modeling analysis to confirm that the Selected Wind Facilities will provide customer benefits when compared to the Base case.

Q. IN ADDITION TO NET CUSTOMER SAVINGS, WILL THE SELECTED WIND FACILITIES PROVIDE OTHER BENEFITS TO CUSTOMERS?

A. Yes. We constantly focus on economic development in the states and communities we serve. One of the ways we assist in economic development is by working to retain existing and attract new customers. Current and potential customers have expressed an increasing interest in energy savings including low-cost renewable energy to meet their sustainability goals. In fact, many local, regional, national, and international companies have sustainability goals, of which renewable energy is a key component. For example, some of the customers in the SWEPCO service territory that have publicly expressed a desire for increased renewable energy content include Walmart, Tyson Foods, McDonalds, Target, and United Parcel Service. The Selected Wind Facilities will meet customer demand for both sustainability and low-cost energy.

Q. WILL THE SELECTED WIND FACILITIES PROMOTE ECONOMIC GROWTH?

A. Yes. Growth can come in the form of expansion of existing companies and customers, as well as attracting new customers. Providing lower-cost energy and meeting sustainability goals helps achieve both of these objectives.

Q. DOES SWEPCO'S OWNERSHIP OF THE SELECTED WIND FACILITIES PROVIDE OTHER ADVANTAGES FOR CUSTOMERS?

A. Yes. As further addressed by Company witness Brice, acquisition of the Selected Wind Facilities provides significant benefits to SWEPCO customers, including reduced fuel costs and the potential value of the Facilities continuing to serve customers after they have been substantially depreciated. Finally, another benefit of SWEPCO and PSO purchasing and owning these Selected Wind Facilities is that the Company can better facilitate the guarantees discussed below.

## IV. GUARANTEES FOR THE BENEFIT OF CUSTOMERS

Q. PLEASE DISCUSS THE GUARANTEES SWEPCO IS PROVIDING TO CUSTOMERS ASSOCIATED WITH THE ACQUISITION OF THE WIND FACILITIES.

A. SWEPCO is offering a suite of guarantees that are designed to protect customers and provide significant value. The guarantees include a cost cap, a long-term minimum production guarantee, and a guarantee that the Facilities will qualify for the PTC percentage at the levels outlined above. These guarantees are further detailed by Company witness Brice.

Q. ARE THE PERFORMANCE GUARANTEES A SUBSTANTIAL BENEFIT OF SWEPCO OWNING THE SELECTED WIND FACILITIES?

A. Yes. SWEPCO ownership and control of the Selected Wind Facilities facilitates the offering of these substantial guarantees for the benefit of customers. Ownership allows the Company to better respond to changing market conditions and to make operational decisions necessary to deliver the guarantees, as discussed further by Company witness Brice.

## V. CONCLUSION

Q. PLEASE SUMMARIZE WHY THE COMMISSION SHOULD APPROVE SWEPCO'S ACQUISITION OF AN INTEREST IN THE SELECTED WIND FACILITIES.

A. The proposed transaction to acquire the Selected Wind Facilities is in the public interest and provides benefits in excess of its costs for SWEPCO customers and long-term fuel diversity for SWEPCO. The Selected Wind Facilities are estimated to result in savings to SWEPCO customers of $2.03 billion in nominal dollars and of $567 million on a Net Present Value basis in the Base Fundamentals Forecast. There are substantial customer benefits and savings over all the scenarios considered. There is no risk of fuel cost volatility and customers are seeking sustainable energy. However, due to the phase out of PTCs, there is a relatively limited period of time for SWEPCO to take full advantage of the potential acquisition of the wind resources for the benefit of customers.

Accordingly, SWEPCO respectfully requests approval of the transaction to acquire the Selected Wind Facilities.

Q. DOES THIS COMPLETE YOUR TESTIMONY?

A. Yes. Thank you.

PUC DOCKET NO.

PUBLIC UTILITY COMMISSION OF TEXAS

APPLICATION OF

SOUTHWESTERN ELECTRIC POWER COMPANY

FOR CERTIFICATE OF CONVENIENCE AND NECESSITY

AUTHORIZATION AND RELATED RELIEF FOR

THE ACQUISITION OF WIND GENERATION FACILITIES

DIRECT TESTIMONY OF

JOHN F. TORPEY

FOR

SOUTHWESTERN ELECTRIC POWER COMPANY

JULY 15, 2019

## TESTIMONY INDEX



## EXHIBITS

| EXHIBIT | DESCRIPTION |
|---|---|
| EXHIBIT JFT-1 | SWEPCO Arkansas & Louisiana Draft 2018 Integrated Resource Plan |
| EXHIBIT JFT-2 | Request for Proposal Screening - Confidential |
| ERRATA EXHIBIT JFT-3 | Benefits of Selected Wind Facilities |
| ERRATA EXHIBIT JFT-4 | Natural Gas Price and Additional Sensitivities |

## I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, POSITION IN THE COMPANY, AND BUSINESS ADDRESS.

A. My name is John F. Torpey, and I am employed as Managing Director - Resource Planning and Operational Analysis for American Electric Power Service Corporation (AEPSC). AEPSC supplies engineering, financing, accounting, planning, and advisory services to the eleven electric operating companies of American Electric Power Company, Inc. (AEP), including Southwestern Electric Power Company (SWEPCO or the Company). My business address is 1 Riverside Plaza, Columbus, Ohio 43215.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received a Bachelor of Engineering from The Cooper Union for the Advancement of Science and Art (New York) in 1979 and a Master of Business Administration from Saint John's University (New York) in 1984. In addition, in 1995, I completed the American Electric Power System Management Development Program at The Ohio State University, and in 2000, I completed the Darden Partnership Program at the Darden Graduate School of Business Administration, University of Virginia.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL BACKGROUND.

In 1979, I was employed by AEPSC as a Design Engineer in the Structural Design Department. In 1985, I became the Project Controls Engineer for the Zimmer Conversion Project and then for the Gavin Flue Gas Desulfurization (FGD) Retrofit Project. I became Manager of the Controls Services Department in 1994, with responsibility for capital and expense budgeting, and maintenance outage planning for the AEP generating plants. I held various managerial positions in the AEPSC generation organization related to planning, budgeting, and cost control. In 2004, I became the Director of Corporate Budgeting in the Corporate Planning and Budgeting Department, and in 2007 became Director - Integrated Resource Planning. I assumed my current position in January 2018.

I am a Professional Engineer registered in the State of Ohio and a Certified Management Accountant. I have been an adjunct instructor at Franklin University (Ohio) since 2006 and have taught classes in the Accounting program and the Energy Management program.

Q. WHAT ARE YOUR CURRENT RESPONSIBILITIES?

A. I am primarily responsible for the supervision and administration of long-term generation resource planning and analysis for AEP operating companies including SWEPCO. In such capacity, I coordinate the use of short- and long-term generation production costing and other resource planning models used in the ultimate development of operating and capital budget forecasts and integrated resource plan (IRP) filings for the Company and its AEP affiliates. I oversee the economic evaluation of responses to requests for proposals (RFP) for new generation resources, and I regularly monitor actual performance and oversee the preparation of forecasted information for use in regulatory proceedings.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE ANY REGULATORY COMMISSIONS?

A. Yes. I have testified or provided testimony on behalf of SWEPCO affiliates Ohio Power Company before the Public Utilities Commission of Ohio, Indiana Michigan

Power Company before the Michigan Public Service Commission and the Indiana Utility Regulatory Commission, Appalachian Power Company (APCo) and Wheeling Power Company before the Public Service Commission of West Virginia, and APCo before the Virginia State Corporation Commission.

## II. PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony discusses the Company's Integrated Resource Plan (IRP), its identification of potentially cost effective wind generation additions, which led to its request for proposals (RFP) for wind generation, and the economic analysis of the bids received in the RFP. In addition, my testimony quantifies the benefits of SWEPCO's proposal to acquire 810 MW of the three proposed wind facilities (1,485 MW total) in this case (Selected Wind Facilities), which represents a 54.5% share. SWEPCO's sister company, Public Service Company of Oklahoma (PSO), will acquire the remaining 675 MW (45.5%) share of the Selected Wind Facilities, subject to regulatory approval.

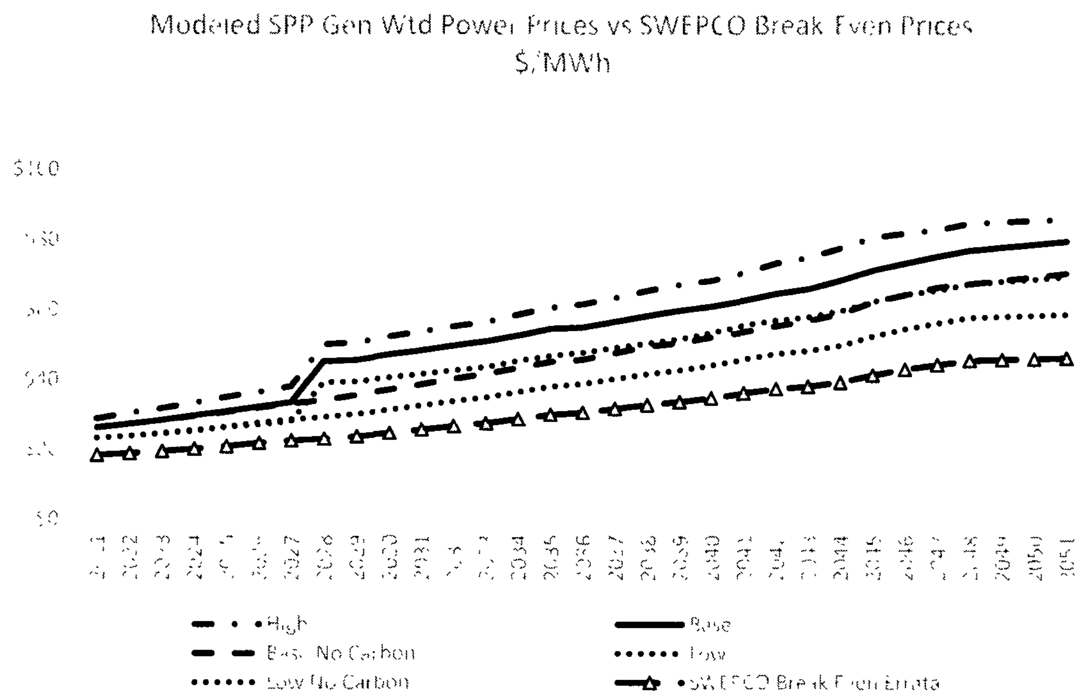
Using the Company's Base fundamental forecast that assumes a cost on carbon emissions beginning in 2028, the Selected Wind Facilities are forecasted to provide SWEPCO's customers savings over the 31-year project life of approximately $567 million on a net present value (NPV) basis, or $2,030 million on a nominal basis. Using the same Base fundamental forecast, excluding the future carbon dioxide cost from the forecast, SWEPCO's customers are expected to realize a savings over the 31-year project life of approximately $396 million on an NPV basis or $1,453 million on a nominal basis. These forecasts are sponsored by Company witness Bletzacker. Indeed, the Selected Wind Facilities are forecasted to provide SWEPCO's customers substantial savings under a wide range of future scenarios at their expected level of performance (P50) as summarized in Errata Table 1.

Errata Table 1: Benefits of Selected Wind Facilities – All Fundamental Forecasts and P50 Capacity Factor

| SWEPCO | | | |
|---|---|---|---|
| | | | |
| Amounts in Millions | 31 Year NPV | PTC Period - First 11 years Nominal Total | Full 31 Year Nominal Total |
| **P50 Capacity Factor Cases** | | | |
| High Gas With CO2 | $718 | $520 | $2,501 |
| Base Gas With CO2 | $567 | $418 | $2,030 |
| Base Gas Without CO2 | $396 | $318 | $1,453 |
| Low Gas With CO2 | $396 | $296 | $1,532 |
| Low Gas Without CO2 | $236 | $211 | $971 |

The savings shown in Errata Table 1 are calculated using a range of forecasted energy prices described by Company witness Bletzacker. For the Selected Wind Facilities the Company calculated the energy prices necessary to provide a customer benefit of $0 on a NPV basis. Figure 1, below, shows that the energy prices indicated in the Low Gas Without Carbon fundamentals forecast would have to be reduced by more than 20% for the Selected Wind Facilities to break-even on an NPV basis. The break-even power price in Errata Figure 1 is well below all of the Company's forecasted power prices.

Errata Figure 1




The balance of my testimony will cover the analysis and evaluations performed by my group as it relates to SWEPCO's resource plan. RFP and Customer Benefits Analysis. Specifically, my testimony will:

1) Provide an overview of SWEPCO's most recent IRP.
2) Describe the RFP Economic Analysis.
3) Describe the Customer Benefits Analysis of the Selected Wind Facilities.
4) Describe the results of natural gas price, capacity factor, and other sensitivity analyses of the Customer Benefits Analysis.

Q. ARE YOU SPONSORING ANY EXHIBITS?

A. Yes, I am supporting the following exhibits:

- JFT-1 SWEPCO (Arkansas & Louisiana Draft) 2018 IRP
- JFT-2 Request for Proposal Screening - Confidential
- ERRATA JFT-3 Benefits of Selected Wind Facilities
- ERRATA JFT-4 Natural Gas Price and Additional Sensitivities

## III. IRP OVERVIEW

Q. WHAT IS THE PURPOSE OF AN IRP?

A. An IRP is a planning document that outlines how an electric utility plans to meet its obligation to provide safe, reliable, cost-effective electric service to its customers through a wide array of supply-side and demand-side resource alternatives. An IRP typically includes a forecast of customer electricity load, generation capacity, energy production, and generating unit retirements, and a description of how the utility intends to fulfill its capacity reserve obligation. In accordance with Arkansas and Louisiana Public Service Commission requirements, SWEPCO completed and submitted its most recent IRP, which covers a twenty-year planning period, in December 2018. EXHIBIT JFT-1 is a link to the IRP.

Q. DESCRIBE THE RESULTS OF THE 2018 SWEPCO ARKANSAS IRP.

A. The 2018 IRP forecasts SWEPCO to have adequate capacity to meet its SPP load obligations through 2026 at which time it will experience a capacity shortfall of 22 MW, increasing to 348 MW by 2030 and 1,886 MW by 2038 if it does not acquire new capacity. This shortfall is due to modest load growth, the expiration of existing purchase power agreements, and the retirements of older gas steam units. The 2018 SWEPCO IRP shows that while coal capacity makes up 43 percent of SWEPCO's generating capacity, 83 percent of its energy comes from coal-fired generation.

To address the future capacity deficit, provide customer energy cost savings, and diversify its generation sources, the SWEPCO IRP's Preferred Plan recommends various alternatives including energy efficiency measures, new wind generation resources beginning in 2022, utility-scale solar additions beginning in 2025, and new natural gas-fired generation in 2037. As it relates to this filing, SWEPCO's Preferred Plan includes 1200 MW of cumulative additional wind resources coming online by 2023. These additions will provide SWEPCO with sufficient capacity to meet its SPP reserve margin requirements, will reduce the percent of coal-generated energy to 44 percent by 2038, and will reduce customer costs. The capacity additions in SWEPCO's Preferred Plan IRP are set out in Table 2 below.

Table 2: SWEPCO 2018 IRP Cumulative Capacity Additions (MW)

| ***Preferred Plan*** | | **2021** | **2022** | **2023** | **2024** | **2025** | **2026** | **2027** | **2028** | **2029** | **2030** | **2031** | **2032** | **2033** | **2034** | **2035** | **2036** | **2037** | **2038** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Commodity, Base Load | [illegible] | | | | | | | | | | | | | | | | | [illegible] | |
| | [illegible] | | | | | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |
| | | | | | | | | | | | | | | | | | | | |
| | [illegible] | [illegible] | [illegible] | 23 | 25 | [illegible] | [illegible] | 17 | 13 | 12 | [illegible] | [illegible] | [illegible] | 5 | - | 3 | 2 | [illegible] | 1 |
| | VVO | [illegible] | [illegible] | [illegible] | 24 | [illegible] | | 37 | [illegible] | 37 | [illegible] | [illegible] | [illegible] | [illegible] | 43 | [illegible] | [illegible] | [illegible] | [illegible] |
| | [illegible] | 4 | 4 | 4 | 4 | 1 | [illegible] | [illegible] | [illegible] | - | [illegible] | [illegible] | - | 6 | | 7 | [illegible] | | [illegible] |
| Capacity Reserves (MW) Above SPP Requirement without New Additions | | **419** | **386** | **258** | **237** | **109** | (22) | (101) | (121) | (159) | (348) | (376) | (404) | (497) | (521) | (552) | (946) | (1,330) | (1,886) |
| Capacity Reserves (MW) Above SPP Requirement with New Additions | | **462** | **465** | **366** | **360** | **409** | **439** | **423** | **448** | **490** | **359** | **379** | **548** | **522** | **531** | **534** | **140** | **129** | **318** |

Base/Intermediate=NGCC, Peaking=NGCT, AD, CHP=Combined Heat & Power, VVO=Volt VAR Optimization, DG=Distributed Generation

Q. DESCRIBE THE INPUTS AND METHODOLOGY USED TO DEVELOP SWEPCO'S DRAFT IRP.

A. Inputs to the IRP include:

- the Company's load forecast including capacity and energy requirements;
- reserve margin requirements for the SPP;
- future costs, operating characteristics, retirement dates, and forecasted performance of existing resources, including Company-owned generation and purchase power agreements;

- a projection of fuel costs, emission costs, short-term capacity purchase costs, and market energy prices; and
- cost and performance characteristics of potential alternatives for new supply- and demand-side resources, including constraints on the amount and timing of new resource additions.

This data is input to the PLEXOS® model, which calculates the optimal portfolio of resources that will meet the Company's capacity obligation at the lowest cost. PLEXOS is a widely accepted model that AEPSC uses to forecast its operating companies' production costs and to develop optimal resource plan solutions. Optimized portfolios are created under a variety of pricing forecasts (*e.g.*, low gas, high gas), and are used as the basis for the Company's Preferred Plan.

Q. IS THE SWEPCO IRP RESULT CONSISTENT WITH OTHER IRPs FILED BY AEP OPERATING COMPANIES THAT OPERATE IN SPP?

A. Yes. In December 2018, SWEPCO filed an IRP in Arkansas with a resource plan identical to the plan in the Draft SWEPCO Louisiana IRP. Also, in December 2018, SWEPCO affiliate PSO filed an IRP in Oklahoma. As a planning assumption, the SWEPCO and PSO IRPs constrained wind resource additions through the planning period to a maximum of roughly 40 percent of each company's energy production to prevent the model from selecting an amount of wind resources that could be inconsistent with maintaining SPP grid stability. The model selected the maximum amount of wind resources as part of the lowest-cost solution to meet customers' needs.

Q. SINCE SWEPCO AND PSO FILED THEIR RESPECTIVE IRPs AND DRAFT IRP HAVE ANY INPUT ASSUMPTIONS CHANGED?

A. Yes. The IRP modeling represents the latest and best information the Company has at a point in time. The 2018 SWEPCO Arkansas IRP, draft SWEPCO Louisiana IRP, and PSO IRP were all prepared using an August 2018 vintage fundamentals forecast. The final SWEPCO Louisiana IRP, which will be filed in August 2019, and the PLEXOS analysis for the filing in this case are using a more recent April 2019 fundamentals forecast which includes generally lower natural gas and SPP market energy prices than the 2018 forecast. The SWEPCO load forecast has been updated and shows slower load growth than the 2018 load forecast used in the IRP, delaying the need for new capacity in SWEPCO until 2030. Initial optimization modeling runs for the final 2019 SWEPCO Louisiana IRP show that the addition of wind resources in 2022 and 2023 continue to provide economic value for customers and will be included in SWEPCO's Preferred Plan.

Q. HOW DOES SWEPCO'S WIND RFP RELATE TO THE COMPANY'S 2018 FINAL AND 2019 DRAFT IRPs?

A. SWEPCO's 2018 and 2019 IRPs identified wind resources as economic and began adding wind resources in 2022. In the IRP, by adding 1200 MW of new wind resources by 2023, and an additional 200 MW in 2024, SWEPCO's wind generation would equate to approximately 40% of its total generation. In each commodity price scenario analyzed for the IRP, 1200 MW of wind by 2023 was determined to be part of the optimal plan. The wind resources selected by the model in 2022 and 2023 were eligible for the 80% and 60% PTC, respectively, which made them economic resources. This result was a key driver in the decision for SWEPCO to issue an RFP for wind resources.

The Selected Wind Facilities procured through the RFP would provide SWEPCO 810 MW of the 1200 MW of new wind resources called for by the IRP.

## IV. RFP BID ECONOMIC ANALYSIS

Q. DID THE COMPANY RANK THE BIDS RECEIVED IN THE RFP BASED ON AN ECONOMIC ANALYSIS OF THOSE BIDS?

A. Yes, in part. Consistent with the RFP, 90% of the bid ranking was based on an economic evaluation and the remaining 10% was based on non-price factors. The project economic rankings are shown in CONFIDENTIAL EXHIBIT JFT-2. This information was provided to witness Godfrey to determine the final portfolio of Selected Wind Facilities.

Q. EXPLAIN THE PROCESS USED TO EVALUATE THE RESPONSES TO THE COMPANY'S RFP.

A. As further discussed by witness Godfrey, responses to the RFP that met the Eligibility and Threshold Requirements (RFP §9.1), then moved into the Detailed Analysis (RFP §9.2) phase of the RFP that included the 1) Economic Analysis (RFP §9.2.1) and 2) the Non-Price Factor Analysis (RFP §9.2.2). The Economic Analysis included calculating three metrics for each bid, the Levelized Cost of Energy (LCOE), the Levelized Adjusted Cost of Energy (LACOE), and the Levelized Net Cost of Energy (LNCOE).

First, the LCOE, which only represents the project cost and ignores delivery cost to the customer, was calculated for each bid. Congestion and losses costs and the potential cost for congestion mitigation, based on input from Company witnesses Sheilendranath and Ali, were added to determine the LACOE for each bid. Finally, LNCOE, while not part of the bid ranking, was calculated for each bid as a preliminary indicator to show that the proposals resulted in savings to customers. To calculate LNCOE, avoided energy and capacity costs were subtracted from the LACOE for each bid. The LNCOE represents the levelized net revenue requirement to the customer including a credit to account for capacity value. The capacity value is the same on a \$/MW basis for all bids. Each of these metrics results in a \$/MWh unit of measure allowing for comparison of different sized (MW) projects with varying capital costs (\$) and expected annual generation (MWh). As discussed by Company witness Godfrey, the results of the Economic Analysis and Non-Price Factor Analysis were used in determining the final bid selection.

Q. HOW WAS THE LCOE FOR EACH BID CALCULATED?

A. The LCOE was determined by dividing the present value of the revenue requirements (\$) for a bid by the generation (MWh) over the study period, producing a levelized cost of energy for each project expressed in \$/MWh. The present value of the revenue requirements for a project is determined from the annual revenue requirements for each of the 30 years the project is assumed to be in service. Annual revenue requirements take into account the following factors:

- Purchase price
- Owners' costs and contingency
- Book depreciation
- Tax depreciation (including Modified Accelerated Cost Recovery System, or MACRS)
- Flow-through treatment of deferred state income tax
- SWEPCO Weighted Average Cost of Capital
- Federal PTCs, net of Deferred Tax Asset (DTA) carrying costs
- Land lease costs

- Operation and Maintenance (O&M) costs
- Property taxes

The generation for a project is determined from the sum of the expected annual energy output over the life of the project. The expected annual energy, which does account for an extra day during leap year, was provided by witness Godfrey and is discussed in detail in his testimony.

Q. HOW DID YOU CALCULATE THE LACOE FOR THE RFP BID ECONOMIC ANALYSIS?

A. The LACOE takes into account two additional factors, in addition to the LCOE. First is the costs of congestion and transmission line losses. Congestion and line losses costs were developed by Company witness Sheilendranath. The other factor is the cost of a potential future generation-tie line to alleviate unexpectedly higher congestion costs if such congestion costs were not mitigated by the SPP. Generation-tie line (gen-tie) costs were provided to me by company witness Ali.

To treat all bid proposals equitably, the LCOEs for each bid were adjusted for the average of levelized congestion and line loss costs and levelized gen-tie costs. The following shows how LACOE is calculated:

Levelized Cost of Energy (LCOE)
+ 50% Levelized Cost of Congestion and Line Losses
+ 50% Levelized Cost of Potential Gen-Tie
Total Levelized Adjusted Cost of Energy (LACOE)

Q. HOW DID YOU CALCULATE THE LNCOE?

A. The LNCOE was determined by subtracting the avoided energy and capacity costs from the LACOE. Avoided energy costs represent the energy value of the output from each bid into the SPP market. Avoided energy costs were based on projected SPP energy prices used in SWEPCO's 2018 IRP.

Avoided capacity costs represent an assumed capacity contribution for each project at the assumed price for capacity in the SPP used in the 2018 IRP. For the RFP Economic Analysis the value of capacity is based on an assumed \$/MW-day value attributed to the firm capacity of each project. This adds an equivalent \$/MW capacity value to each project. The capacity benefit attributed to the Selected Wind Facilities is based on a more robust analysis described in the Customer Benefits Analysis section of my testimony.

Q. HOW DID THE COMPANY DEVELOP THE CONGESTION AND LOSSES INPUTS TO THE RFP ANALYSIS?

A. For the RFP Economic Analysis, PROMOD, a proprietary model used by the SPP in transmission planning, was used to calculate congestion costs and losses. Witness Sheilendranath discusses how the PROMOD tool was used to develop congestion costs and loss projections for each of the RFP bids.

## V. CUSTOMER BENEFITS OF SELECTED WIND FACILITIES

Q. WHAT ARE THE FORECASTED BENEFITS AND COSTS OF THE SELECTED WIND FACILITIES?

A. Errata Table 3 contains the forecasted benefits, projected costs, and resulting net customer savings of the Selected Wind Facilities assuming a P50 capacity factor (meaning it is equally probable (50%) that the wind output would be greater or lesser than the P50 value) under the Company's Base Case fundamentals forecast that both includes and excludes a carbon burden. ERRATA EXHIBIT JFT-3, pages 1-2, shows the annual costs and benefits of this case.

ERRATA Table 3: Net Benefits of Selected Wind Facilities
Base Gas with Carbon and P50 Capacity Factor

| Year | 31 Year NPV | Total 31 Year Nominal |
|---|---|---|
| Production Cost Savings Excluding Congestion/Losses | $1,660 | $5,095 |
| Congestion and Losses | ($322) | ($893) |
| Capacity Value | $70 | $311 |
| Production Tax Credits (grossed up, net of DTA) | $507 | $750 |
| Wind Facility Revenue Requirement | ($1,348) | ($3,233) |
| **Net Customer Benefits** | **$567** | **$2,030** |

Errata Base Gas with No Carbon and P50 Capacity Factor

| Year | 31 Year NPV | Total 31 Year Nominal |
|---|---|---|
| Production Cost Savings Excluding Congestion/Losses | $1,448 | $4,386 |
| Congestion and Losses | ($269) | ($725) |
| Capacity Value | $57 | $274 |
| Production Tax Credits (grossed up, net of DTA) | $507 | $750 |
| Wind Facility Revenue Requirement | ($1,348) | ($3,233) |
| **Net Customer Benefits** | **$396** | **$1,453** |

Q. EXPLAIN HOW EACH OF THE COMPONENTS IN ERRATA TABLE 3 ARE CALCULATED OR DERIVED.

A. The project benefits and costs are calculated or derived as follows:

- Production Cost Savings were determined by my group and equal the difference in cost for: fuel, purchased power, other variable costs, and increased off-system sales, between a portfolio that includes the Selected Wind Facilities and a baseline portfolio that excludes them.
- Congestion and losses costs were provided by Company witness Sheilendranath.

- Capacity Value is the savings from deferring capacity additions (new construction or purchases) due to the addition of the Selected Wind Facilities.
- PTCs - grossed up and net of DTA carrying costs are the value of production tax credits for each MWh of wind generation during the facilities' first ten years of production. Because the PTC is a tax credit, it is equivalent to a revenue reduction equal to the PTC divided by 1 – the tax rate, which is referred to as a tax gross up. The DTA cost represents the carrying charge on the deferred tax asset balance and is supported by Company witnesses Multer and Hollis.
- Revenue requirements were provided by Company witness Aaron based on the installed capital costs plus operations and maintenance costs from Company witnesses Godfrey and DeRuntz.

Q. EXPLAIN THE PROCESS USED TO EVALUATE THE ECONOMIC BENEFIT TO CUSTOMERS OF THE SELECTED WIND FACILITIES.

A. While the initial RFP Economic Analysis indicated that the bids would provide customer benefits under the Company's assumed avoided energy and capacity values, along with expected congestion and loss costs, a more robust analysis of the customer benefits of the Selected Wind Facilities was subsequently conducted using the PLEXOS model. The PLEXOS model utilizes a forecast for the Company's generating units cost of energy (e.g., fuel, fuel handling, variable operations and maintenance, consumable costs and emission allowance costs), scheduled maintenance outages, and forced outages, along with forecasted market prices of energy to determine forecasted generation output, costs, and revenues.

The model compares the total hourly energy output of SWEPCO's generation resources against the hourly internal load and energy requirement of SWEPCO. To the extent that the resources exceed the load, the model determines the surplus generation sold at the hourly generation price. To the extent that the load exceeds the resources, the model determines the deficit purchase at the market load price. Consequently, the

Production Cost Savings includes the cost of production less the cost of purchases, plus the revenues from additional off-system sales (OSS) less the OSS margins retained by SWEPCO.

To determine the net customer benefits of the Selected Wind Facilities, the Company developed both a case that assumed the Selected Wind Facilities for SWEPCO were not added (the Baseline Case), and a change-case scenario that included the Selected Wind Facilities (Project Case). The Company then compared the difference or "delta" between these two cases for the period modeled, 2021 to 2051. In a methodology consistent with the development of the SWEPCO 2018 IRP, natural gas combined cycle (NGCC) units, natural gas peaking units, solar resources, and short-term market purchases were optimally added as needed to SWEPCO's resources in both the Baseline Case and Project Case throughout the period to maintain the 12% reserve margin as required by the SPP. The benefits also include the Selected Wind Facilities' capacity value, which were determined using the PLEXOS model.

In summary, the adjusted production cost savings were added to the avoided capacity value and the grossed-up value of PTCs net of DTA carrying costs to arrive at the total economic benefit. Project costs including the wind project revenue requirements and congestion and transmission line loss costs were then subtracted from the total benefit to arrive at an annual net benefit to customers. The present value of all costs and benefits is then calculated.

Q. EXPLAIN THE METHODOLOGY USED TO MODEL THE SELECTED WIND FACILITIES' ENERGY VALUE.

A. As explained by Company witness Pfeifenberger, the PROMOD, Aurora, and PLEXOS models were used to calculate system energy costs and benefits. Company witness Sheilendranath explains how PROMOD simulations produced a projection of AEP West Load Zone locational marginal prices (LMPs) and congestion and loss effects for 2024 and 2029. The results of this simulation were interpolated and extrapolated over 31 years and then incorporated into PLEXOS. The PLEXOS simulation of the Company's resources was based on a 31-year forecast and includes the impact the Selected Wind Facilities have on the production cost versus the Baseline Case. The Plexos model computed different optimal portfolios of future resources for each of the Fundamental forecast cases presented in Errata Table 1.

Q. DOES THE COMPANY'S METHODOLOGY RECOGNIZE THE COMMISSION AUTHORIZED OFF-SYSTEM SALES SHARING ARRANGEMENT FOR SWEPCO LOUISIANA?

A. Yes. The adjusted production cost takes into account that 90% of OSS margin is returned to the customers.

Q. HOW DOES THE COMPANY'S METHODOLOGY ACCOUNT FOR THE SELECTED WIND FACILITIES' CAPACITY VALUE?

A. For the SWEPCO share of the Selected Wind Facilities, the Company assumed a firm capacity rating of 15% of the Selected Wind Facilities' nameplate rating, representing a capacity contribution of 123 MW. SWEPCO's current wind resources have a MW weighted aggregate capacity rating of 17.0% of nameplate. Because wind is an intermittent resource, meaning the output from a wind project will vary throughout the day, the SPP has developed a methodology to calculate the capacity value a wind project provides using actual or expected performance data.

The capacity from the Selected Wind Facilities is expected to defer or reduce future capacity requirements of the Company. As such, the NPV savings associated with the delay in future capacity additions was included as a benefit of the Selected Wind Facilities. This capacity benefit calculation compares the present value of the fixed costs and carrying costs of resource additions from a PLEXOS-optimized portfolio that included the capacity contribution of Selected Wind Facilities (the Project Case) to a PLEXOS-optimized portfolio that excluded that capacity contribution (the Baseline Case). The annual difference in fixed cost and carrying costs between these two portfolios was discounted and summed to arrive at the NPV of the Selected Wind Facilities' capacity benefit. The PLEXOS model computed different optimal portfolios of future resources for each of the Fundamental forecast cases presented in Errata Table 1.

Q. DID THE COMPANY DETERMINE A NATURAL GAS PRICE AND SPP MARKET ENERGY PRICE AT WHICH THE COSTS AND BENEFITS OF THE SELECTED WIND FACILITIES ARE PROJECTED TO BE THE SAME (I.E., A BREAK-EVEN PRICE)?

A. Yes. Errata Figure 1 shown earlier in my testimony shows the break-even energy prices compared to the generation weighted fundamentals forecast prices. Company witness Bletzacker calculated a break-even natural gas price.

Q. HOW DID THE COMPANY PREPARE ITS BREAK-EVEN ANALYSIS FOR THE SELECTED WIND FACILITIES?

A. The Company determined the reduction in production costs savings required to result in a zero NPV of customer benefits (*i.e.*, what reduction in production cost savings result in the bottom line of Errata Table 3, Net Customer Benefits, equaling $0). This reduction approximates the reduction in around-the-clock energy prices that result in a break-even result. I provided Witness Bletzacker with the energy price reduction (assuming no costs for carbon emissions) which he used to calculate the reduction in natural gas prices that would achieve that energy price reduction. This process determined the natural gas and energy prices at which the costs and benefits of the Selected Wind Facilities would break-even.

Q. HOW DOES THE BREAK-EVEN PRICE COMPARE TO THE FUNDAMENTALS FORECAST USED IN THE COMPANY'S CUSTOMER BENEFIT CALCULATION?

A. For the Customer Benefit to equal zero, average energy prices would have to be reduced by 33% from the Company's Base No Carbon Case fundamentals forecast.

Q. HOW WILL INCLUSION OF THE SELECTED WIND FACILITIES INTO THE COMPANY'S RESOURCE MIX IMPACT SWEPCO'S EXISTING GENERATING FLEET?

A. The addition of the Selected Wind Facilities will reduce the volume of energy SWEPCO must buy from the SPP market on an annual basis and allow SWEPCO to sell more energy into the SPP market throughout the year. SWEPCO assigns the lower cost wind energy to customers and higher cost energy from its existing fossil assets to OSS. The change in generation from the existing SWEPCO fleet generation is minimal. The addition of the Selected Wind Facilities is not expected to have a significant impact on the SWEPCO Gen Hub energy prices under the assumption that additional wind facilities would be built at some point in the future.

## VI. SENSITIVITIES

Q. WHAT SENSITIVITY ANALYSES DID YOU PERFORM?

A. The Company calculated customer savings for additional sensitivity analyses under a variety of pricing forecasts:

- A high gas (with a carbon cost) and a low gas with and without carbon pricing forecast at expected (P50) performance;
- A lower capacity factor (the P95 scenario) using high, base, and low gas pricing with a carbon cost, and base gas pricing without carbon; and
- A higher congestion cost scenario including the addition of a gen-tie in 2026 to relieve that congestion at base pricing with and without carbon using P50 performance, and at base pricing without a carbon cost at P95 performance.

ERRATA EXHIBIT JFT-3 contains the annual forecasted benefits, projected costs, and resulting net customer savings of the Selected Wind Facilities under all sensitivities.

Q. WHAT DOES THE COMPANY'S ANALYSIS DEMONSTRATE CONCERNING THE BENEFITS OF THE SELECTED WIND FACILITIES UNDER THESE VARIOUS PRICING AND WIND PERFORMANCE SCENARIOS?

A. The results of the P50 performance scenarios are included in Errata Table 1 and are summarized in ERRATA EXHIBIT JFT-4. The Selected Wind Facilities will provide an economic benefit to customers under all of the P50 pricing sensitivities analyzed by the Company.

The P95 cases represent the level at which there is a 95% chance the actual output of the Selected Wind Facilities will be greater than the level assumed for each case. These scenarios assume a 38.1% capacity factor and 2,705 GWh per year for SWEPCO, which amounts to 13.4% less wind energy from the Selected Wind Facilities than in the P50 scenario. The P95 scenario analyses, summarized in ERRATA EXHIBIT JFT-4, demonstrate that the Selected Wind Facilities will provide an economic benefit to customers even under a variety of adverse or unlikely conditions.

Q. WHAT DOES THE COMPANY'S ANALYSIS DEMONSTRATE CONCERNING THE BENEFITS OF THE SELECTED WIND FACILITIES, IF HIGHER CONGESTION COSTS LEAD TO THE ADDITION OF A GEN-TIE?

A. Over the 31-year life of the Selected Wind Facilities, assuming congestion costs were high enough to warrant building a gen-tie by 2026, the Selected Wind Facilities would still result in customer benefits even when the cost of a gen-tie is included. The gen-tie cases, as shown in ERRATA EXHIBIT JFT-4, were analyzed using base pricing forecasts with and without a carbon cost at the P50 performance level, and the base with no carbon pricing forecast at the P95 performance level. The results of the Gen-Tie scenarios show that a gen-tie preserves customer benefits if congestion costs increase significantly.

The absolute benefit values in the Gen-Tie cases are not directly comparable to the lower congestion cases without a gen-tie because the Gen-Tie cases assume higher congestion costs as described by witness Sheilendranath. The no Gen-Tie scenarios presented in Errata Table 1 reflect a level of congestion costs consistent with the assumption that SPP will undertake certain transmission projects to address congestion as described by Company witness Ali. In the scenarios analyzed in Errata Table 1, a gen-tie is not necessary to provide customer benefits.

## VI. CONCLUSION

Q. PLEASE PROVIDE A SUMMARY OF YOUR TESTIMONY.

A. The Company's IRP identified wind as an economic resource alternative under multiple pricing forecasts that convinced the Company to issue an RFP for wind resources. The responses to the RFP were evaluated using an Economic Analysis and Non-Price Factor Analysis ranking. The RFP Economic Analysis was a key input in determining the Selected Wind Facilities. An additional economic analysis of the Selected Wind Facilities versus a Baseline portfolio excluding those Facilities shows customer benefits under a wide range of assumptions and sensitivities, including lower-bound energy and natural gas price forecasts or addition of a gen-tie if it became necessary. The Selected Wind Facilities have a break-even average energy price that is 33% below the Company's base (no-carbon) energy price forecast. The economic analysis was performed with widely used modeling tools and was based on reasonable inputs and assumptions.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

The SWEPCO-Arkansas IRP was filed in docket number 17-011-U on December 14, 2018.

http://www.apscservices.info/pdf/17/17-011-U_32_2.pdf

The SWEPCO-Louisiana draft IRP was filed in docket number I-34715 on January 11, 2019. The final report will be filed in August 2019.

http://lpscstar.louisiana.gov/star/portal/lpsc/PSC/PSCDocumentDetailsPage.aspx?DocumentId=1fcc9798-4a80-4927-970a-2a2c3c8ae688&Class=Filing

CONFIDENTIAL IN ITS ENTIRETY

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P50 BASE GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1 660 | $5,095 | $12 | $86 | $89 | $93 | $97 | $101 | $105 | $143 | $143 | $147 | $151 |
| 2 Congestion and Losses | ($322) | ($893) | ($3) | ($18) | ($19) | ($20) | ($22) | ($25) | ($27) | ($30) | ($32) | ($32) | ($32) |
| 3 Capacity Value | $70 | $311 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0) | ($4) | ($9) | ($13) | ($17) | ($19) | ($21) | ($22) | ($23) | ($24) | ($24) |
| 6 Wind Facility Revenue Requirement | ($1 348) | ($3,233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$567** | **$2,030** | **$6** | **$20** | **$22** | **$21** | **$26** | **$25** | **$29** | **$66** | **$67** | **$72** | **$63** |

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

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

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P50 BASE GAS NO CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,448 | $4,386 | $12 | $86 | $89 | $93 | $97 | $100 | $104 | $108 | $111 | $115 | $119 |
| 2 Congestion and Losses | ($269) | ($725) | ($3) | ($18) | ($19) | ($20) | ($21) | ($22) | ($23) | ($24) | ($25) | ($25) | ($25) |
| 3 Capacity Value | $57 | $274 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0) | ($4) | ($9) | ($13) | ($17) | ($19) | ($21) | ($22) | ($23) | ($24) | ($24) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3,233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$396** | **$1,453** | **$6** | **$20** | **$22** | **$21** | **$26** | **$27** | **$32** | **$36** | **$42** | **$47** | **$38** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $125 | $129 | $139 | $145 | $147 | $153 | $148 | $146 | $161 | $157 | $163 | $175 | $181 |
| 2 Congestion and Losses | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) |
| 3 Capacity Value | $0 | $0 | ($7) | ($7) | ($8) | ($6) | $47 | $55 | ($0) | $55 | $52 | ($1) | $2 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($20) | ($12) | ($3) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **($37)** | **($22)** | **($9)** | **$2** | **$6** | **$16** | **$66** | **$74** | **$35** | **$88** | **$93** | **$54** | **$65** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $191 | $197 | $193 | $199 | $210 | $212 | $185 |
| 2 Congestion and Losses | ($25) | ($25) | ($25) | ($25) | ($25) | ($25) | ($21) |
| 3 Capacity Value | $3 | $1 | $47 | $44 | ($3) | ($2) | $4 |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$78** | **$84** | **$127** | **$131** | **$97** | **$99** | **$88** |

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P50 LOW GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,452 | $4 476 | $10 | $75 | $77 | $80 | $84 | $86 | $89 | $125 | $125 | $128 | $131 |
| 2 Congestion and Losses | ($278) | ($774) | ($3) | ($16) | ($17) | ($17) | ($19) | ($21) | ($23) | ($26) | ($28) | ($28) | ($28) |
| 3 Capacity Value | $63 | $313 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0) | ($4) | ($9) | ($13) | ($17) | ($19) | ($21) | ($22) | ($23) | ($24) | ($24) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **$396** | **$1,532** | **$6** | **$12** | **$13** | **$11** | **$15** | **$14** | **$17** | **$51** | **$53** | **$57** | **$47** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $134 | $137 | $148 | $153 | $156 | $160 | $156 | $154 | $167 | $164 | $169 | $179 | $185 |
| 2 Congestion and Losses | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) |
| 3 Capacity Value | $0 | $0 | ($7) | ($7) | ($8) | ($6) | $47 | $55 | ($1) | $57 | $56 | ($4) | ($3) |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($20) | ($12) | ($3) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **($30)** | **($16)** | **($3)** | **$8** | **$13** | **$21** | **$72** | **$80** | **$38** | **$95** | **$101** | **$53** | **$62** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $193 | $198 | $198 | $204 | $209 | $213 | $188 |
| 2 Congestion and Losses | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($23) |
| 3 Capacity Value | ($2) | ($3) | $58 | $57 | $9 | $9 | $6 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$72** | **$78** | **$141** | **$147** | **$106** | **$109** | **$90** |

Benefits of Selected Wind Facilities (Low P50)

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P50 HIGH GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,849 | $5 676 | $13 | $95 | $99 | $104 | $110 | $114 | $118 | $157 | $158 | $163 | $167 |
| 2 Congestion and Losses | ($358) | ($994) | ($3) | ($21) | ($21) | ($22) | ($25) | ($28) | ($30) | ($33) | ($35) | ($35) | ($35) |
| 3 Capacity Value | $68 | $301 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0) | ($4) | ($9) | ($13) | ($17) | ($19) | ($21) | ($22) | ($23) | ($24) | ($24) |
| 6 Wind Facility Revenue Requirement | ($1 348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$718** | **$2,501** | **$7** | **$28** | **$30** | **$30** | **$35** | **$35** | **$40** | **$76** | **$78** | **$84** | **$76** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $172 | $176 | $182 | $189 | $192 | $198 | $191 | $196 | $212 | $209 | $217 | $231 | $240 |
| 2 Congestion and Losses | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) |
| 3 Capacity Value | $0 | $0 | $0 | $0 | $0 | $2 | $51 | $52 | $1 | $52 | $48 | $1 | $6 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($20) | ($12) | ($3) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **($0)** | **$15** | **$32** | **$44** | **$49** | **$59** | **$103** | **$111** | **$78** | **$127** | **$133** | **$102** | **$118** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $249 | $252 | $252 | $260 | $264 | $265 | $230 |
| 2 Congestion and Losses | ($35) | ($35) | ($35) | ($35) | ($35) | ($35) | ($30) |
| 3 Capacity Value | $7 | $4 | $38 | $35 | ($1) | ($1) | $6 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$130** | **$132** | **$167** | **$173** | **$142** | **$143** | **$125** |

Benefits of Selected Wind Facilities (High P50)

Benefits of Selected Wind Facilities (Low No Carbon P50)

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P50 LOW GAS NO CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,277 | $3,988 | $10 | $75 | $78 | $81 | $84 | $88 | $90 | $93 | $95 | $98 | $102 |
| 2 Congestion and Losses | ($230) | ($617) | ($3) | ($16) | ($17) | ($17) | ($18) | ($19) | ($20) | ($21) | ($21) | ($21) | ($21) |
| 3 Capacity Value | $29 | $83 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0) | ($4) | ($9) | ($13) | ($17) | ($19) | ($21) | ($22) | ($23) | ($24) | ($24) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$236** | **$971** | **$6** | **$12** | **$14** | **$11** | **$16** | **$18** | **$22** | **$24** | **$29** | **$34** | **$25** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $106 | $113 | $118 | $123 | $126 | $130 | $127 | $125 | $137 | $134 | $138 | $149 | $154 |
| 2 Congestion and Losses | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) |
| 3 Capacity Value | $0 | ($7) | ($7) | ($7) | ($7) | ($6) | $47 | $55 | ($1) | $57 | $56 | ($3) | ($2) |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($20) | ($12) | ($3) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **($52)** | **($41)** | **($26)** | **($16)** | **($11)** | **($3)** | **$49** | **$57** | **$14** | **$71** | **$77** | **$29** | **$37** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $161 | $167 | $212 | $218 | $224 | $227 | $206 |
| 2 Congestion and Losses | ($21) | ($21) | ($21) | ($21) | ($21) | ($21) | ($18) |
| 3 Capacity Value | ($2) | ($2) | $12 | $11 | ($35) | ($37) | ($37) |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **$47** | **$54** | **$115** | **$122** | **$82** | **$84** | **$70** |

## NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS
## P95 BASE GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line

**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,437 | $4,410 | $10 | $74 | $77 | $81 | $84 | $88 | $91 | $124 | $124 | $128 | $131 |
| 2 Congestion and Losses | ($279) | ($774) | ($3) | ($16) | ($17) | ($17) | ($19) | ($21) | ($23) | ($26) | ($28) | ($28) | ($28) |
| 3 Capacity Value | $70 | $311 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $546 | $834 | $13 | $76 | $79 | $79 | $82 | $82 | $85 | $85 | $88 | $88 | $75 |
| 5 Deferred Tax Asset Carrying Charges | ($96) | ($163) | ($0 4) | ($3 2) | ($7 7) | ($11 5) | ($14 2) | ($16 1) | ($17 4) | ($18 2) | ($18 7) | ($18 9) | ($18 2) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$330** | **$1,386** | **$4** | **($0)** | **$2** | **$1** | **$5** | **$6** | **$9** | **$41** | **$43** | **$48** | **$42** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $135 | $138 | $142 | $148 | $149 | $153 | $147 | $150 | $165 | $161 | $166 | $177 | $184 |
| 2 Congestion and Losses | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) |
| 3 Capacity Value | $0 | $0 | $0 | $0 | $0 | $1 | $54 | $55 | ($1) | $56 | $55 | ($3) | ($1) |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($13) | ($5) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **($23)** | **($8)** | **$3** | **$10** | **$14** | **$21** | **$70** | **$76** | **$36** | **$91** | **$97** | **$52** | **$62** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $191 | $195 | $196 | $202 | $208 | $210 | $182 |
| 2 Congestion and Losses | ($28) | ($28) | ($28) | ($28) | ($28) | ($28) | ($23) |
| 3 Capacity Value | ($0) | ($1) | $50 | $46 | ($3) | ($2) | $4 |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **$72** | **$78** | **$131** | **$134** | **$92** | **$94** | **$83** |

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P95 BASE GAS NO CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,255 | $3,798 | $10 | $74 | $77 | $80 | $84 | $87 | $90 | $93 | $96 | $100 | $104 |
| 2 Congestion and Losses | ($233) | ($628) | ($3) | ($16) | ($17) | ($17) | ($18) | ($19) | ($20) | ($21) | ($22) | ($22) | ($22) |
| 3 Capacity Value | $57 | $274 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $546 | $834 | $13 | $76 | $79 | $79 | $82 | $82 | $85 | $85 | $88 | $88 | $75 |
| 5 Deferred Tax Asset Carrying Charges | ($96) | ($163) | ($0 4) | ($3 2) | ($7 7) | ($11 5) | ($14 2) | ($16 1) | ($17 4) | ($18 2) | ($18 7) | ($18 9) | ($18 2) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3,233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$181** | **$883** | **$4** | **($0)** | **$2** | **$1** | **$6** | **$7** | **$12** | **$15** | **$21** | **$26** | **$20** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $108 | $112 | $121 | $126 | $128 | $133 | $128 | $126 | $139 | $135 | $140 | $152 | $157 |
| 2 Congestion and Losses | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) |
| 3 Capacity Value | $0 | $0 | ($7) | ($7) | ($8) | ($6) | $47 | $55 | ($0) | $55 | $52 | ($1) | $2 |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($13) | ($5) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **($44)** | **($29)** | **($20)** | **($13)** | **($9)** | **($1)** | **$49** | **$57** | **$17** | **$69** | **$74** | **$34** | **$44** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $166 | $170 | $166 | $171 | $182 | $184 | $160 |
| 2 Congestion and Losses | ($22) | ($22) | ($22) | ($22) | ($22) | ($22) | ($18) |
| 3 Capacity Value | $3 | $1 | $47 | $44 | ($3) | ($2) | $4 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$56** | **$61** | **$103** | **$107** | **$72** | **$74** | **$65** |

Benefits of Selected Wind Facilities (Base No Carbon P95)

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P95 LOW GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,259 | $3,878 | $9 | $65 | $67 | $69 | $72 | $75 | $77 | $108 | $108 | $111 | $113 |
| 2 Congestion and Losses | ($241) | ($671) | ($2) | ($14) | ($14) | ($15) | ($17) | ($18) | ($20) | ($22) | ($24) | ($24) | ($24) |
| 3 Capacity Value | $63 | $313 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $546 | $834 | $13 | $76 | $79 | $79 | $82 | $82 | $85 | $85 | $88 | $88 | $75 |
| 5 Deferred Tax Asset Carrying Charges | ($96) | ($163) | ($0 4) | ($3 2) | ($7 7) | ($11 5) | ($14 2) | ($16 1) | ($17 4) | ($18 2) | ($18 7) | ($18 9) | ($18 2) |
| 6 Wind Facility Revenue Requirement | ($1 348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$183** | **$960** | **$3** | **($7)** | **($6)** | **($8)** | **($4)** | **($4)** | **($1)** | **$29** | **$31** | **$35** | **$28** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $117 | $119 | $129 | $133 | $136 | $140 | $135 | $132 | $145 | $141 | $146 | $156 | $160 |
| 2 Congestion and Losses | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) |
| 3 Capacity Value | $0 | $0 | ($7) | ($7) | ($8) | ($6) | $47 | $55 | ($1) | $57 | $56 | ($4) | ($3) |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($13) | ($5) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **($37)** | **($24)** | **($14)** | **($8)** | **($3)** | **$4** | **$55** | **$62** | **$20** | **$76** | **$81** | **$33** | **$41** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $167 | $171 | $171 | $176 | $182 | $185 | $163 |
| 2 Congestion and Losses | ($24) | ($24) | ($24) | ($24) | ($24) | ($24) | ($20) |
| 3 Capacity Value | ($2) | ($3) | $58 | $57 | $9 | $9 | $6 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$50** | **$55** | **$118** | **$123** | **$81** | **$85** | **$69** |

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**P95 HIGH GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - No Tie Line**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1 601 | $4 913 | $11 | $83 | $86 | $91 | $95 | $99 | $103 | $136 | $137 | $141 | $145 |
| 2 Congestion and Losses | ($310) | ($861) | ($3) | ($18) | ($19) | ($19) | ($22) | ($24) | ($26) | ($28) | ($31) | ($31) | ($31) |
| 3 Capacity Value | $68 | $301 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits, Grossed Up | $546 | $834 | $13 | $76 | $79 | $79 | $82 | $82 | $85 | $85 | $88 | $88 | $75 |
| 5 Deferred Tax Asset Carrying Charges | ($96) | ($163) | ($0 4) | ($3 2) | ($7 7) | ($11 5) | ($14 2) | ($16 1) | ($17 4) | ($18 2) | ($18 7) | ($18 9) | ($18 2) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **$461** | **$1,792** | **$4** | **$6** | **$9** | **$9** | **$14** | **$14** | **$18** | **$51** | **$53** | **$59** | **$52** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $149 | $152 | $158 | $164 | $167 | $171 | $164 | $168 | $184 | $180 | $186 | $200 | $208 |
| 2 Congestion and Losses | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) |
| 3 Capacity Value | $0 | $0 | $0 | $0 | $0 | $2 | $51 | $52 | $1 | $52 | $48 | $1 | $6 |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($13) | ($5) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8. Total Net Customer Benefits/(Cost)** | **($11)** | **$3** | **$15** | **$23** | **$28** | **$37** | **$80** | **$88** | **$55** | **$102** | **$107** | **$76** | **$90** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $216 | $218 | $218 | $225 | $229 | $230 | $199 |
| 2 Congestion and Losses | ($31) | ($31) | ($31) | ($31) | ($31) | ($31) | ($26) |
| 3 Capacity Value | $7 | $4 | $38 | $35 | ($1) | ($1) | $6 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **8 Total Net Customer Benefits/(Cost)** | **$101** | **$103** | **$138** | **$143** | **$111** | **$113** | **$98** |

Benefits of Selected Wind Facilities (High P95)

## NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS
## NETWORK UPGRADES ONLY BRATTLE HIGHER CONGESTION CASE
## P50 BASE GAS WITH CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - TIE LINE IN SERVICE 2026

**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1 658 | $5,057 | $12 | $88 | $92 | $96 | $100 | $104 | $104 | $143 | $143 | $147 | $150 |
| 2 Congestion and Losses | ($113) | ($149) | ($3) | ($26) | ($27) | ($28) | ($31) | ($34) | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | $70 | $311 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 4 Production Tax Credits Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0 4) | ($3 6) | ($8 9) | ($13 4) | ($16 7) | ($19 1) | ($21 1) | ($22 4) | ($23 3) | ($24 1) | ($24 3) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3,233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | ($233) | ($712) | $0 | $0 | $0 | $0 | $0 | $0 | ($36) | ($35) | ($35) | ($34) | ($34) |
| **8. Total Net Customer Benefits/(Cost)** | **$541** | **$2,025** | **$6** | **$15** | **$17** | **$16** | **$20** | **$19** | **$20** | **$59** | **$64** | **$69** | **$61** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $155 | $159 | $164 | $170 | $172 | $177 | $167 | $171 | $189 | $182 | $188 | $202 | $210 |
| 2 Congestion and Losses | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | $0 | $0 | $0 | $0 | $0 | $1 | $54 | $55 | ($1) | $56 | $55 | ($3) | ($1) |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($20) | ($12) | ($3) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | ($33) | ($32) | ($31) | ($30) | ($30) | ($29) | ($28) | ($27) | ($26) | ($26) | ($26) | ($25) | ($25) |
| **8. Total Net Customer Benefits/(Cost)** | **($15)** | **$1** | **$17** | **$30** | **$35** | **$43** | **$89** | **$97** | **$61** | **$113** | **$120** | **$80** | **$91** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $218 | $223 | $221 | $227 | $237 | $240 | $209 |
| 2 Congestion and Losses | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | ($0) | ($1) | $50 | $46 | ($3) | ($2) | $4 |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | ($25) | ($25) | ($24) | ($24) | ($24) | ($24) | ($24) |
| **8. Total Net Customer Benefits/(Cost)** | **$102** | **$109** | **$159** | **$163** | **$125** | **$128** | **$109** |

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**NETWORK UPGRADES ONLY BRATTLE HIGHER CONGESTION CASE**
**P50 BASE GAS NO CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - TIE LINE IN SERVICE 2026**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,404 | $4,254 | $12 | $88 | $92 | $96 | $99 | $103 | $103 | $107 | $97 | $101 | $105 |
| 2 Congestion and Losses | ($109) | ($143) | ($3) | ($26) | ($27) | ($28) | ($29) | ($30) | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | $108 | $368 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $20 | $20 | $20 |
| 4 Production Tax Credits, Grossed Up | $630 | $963 | $15 | $88 | $91 | $92 | $95 | $95 | $98 | $98 | $102 | $102 | $87 |
| 5 Deferred Tax Asset Carrying Charges | ($123) | ($212) | ($0 4) | ($3 6) | ($8 9) | ($13 4) | ($16 7) | ($19 1) | ($21 1) | ($22 4) | ($23 3) | ($24 1) | ($24 3) |
| 6 Wind Facility Revenue Requirement | ($1,348) | ($3 233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | ($233) | ($712) | $0 | $0 | $0 | $0 | $0 | $0 | ($36) | ($35) | ($35) | ($34) | ($34) |
| **8. Total Net Customer Benefits/(Cost)** | **$330** | **$1,285** | **$6** | **$15** | **$17** | **$16** | **$21** | **$22** | **$19** | **$24** | **$38** | **$44** | **$36** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $109 | $113 | $133 | $138 | $140 | $146 | $139 | $143 | $159 | $153 | $159 | $173 | $179 |
| 2 Congestion and Losses | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | $21 | $21 | ($2) | ($2) | ($2) | ($1) | $52 | $53 | ($4) | $53 | $51 | ($4) | ($3) |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($20) | ($12) | ($3) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | ($33) | ($32) | ($31) | ($30) | ($30) | ($29) | ($28) | ($27) | ($26) | ($26) | ($26) | ($25) | ($25) |
| **8. Total Net Customer Benefits/(Cost)** | **($40)** | **($24)** | **($16)** | **($4)** | **$1** | **$11** | **$60** | **$67** | **$29** | **$81** | **$87** | **$49** | **$59** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $189 | $195 | $188 | $194 | $208 | $210 | $184 |
| 2 Congestion and Losses | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | ($4) | ($2) | $45 | $42 | ($5) | ($4) | $3 |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | ($25) | ($25) | ($24) | ($24) | ($24) | ($24) | ($24) |
| **8 Total Net Customer Benefits/(Cost)** | **$69** | **$78** | **$121** | **$126** | **$94** | **$97** | **$82** |

**NORTH CENTRAL WIND ENERGY FACILITIES - SWEPCO 810 MW SHARE OF ALL THREE PROJECTS**
**NETWORK UPGRADES ONLY BRATTLE HIGHER CONGESTION CASE**
**P95 BASE GAS NO CARBON CUSTOMER COSTS AND BENEFITS VS BASELINE - TIE LINE IN SERVICE 2026**
**$ in Millions (Nominal unless otherwise indicated)**

| Year | NPV | Total 31 Yr. Nominal | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $1,211 | $3,668 | $10 | $76 | $79 | $83 | $86 | $89 | $90 | $93 | $82 | $86 | $89 |
| 2 Congestion and Losses | ($94) | ($124) | ($3) | ($22) | ($23) | ($24) | ($25) | ($26) | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | $108 | $368 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $20 | $20 | $20 |
| 4 Production Tax Credits, Grossed Up | $546 | $834 | $13 | $76 | $79 | $79 | $82 | $82 | $85 | $85 | $88 | $88 | $75 |
| 5 Deferred Tax Asset Carrying Charges | ($96) | ($163) | ($0 4) | ($3 2) | ($7 7) | ($11 5) | ($14 2) | ($16 1) | ($17 4) | ($18 2) | ($18 7) | ($18 9) | ($18 2) |
| 6 Wind Facility Revenue Requirement | ($1 348) | ($3,233) | ($17) | ($132) | ($130) | ($130) | ($128) | ($127) | ($126) | ($124) | ($123) | ($121) | ($119) |
| 7 Tie Line Revenue Requirement | ($233) | ($712) | $0 | $0 | $0 | $0 | $0 | $0 | ($36) | ($35) | ($35) | ($34) | ($34) |
| **8. Total Net Customer Benefits/(Cost)** | **$94** | **$640** | **$4** | **($4)** | **($2)** | **($4)** | **$1** | **$3** | **($4)** | **$1** | **$15** | **$20** | **$14** |

| Year | 2032 | 2033 | 2034 | 2035 | 2036 | 2037 | 2038 | 2039 | 2040 | 2041 | 2042 | 2043 | 2044 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $93 | $96 | $115 | $120 | $122 | $126 | $119 | $122 | $138 | $131 | $136 | $150 | $155 |
| 2 Congestion and Losses | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | $21 | $21 | ($2) | ($2) | ($2) | ($1) | $52 | $53 | ($4) | $53 | $51 | ($4) | ($3) |
| 4 Production Tax Credits Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | ($13) | ($5) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($116) | ($114) | ($112) | ($110) | ($108) | ($106) | ($104) | ($102) | ($100) | ($98) | ($97) | ($95) | ($93) |
| 7 Tie Line Revenue Requirement | ($33) | ($32) | ($31) | ($30) | ($30) | ($29) | ($28) | ($27) | ($26) | ($26) | ($26) | ($25) | ($25) |
| **8. Total Net Customer Benefits/(Cost)** | **($49)** | **($34)** | **($30)** | **($22)** | **($17)** | **($9)** | **$39** | **$46** | **$8** | **$60** | **$64** | **$26** | **$35** |

| Year | 2045 | 2046 | 2047 | 2048 | 2049 | 2050 | 2051 |
|---|---|---|---|---|---|---|---|
| 1 Production Cost Savings Excluding Congestion/Losses | $164 | $169 | $161 | $166 | $180 | $182 | $158 |
| 2 Congestion and Losses | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 3 Capacity Value | ($4) | ($2) | $45 | $42 | ($5) | ($4) | $3 |
| 4 Production Tax Credits, Grossed Up | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 5 Deferred Tax Asset Carrying Charges | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| 6 Wind Facility Revenue Requirement | ($91) | ($89) | ($88) | ($86) | ($85) | ($86) | ($81) |
| 7 Tie Line Revenue Requirement | ($25) | ($25) | ($24) | ($24) | ($24) | ($24) | ($24) |
| **8. Total Net Customer Benefits/(Cost)** | **$44** | **$53** | **$94** | **$98** | **$66** | **$69** | **$57** |

Natural Gas Price and Other Sensitivities

## SWEPCO

| Line | Amounts in Millions | 31 Year NPV | PTC Period - First 11 years Nominal Total | Full 31 Year Nominal Total |
|---|---|---|---|---|
| | **P50 Capacity Factor Cases** | | | |
| 1 | High Gas With CO2 | $718 | $520 | $2,501 |
| 2 | Base Gas With CO2 | $567 | $418 | $2,030 |
| 3 | Base Gas Without CO2 | $396 | $318 | $1,453 |
| 4 | Low Gas With CO2 | $396 | $296 | $1,532 |
| 5 | Low Gas Without CO2 | $236 | $211 | $971 |

| Line | Amounts in Millions | 31 Year NPV | PTC Period - First 11 years Nominal Total | Full 31 Year Nominal Total |
|---|---|---|---|---|
| | **P95 Capacity Factor Cases** | | | |
| 1 | High Gas With CO2 | $461 | $290 | $1,792 |
| 2 | Base Gas With CO2 | $330 | $202 | $1,386 |
| 3 | Base Gas Without CO2 | $181 | $115 | $883 |
| 4 | Low Gas With CO2 | $183 | $95 | $960 |

| | **Higher Congestion With Tie Line In Service 2026** | | | |
|---|---|---|---|---|
| Line | Amounts in Millions | 31 Year NPV | PTC Period - First 11 years Nominal Total | Full 31 Year Nominal Total |
| | **P50 Capacity Factor Cases** | | | |
| 1 | Base Gas With CO2 | $541 | $367 | $2,025 |
| 2 | Base Gas Without CO2 | $330 | $258 | $1,285 |
| | | | | |
| | **P95 Capacity Factor Case** | | | |
| 3 | Base Gas Without CO2 | $94 | $43 | $640 |