capacity identified on lines 2 and 3 of JP-4—that Mr. Pollock identified as in the active SPP queue but not yet having a pending or completed GIA. Indeed, SPP itself has recognized that wind generation is expected to continue to grow and that this is "becoming a contributing factor to the low levels of SPP energy prices."[265] And SWEPCO's own witnesses have discussed the expansion of wind projects in the SPP in this case. In fact, Mr. Pearce testified to the possibility that wind farms even larger than Wind Catcher may be on the horizon, noting that "while Wind Catcher is a very large wind farm, there's some discussions of even larger ones. And SPP seems like it would be a potential area for that."[266]

SWEPCO's attempts to minimize the impact that additional wind would have on future LMPs are similarly unavailing.[267] Mr. Pfeifenberger concedes that assuming additional wind would lower LMPs, but contends that the impact would be minimal. Specifically, he argues that

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[262] SWEPCO Ex. 24, Pfeifenberger Reb. at 3-4, 6.

[263] *Id.* at 4.

[264] Tr. at 796:5-797:23 (Pfeifenberger Cross) (Feb. 16, 2018); TIEC Ex. 65.

[265] TIEC Ex. 1, Pollock Dir. at 26, 29.

[266] Tr. at 317:24-318:4 (Pearce Cross) (Feb. 14, 2018); *see also id.* at 327:10-24.

[267] Mr. Pfeifenberger's primary tactic on this score is to change the subject by repeatedly arguing that additional wind would increase the economics of Wind Catcher *relative* to the Generic Wind case. He makes this argument in his rebuttal testimony no fewer than seven times. SWEPCO Ex. 24, Pfeifenberger Reb. at 2, 5-16, 17-19, 21-23, 32-33, 35-36, 38-39. However, Mr. Pollock did not compare the economics of the Wind Catcher project to the Generic Wind case at any point in his testimony. Mr. Pollock's testimony is that additional wind will reduce LMPs compared to a scenario in which that additional wind is not added, a point that, as discussed above, Mr. Pfeifenberger eventually concedes in his rebuttal testimony. *See id.* at 6; TIEC Ex. 1, Pollock Dir. at 28.

adding what he considered to be an appropriate amount of additional wind would reduce AEP load zone LMPs by 5%,[268] reduce LMPs at the Wind Catcher injection node in Tulsa by 4%,[269] and reduce SWEPCO's generation LMPs by 1.5%.[270] As an initial matter, Mr. Pfeifenberger's analysis is based on including only 5,700 MW of additional wind capacity in the model runs, which as discussed above, is an unreasonable assumption given the continued growth of wind in the SPP. A more reasonable assumption would be that at least 14,000 MW of additional wind should be added, which—by itself—would more than double the impacts estimated by Mr. Pfeifenberger.[271]

Moreover, Mr. Pfeifenberger's analysis understates the impact that additional wind would have on LMPs by virtue of overstating the impact of congestion costs.[272] Even assuming that Mr. Pfeifenberger is correct that no additional wind will be built in the eastern portion of SPP, because SWEPCO limited its modeling of SPP to the 2020 and 2025 PROMOD runs, it has ignored any subsequent build-out of the SPP transmission system that would occur to address the proliferation of wind resources over the remaining 20 years that Wind Catcher would be in-service.[273] As noted above, in its PROMOD runs, SWEPCO used one of the planning scenarios from the 2017 ITP10. The 2017 ITP10, which was completed in January 2017, contains the transmission projects that SPP has approved over a ten-year planning horizon.[274] Projects outside that time period are not included in the ITP10, and therefore were also not included in SWEPCO's analysis. Indeed, SWEPCO's witness Mr. Bradish testified that SPP is considering the construction of EHV transmission to create a wind "superhighway," but that such a project is beyond the scope of the current ten-year planning horizon.[275] As Mr. Pollock summarized,

[268] Mr. Pfeifenberger testifies that these are the LMPs that SWEPCO pays for its off-system purchases. SWEPCO Ex. 24, Pfeifenberger Reb. at 8.

[269] Mr. Pfeifenberger testifies that these are the LMPs that govern the value of Wind Catcher's output. *Id.*

[270] *Id.* at 8-9. Mr. Pfeifenberger testifies that these are the LMPs that govern SWEPCO's off-system sales. *Id.* at 9.

[271] As noted, Mr. Pollock's estimate is that there will be 30,785 MW of additional wind capacity will be added to the SPP region by 2022, whereas Futures 3 assumes that there will be 16,605 to 17,025 MW of wind capacity in the 2020 to 2025 time frame. Averaging the differences results in approximately 14,000 MW of additional wind capacity.

[272] TIEC Ex. 1, Pollock Dir. at 30-31.

[273] TIEC Ex. 1, Pollock Dir. at 26.

[274] *Id.* at 21.

[275] *Id.* at 25; Rebuttal Testimony and Exhibits of Robert W. Bradish, SWEPCO Ex. 19 (Bradish Reb.) at 17-18.

"SWEPCO's failure to consider SPP's longer term transmission build-out invalidates its simple extrapolation of the market prices derived from a 2025 PROMOD run (which already understates the amount of wind build-out), and it will most certainly result in overstating future market energy prices."[276]

Third, SWEPCO's assumed congestion costs are inflated because they are based on the Fundamental Forecast's natural gas price assumptions. As Mr. Pfeifenberger testified at the hearing, congestion costs reflect the cost of redispatch.[277] Stated differently, congestion can prevent the most economic plant from dispatching, meaning that a less economic plant will be dispatched in its place. As such, the incremental cost of running the less economic plant will be impacted by the cost of the fuel that plant will use to generate electricity.[278] SWEPCO used the inflated commodity prices from the Fundamentals Forecast in its model, which in turn overstates the congestion costs assumed in Mr. Pfeifenberger's analysis.

In sum, SWEPCO's modeling understates the amount of wind that will be added in the SPP footprint, which has the effect of overstating the LMPs in SWEPCO's analysis and, in turn, overstating the production cost savings that Wind Catcher would provide.

(d) SWEPCO's Projected Locational Marginal Prices Are Unreasonable

The results of SWEPCO's flawed assumptions and modeling are predictable: SWEPCO's projected LMPs are unrealistically high and inflate the benefits that Wind Catcher would provide. As can be seen in Mr. Pollock's Exhibit JP-5, SWEPCO's average projected LMPs in its cases (base, high, and low) range from 4.0¢ to 4.89¢ per kWh in 2021, before escalating significantly throughout the 25-year study period.[279] As a point of reference, actual AEP load zone LMPs for the years 2015 to 2017 ranged from 2.37¢ to 2.64¢ per kWh, meaning that SWEPCO is projecting that its load zone LMPs will increase by 62% in four years.[280] SWEPCO is also projecting that those 2021 LMPs would more than double by 2035. As Mr. Pollock

[276] TIEC Ex. 1, Pollock Dir. at 26.

[277] Tr. at 824:25-826:18 (Pfeifenberger Cross) (Feb. 16, 2018).

[278] *Id.* at 826:12-18.

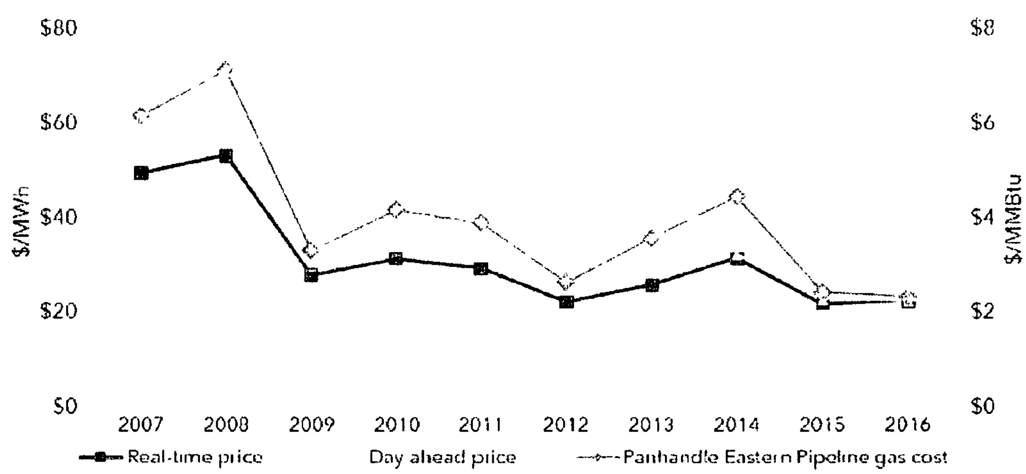
[279] TIEC Ex. 1, Pollock Dir. at Ex. JP-5.

[280] *Id.* at 30. The 2017 actual LMP is the year-to-date number as of the time that Mr. Pollock compiled his direct testimony. *Id.*

testified, SWEPCO has not demonstrated that these assumptions are realistic.[281]

Indeed, contrary to SWEPCO's assumption of ever (and significantly) increasing LMPs, the evidence shows that SPP LMP prices have not always increased year over year. For example, as shown in JP-5, AEP Load Zone LMPs actually decreased slightly from 2015 to 2016. This is also evident from a chart that Mr. Pfeifenberger included in his rebuttal testimony. While the purpose of this chart was to show how changes in SPP LMPs track changes in natural gas prices, it also demonstrates that SPP LMPs have generally decreased since 2012, including decreasing from 2014 (when the SPP integrated market commenced)[282] to 2016:

Figure 5
SPP Real-Time Energy Price vs. Natural Gas Price, 2007-2016 (Annual)



SWEPCO's projected LMPs are also significantly higher than those presented by SPS in its pending wind project CCN case.[283] As can be calculated from Exhibit JP-5, the average LMP in SPS's base case is 4.17¢ per kWh, while the average LMP in SWEPCO's base case is 7.55¢ per kWh. Thus, SWEPCO's base case LMPs are 81% higher than SPS's.[284] Meanwhile, SWEPCO's average low case LMP is 6.78¢ per kWh, which, despite representing SWEPCO's low gas case, is still substantially higher than SPS's average base case LMP.

Moreover, the evidence shows that even SWEPCO's "ultra-low" gas case LMPs are

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281 *Id.*

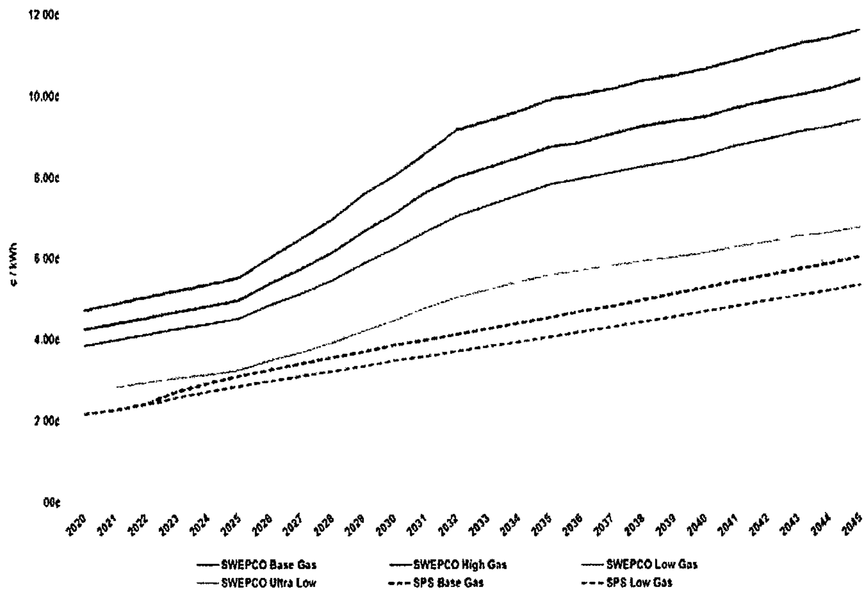
282 SWEPCO Ex. 24, Pfeifenberger Reb. at 31.

283 TIEC Ex. 1, Pollock Dir. at Ex. JP-5.

284 7.55¢/4.17¢ = 181%.

higher than either SPS's base case or its low gas case LMPs. The average ultra-low LMP for SWEPCO's generation nodes is 4.94¢ per kWh,[285] compared to SPS's average base-case LMP of 4.17¢ per kWh. SPS's average low-case LMP is 3.78¢ per kWh, which is 23.5% lower than SWEPCO's average "ultra-low" case LMP.[286] The following graph shows the projected LMPs under SWEPCO's and SPS's various cases.[287]

LMPs Under Various Scenarios



That even SWEPCO's "ultra-low" natural gas case LMPs are substantially higher than both SPS's base and low case LMPs serves only to confirm that SWEPCO's projections are grossly inflated. Additionally, because the only change that SWEPCO made to its ultra-low case from its base case was to adjust its natural gas price downward,[288] this also demonstrates that the flaws in SWEPCO's projected LMPs are not limited to exaggerated natural gas assumptions. As discussed above, the LMPs are also inflated by other skewed assumptions in SWEPCO's modeling, including the imposition of a carbon tax and a failure to include an appropriate amount of additional wind capacity.

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[285] TIEC Ex. 96. SWEPCO explained that its ultra-low LMPs are 24.3% lower than its base case LMPs. *Id.* at Bates 3, Item D.

[286] 3.78¢/4.94¢ = 76.5%.

[287] This graph is derived from Exhibit JP-5, with the ultra-low case added and additional detail removed to fit on the page. As noted, the ultra-low LMPs were admitted into the record in TIEC Ex. 96. A full reproduction of Exhibit JP-5 with the ultra-low case LMPs added is attached to this brief as Attachment 1.

[288] Tr. at 812:13-813:3 (Pfeifenberger Cross) (Feb. 16, 2018). The ultra-low case is simply half of the low case. *Id.* at 827:10-11.

The flawed LMP assumptions SWEPCO presents in this case are just the latest example of AEP forecasting unrealistically high LMPs in SPP. As set out in Mr. Pollock's Exhibit JP-SD-2, the AEP Fundamentals Forecast has consistently overstated future LMP prices:[289]

SOUTHWESTERN ELECTRIC POWER COMPANY
Forecast Versus Actual AEP Load Zone LMPs
On-Peak Hours
($/MWh)

Line	Description	2012	2013	2014	2015	2016
		(1)	(2)	(3)	(4)	(5)
	Past SWEPCO Forecasts					
1	2007 Q4	$61.19	$61.82	$62.61	$67 76	$69.15
2	2H2009	$60.90	$68.64	$83.92	$85.75	$89.03
3	2010 2H	$49.65	$53.07	$56.95	$59.01	$64.84
4	2011 2H	$47.39	$50.77	$55.73	$59.20	$64.97
5	2012 2H		$49.34	$54.00	$58.46	$63.81
6	2013 2H		$34.02	$41.16	$47.93	$53.00
7	2015 1H					$37.04
8	**Actual AEP Load Zone LMPs**			**$41.52**	**$27.12**	**$27.39**
	Percentage Variance					
9	2007 Q4			151%	250%	252%
10	2H2009			202%	316%	325%
11	2010 2H			137%	218%	237%
12	2011 2H			134%	218%	237%
13	2012 2H			130%	216%	233%
14	2013 2H			99%	177%	193%
15	2015 1H					135%

To take one example, actual (on-peak) LMPs for 2015 averaged $27.12 per MWh. AEP's forecasts of on-peak LMPs for that year, however, ranged from $85.75 to $47.93 per MWh.[290] Indeed, since the commencement of the SPP integrated market in 2014, and with only one exception,[291] AEP's predicted LMPs have been 30% to over 100% higher than the actual

[289] TIEC Ex. 2, Pollock Supp. Dir. at Ex. JP-SD-2. This chart shows page 1 of JP-SD-2, which compares forecasted on-peak hours AEP Load Zone LMPs to actuals. Page 2 of that exhibit compares off-peak hours forecasts to actuals.

[290] *Id.*

[291] As can be seen on JP-5, the one exception is AEP's 2013 forecast of 2014 prices. 2014 was the year of the Polar Vortex, which saw record cold temperatures. TIEC Ex. 1A, Pollock Dir. Workpapers, EIA NG Market Digest 061214.

LMPs.[292] The evidence shows that the LMP projections SWEPCO used in this case are no more reliable than AEP's past estimates.

3. Net Capacity Factor (NCF)

The second major assumption undergirding SWEPCO's economic analysis and inflating the projected benefits is SWEPCO's forecast of the NCF of the Wind Catcher project. The NCF is a ratio that represents the amount of energy actually generated by the Wind Facilities divided by the total amount of energy that could be generated given the nameplate capacity.[293] In its economic analysis, SWEPCO assumed an NCF of 51.1%, which was the P50 result produced in a study by Invenergy's consultant, DNV-GL.[294] Despite SWEPCO's heavy reliance on the DNV-GL report, the study's results are only as good as its assumptions, and DNV-GL made several assumptions that serve to understate the operational risks of Wind Catcher. In fact, a backcast study conducted by DNV-GL of its prior estimates showed that its predicted NCFs were on average 2% higher than the actual achieved NCFs, after adjusting for windiness.[295] In light of the deficiencies identified in the report for the Wind Facilities, DNV-GL's overestimation could be even greater in this instance.

DNV-GL's methodology began with a modeling of the wind resource at the Wind Catcher site, which was based primarily on observational data through the use of on-site meteorological towers.[296] DNV-GL then applied this wind profile to the power curve, a representation of the amount of power that the turbines will generate for every given level of wind,[297] to calculate the gross capacity factor.[298] Lastly, DNV-GL applied loss factors, such as curtailment for weather and curtailment for grid availability, to reach a NCF.[299] In every step of this process, there are potential uncertainties and risks that were not fully considered by the DNV-GL report.

The first model input that was not adequately studied by DNV-GL was the modeling of

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[292] TIEC Ex. 1, Pollock Dir. at 36.

[293] Tr. at 192:10-15 (Godfrey Cross) (Feb. 13, 2018).

[294] *Id.* at 192:16-23.

[295] TIEC Ex. 1, Pollock Dir. at 44.

[296] Tr. at 195:12-23 (Godfrey Cross) (Feb. 13, 2018).

[297] *Id.* at 196:3-6.

[298] Tr. at 870:17-20 (Godfrey Cross) (Feb. 16, 2018).

[299] Tr. at 197:20-22 (Godfrey Cross) (Feb. 13, 2018).

the wind at the Wind Catcher site. To observe the windiness of the site, DNV-GL used only eight meteorological towers, which, given the vast size of the Wind Catcher site,[300] is insufficient. In fact, while DNV-GL recommends that there be a meteorological tower within 2 km of every turbine, the turbines at the Wind Catcher site are, on average, 6.5 km from the nearest tower, with some as far as 17.1 km away.[301] Moreover, half of the eight towers that DNV-GL did use had less than a year of data.[302] Notably, Simon Wind, the consultant that SWEPCO hired to check the reasonableness of DNV-GL's study, noted the need for more meteorological data, stating in May 2017 (two months before SWEPCO signed the MIPA),[303] that "[t]his is too big of a project not to have that information collected."[304] Nevertheless, neither SWEPCO, Invenergy, nor any of their consultants ever collected that data.[305]

DNV-GL stated that it accounts for the dearth of wind data by increasing the level of uncertainty,[306] but this is still concerning because DNV-GL makes an adjustment for windiness in its backcast study.[307] That is, the 2% discrepancy between projected capacity factors and actual performance is only the deficiency that remains after DNV-GL corrects for windiness, so DNV-GL's performance in predicting windiness is not being measured.[308] Given the crucial role wind modeling plays in DNV-GL's study and the high level of associated uncertainty, less-than-predicted windiness could result in a much higher level of overestimation than the 2% presented in the DNV-GL backcast.

Another source of uncertainty is the power curve of the GE 2.5-127 turbines, which are a new model that will not be delivered for commercial operation for the first time until the second half of 2018.[309] In its wind study, DNV-GL used the power curve that was provided by the manufacturer, GE, and did not take into account the possibility that the new model turbines

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300 SWEPCO Ex. 4, Godfrey Dir. at Ex. JFG-4 at 8.

301 *Id.*

302 Tr. at 862:24-863:17 (Godfrey Cross) (Feb. 16, 2018).

303 *Id.* at 860:13-17; *see also* SWEPCO Ex. 4A, HS Godfrey Dir. at Ex. JFG-2 at 1.

304 Tr. at 868:16-18, 869:14-25 (Godfrey Cross) (Feb. 16, 2018); TIEC Ex. 18, SWEPCO Response to TIEC 8-11 (HSPM).

305 Tr. at 870:1-8 (Godfrey Cross) (Feb. 16, 2018).

306 *Id.* at 864:21-865:5.

307 *Id.* at 878:19-879:2.

308 *Id.* at 879:3-10.

309 TIEC Ex. 15, SWEPCO Response to TIEC 5-27.

would not perform up to that level, despite noting in its backcast study that "[d]espite recent improvements within the industry, there remains uncertainty associated with predicting the performance of new and unproven turbine models."[310]

DNV-GL's wind study also neglects to take into account several loss factors that would limit the availability and lower the NCF of the Wind Facilities. These loss factors include high wind speed hysteresis, which is the possibility that turbines will shut down when wind speeds are too high.[311] Another unconsidered loss factor is temperature shutdown, which is to account for when a turbine has to curtail due to temperatures outside its operating range.[312] For the latter, DNV-GL explicitly noted that it did not take into account specifications related to high temperature operation,[313] despite the fact that the upper range of the operating temperatures of the GE 2.5-127, 104 degrees Fahrenheit, could be exceeded at the project site.[314]

Further, DNV-GL used assumptions for other loss factors that could overstate the actual availability of Wind Catcher. One example is balance of plant availability, which was assumed to be 96.6% at Invenergy's request.[315] As a result, DNV-GL noted that "the net energy estimate presented [in the study] is not a fully independent assessment of the net energy production for the Project."[316] Invenergy requested this assumption based on its historical performance in operating wind farms, but, as noted before, the largest wind farm it has ever operated is merely 210 MW, or a tenth of the size of Wind Catcher.[317] There is simply no guarantee that Invenergy can perform just as well in operating a wind farm of this size, and in fact, the performance guarantee contained in the O&M contract with Invenergy is only set at 96.0% availability.[318]

Lastly, SWEPCO's analysis relies on highly optimistic assumptions regarding the availability of the Gen-Tie line. Although SWEPCO did not explicitly take Gen-Tie reliability into account in its economic analysis, the DNV-GL study included a "grid availability" loss

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310 Rebuttal Testimony and Exhibits of Jay F. Godfrey, SWEPCO Ex. 16 (Godfrey Reb.) at Ex. JFG-1R at 17.

311 SWEPCO Ex. 4, Godfrey Dir. at Ex. JFG-4 at 51-52.

312 *Id.*

313 *Id.* at 30.

314 Tr. at 200:14-22 (Godfrey Cross) (Feb. 16, 2018).

315 SWEPCO Ex. 4, Godfrey Dir. at Ex. JFG-4 at 30.

316 *Id.*

317 TIEC Ex. 1, Pollock Dir. at 40.

318 SWEPCO Ex. 17, Bright Reb. at 8.

factor of 99.8% that is analogous to Gen-Tie downtime.[319] In rebuttal testimony, SWEPCO witness Mr. Bradish supported this assumption by noting that AEP's 765-kV transmission system had a historical availability rate per 100 miles of 99.7%.[320] However, because the Gen-Tie will be more than 350 miles in length, applying the historical availability of AEP's transmission system would actually result in an availability rate of 98.8%, which is nearly 1% lower than the loss factor presented in the DNV-GL study.[321] Although Mr. Bradish testified that he was still confident in the 99.8% number, his sole quantitative empirical support for his belief actually demonstrated that the availability of a random 350-mile stretch of AEP-owned 765-kV transmission lines would only be 98.8%.[322]

Regardless of the specific numbers, the unique risks posed by the configuration of the Gen-Tie are readily apparent. Rather than being part of a network of transmission lines where energy can be rerouted in case of an outage, the Gen-Tie will be a radial line stretching across the entire length of Oklahoma.[323] Accordingly, if there is any outage along the 350- to 380-mile length of the line, the entire line will not be available, and no energy would be delivered from the Wind Facilities to the Tulsa substation.[324] This risk is especially striking because of the high frequency of tornadoes and other severe weather events in Oklahoma,[325] which pose a significant risk to the reliability of the Gen-Tie.[326] In fact, both of the major three-phase faults that occurred on AEP's 765-kV system within the past decade were due to tornados.[327]

In sum, SWEPCO has understated the risks associated both with the Wind Facilities' performance and the Gen-Tie line's availability.

C. Projected Benefits of Wind Catcher

1. Production Cost Savings

SWEPCO's projection of $3.8 billion (NPV) in production cost savings from Wind

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[319] SWEPCO Ex. 19, Bradish Reb. at 2.

[320] *Id.*

[321] Tr. at 895:21-896:2 (Bradish Cross) (Feb. 16, 2018); *see also* ETEC-NTEC Ex. 8, Demonstrative.

[322] *Id.* at 898:8-899:3 (Bradish Cross) (Feb. 16, 2018).

[323] Direct Testimony of David Smithson with Errata, Staff Ex. 3A (Smithson Dir.) at 6-8.

[324] *Id.*

[325] Tr. at 650:17-25 (Weber Cross) (Feb. 15, 2018) (noting that tornados are so frequent in Oklahoma that he would not consider them to be a force majeure).

[326] Staff Ex. 3A, Smithson Dir. at 9.

[327] SWEPCO Ex. 7, Bradish Dir. at 13, Table 1.

Catcher is unrealistic and unreliable. There are three central problems with SWEPCO's production-cost-savings analysis: (i) it assumes inflated natural gas prices, which in turn inflate the LMPs used in the analysis; (ii) it makes other flawed assumptions that increase the projected LMPs, including that a carbon tax will be imposed; and (iii) it assumes an overly optimistic net capacity factor. These flaws are discussed above in Section III.B of this brief, and are quantified here.

(a) Natural gas assumptions

With respect to SWEPCO's natural gas assumptions, Mr. Pollock testified that for every reduction of $1.00 per MMBtu, SWEPCO's projected production cost savings decline by $392 million (NPV), holding SWEPCO's remaining assumptions constant.[328] He then compared SWEPCO's inflated natural gas assumptions to SPS's more reasonable forecasts. The levelized natural gas price under SWEPCO's low case is $6.46 per MMBtu, whereas the levelized natural gas price under SPS's low case is $3.55 per MMBtu.[329] Thus, under the foregoing calculation, using SPS's low gas case in place of SWEPCO's low case would reduce the production cost savings by $1.141 billion (NPV).[330] If SPS's low case (which is the case most aligned with NYMEX futures) were substituted for SWEPCO's base case, the reduction in SWEPCO's projected production cost savings would be $1.49 billion (NPV).[331]

(b) LMP assumptions other than natural gas prices

Chief among SWEPCO's assumptions other than natural gas prices that inflated its LMPs is the projection that an unprecedented carbon tax will be implemented in 2024. As discussed above, the impact of this assumption is to increase SWEPCO's production cost savings by approximately $550 million (NPV).

Additionally, SWEPCO's PROMOD runs failed to adequately account for the influx of new wind projects in SPP, which will have the impact of reducing future LMPs. While it is difficult to quantify the impact of this flawed assumption without rerunning SWEPCO's models,

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328 TIEC Ex. 1, Pollock Dir. at 51.

329 *Id.*

330 *Id.* at 52. The difference between the two gas forecasts is $2.91 per MMBtu, which when multiplied by $392 million equals $1.141 billion. *Id.*

331 $7.35/MMBtu - $3.55/MMBtu = $3.80/MMBtu, which, when multiplied by $392 million, equals $1.489 billion.

Mr. Pfeifenberger's rebuttal testimony provides a method of estimating the impact.[332] Specifically, Mr. Pfeifenberger testified that "adding 5,700 MW of wind to the SPP PROMOD models would reduce the estimated value of the Wind Catcher output by only about 4%."[333] As noted above, a more reasonable assumption would be that 14,000 MW of additional wind should be added, which would imply that the impact on Wind Catcher output would be approximately 9.8%.[334] SWEPCO projects that Wind Catcher will deliver 8,722 GWh to the Tulsa North Substation each year on a total project basis, which is 6,105 GWh per year on a SWEPCO basis, or 6,105,000 MWh.[335] SWEPCO's average base case LMP is 7.55¢ per kWh, or $75.50 per MWh. Multiplying the two together results in annual Wind Catcher sales of $460.9 million. This is the value of Wind Catcher's output under SWEPCO's base case assumptions.

Reducing this output value by 4% (based on Mr. Pfeifenberger's estimate)[336] would yield a $18.44 million annual reduction, and reducing it by 9.8% (based on Mr. Pollock's estimate)[337] would yield a $45.17 million annual reduction. Multiplying these annual figures by the 25 years Wind Catcher would be in service results in total nominal reductions to the value of Wind Catcher output of $460 million to $1.129 billion. Notably, these are conservative estimates which reflect only the impact of adding additional wind to the economic analysis. These reductions do not account for TIEC's contentions that Mr. Pfeifenberger also understates the impact that wind additions have on LMPs, as discussed above.[338]

(c) Net capacity produced by Wind Catcher

As explained in Section III.B.3, SWEPCO's economic analysis assumes an NCF of 51.1%, which is derived from the DNV-GL study that contains several oversights that serve to inflate the results. Using a more conservative assumption of DNV-GL's P90 level of 46.6%, the

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[332] Indeed, in attempting to quantify the impact of adding 5,700 MW of wind to the analysis, Mr. Pfeifenberger himself did not rerun SWEPCO's modeling, but instead simply extrapolated from the impact of adding 1,900 MW (which was done in the original modeling). SWEPCO Ex. 24, Pfeifenberger Reb. at 7-9.

[333] *Id.* at 8.

[334] *See supra* Section III.B.2.c. 14,000 MW is 2.45 times higher than 5,700 MW. Multiplying Mr. Pfeifenberger's 4% estimated impact by 2.45 equals 9.8%.

[335] SWEPCO Ex. 4, Godfrey Dir. at 14. 70% of 8,722 is 6,105.

[336] This results in an average LMP of $72.48/MWh.

[337] This results in an LMP of $68.10/MWh.

[338] *See supra* Section III.B.2.c.

production cost savings would decrease by $216 million (NPV) at SPS's low gas case.[339] At a minimum, SWEPCO's projected net capacity factor should be adjusted by 1% to account for the 2% underperformance shown in DNV-GL's backcast study, which would result in a decrease of $67.3 million to SWEPCO's projected production cost savings.[340] Moreover, if the Gen-Tie's availability rate is at the historical 98.8% level rather than the 99.8% assumed, that would reduce the production cost savings by another $33.7 million.[341] Thus, conservatively adjusting SWEPCO's projected net capacity factor for only the backcast underperformance and the historical availability rate reduces the production cost savings by approximately $100 million (NPV).

(d) Summary of Production Cost Savings

While not all of SWEPCO's flawed assumptions can be quantified without rerunning the models, even if only the following reductions are made, the impact to SWEPCO's production cost savings is substantial. Such reductions include:

- $1.49 billion (NPV) to account for SWEPCO's inflated natural gas price estimates;
- $550 million (NPV) to remove SWEPCO's unwarranted carbon tax assumption; and
- $100 million (NPV) for SWEPCO overstating the amount of energy that Wind Catcher will deliver to the Tulsa substation.

These three quantifiable reductions alone reduce SWEPCO's projected production cost savings by over $2 billion. And that is before, among other things, any adjustment whatsoever is made to account for SWEPCO's admitted failure to include sufficient wind capacity in its model runs, which could further reduce the cost savings by $460 million to $1.15 billion on a nominal basis. The evidence is overwhelming that SWEPCO's projected production cost savings are overly optimistic and unreliable.

2. Production Tax Credits

While it is unclear whether SWEPCO will meet its scheduled completion date for Wind

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[339] TIEC Ex. 1, Pollock Dir. at 52.

[340] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R. $599 million / (51.1%-42.2%) = $67.3 million per 1% of energy loss.

[341] *Id.* The 1% in additional Gen-Tie downtime would result in 0.5% of energy loss because of the 51.1% capacity factor, resulting in a $33.7 million decrease.

Catcher, what is clear is the reason it has proposed such an aggressive timeline: to fully qualify for the PTCs that are crucial to the economics of the project. With the new tax rate, SWEPCO revised down its estimate of the value of the PTCs over the life of the project by $332 million to $1.541 billion.[342] At the same time, SWEPCO estimates the net benefits under its base and low natural gas cases to be $1.495 billion and $1.114 billion, respectively,[343] meaning that even under SWEPCO's baseline assumptions, the project would be underwater without PTCs for both the base and low gas cases.[344]

If SWEPCO fails to meet the safe harbor deadline of December 31, 2020, it may not be able to meet the continuous construction test under a "facts and circumstances" analysis, and, at minimum, it could be embroiled in a protracted controversy with the IRS.[345] And even if the PTCs are not completely eliminated, they could be greatly diminished for a number of reasons. If the Wind Facilities generate less energy than SWEPCO's assumed 51.1% NCF, that would result in $28.3 million decrease in the net benefits of the PTCs for every percentage point of underperformance.[346] If completion of the Gen-Tie is behind schedule by a year, SWEPCO would lose $186 million of PTCs on an NPV basis.[347] If Congress passes legislation similar to the House version of the 2017 tax bill, which eliminated the inflation adjustment for PTCs, the total value of the PTCs over the life of the project would be reduced by $570 million.[348] In sum, all of these risks demonstrate that it is certainly not a guarantee that SWEPCO can realize the full $1.541 billion in projected PTC benefits.

Moreover, PTCs only have value when they can be used, and SWEPCO will not be able to use all of its PTCs when they are generated due to the net operating losses AEP expects to show for tax purposes during the early years of the project.[349] To address this problem,

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[342] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R.

[343] *Id.* at Ex. KDP-2R.

[344] *Id.*

[345] TIEC Ex. 13; Tr. at 174:10-176:10 (Bright Cross) (Feb. 13, 2018); Tr. at 909:10-16 (Finn Cross) (Feb. 20, 2018).

[346] *See* SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R. This exhibit shows a $252 million decrease in total PTC value, including tax gross-up, when the capacity factor is lowered from 51.1% to 42.2%. $252 / (51.1%-42.2%) = $28.3 million per hundred basis points. *See* Tr. at 1051:4-9 (Pearce Cross) (Feb. 20, 2018) (doing similar calculation).

[347] *See supra* Section III.B.

[348] ETEC/NTEC Ex. 7. $570 million is 37% of the $1.541 billion in PTC value assuming the new tax rate.

[349] TIEC Ex. 3, Pollock Second Supp. Dir. at 2.

SWEPCO has proposed to credit all PTCs to customers when they are generated, and to record the unused PTCs in a deferred tax asset (DTA) that SWEPCO will include in rate base and earn a return on.[350] In essence, SWEPCO is forcing ratepayers to borrow the unused PTCs from SWEPCO and, for that privilege, charging them interest, which would be based 60% on SWEPCO's WACC and 40% on SWEPCO's cost of debt.[351]

SWEPCO estimates these carrying costs to be $300 million (NPV),[352] assuming that SWEPCO's taxable income forecasts are accurate. However, that assumption is a major qualification. Forecasting future tax liability is inherently imprecise, and requires AEP to make a myriad of assumptions for each of its more than twenty subsidiary companies.[353] [redacted][354] The carrying costs on the DTA would increase to $321 million if SWEPCO is unable to use PTCs to the point where it would max out its proposed DTA cap.[355] Further, the carrying costs could be even higher if SWEPCO's authorized WACC or cost of debt is higher than estimated.[356]

However, the PTCs only have true economic value when SWEPCO can actually use them. Thus, for the purposes of an economic analysis, it is inappropriate to assume SWEPCO's counterfactual premise that it can monetize the PTCs when they are generated.[357] As Mr. Pollock testified: "SWEPCO's proposal to flow unmonetized PTCs through to customers, and to earn a return on those deferred PTCs, is not relevant to the economics of the Wind Project itself. And if the project is too risky from an economic standpoint, it should not be approved."[358]

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[350] *Id.* at 8-10.

[351] *Id.* at 10.

[352] *Id.* at 2.

[353] *Id.* at 5.

[354] *Compare* TIEC Ex. 85 (HSPM) *and* TIEC Ex. 86 (HSPM) *with* TIEC Ex. 87 (HSPM); *see also* TIEC Ex. 88 (confirming that the numbers between forecasts and actuals can be directly compared).

[355] Supplemental Rebuttal Testimony of Kelly D. Pearce, SWEPCO Ex. 25B (Pearce Supp. Reb.) at 9.

[356] TIEC Ex. 3, Pollock Second Supp. Dir. at 13.

[357] *Id.* at 9.

[358] *Id.*

If the economic analysis is adjusted to reflect the recognition of PTC benefits only when AEP's projects that the PTCs can be monetized, the estimated PTC benefits decrease from $1.541 billion to $1.153 billion, a reduction of $388 million (NPV).[359] Because the $300 million in DTA carrying costs would also no longer be considered, that results in a net reduction of $88 million (NPV) from SWEPCO's economic analysis. If SWEPCO's forecasts are inaccurate and only half of the PTCs are monetized during years 1 through 10, the NPV of the PTCs would be reduced by an additional $179 million.[360]

3. Capacity Value

SWEPCO's assumption that Wind Catcher will provide $269 million (NPV) of capacity value is speculative and should be rejected. SWEPCO asserts that Wind Catcher will allow it to delay the addition of a new combined cycle plant from 2026 to 2033, and to defer the addition of a second NGCC unit from 2038 to outside the 25-year study period.[361] However, this estimate of capacity value is based on mere projections of what SWEPCO's needs will be in the future years and its modeling of Wind Catcher.[362] As Mr. Pollock testified, the amount of capacity savings Wind Catcher will provide, if any, is currently unknown.[363] That will turn on a number of factors, including the amount of SWEPCO's future capacity needs, the actual performance of Wind Catcher, the then-current SPP rules for calculating capacity, and the type of generation that would be avoided at the time, if any.[364] It is thus substantially uncertain whether Wind Catcher will provide the capacity value that SWEPCO projects. What is certain, however, is that SWEPCO has no current need for the capacity Wind Catcher would provide.[365] Consequently, SWEPCO's speculation about the future capacity value of Wind Catcher provides no reliable basis for finding that the project will provide net economic benefits.

D. Summary of Costs and Benefits of Wind Catcher

As discussed throughout this brief, SWEPCO has vastly understated the risks and costs of Wind Catcher while overstating the benefits the project is likely to provide. Under a more

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[359] *Id.* at 3, Table SD2-1.

[360] *Id.* (showing $179 million difference between lines 3 and 4 of the table).

[361] SWEPCO Ex. 7, Pearce Direct at 10.

[362] *Id.*

[363] Tr. 1235:22-1236:9 (Pollock Surreb.) (Feb. 21, 2018).

[364] *Id.*

[365] TIEC Ex. 1, Pollock Dir. at 48-49; SWEPCO Ex. 2, McCellon-Allen Dir. at 22.

balanced assessment, it is apparent that the project poses too great a risk to ratepayers to pass muster. Indeed, this is evident from SWEPCO's ultra-low-gas case alone. As SWEPCO acknowledges, the wind project would be underwater by $74 million under this scenario.[366] SWEPCO touts these results, arguing that the gas price is unrealistic, and that this demonstrates the project is likely to be economical.[367] However, SWEPCO fails to note that its "ultra-low" LMPs are actually substantially higher than the *base case* LMPs presented in the SPS case.[368] Thus, at LMPs that SPS considered to be a reasonable estimate under a base case scenario, Wind Catcher would not only result in net costs, but net costs of greater than $74 million, even under all of SWEPCO's assumptions (other than natural gas) regarding project costs and economic benefits. This alone confirms that SWEPCO's application should be denied.

Moreover, once SWEPCO's unreasonable modeling assumptions are corrected, it is evident that Wind Catcher will be firmly in the red. While TIEC has identified numerous risk factors and faulty assumptions, the chart below summarizes only a few quantifiable adjustments to SWEPCO's economic analysis:

Category	**KDP-2R Base**	**Adjustments**	**Revised**
Adjusted Production Cost Savings	$4,079	($2,140)[369]	$2,329
Congestion and Loss Cost	($375)	$0	($375)
Capacity Value	$269	($269)[370]	$0
Wind Facilities Revenue Requirement	($2,668)	$0	($2,668)
Production Tax Credits	$1,541	($28)[371]	$1,513
Gen-Tie Line Revenue Requirement	($1,151)	($102)[372]	($1,253)
Deferred Tax Asset Carrying Charges	($300)	$0	($300)
Additional OSS Margin at 100% Sharing	$100	$0	$100
Total Benefits/(Costs)	$1,495	($2,539)	($1,044)

366 Tr. at 693:17-694:8 (Chodak Cross) (Feb. 15, 2018); Tr. at 297:22-301:23 (Pearce Cross) (Feb. 14, 2018).

367 Tr. at 299:1-21 (Pearce Cross) (Feb. 14, 2018).

368 TIEC Ex. 1, Pollock Dir. at Ex. JP-5.

369 This amount reflect the adjustments summarized in Section III.C.1(d).

370 This amount removes SWEPCO's speculative capacity value. Section III.C.3.

371 This amount is based on a modest reduction to NCF based on historical underperformance. Section III.C.2.

372 This amount reflects an adjustment to a 25-year life for the Gen-Tie, consistent with the Wind Facilities. Section III.A.2.

Importantly, this chart does not include adjustments for many of the risks identified throughout this brief:

- It assumes that SWEPCO will not spend a penny over the capital cost estimates it presented in its application. For every 1% of cost overrun, the NPV decreases by $30 million.[373]
- It makes no deductions for the risk that SWEPCO is unable to fully qualify for the PTCs.
- It assumes that SWEPCO meets its highly compressed construction schedule for the Gen-Tie Line. If the Gen-Tie is delayed for a year, SWEPCO loses $186 million in PTC value (and perhaps much more if this causes the project to fail to qualify for the PTCs).[374]
- It makes no deductions for SWEPCO's undercounting of wind in its PROMOD analysis, which conservatively inflates production cost savings by $460 million to $1.129 billion on a nominal basis.[375]
- It assumes that PTCs will be credited to ratepayers as they are earned and that the unused PTCs will be placed in a DTA, and that AEP's taxable income forecasts until 2045 are completely accurate. If the DTA proposal is not considered, the NPV decreases by $88 million, and further decreases by $197 million if AEP's tax forecasts are incorrect and SWEPCO can only use half the PTCs at the time they are generated.[376]
- It makes only a modest adjustment to the assumed NCF in order to reflect the historical underperformance of DNV-GL's wind studies and AEP's 765-kV system. Every hundred basis points of further decreases in the NCF results in an additional $95.6 million reduction in NPV.[377]

If the NCF and construction cost risks are assumed to be at SWEPCO's "guaranteed" levels, the economics of the project are even more dismal, resulting in an NPV of negative $1.864 billion:

[373] *See supra* Section III.A.

[374] *See supra* Section III.A.2.

[375] *See supra* Section III.B.2.c.

[376] *See supra* Section III.C.2.

[377] *See supra* Section III.B.3.

Category	Amount
Revised Total Benefits/(Costs)	($1,044 million)
44.7% Capacity Factor	($533 million)[378]
9% Higher Construction Cost	($266 million)[379]
Deferred Tax Asset Cap	($21 million)[380]
Total	($1,864 million)

Regardless of the precise quantification, by any reasonable measure, the project is an unacceptably uneconomic and risky proposition for ratepayers, and it should not be approved.

IV. Proposed Conditions to CCN (P.O. Issue No. 13)

No set of conditions can transform SWEPCO's Wind Catcher proposal into something that warrants approval by the Commission. Unlike other wind facilities, this proposal is burdened by the need for a high-voltage transmission line across most of Oklahoma that SWEPCO currently estimates would cost over $1.6 billion.[381] The Gen-Tie Line is a critical part of the generation project itself, and its inclusion removes any reasonable likelihood that the project would be economical. Even in the unlikely event that the Wind Catcher project were completed on time and on budget, it would still be the most expensive wind generation project in recent history by far, and about 37% more expensive on a per kW basis than the average wind project built since 2015.[382]

The Wind Catcher facility was uneconomical even when SWEPCO filed this proposal last summer. That is why the CCN was opposed by Staff and Intervenors in testimony filed in December. But a number of events since then have resulted in further deterioration of the economics of this facility. First, SWEPCO confirmed in early January that the December 22, 2017, change in the corporate tax rate would reduce the value of SWEPCO's share of the project by $245 million (NPV).[383] By mid-January, SWEPCO had realized that it would not actually be

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[378] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R. The reduction from 51.1% to 44.7% is the sum of lines 7 through 9, net of line 14, or $629 million. $96 million was subtracted to reflect the fact that a 1% NCF adjustment was already in the prior table, which results in $533 million. Note that there is a minor degree of overlap because this adjustment is quantified based on SWEPCO's low gas case rather than SPS's low gas case.

[379] *Id.* The $266 million impact of a 9% increase in capital costs is calculated by taking line 11, net of line 15.

[380] SWEPCO Ex. 25B, Pearce Supp. Reb. at 9.

[381] SWEPCO Ex. 2, McCellon-Allen Dir. at 5.

[382] TIEC Ex. 1, Pollock Dir. at 39 & JP-9 ($2,263/$1,655 = 137%).

[383] SWEPCO Ex. 25, Pearce Reb. at 10.

able to use the PTCs as accrued, contrary to its prior testimony. That added at least $300 million (NPV) more to SWEPCO's share of the cost of the facilities.[384] To compound these problems, natural gas price forecasts—which impact the price for electricity that would be generated by Wind Catcher—continued to decline, and in February the EIA issued its 2018 Annual Energy Outlook, which showed a decline of approximately 20% in natural gas projections from the same forecast in effect when SWEPCO prepared its natural gas forecast in 2016.[385]

Faced with the worsening economics of the wind project and the unavoidable fact that this project was now a risky venture for ratepayers even under the most optimistic of scenarios, SWEPCO presented a series of what it characterized as guarantees to "tak[e] these risk arguments off the table."[386] First, SWEPCO proposed three "guarantees" in its January 4, 2018, rebuttal testimony—(1) a soft cap[387] on capital costs of 110% of the July 2017 estimate, (2) a soft floor on the net capacity factor of approximately 83% of the projected level in SWEPCO's filing, and (3) a proposal to insure PTC qualification at the 100% level.[388] These so-called guarantees excluded the two major factors that cause projects to exceed budget or under-perform—force-majeure events and changes in law. SWEPCO also excluded increases in AFUDC, which are the inevitable result of either delays or cost over-runs.

When SWEPCO realized in mid-January that the project economics for its portion had deteriorated by at least an additional $300 million (NPV),[389] SWEPCO revised its soft-capital-cost cap to 109%, again excluding AFUDC and cost increases associated with force-majeure events or changes in law.[390] SWEPCO also proposed a new soft performance guarantee at 87%

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[384] *Id* at 11. As noted in Section III.C.2, the actual impact on project economics is even greater.

[385] *See supra* note 8 and accompanying text.

[386] Rebuttal Testimony of Paul Chodak, SWEPCO Ex. 14 (Chodak Reb.) at 5.

[387] For purposes of this brief, the term soft cap refers to caps that provide no protection against cost increases related to force majeure, changes in law, or increases in AFUDC. The term "hard cap" refers to caps which have no such limitation, such as those adopted by the Commission in Docket No. 33891 relating to SWEPCO's Turk Plant or those agreed to in the SPS New Mexico stipulation. Docket No. 33891, Final Order at Ordering Paragraph 2; TIEC Ex. 65.

[388] SWEPCO Ex. 14, Chodak Reb. at 3-8; SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R; Tr. at 192:16-193:1 (Godfrey Cross) (Feb. 13, 2018). The proposed minimum NCF guarantee of 42.2% is 83% of SWEPCO's estimated NCF of 51.1%.

[389] SWEPCO Ex. 25, Pearce Reb. at 10-11.

[390] SWEPCO Ex. 14, Chodak Reb. at 3.

of the output projected in the filing.[391]

After several days of hearing, SWEPCO volunteered yet another proposal, which it characterized as "an effective guarantee of net benefits to customers."[392] The following day, SWEPCO amended that proposal by withdrawing certain provisions.[393] But more importantly, the evidence over several additional days of hearing to address this proposal demonstrated that SWEPCO's latest proposal was as ineffectual as its prior proposals. It provided for a "net benefit" proceeding sometime in the early 2030s—based on a grossly inflated recalculation of "fuel savings" from the wind project—and provided little or nothing in the way of compensation to ratepayers for the higher rates they would pay throughout the 2020s as a result of the project.

As discussed below, none of SWEPCO's series of proposed conditions provide any meaningful ratepayer protection, and none can compensate for the fact that this singularly expensive wind project is simply not economically justified.

A. SWEPCO Proposed Conditions

1. Capital Cost Cap

The first of SWEPCO's currently proposed ratepayer protections is a cost cap equal to 109% of SWEPCO's originally filed capital-cost estimates, excluding AFUDC.[394] This proposal provides little or no value to ratepayers for two principal reasons. First, the level of the proposed cap—$2,460/kW including currently estimated AFUDC[395]—is so high that the project would be underwater long before the cost cap was met. Second, SWEPCO has excluded from the cost cap any escalations attributable to the events that would actually cause it to be exceeded.

The level of the cost cap is extraordinarily high compared to either the cost of other wind facilities or the cost cap in the much-discussed SPS settlement in New Mexico. The average installed cost for wind facilities since 2015 has been approximately $1,655/kW.[396] SWEPCO's proposed soft cap is almost 50% higher.[397] It is also 47% higher than the hard cap of $1,675/kW

[391] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R. 44.7%/51.1% = 87%.

[392] TIEC Ex. 69; Tr. at 719:6-7 (Chodak Cross) (Feb. 15, 2018).

[393] Tr. at 744:15-745:13 (Chodak Cross) (Feb. 16, 2018).

[394] SWEPCO Ex. 14, Chodak Reb. at 3.

[395] Tr. at 700:22-701:22 (Chodak Cross) (Feb. 15, 2018).

[396] TIEC Ex. 1, Pollock Dir. at 39.

[397] 2,460/1,655 = 149%.

in the recent SPS settlement in New Mexico.[398] Accordingly, the required base rate increase would be almost 50% greater with SWEPCO's proposed soft cap than for a comparably sized wind facility at an average cost. Applying the 109% cap to SWEPCO's projection of the impact on base rates at the originally estimated cost yields a $444 million base rate revenue requirement for SWEPCO alone in the first year this project would go into service.[399] With a base rate increase that is almost 50% higher than would be associated with comparable wind facilities, the Wind Catcher project would have to generate far greater fuel savings and PTCs than is required for other wind projects. And, while this project is uniquely expensive, there is nothing unique about its ability to generate savings from the kWhs it produces.

Second, SWEPCO's exclusions to its proposed cost cap eviscerate any value the cap might otherwise have had. As discussed above, SWEPCO has a history of cost overruns on both its most recent generation project (the Turk Plant) and it most recent major transmission project (the Valliant-to-Texarkana line).[400] And there is no suggestion that the cause of those cost overruns was attributable to anything other than force-majeure or change-in-law events.[401]

The construction cost risk for the Wind Facilities and the Gen-Tie is discussed in Section III.A of this brief. There are any number of reasons that the cost of this facility would likely exceed the actual estimates, and almost all would qualify as force-majeure events or changes in law. Further, to the extent that there were delays or cost overruns for *any* reason, there would be no cap on AFUDC. Accordingly, any claimed ratepayer benefits from SWEPCO's proposed cost cap are illusory.

SWEPCO responds to the above argument by asserting that the regulatory bargain does generally not require that utilities bear the risk of cost increases that are prudently incurred as a result of force-majeure events or changes in law.[402] TIEC does not dispute that contention. SWEPCO misses the point entirely, however, which is that SWEPCO's proposed exclusion of

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[398] TIEC Ex. 65 at 8.

[399] KDP-2R (line 2 ($280 million for Wind Facilities) + line 4 ($127 million for Gen-Tie)) x 109% = $444 million for SWEPCO's share of this facility. This does not include the additional revenue requirement associated with SWEPCO's January 19 proposal to establish a deferred tax asset. The Texas retail jurisdiction currently constitutes 34.3% to 36.7% of SWEPCO's load, depending on whether one uses a demand or energy allocator. SWEPCO Ex. 11, Aaron Dir. at Revised Ex. JDA-2.

[400] *See supra* Section III.A.

[401] *Id.*; *see also* Tr. at 223:11-17 (Bradish Cross) (Feb. 13, 2018).

[402] Tr. at 1349:10-25 (Chodak Cross) (Feb. 24, 2018).

these items from the cost cap renders the cost cap ineffective as a ratepayer protection. That is, if the total cost of the project were to exceed $2,460/kW for any of the reasons that normally cause plants to exceed budget, the cost cap will provide no protection. TIEC is not seeking to change the regulatory bargain, it simply asks that this reality be considered in assessing SWEPCO's claim that the soft cost cap has taken ratepayer risks "off the table." It does no such thing.

2. Net Capacity Factor

In its January 19 revisions to its proposed guarantees, SWEPCO proposed a soft NCF floor of 44.7%, or 87% of the capacity projected in its filing.[403] SWEPCO's proposed floor on the performance of Wind Catcher is ineffective for two principal reasons. First, the floor is so low that the facility would almost certainly be uneconomical well before the performance dropped to the "guaranteed" level. Given the risks associated with Wind Catcher performance, which are detailed in Section III.C.2 above, it is perhaps understandable that SWEPCO set its NCF floor at such a low level. Nevertheless, that low floor provides little ratepayer protection. Second, as with its other guarantees, SWEPCO would be relieved of any obligation to meet even that low level of performance if its failure to do so was caused by any of the factors that might actually be expected to cause such poor performance.

It is instructive to contrast SWEPCO's proposed 44.7% soft NCF floor with the guarantee made by SPS in the New Mexico settlement that SWEPCO repeatedly referenced at the hearing.[404] SPS agreed to a hard NCF floor of 48%, without exception for force-majeure or change-in-law events.[405] Moreover, SPS's guarantee is calculated on an annual basis, not a five-year average as proposed by SWEPCO.[406] A provision like that agreed to by SPS actually would provide some ratepayer protections. Every percent reduction in the NCF results in a reduction in the Wind Catcher economics of $95.6 million on a net present value basis.[407] SWEPCO's 44.7% NCF guarantee is set at such a low level that the project would be uneconomical well before the soft floor came into play.

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[403] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R.

[404] TIEC Ex. 65. TIEC notes that a similar settlement has been reached in the parallel Texas proceeding, Docket No. 46936. The final order in that case will presumably be issued before the issuance of the PFD in this proceeding.

[405] *Id.*; Tr. at 1238:11-15 (Pollock Surreb.) (Feb. 21, 2018).

[406] Tr. at 1238:21-25 (Pollock Surreb.) (Feb. 21, 2018).

[407] SWEPCO Ex. 25, Pearce Reb. at Ex. KDP-1R; Tr. at 1050:25-1051:9 (Pearce Cross) (Feb. 20, 2018).

But even if SWEPCO had proposed an NCF floor at a level comparable to SPS's, its exclusion of force-majeure and change-in-law events would eviscerate any real protections. One obvious example is the risk that the Gen-Tie will not be completed by the time the Wind Facilities are ready to go in service. The routing for the line is incomplete, the permitting for the line remains to be accomplished, easements have not yet been acquired, and there is always the prospect of litigation on a project of this magnitude.[408] So long as the Gen-Tie Line is not in service, SWEPCO can deliver only approximately 50 MW, or 2.5% of the net capacity of the wind facility.[409] Any delays or interruptions in the Gen-Tie Line would almost certainly be characterized as attributable to force-majeure events or changes in law, rendering ratepayers entirely responsible for the project's failure to deliver the promised fuel savings or PTCs. And similar delays or interruptions in the output of the Wind Facilities themselves would also likely be attributable to force-majeure or change-in-law provisions, leaving the ratepayers with no protection.[410]

In short, SWEPCO's soft NCF floor is both too low and too riddled with exceptions to provide any meaningful benefit to ratepayers. It does nothing to rescue the facility from its dismal economics.

3. Production Tax Credit (PTC)

The availability of PTCs for the first ten years is critical to the economics of SWEPCO's Wind Catcher project or any wind project. As explained in Section III.C.2, if the value of the PTCs were substantially impaired or eliminated, the project would be uneconomical even under SWEPCO's rosy assumptions.

SWEPCO proposed what it characterized as a PTC guarantee in the rebuttal testimony of Mr. Brice filed on January 4, and that proposal did not change in its January 19 filing.[411] A review of SWEPCO's description of its proposed guarantee reveals that it is in fact no such thing. Rather, Mr. Brice noted that there were three levels of protection to ensure eligibility of

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[408] *See supra* Section III.A.2.

[409] Tr. at 186:14-21 (Bright Cross) (Feb. 13, 2018).

[410] TIEC notes that SWEPCO has excluded low wind speeds from the list of force-majeure. However, given the low capacity factor that SWEPCO proposes, it is hard to imagine that low wind speeds alone would produce a drop that dramatic. Accordingly, even if low wind speeds were contributing factor to failure to meet the soft floor, it would likely be the force-majeure or change-in-law events that were actually the "but for" cause.

[411] Unlike other provisions, this provision was not revised in the January 19 testimony.

PTC guarantee: (1) a precise timeline in the contracts; (2) a provision in IRS regulations for excusable disruptions; and (3) the existence of a 50-MW alternative interconnection.[412] Mr. Brice's rebuttal testimony did not explain what would happen if those three levels of protection failed, and he confirmed that those were the three elements of the PTC guarantee on cross-examination.[413] On redirect examination, however, Mr. Brice appeared to both limit the guarantee and provide some assurance even if the three elements of the guarantee described in his testimony did not result in full eligibility for PTCs.[414] It appears that the essence of SWEPCO's guarantee is that the project will qualify for 100% PTCs, rather than 80% or 60%, as Mr. Brice asserts would apply to facilities that do not meet the deadlines in the IRS regulations.[415] That is the extent of this guarantee and, as with all its other guarantees, the exceptions devour the protections.

First, SWEPCO offers no guarantee whatsoever against congressional action to reduce the value of PTCs. This could come in any number of forms. For example, SWEPCO has estimated an increasing value of PTCs based on an inflation rate, which the House proposed to eliminate in its version of the 2017 tax bill.[416] Further, the PTCs were created by Congress, and Congress is always free to reduce or even eliminate the value of PTCs. Whatever the probability one associates with the above events, they are risks SWEPCO insists be borne by ratepayers under the change-in-law exception.

In addition, SWEPCO's guarantee of eligibility for PTCs at the 100% level, as opposed to 80% or 60%, is not applicable in the event of force-majeure events.[417] Further, the fact remains that, whether at 100% value or 60% value, PTCs are only accrued when the Wind Facilities generate and deliver kilowatt-hours. And, as noted above, if Wind Catcher does not perform as a result of any number of force-majeure or change-in-law events, including unavailability of the Gen-Tie, SWEPCO's entitlement to the PTCs will decline. Accordingly, SWEPCO's PTC guarantee offers little or no value to ratepayers. Finally, Mr. Brice's description of the guarantees in redirect reflects a misunderstanding of the effect of a failure to

[412] SWEPCO Ex. 15, Brice Reb. at 6-7.

[413] Tr. at 964:1-20 (Brice Cross) (Feb. 20, 2018).

[414] Tr. at 988:9-989:13 (Brice Redir.) (Feb. 20, 2018).

[415] Tr. at 989:1-13 (Brice Redir.) (Feb. 20, 2018).

[416] ETEC/NTEC Ex. 7.

[417] Tr. at 989:20-990:4 (Brice Cross) (Feb. 20, 2018).

complete the project by the deadline.[418]

4. Off-System Energy Sales Margins

Off-system sales margins are calculated on variable cost basis, and Wind Catcher will have no fuel costs.[419] Accordingly, no matter how uneconomical the project is, once the base rate increase is eliminated, it will show margins for off-system sales.[420] In light of the fact that SWEPCO ratepayers would be expected to pay over $7.9 billion in Wind Catcher revenue requirements (nominal),[421] and that SWEPCO is expected to earn a return of $2 billion on its invested capital in those facilities,[422] it is difficult to imagine that the Commission would further sweeten the pot for SWEPCO's shareholders by allowing them to keep 10% of the margins from off-system sales generated by the project. But whether this is a real concession or not, the flow-through of off-system sales margins to ratepayers is already baked into SWEPCO's various revised cost-benefit analyses.[423] Once realistic assumptions are made for items such as a speculative carbon tax, natural gas prices projections, LMPs, tax law changes, and other factors, the project is deep in the red whether or not SWEPCO's shareholders keep 10% of off-system sales margins.

5. Deferred Tax Asset Cap

SWEPCO's proposed deferred tax asset cap first appeared in its January 19 testimony after SWEPCO realized that it would not be able to use PTCs as they are accrued. The deferred tax asset cap, as described in the revised rebuttal testimony of Paul Chodak, would limit the customer impact through the provision of a ceiling on the size of the deferred tax asset.[424] TIEC witness Mr. Pollock pointed out in his supplemental direct testimony that the proposed cap is structured so that it is unlikely to ever be triggered, since the $560 million cap applies to the

[418] Tr. at 995:1-997:6 (Brice Recross) (Feb. 20, 2018). The rampdown for PTCs depends on the date construction begins, not the date construction is completed. 26 U.S.C. § 45(b)(5). Failure to meet the safe harbor date would not result in 80% PTCs, but rather would require SWEPCO to prove continuous construction under a "facts and circumstances" analysis. TIEC Ex. 13.

[419] Tr. at 1057:19-1059:20 (Pearce Cross) (Feb. 20, 2018).

[420] *Id.*

[421] Rebuttal Testimony of Thomas P. Brice, SWEPCO Ex. 25 (Pearce Reb.) at Ex. KDP-2R at 1-3, line 4 (Wind Facility - $5.62 billion) + line 6 (Gen-Tie Line - $2.365 billion). Note that the Gen-Tie Line costs included in this analysis include only the first 25 years of the proposed 50-year amortization.

[422] TIEC Ex. 3, Pollock Second Supp. Dir. at 16.

[423] Tr. at 1057:19-1059:20 (Pearce Cross) (Feb. 20, 2018).

[424] SWEPCO Ex. 14, Chodak Reb. at 9.

lifetime *average* balance of a deferred tax asset, not to the annual balance.[425] As a result, SWEPCO's proposed deferred tax asset would rapidly escalate, reaching $1 billion dollars by 2027 and remaining above that level for four years.[426] Mr. Pearce acknowledged the lack of value in the deferred tax asset cap in his supplemental rebuttal testimony, noting that the cap was actually very close to the "worse case scenario" and at most could provide ratepayer protections of approximately $21 million.[427]

The other element of SWEPCO's proposed cap is to earn its weighted average cost of capital on 60% of the deferred tax asset balance while earning its slightly lower cost of debt on the remaining 40%.[428] Since it is unknown how a future Commission might treat the deferred tax asset, it is impossible to say whether this proposal provides any benefit, and if so, how much. SWEPCO did not calculate how much actual benefit this would allegedly provide to ratepayers, but in any event, it is the assumption used in SWEPCO's revised calculation of costs and benefits, which showed that SWEPCO's proposal to create a deferred tax asset would cost ratepayers an estimated $518 million on a nominal basis and $300 million on an NPV basis.[429]

The actual cost to ratepayers would depend on such things as the return on equity and the cost of debt over the period 2021 through 2033. To the extent debt or equity costs are higher than they are currently, the adverse effect on ratepayers will be greater.[430] In any event, SWEPCO's attempt at damage control for its failure to realize that it cannot utilize PTCs timely provides little potential for actual ratepayer protection.

6. Ten-Year Lookback

In his rebuttal cross-examination, SWEPCO witness Paul Chodak submitted a proposal for a proceeding in 2031 to assess whether Wind Catcher provided ratepayers benefits, as defined in Mr. Chodak's proposal.[431] Mr. Chodak had written up this proposal, identified as TIEC Ex. 69, on the first day of the hearing.[432]

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[425] TIEC Ex. 3, Pollock Second Supp. Dir. at 11-12.

[426] *Id.* at 11.

[427] SWEPCO Ex. 25B, Pearce Supp. Reb. at 9.

[428] SWEPCO Ex. 14, Chodak Reb. at 9.

[429] SWEPCO Ex. 25, Pearce Reb. at KDP-2R, line 8.

[430] TIEC Ex. 3, Pollock Second Supp. Dir. at 12.

[431] Tr. at 717:12-719:10 (Chodak Cross) (Feb. 15, 2018).

[432] Tr. at 720:21-25 (Chodak Cross) (Feb. 15, 2018).

While there was no time to conduct discovery on SWEPCO's latest proposal, the ALJs did permit the parties to explore the proposal through cross-examination and to present live testimony in response. As it turned out, it did not take a great deal of discovery or analysis to determine that this latest proposal, like SWEPCO's other proposals, is devoid of value to ratepayers.

It requires a rudimentary understanding of the SPP generation market to discern the major flaw in SWEPCO's proposal—that it seeks to calculate "fuel savings" based on an approach that is entirely divorced from reality. In the SPP market, utilities and other generation owners offer their generation based on the variable cost of each individual unit. Starting with the lowest cost unit, SPP goes up the bid stack until it has enough supply to meet demand. That point on the bid stack sets the price for all generation.[433] Units that were bid in above that price are not dispatched. To the extent additional generation is required, SPP simply moves up the bid stack.[434]

A review of SWEPCO's actual dispatch history for its own generation units shows how the system works. SWEPCO has a number of units that are dispatched quite frequently, based on either a low heat rate or some other operational characteristic.[435] But SWEPCO has a number of other units that are almost never dispatched, due to their age or inefficiency, even though these units are generally available.[436] It is these units—which are too expensive to actually be dispatched into SPP—that SWEPCO would use to calculate the fuel savings. That is, SWEPCO would take its least efficient units, which would not be running under almost any circumstance, and calculate presumed fuel savings based on the assumption that they alone would have picked up the slack for Wind Catcher. With these phantom fuel savings, the Wind Catcher project would be likely to show "benefits" no matter how uneconomical it was in reality.

All three witnesses that responded to SWEPCO's proposal pointed out the effect of this assumption.[437] For example, TIEC witness Jeffry Pollock testified as follows:

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[433] Note that there may be some adjustments for market congestion or other factors.

[434] Tr. at 1090:23-1091:10 (Pearce Cross) (Feb. 20, 2018).

[435] TIEC Ex. 99.

[436] *Id.*

[437] Tr. at 1232:6-20 (Pollock Surreb.) (Feb. 21, 2018); Tr. at 1144:20–1145:7 (Norwood Surreb.) (Feb. 21, 2018); Tr. at 1192:12–1193:5 (Nalepa Surreb.) (Feb. 21, 2018).

SWEPCO would calculate fuel savings based on generation that had not already been dispatched by the SPP to serve load, which would include the least-efficient generation that could not produce electricity at the otherwise applicable LMP. This generation would include old deficient units with high heat rates that would rarely be run. SWEPCO's model pretends that the entire SWEPCO portion of the output of Wind Catcher would be replaced by its own highest cost generation. When there's not enough generation remaining in SWEPCO's generation stack to meet the output of Wind Catcher, SWEPCO would calculate the fuel cost for the surplus based on the fuel cost of the least-efficient unit in its generation stack.[438]

So the result of this approach is a calculation in fuel savings that bears no relation to reality and would dramatically overstate the actual fuel savings. With this approach, SWEPCO's proposed guarantee of net benefits over ten years has virtually no value, because it would almost certainly show, erroneously, that there were net benefits, but they would be the result of an unrealistic methodology, not any actual net benefits.[439]

One other twist to SWEPCO's proposal makes the overstatement of fuel savings even more ludicrous. When one looks at the SWEPCO units that are usually not being dispatched in the SPP[440] and compares the megawatts on those units as shown on TIEC Ex. 94, it is apparent that there will be times when SWEPCO does not have enough generation remaining in its generation stack to hypothetically substitute for up to 1,400 MW of Wind Catcher generation. SWEPCO's proposal contemplates that in that circumstance, SWEPCO would identify the single most expensive unit on its system and use the cost of that assumed unit as the replacement cost for the rest of the Wind Catcher output.[441] Given the fact that the most expensive unit has a heat rate of over [redacted], the effect of that approach on overstating fuel costs is obvious.[442] In contrast, the actual implied heat rates in the SPP have been in the 8,000 to 9,000 range for off-peak months and in the 10,000 range for on peak months.[443] Further, the marginal unit in SPP is increasingly a wind unit, which often bids prices into the SPP that are negative because of the PTC value.[444]

So how does SWEPCO propose to calculate the fuel savings associated with Wind

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[438] Tr. at 1232:6-20 (Pollock Surreb.) (Feb. 21, 2018).

[439] *Id.* at 1233:2-11.

[440] TIEC Ex. 99.

[441] Tr. at 1232:3-1233:11 (Pollock Surreb.) (Feb. 21, 2018).

[442] TIEC Ex. 99 (HSPM).

[443] TIEC Ex. 102 at 32; Tr. at 1335:19-1336:8 (Pearce Cross) Feb. 22, 2018.

[444] Tr. at 1338:19-1341:4 (Pearce Cross) Feb. 22, 2018.

Catcher at those times when LMPs are negative? Mr. Pearce provided the answer as follows:

> Q. And even though the actual LMP is negative, you would go to your generation stack at the -- as you have it in this case, and just go up those -- that generation stack with those heat rates and those -- and current gas prices and say that's our fuel savings for this plant.
>
> A. That is -- that is the Company's recommendation.[445]

Another element of SWEPCO's proposal that biases the fuel savings is its requirement to use what Mr. Pearce refers to as a "frozen stack" of SWEPCO generation.[446] That is, whatever units are shown in SWEPCO's filing in this case will be the assumed units for calculating fuel savings through 2030, irrespective of SWEPCO's actual generation at the time. Thus, even if SWEPCO were to add a unit with more efficient generation, it would not be included, because there is no forecasted new generation in this case.[447] And while SWEPCO proposes to retire a few of its older, less efficient units,[448] the vast majority of SWEPCO's inefficient high-heat-rate units are currently projected to remain. But even if they are retired at some point before 2030 because they ceased to be economic, SWEPCO would continue to calculate fuel savings based on those units. In the words of Mr. Pearce: "Freeze the stack, and that's what we would use."[449]

The disconnection from reality of SWEPCO's proposal is further illustrated by one other feature. SWEPCO provides for the addition of carbon costs to its hypothetical generation. Of course, the very purpose of a carbon tax, if one would pass, would be to discourage production from inefficient high heat rate units. But for purposes of its fuel savings calculation, not only does SWEPCO assume those units would be running, but it adds the assumed carbon tax to the cost of that imagined generation, further inflating its calculation of fuel savings.[450]

Given that the calculation of fuel savings based on SWEPCO's frozen stack in and of itself would be adequate to ensure that the ten-year look-back would never provide ratepayer benefits, it is baffling why SWEPCO also sought to overlay its force-majeure and change-in-law

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[445] Tr. at 1341:15-21 (Pearce Cross) Feb. 22, 2018.

[446] Tr. at 1063:6-19 (Pearce Cross) Feb. 20, 2018.

[447] Tr. at 1074:19-24 (Pearce Cross) Feb. 20, 2018.

[448] Tr. at 1076:24-1077:22 (Pearce Cross) Feb. 20, 2018.

[449] Tr. at 1078:17–18 (Pearce Cross) Feb. 20, 2018.

[450] TIEC Ex. 69.

exceptions to this ten-year look back. But it did, as described by Mr. Pearce:

> Q. (By Ms. Quinn) . . . And so for this new ten-year guarantee, is there an exclusion for force-majeure?
>
> A. Yes, there is.
>
> Q. And is there an exclusion for change-in-law?
>
> A. Yes, there is.[451]

As discussed above, the exclusion of cost increases, delays, or underperformance due to force-majeure events or changes in law eviscerates any ratepayer protection. That SWEPCO saw the need to require the same provisions in its ten-year look back, even with the overstated fuel savings calculation, suggests that SWEPCO is concerned that this project could end up so detrimental to ratepayers that even the grossly inflated fuel savings calculation would not save it.

SWEPCO further inflates the benefits calculation by proposing to lock in $269 million in avoided capacity costs.[452] There is, however, considerable uncertainty about whether any actual capacity savings would result from the Wind Catcher facility, which would depend on, among other things, the performance of the facility, the SPP rules at the time, and SWEPCO's future need for generation.[453] Further, there is no guarantee that SWEPCO's hypothetical 2017 vintage combined cycle plant would be the avoided unit.[454] SWEPCO's proposal requires that the Commission determine now in this proceeding that $269 million be added to the benefits of the facility for this 2031 calculation, whether there is any such benefit or not.

SWEPCO's defense of Mr. Chodak's proposal came down to two points. First, SWEPCO repeatedly asserted that a similar provision had been approved by the New Mexico Commission.[455] The provisions in the SPS stipulation, however, bear little resemblance to SWEPCO's proposal, as explained at length the live supplemental testimony of Jeff Pollock.[456] The SPS ten-year look back proposal was much stronger than SWEPCO's proposal, but even

[451] Tr. at 1106:12–16 (Pearce Cross) Feb. 20, 2018.

[452] Tr. at 1235:18–21 (Pollock Surreb.) Feb. 21, 2018.

[453] Tr. at 1235:22–1236:6 (Pollock Surreb.) Feb. 21, 2018.

[454] *Id.*

[455] TIEC Ex. 69; Tr. at 753:3-26 (Chodak Cross) (Feb. 16, 2018). Mr. Chodak testified on the last day of hearing that he knew all along that the New Mexico Commission had not actually adopted the proposal and that he just repeatedly forgot to add the word "Staff." Tr. at 1364:9-21 (Chodak Cross) (Feb. 22, 2018).

[456] Tr. at 1237:5-1239:17 (Pollock Surreb.) (Feb. 21, 2018).

then it was not regarded as providing much value except in a very limited change-in-law circumstance that was not covered by the other provisions.[457] As described by Mr. Pollock, the provision in New Mexico settlement relating to the ten-year look back provided little value, even though it covered force-majeure and change-in-law events and did not contain any provision for adding carbon taxes, while SWEPCO's proposal provides no value.[458]

SPS's other faint-hearted defense for its proposal was that it was easy to calculate. However, Mr. Chodak had no answer about how to make assumptions about when plants are available and when they are down for maintenance. For example:

> Q. (By Mr. VanMiddlesworth) All right. Now, sir, you also have to make some assumptions about when this plant is available and when it's down for maintenance and so on to do that savings, don't you?
>
> A. I don't know. You need to ask Mr. Pearce.[459]

SWEPCO's proposal is complicated by the fact that the bid stack is frozen, so it may include plants that are no longer in operation while ignoring whatever plants, if any, SWEPCO adds by 2030. Mr. Chodak had no idea how to deal with plants that are out due to planned outages.[460] In short, SWEPCO's proposal raises more questions than it answers. But in any event, the critical flaw is that it grossly overstates the fuel savings benefit that would hypothetically arise from the Wind Catcher facility, thereby rendering the look-back proposal entirely toothless.

B. Staff or Intervenor Proposed Conditions

SWEPCO's request for a CCN should be denied. This plant is not necessary to serve SWEPCO's load. And in the months leading up to the hearing, the economics of the project deteriorated to a point where it has become clear that there is no reasonable scenario remaining under which this project would be a good bet for ratepayers.

For SWEPCO's previous major generation project, the Commission imposed a hard cap on capital costs based on SWEPCO's then-current estimate.[461] While that cap saved Texas

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[457] *Id.* at 1239:18-1240:18.

[458] *Id.* at 1239:18-1241:15.

[459] Tr. at 1368:3-14 (Chodak Cross) (Feb. 22, 2018).

[460] *Id.* at 1366:2-7.

[461] Docket No. 33891, Final Order at Ordering Paragraph 2.

ratepayers from the 16% cost overrun on this $1.5 billion project, Texas ratepayers still had to endure the base rate increase for the Turk Plant. That plant's economics required natural gas prices of at least $8.25/MMbtu.[462] As natural gas prices dropped to $5.00 and then to $3.00 or below, where they have remained since 2015,[463] SWEPCO's ratepayers were locked into paying for expensive generation from a high capital cost plant without the promised savings. That unfortunate circumstance should not be repeated here.

SWEPCO has made clear that it is not interested in any cost caps, performance floors, or PTC guarantees that would actually provide firm protection to ratepayers by covering force-majeure or change-in-law events. That is an entirely understandable position from SWEPCO's perspective, given the dismal economics of this project. TIEC takes SWEPCO at its word, so the establishment of Turk Plant-type hard caps or real performance guarantees does not appear to be an option. Further, the economics of this project are so underwater that the project would not be saved by holding SWEPCO to its low cost estimates and optimistic performance projections. Accordingly, attempting to impose conditions, which would still not save the project and which SWEPCO is unwilling to accept, is not an option.[464] It is now clear that those conditions cannot save a project that makes no economic sense under any reasonable projections.

V. Other CCN Issues (P.O. Issue Nos. 9, 11, 14, 15, 16, 17)

Not briefed.

VI. Proposed Ratemaking Treatments (P.O. Issue Nos. 18, 19, 20, 21, 22, 23, 24, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36)

In its CCN application, SWEPCO has proposed a suite of unprecedented ratemaking requests that should be denied along with the rest of the application. More fundamentally, these requests are premature, well beyond the scope of a CCN proceeding, and appropriately addressed, if necessary, in a rate case, where a thorough assessment of SWEPCO's operating and financial situation can be made.[465] Accordingly, SWEPCO's ratemaking proposals should not be addressed in this proceeding.

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[462] Docket No. 40443, Order on Rehearing at FoF 37.

[463] TIEC Ex. 1, Pollock Dir. at Ex. JP-2, line 9.

[464] TIEC notes that the four potential ratepayer protections were identified in the Mr. Pollock's Direct Testimony on page 55: 1) a hard cap on construction costs; 2) a hard capacity factor floor; 3) a PTC guarantee; and 4) a hold harmless commitment for the $1.6 billion Gen-Tie Line if the wind facilities do not qualify for PTCs.

[465] TIEC Ex. 1, Pollock Dir. at 61.

A. Request to Recover Revenue Requirement Through Fuel

SWEPCO requests a good cause exception to the Commission's fuel rule that would allow recovery of the revenue requirement through fuel expense until the project is included in base rates. The preliminary order forecloses this request, as it identified as an issue not to be addressed whether the Commission can "permit recovery of costs before their inclusion in rate base through a mechanism other than construction work in progress under PURA § 36.054."[466] SWEPCO has admitted that this request is not necessary to preserve its financial integrity,[467] and has not provided any legitimate reasons for fundamentally changing the ratemaking process.[468] Thus, not only is SWEPCO's request for early recovery through fuel premature, it is unwarranted and should be denied.

B. Proposal to Flow PTCs Through Fuel

SWEPCO's request for a special circumstances exception to flow PTCs to customers through fuel expense should not be addressed.[469] However, SWEPCO has modeled the project's benefits assuming that ratepayers will receive the PTCs when they are generated.[470] Given the dire economics of the project, if the Commission rejects the recommendations of Staff and intervenors and approves the CCN, SWEPCO should be required to flow through benefits to customers in the manner presented in its economic analysis.

C. Deferred Tax Asset for PTCs

SWEPCO's request to record unused PTCs in a deferred tax asset on which it will earn a return should not be addressed.[471]

D. Proposal to Defer PTCs to "Shape" the Revenue Requirement

SWEPCO's request to defer PTCs to later years to smooth the revenue requirement should not be addressed.[472]

E. Jurisdictional and Class Allocation

SWEPCO's request to set jurisdictional and class allocation factors should not be

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466 Preliminary Order at 9.

467 SWEPCO Ex. 10, Hawkins Dir. at 5-6.

468 TIEC Ex. 1, Pollock Dir. at 60-64 (explaining why regulatory lag does not justify this request).

469 *Id.* at 60.

470 *See supra* Section III.C.2.

471 TIEC Ex. 1, Pollock Dir. at 65.

472 *Id.* at 66.

addressed.

F. Depreciation

SWEPCO's request to set depreciation rates for the Wind Facilities and the Gen-Tie should not be addressed.

G. Treatment of Renewable Energy Credits

SWEPCO's request to create a new tariff schedule through which customers could purchase renewable energy credits should not be addressed.

VII. Sale, Transfer, Merger Issues (P.O. Issue Nos. 1, 2, 3)

Not briefed.

VIII. Other Regulatory Approvals (P.O. Issue Nos. 4, 5, 6, 7, 8)

Not briefed.

IX. Conclusion

For the foregoing reasons, TIEC requests that the Commission deny SWEPCO's application in its entirety. TIEC also requests all other relief to which it is justly entitled.

Respectfully submitted,

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ATTORNEYS FOR TEXAS INDUSTRIAL
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CERTIFICATE OF SERVICE

I, Benjamin B. Hallmark, Attorney for TIEC, hereby certify that a copy of the foregoing document was served on all parties of record in this proceeding on this 12th day of March, 2018 by electronic mail, facsimile and/or First Class, U.S. Mail, Postage Prepaid.

Benjamin B. Hallmark

CERTIFICATE OF COMPLIANCE

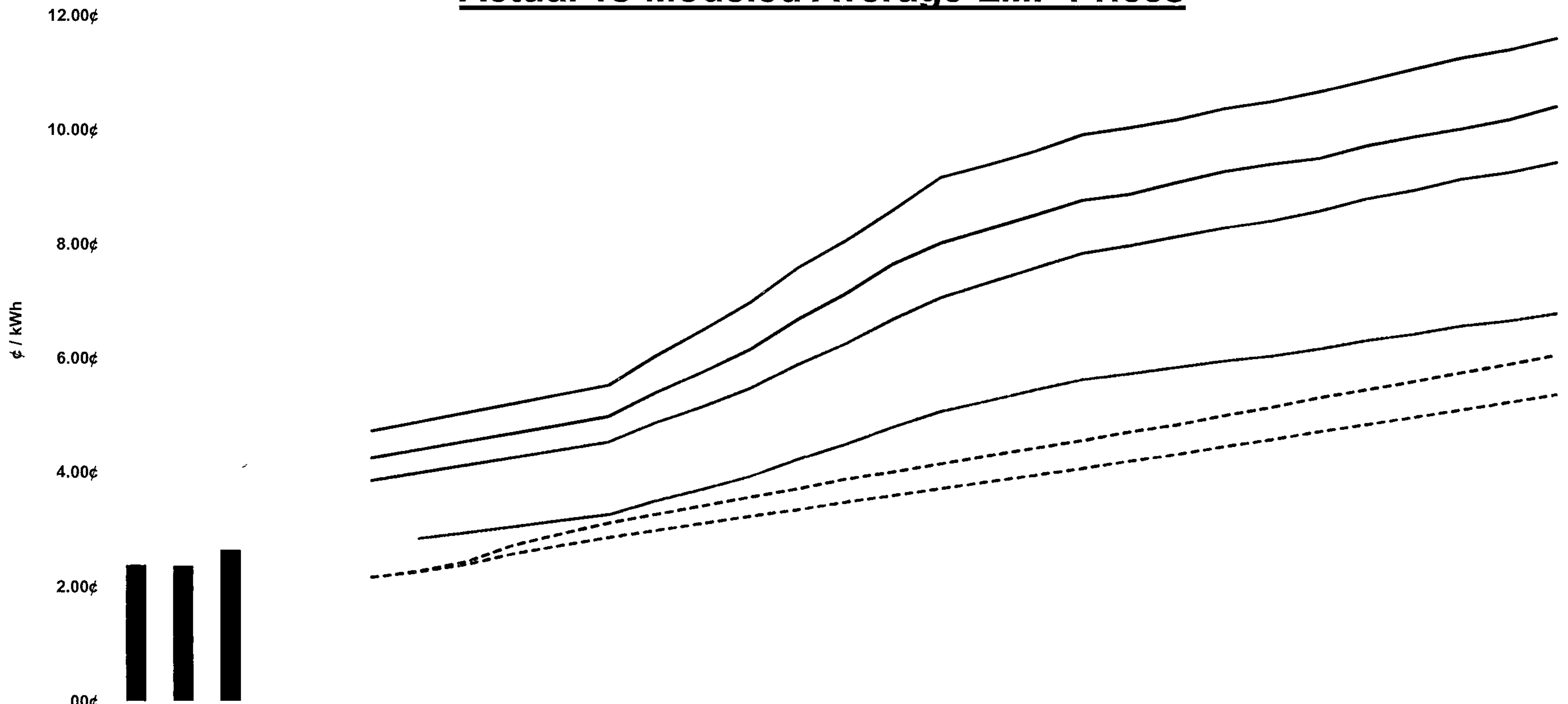
Per SOAH Order 9, I, Benjamin Hallmark, Attorney for Texas Industrial Energy Consumers, hereby certify that this document contains 26,366 words from cover page to end of document, as identified by the undersigned's word-processing program.

Benjamin B. Hallmark

ATTACHMENT 1

SOUTHWESTERN ELECTRIC POWER COMPANY

Actual vs Modeled Average LMP Prices



	2015	2016	2017 YTD	2018	2018 2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
AEP LZ Actual	2.37¢	2.36¢	2 64¢												
Base Gas						4 25¢	4 39¢	4 54¢	4 68¢	4.83¢	4 97¢	5 39¢	5 75¢	6 15¢	6 67¢
High Gas						4 73¢	4 89¢	5 05¢	5 21¢	5.37¢	5 53¢	6.04¢	6 50¢	6 98¢	7 59¢
Low Gas						3 86¢	4 00¢	4 13¢	4 26¢	4.40¢	4 53¢	4 87¢	5 15¢	5 48¢	5 89¢
Ultra Low							2 84¢	2 94¢	3 05¢	3.15¢	3 26¢	3 50¢	3 70¢	3 93¢	4 23¢
SPS Base Gas						2 17¢	2 28¢	2 44¢	2 73¢	2.92¢	3.11¢	3.26¢	3 42¢	3.57¢	3 71¢
SPS Low Gas						2.17¢	2.27¢	2.40¢	2.59¢	2.73¢	2.87¢	2.99¢	3.11¢	3.24¢	3.36¢

	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045
AEP LZ Actual																
Base Gas	7 12¢	7.64¢	8 01¢	8 26¢	8 51¢	8.77¢	8.88¢	9.09¢	9 28¢	9 40¢	9.50¢	9.72¢	9.88¢	10.02¢	10.18¢	10.41¢
High Gas	8 06¢	8 60¢	9 18¢	9 40¢	9 63¢	9 93¢	10 05¢	10.19¢	10 38¢	10 51¢	10 68¢	10 87¢	11 07¢	11 27¢	11 41¢	11 61¢
Low Gas	6 25¢	6.68¢	7 05¢	7 32¢	7 58¢	7 84¢	7 98¢	8 14¢	8 29¢	8 41¢	8 59¢	8.80¢	8.95¢	9 14¢	9 26¢	9 43¢
Ultra Low	4 48¢	4 79¢	5 06¢	5 25¢	5 43¢	5 62¢	5 72¢	5.83¢	5 94¢	6 03¢	6.16¢	6 31¢	6 42¢	6.56¢	6 65¢	6 77¢
SPS Base Gas	3 88¢	4.00¢	4 14¢	4 28¢	4 42¢	4 55¢	4 70¢	4.83¢	4.99¢	5 14¢	5.30¢	5.44¢	5.59¢	5.73¢	5 89¢	6 04¢
SPS Low Gas	3.49¢	3 60¢	3 72¢	3.84¢	3.96¢	4.08¢	4.20¢	4.32¢	4.45¢	4 58¢	4 71¢	4.84¢	4.96¢	5 09¢	5 22¢	5 36¢

Sources· TIEC 2-19, Workpapers JPP-WP-1a, JPP-WP-1c, JPP-WP-1d. September and October compiled from LMP's from SPP websıte, (https://marketplace spp.org/pages/da-lmp-by-locatıon#), Attachments JSA-7-U and Attachments JSA-8-U (Docket No 46936)
Source for ultra-low case LMPs: TIEC Ex. 96 (admitted at the hearing on the merits).