DOCKET NO. 46936

APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY FOR: A CERTIFICATE OF CONVENIENCE AND NECESSITY AUTHORIZING CONSTRUCTION AND OPERATION OF WIND GENERATION AND ASSOCIATED FACILITIES IN HALE COUNTY, TEXAS AND ROOSEVELT COUNTY, NEW MEXICO, AND RELATED RATEMAKING PRINCIPLES; AND APPROVAL OF A PURCHASED POWER AGREEMENT TO OBTAIN WIND GENERATED ENERGY	**§**	**PUBLIC UTILITY COMMISSION OF TEXAS**

DIRECT TESTIMONY
of
JONATHAN S. ADELMAN

on behalf of

SOUTHWESTERN PUBLIC SERVICE COMPANY

(*Filename:* AdelmanTXDirect.doc; *Total Pages:* 59)

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GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
2013 Wind RFP	March 2013 Wind Request for Proposals
AWS Truepower	AWS Truepower, LLC
Bonita	Bonita Wind Energy LLC
Btu	British Thermal Unit
CCN	Certificate of Convenience and Necessity
Commission	Public Utility Commission of Texas
EOY	End-of-year
IM	Integrated Marketplace
ITP	Integrated Transmission Planning
ITP10	Southwest Power Pool 2017 ITP ten-year database
kWh	Kilowatt hour
LMP	Locational Marginal Price
LCOE	Levelized Cost of Energy
MCC	Marginal congestion cost
MEC	Marginal energy cost
MLC	Marginal loss cost
MMBTU	One million British Thermal Units
MWh	Megawatt hour
NYMEX	New York Mercantile Exchange
PIRA	Petroleum Industry Research Associates
PPA	Power Purchase Agreement

Acronym/Defined Term	Meaning
Promod	Promod IV
PTC	Production Tax Credit
PVRR	Present Value Revenue Requirement
RFP	Request for Proposals
SPP	Southwest Power Pool, Inc.
SPS	Southwestern Public Service Company, a New Mexico corporation
SPS Wind Projects	Hale Wind Project and Sagamore Wind Project
Wind Resources	Hale Wind Project, Sagamore Wind Project, and Bonita PPA
Xcel Energy	Xcel Energy Inc.

LIST OF ATTACHMENTS

Attachment	Description
JSA-1	Loads & Resources Table Based on October 2016 Forecast (*Filename*: JSA-1.xlsx)
JSA-2	Strategist Analysis – Annual Savings, PVRR, and Gas Breakeven (Base Gas) (*Filename*: JSA-2.xlsx)
JSA-3	Strategist Analysis – Annual Savings and PVRR (Low Gas) (*Filename*: JSA-3.xlsx)
JSA-4	Strategist Analysis – Annual Savings, PVRR, and Gas Breakeven (Base Gas, Tolk Alternative Case) (*Filename*: JSA-4.xlsx)
JSA-5	Strategist Analysis – Annual Savings and PVRR (Low Gas, Tolk Alternative Case) (*Filename*: JSA-5.xlsx)
JSA-6	Contour Maps (Base Gas) (*Non-native format*)
JSA-7	Promod IV LMP Market Analysis (Base Gas) (*Filename*: JSA-7.xlsx)
JSA-8	Promod IV LMP Market Analysis (Low Gas) (*Filename*: JSA-8.xlsx)
JSA-9(CD)	Workpapers (Provided on CD)

DIRECT TESTIMONY
OF
JONATHAN S. ADELMAN

I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q. Please state your name and business address.

A. My name is Jonathan S. Adelman. My business address is 1800 Larimer Street, 16th Floor, Denver, Colorado 80202.

Q. On whose behalf are you testifying in this proceeding?

A. I am filing testimony on behalf of Southwestern Public Service Company, a New Mexico corporation ("SPS") and wholly-owned electric utility subsidiary of Xcel Energy Inc. ("Xcel Energy").

Q. By whom are you employed and in what position?

A. I am employed by Xcel Energy Services Inc. ("XES") as Area Vice President, Strategic Resource & Business Planning.

Q. Please briefly outline your responsibilities as Area Vice President, Strategic Resource & Business Planning.

A. I am responsible for providing leadership for the development of long-term generation planning and strategic business plans for Xcel Energy's operating utilities. In this role, I am responsible for coordinating the overall resource planning process, including meeting all long-term generation capacity needs.

Q. Please describe your educational background.

A. I graduated from Washington and Lee University in May 1997, receiving a Bachelor of Science degree in Accounting with Special Attainments in Commerce.

Q. Please describe your professional experience.

A. I have over 15 years of experience in a variety of business areas at Xcel Energy, including Commercial Operations, Finance, Human Resources, Marketing, and Resource Planning. I assumed my current position of Area Vice President, Strategic Resource & Business Planning in December 2015. Prior to joining Xcel Energy, I worked in public accounting both domestically and abroad. I am an inactive Certified Public Accountant.

Q. Have you testified or filed testimony before any regulatory authorities?

A. Yes. I have testified in proceedings before the Colorado Public Utilities Commission and Minnesota Public Utilities Commission on a variety of topics, including Xcel Energy's resource planning efforts.

II. ASSIGNMENT AND SUMMARY OF TESTIMONY AND RECOMMENDATIONS

Q. What is the purpose of your testimony?

A. My testimony will explain that this application is for economic incremental energy, and is not being made out of a current capacity need. I will then explain the significant economic benefits to SPS customers if SPS's requested Certificate of Convenience and Necessity ("CCN") for the Hale Wind and Sagamore Wind Projects (collectively "SPS Wind Projects"), and the Bonita Wind Energy LLC ("Bonita") Power Purchase Agreement ("PPA") are granted. Throughout my testimony, I will refer to the SPS Wind Projects and Bonita PPA collectively as the "Wind Resources." I will also provide a detailed description of the methodology used to determine the significant economic benefits. Additionally, I will describe other qualitative benefits provided by the Wind Resources and demonstrate that the proposed Wind Resources are cost-reasonable as compared to previous comparable SPS resources.

Q. Please briefly summarize your testimony.

A. My testimony can be briefly summarized as follows:

1. SPS's Strategist analysis demonstrates that the Wind Resources will create substantial economic savings for customers over the life of the resources relative to existing resources and market alternatives, as summarized in Table JSA-1 (next page).

Table JSA-1 – Summary of Projected Economic Savings[1]

	PVRR* ($Millions)	Nominal** ($Millions)
Cost of Wind	$1,217	$3,456
Avoided Cost	$2,408	$6,223
Net Savings	$1,191	$2,768

*Present Value Revenue Requirement ("PVRR")

**Nominal amounts are unadjusted for inflation

2. SPS's projected customer savings are established by three distinct analyses.

- First, customer costs and benefits are evaluated using the Strategist resource planning application in order to determine the overall net cost benefits to SPS's customers from the Wind Resources.

- Second, the Strategist results are extended to include the Southwest Power Pool ("SPP") Integrated Marketplace ("IM") dynamics using the Promod IV ("Promod") modeling application, which can determine the net benefits of the Wind Resources in a Locational Marginal Price ("LMP") market structure.

- And last, Wind Resources costs are compared to recent market alternatives.

3. The cost-effectiveness of the Wind Resources is determined by a rigorous modeling analysis using both the Strategist and Promod modeling software applications. Together, these models fully evaluate the costs and benefits of incorporating the generation of the proposed Wind Resources into the dispatch of the SPS and SPP power supply systems and can estimate the magnitude and timing of overall costs, or savings, to customers.

4. The Strategist analysis shows that the Wind Resources result in a substantial reduction of customer costs. The Strategist analysis estimates the overall net customer savings to be $1.19 billion PVRR. The Promod LMP analysis corroborates Strategist, and results in a modeled value to SPS's customers of approximately $1.04 billion PVRR in customer savings. These models use different approaches to estimate the customer impact, but yielded very consistent results. An additional Promod analysis was conducted to compare the net benefit to SPS customers calculated with Promod to the net benefit calculated with Strategist for specific years. This comparison further validates the results of the modeling and provides additional support for the

[1] Amounts in Table JSA-1 are rounded figures.

net customer benefit. Several sensitivity cases were also tested in both Strategist and Promod to evaluate the potential variability of the net benefits to SPS customers. Significant customer savings are present under all sensitivities modeled as discussed further in this testimony.

5. The Levelized Cost of Energy ("LCOE") of the Wind Resources is also compared to existing and historically offered PPA alternatives delivering energy to the SPS Load. As discussed further in this testimony, this cost comparison shows the Wind Resources are reasonably priced in the market.

6. Based on the extensive analytical evaluations and the cost comparison, the Wind Resources provide significant customer benefit at a reasonable cost, and the Public Utility Commission of Texas ("Commission") should approve SPS's requested CCN for the SPS Wind Projects and find SPS's Bonita PPA reasonable and prudent.

Q. Were Attachments JSA-1 through JSA-9(CD) prepared by you or under your direct supervision and control?

A. Yes.

III. RESOURCE NEED DETERMINATION

Q. Please generally describe SPS's resource planning process.

A. In its simplest form, electric resource planning is the process of taking forecasts of customer electric demand and energy and determining the appropriate sources of electric supply that should be developed to meet those customer requirements in a cost-effective and reliable fashion. For capacity planning, SPS compares its existing firm generating resources, including owned generating capacity and firm purchased power, to SPS's projected annual peak firm load obligation over the planning period. Required reserve margins are also included to determine SPS's net capacity position. These positions are typically shown in a table that covers a specific planning horizon (i.e., Loads and Resources Table ("L&R Table")). Attachment JSA-1 is SPS's current L&R Table, projecting through 2037. The "Cap Position: Long (Short)" row of Attachment JSA-1 shows the annual projected capacity need or surplus.

Q. Could SPS determine that its customers would benefit from obtaining additional resources to save energy costs even if SPS does not need additional resources for capacity purposes?

A. Yes. SPS could determine that additional resources are needed for economic energy purposes. Periodically, SPS will evaluate the long-term avoided costs of the SPS system. The projected avoided costs provide a price signal that may show acquiring lower cost energy resources would be a benefit to SPS's customers.

Q. What customer need are the Wind Resources designed to meet?

A. SPS is proposing the Wind Resources solely as economic energy resources that can provide long-term low-cost energy that will offset more expensive existing

generation and market purchases and net savings to SPS's customers. For purposes of this application, SPS is not proposing the Wind Resources as capacity resources and SPS's economic evaluation has not included any potential capacity benefits. As I describe later in my testimony, the Wind Resources likely will provide capacity value in the future that could provide additional economic benefits beyond what is determined by the analyses included in this testimony.

IV. SUMMARY OF SIGNIFICANT ECONOMIC AND ADDITIONAL BENEFITS OF WIND RESOURCES

Q. Please briefly summarize the anticipated economic benefits of the Wind Resources based on SPS's Strategist analysis.

A. SPS's Strategist analysis, detailed in Section V of my testimony, demonstrates that the Wind Resources will result in an estimated overall net customer savings of $1.19 billion PVRR. These customer savings projections are derived by taking the difference in costs between the 2017-2048 PVRR of a base case model run that did not include the Wind Resources, and a model run that included the Wind Resources. The Wind Resources will deliver customer savings every year of operation and will provide significant customer savings during the first 10 years of operations. Based on a variety of factors, including Production Tax Credit ("PTC") benefits, approximately 74% of the customer savings is expected to occur in the first 10-years of operation of the Wind Resources.

Q. Did SPS's economic analysis in Strategist include any sensitivity cases to test the reasonableness of SPS's projected $1.19 billion of customer savings?

A. Yes. As discussed in Section V of my testimony, SPS evaluated the value of the Wind Resources in sensitivity cases using lower gas price forecasts. That analysis shows that even under the lower gas price assumptions, the Wind Resources still provide $634 million to $703 million in PVRR savings to customers. SPS also ran the models with an alternative case that included different assumptions regarding the Tolk generating units, described in Section V.C of my testimony. That analysis demonstrated that the addition of the Wind Resources would still result in significant PVRR savings of $1.14 billion.

Q. Please briefly summarize the anticipated economic benefits of the Wind Resources based on SPS's Promod analysis.

A. SPS's Promod LMP analysis, detailed in Section VI of my testimony, corroborates the Strategist results and estimates customer savings of $1.04 billion PVRR. Approximately 70% of this customer savings is expected to occur in the first 10-years of operation. SPS also conducted a second Promod analysis focused on the system-wide avoided energy costs resulting from the addition of the Wind Resources. This analysis was run for two years based on the availability of data from the SPP. The analysis shows customer net savings of $281 million for the two years modeled (i.e., 2020 and 2025).

Q. Did SPS's economic analysis in Promod include any sensitivity cases to test the reasonableness of SPS's projected $1.04 billion of customer savings?

A. Yes. As with SPS's Strategist analysis, SPS evaluated the value of the Wind Resources in sensitivity cases using lower gas price forecasts. That analysis, which is discussed in Section VI of my testimony, shows that even under the lower gas price assumptions, the Wind Resources still provide $855 million in PVRR savings to customers.

Q. In addition to the projected economic benefits demonstrated by SPS's Strategist and Promod analyses, are there any additional economic benefits of the Wind Projects and PPA?

A. Yes. In the future, the Wind Resources may provide additional capacity pursuant to the capacity accreditation criteria of the SPP that will add to SPS's total firm capacity for the purpose of complying with the planning reserve margin requirements of the

SPP. The additional capacity would be realized if SPS receives firm transmission service for delivery of the energy. In his direct testimony, SPS witness William A. Grant discusses the process required to seek firm transmission delivery service. SPS's current analysis does not include the benefits SPS could get for the additional capacity (approximately 185 MW) from the Wind Resources. When SPS receives the study results from the SPP that identifies the costs (if any) for firm transmission service, SPS will determine if the savings that would be achieved by obtaining firm capacity from the Wind Resource(s) is greater than the costs of the firm service.

Q. Does SPS expect that the Wind Resources will be able to deliver any hedge benefits?

A. Yes. Obtaining generation from owned or contracted wind resources can be thought of as locking in a fuel price to mitigate the risk of future generator costs and the associated volatility of those costs. Consequently, the Wind Resources represent a valuable hedge of future energy costs and energy cost volatility. The Wind Resources predominantly offset gas generation, and SPS's analysis shows that the Wind Resources would lock-in or hedge approximately 22 billion cubic feet[2] of natural gas each year at a levelized gas price of approximately $2.40/MMBtu. From an energy perspective, this provides a significant hedge value for customers at a competitive energy price. In Section V of my testimony, I show how this estimated gas value of the Wind Resources is below the current range of gas price forecasts and

[2] 22 billion cubic feet of natural gas represents approximately 20% of SPS's annual gas burn for electric production.

serves to not only reduce fuel-cost related risk to SPS's customers, but is also another measure of the cost-effectiveness of the resources.

Q. Will the Wind Resources provide other benefits to SPS's generating and transmission system?

A. Yes. The geographic location of the Wind Resources provides additional benefits as further explained by SPS witness David T. Hudson. SPS specifically focused on the southern portion of the SPS transmission zone for the location of the Wind Resources. One of the reasons for locating the Wind Resources in this manner is due to the higher load and energy growth rates in that region. This location provides benefits in the LMP analysis, which I will further discuss in Section VI of my testimony.

V. STRATEGIST COST-EFFECTIVENESS EVALUATION

Q. What is the purpose of this section of your testimony?

A. In this section of my testimony, I describe SPS's analysis of the cost-effectiveness of the Wind Resources using the Strategist model. After describing the assumptions used by SPS in its Strategist analysis, I provide the results of the analysis, which demonstrate a projected $1.19 billion in PVRR customer savings. Lastly, I discuss additional sensitivity cases run by SPS in Strategist to validate its projected customer savings.

A. Description of Strategist and Modeling Assumptions

Q. What is Strategist?

A. Strategist is a widely accepted and utilized production costing and resource planning model that allows companies to evaluate the impact of generation resources. The Strategist model has been an industry-leading model for many years and is widely used by numerous utilities, consulting firms and regulatory body support staffs. Xcel Energy uses the Strategist model for resource planning analyses in all of the jurisdictions where it provides service. Specifically, Strategist allows SPS to evaluate the overall impact of adding generation resources to the existing SPS power supply system. Strategist is used to determine the costs and benefits of adding more wind generation to the system over the life of the wind generation and how those additions might influence the economics of existing and future resources. To accomplish this, the Strategist model performs a complete commitment and dispatch simulation of the SPS portfolio of resources through a period that includes the full

life of the Wind Resources. SPS uses Strategist for its determinations with respect to all new generation decisions, including the Wind Resources.

Q. Please describe the process used in the Strategist model to evaluate the cost-effectiveness of the Wind Projects.

A. SPS first developed a base case to be used to measure the cost-effectiveness of the Wind Resources. A change case was also modeled that added the Wind Resources to the base case, leaving all other assumptions constant. The various data presented in my testimony result from comparing output data from the two cases.

Q. In developing the base case, what assumptions did SPS make about the existing SPS resources?

A. SPS assumed that existing PPAs and thermal resources expire at their PPA termination date, or at the currently approved retirement date in the case of SPS-owned resources, with the exception of the Tolk generating station.

Q. Please briefly describe the Tolk generating station.

A. SPS's Tolk Generating Station consists of two coal-powered steam turbine units, located in Muleshoe, Texas with a total net capacity of 1,067 megawatts ("MW"). Unit 1 has a net capacity of 532 MW and a current retirement date of 2042; Unit 2 has a net capacity of 535 MW and a current retirement date of 2045. In SPS's current pending rate case before the Commission, Case No. 16-00269-UT, SPS is proposing to reduce the useful life of both units on or before 2030. Thus, SPS reflected that the units will be unavailable by end-of-year ("EOY") 2030 in the Strategist base case for modeling purposes.

Q. What is the resulting Strategist base case assumption regarding Tolk Station that was used for cost-effectiveness analysis of the Wind Projects?

A. As noted above, the base case assumes the retirement of the Tolk generating units EOY 2030 and reduced operations beginning in 2018. The reduced operations assume the Tolk generating units are fully available as energy and capacity resources for the months June through September, but are not dispatched for the remaining months (October through May) and provide reserve capacity only. SPS tested the impact of this assumption on the net benefits of the Wind Resources by developing a sensitivity case where the Tolk units are capable to operate at full output to the end of their currently approved useful lives in 2042 and 2045. As noted below, this sensitivity has a limited impact on the value of the Wind Resources for customers.

Q. What are some of the other major assumptions influencing the cost-effectiveness evaluation of the Wind Projects and PPA?

A. Other than the cost to construct, interconnect, and operate the Wind Projects; the costs under the PPA; and the expected generation from the Wind Projects and PPA, the following assumptions are likely the most influential in the Strategist modeling evaluation of the cost-effectiveness of the Wind Resources.

1) **Natural Gas Price Forecast** – The price of natural gas is a significant variable. SPS uses a combination of market prices and fundamental price forecasts, based on multiple highly respected, industry leading sources, to calculate monthly delivered gas prices. As the foundation of the gas price forecast, Henry Hub natural gas prices are developed using a blend of market information (New York

Mercantile Exchange ("NYMEX") futures prices) and long-term fundamentally-based forecasts from Wood Mackenzie, IHS Energy, and Petroleum Industry Research Associates ("PIRA"). The forecast is fully market-based for the first few years, then transitions into blending the four sources to develop a composite forecast. The Henry Hub forecast is adjusted for regional basis differentials and specific delivery costs for each generating unit to develop final model inputs. The weightings for each component at various time intervals of the forecast period are consistent with SPS's prior proceedings at the Commission and are shown in Table JSA-2 below:

Table JSA-2 – Natural Gas Forecast Weightings

Years	NYMEX	IHS Energy*	PIRA	Wood MacKenzie
2016-2019	100.0%	0.0%	0.0%	0.0%
2020	74.5%	8.5%	8.5%	8.5%
2021	49.7%	16.8%	16.8%	16.8%
2022 to end of forecast period	25.0%	25.0%	25.0%	25.0%

*formerly known as CERA or Global Insight

The natural gas price forecast is influential in the cost effectiveness evaluation of the Wind Resources within Strategist due to the interaction between wind generation and natural gas generation within the modeled dispatch of the system generation resources.

Because wind is primarily an energy resource,[3] wind generation displaces energy generated (and the attendant fuel costs) from natural gas-fired and/or coal-fired units as well as purchases from the wholesale market. Wind generation on the SPS system displaces more gas-fired energy than coal-fired energy, and as a result, the forecasted price of natural gas is a key driver as to whether new wind generation will show a net cost or net savings to customers.

2) **Coal Price Forecast** - Coal price forecasts are developed using two major inputs: (1) the current coal contract volumes and prices combined with (2) current estimates of required spot market coal volumes and prices. Typically, coal volumes and prices are under contract on a plant by plant basis for a one to five-year term with annual spot volumes filling the remainder of the estimated fuel requirements of the coal plant. The spot coal price forecasts are developed by averaging price forecasts provided by multiple industry-leading consulting firms, as well as price indicators from recent request for proposals ("RFP") responses for coal supply.

3) **Market Electricity Prices** - In addition to resources that exist within SPS's service territory, SPS has access to a regional market located outside its service territory. SPS is a member of the SPP. The SPP

[3] Wind resources typically provide accredited capacity to the system at about 15% of their nameplate MW rating and yet provide energy to the system at a net capacity factor ("NCF") of about 50%. The value of the capacity for the Wind Resources is not included in the currently modeled customer benefits.

operates as a consolidated balancing authority and dispatches all available generation resources within its boundaries. This consolidated dispatch allows SPS access to energy resources outside SPS's service territory for purchases, as well as the opportunity to sell from its generating sources to other market participants.

For purposes of representing the price which SPS may buy or sell into this market, power prices are derived using an average of the market-implied-heat-rate forecasts from Wood Mackenzie, IHS Energy, and PIRA. These are then multiplied by the blended natural gas forecast (as described above) to derive a market price for electricity. This process is repeated for all months, distinguishing between on and off-peak prices, through the end of the modeling period.

Q. How does the Strategist modeling consider the cost to construct and operate the SPS Wind Projects, and the cost of the Bonita PPA?

A. The costs to construct and operate the Wind Projects were represented by estimates of the life cycle revenue requirements SPS would collect from customers in order to recover the capital cost to construct the Wind Projects, plus the ongoing costs to operate and maintain each project over its 25-year life. SPS witness Arthur P. Freitas discusses these estimates in his testimony.

The PPA costs were represented by the annual purchased power costs reflected in the PPA.

Q. What portion of the interconnection cost was included in the cost-effectiveness evaluation of the Wind Projects?

A. The entire cost of the interconnect, as discussed in the direct testimony of SPS witness Riley Hill, was included in the cost-effectiveness evaluation of the Wind Projects.

Q. How was the generation output of the Wind Resources represented in the cost-effectiveness evaluation?

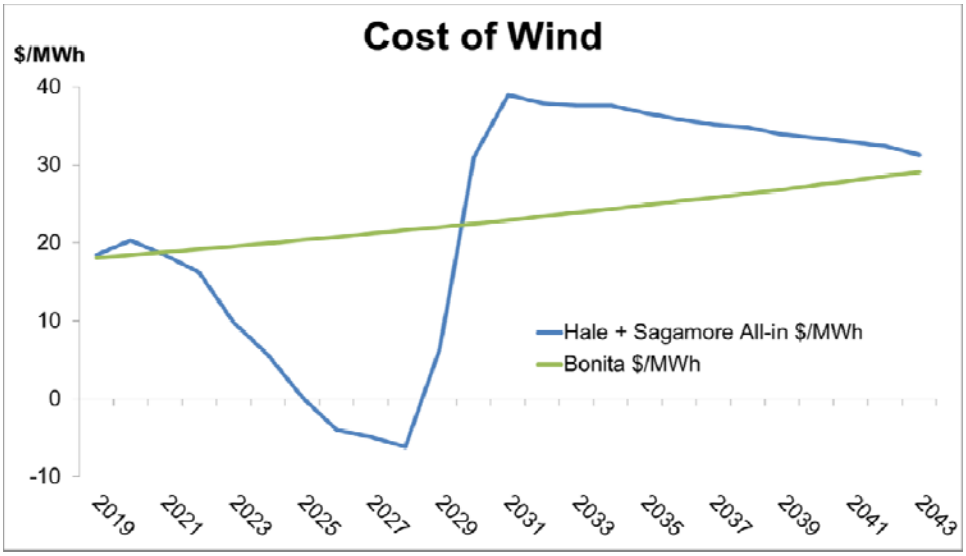
A. The Wind Projects were modeled using the expected generation output developed by AWS Truepower, LLC ("AWS Truepower"), using specific loss factor values provided by Xcel Energy, with certain modifications discussed in the direct testimony of SPS witness Mr. Hill. David P. DeLuca, an expert witness from AWS Truepower retained by SPS, describes AWS Truepower's generation projections in his direct testimony and Mr. Hill describes the modifications to those projections based on project-specific information (e.g., further refinements to the siting of turbines). The Bonita PPA expected generation output is represented in the model pursuant to the terms in the PPA. The expected output is approximately a 51% capacity factor.

Q. What is the estimated all-in cost of the Wind Projects and PPA on an annual $/MWh basis?

A. The all-in $/MWh cost for the Wind Projects each year are presented in Figure JSA-1. All-in costs include the revenue requirements associated with the construction, operation, and maintenance of the Wind Projects, plus the total revenue requirements associated with the interconnection to the transmission system. These

costs are divided by the expected annual generation from the facility to derive an all-in $/MWh cost for the Wind Projects. Figure JSA-1 also includes the all-in cost of the PPA per the contractual annual $/MWh.

Figure JSA-1 - <u>All-in $/MWh Cost of the Wind Projects and the PPA</u>[4]



Q. What causes the 2019-2028 $/MWh costs to be considerably lower than the later year costs in Figure JSA-1 for the Wind Projects?

A. The lower $/MWh cost during the first 10-years of operation are a result of the Wind Projects qualifying for 100% of the PTC which represent approximately $100 to $140 million of tax credits <u>each year</u> from 2019-2028. SPS witness Evan D. Evans describes how the Wind Projects qualify for 100% of the PTC. Figure JSA-1 highlights the importance of the Wind Projects' timeliness in qualifying for safe harbor to receive 100% of the PTC.

[4] The dollar per MWh costs are also shown in my Attachment JSA-2, which is discussed later in my testimony.

B. Results of Strategist Cost-Effectiveness Evaluation

Q. What are the results of the Strategist cost-effectiveness analysis of the Wind Resources in terms of customer savings?

A. Under the base assumptions for electric sales and natural gas prices, and the expected level of wind generation, the addition of SPS's proposed Wind Resources results in $1.19 billion in PVRR customer savings. These customer savings projections are derived by taking the difference in costs between the 2017-2048 PVRR of a base case model run that did not include Wind Resources, and a model run that included the Wind Resources.

Q. How are the $1.19 billion in PVRR customer savings distributed through time?

A. The Wind Resources deliver customer savings every year of operation and provide significant customer savings during the first 10 years of operations. Figure JSA-2 shows that $766 million, or approximately 64% of the $1.19 billion of total savings, occur in the first 10 years of operation.

Figure JSA-2 – Annual Distribution of Wind Resource Savings

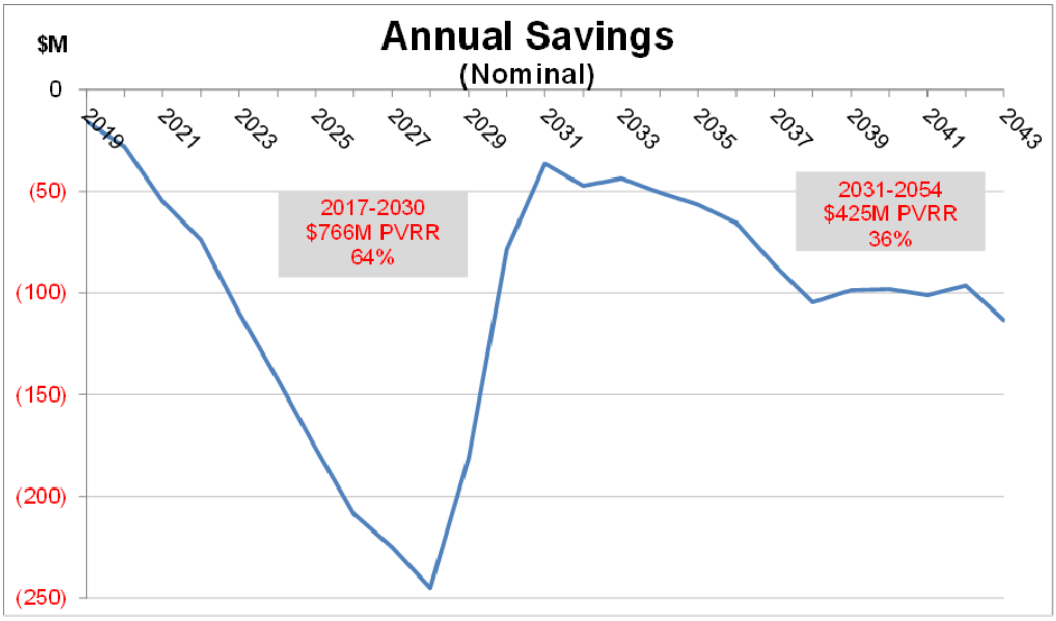
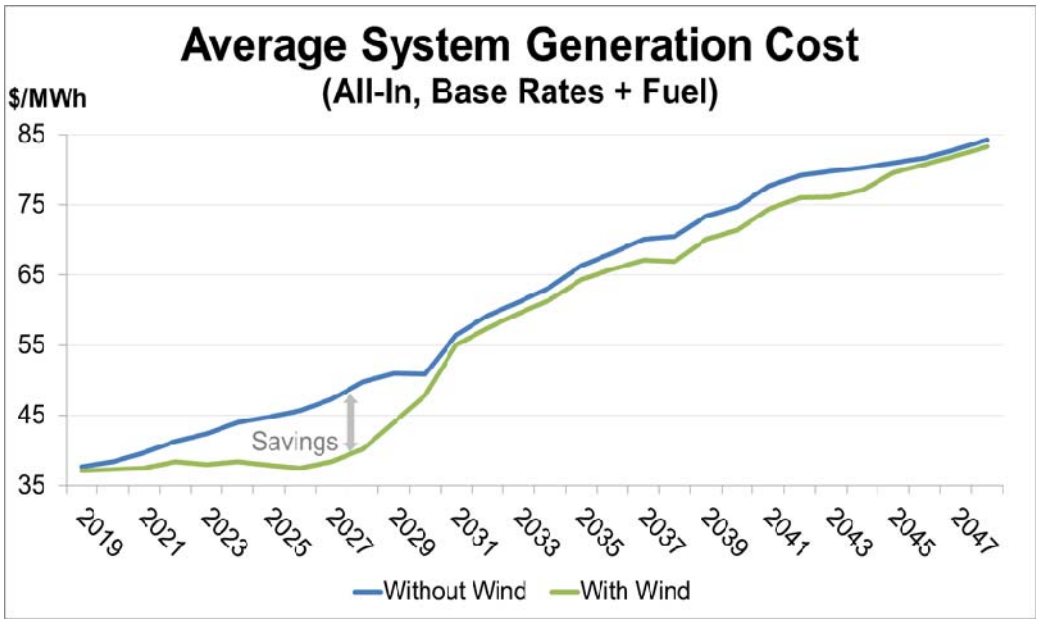


Figure JSA-2 indicates there are immediate savings of about $16 million in 2019 as the Wind Resources begin operation. The Wind Projects and Bonita PPA continue to provide increasing savings to customers in the second year of operation, and each year thereafter. In the tenth year of operation, the PTC ends. Despite the end of the PTC, the competitively priced Wind Resources continue to show annual savings to customers in each year of operation throughout their lives.

Q. How do these savings compare to the overall generation costs of the SPS system?

A. A summary of the average system generation costs between the cases with and without the Wind Resources as modeled by Strategist is depicted in Figure JSA-3. The system generation costs are all-in (including base rates and fuel). Please refer to Attachment JSA-2 for the annual savings and PVRR results. The workpapers to this analysis are provided on Attachment JSA-9(CD) in the folder labeled JSA-2 WP.

Figure JSA-3 – <u>Summary of Strategist Average System Generation Costs</u>



Q. Does the Strategist analysis indicate other benefits from the Wind Resources?

A. Yes. As noted in Section IV of my testimony, SPS's Strategist analysis shows that the Wind Resources would lock-in approximately 22 billion cubic feet[5] of natural gas each year at a levelized gas price of approximately $2.40/MMBtu. In terms of energy price, this gas price burned in a typical combined cycle unit operating at a 7,000 Btu/kWh heat rate with $3/MWh variable operation and maintenance ("O&M") cost, would produce energy at $19.80/MWh. From an energy perspective, this provides a significant hedge value for customers at a competitive energy price.

C. Strategist Sensitivity Cases

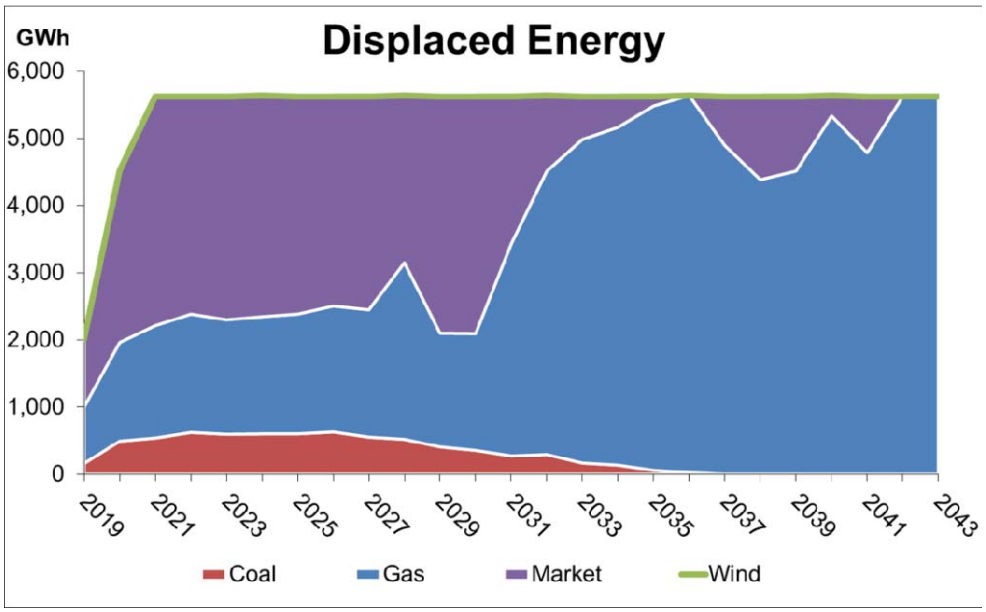
Q. Did SPS test the influence or sensitivity that gas prices have in the Strategist evaluation?

A. Yes. The value of the Wind Resources was evaluated using lower gas price forecasts. Figure JSA-4 (next page) shows the sources of energy that the Wind Resources are displacing in the base analysis. As the incremental energy from the Wind Resources is added to the system, because the total system energy requirements are the same, other sources of generation or market purchases are consequently reduced. As can be seen in Figure JSA-4, a significant component of the displaced energy is from natural gas-fired generation and market purchases (of which gas price is a major component), thus the assumption for the price of gas is a primary driver of the value of the benefits that the Wind Resources provide to SPS's customers. As such, SPS evaluated the cost-effectiveness of the Wind Resources

[5] 22 billion cubic feet of natural gas represents approximately 20% of SPS's annual gas burn for electric production.

using a lower natural gas price forecast to test the reasonableness/validity of SPS's projected $1.19 billion of customer savings that was derived under base gas prices.

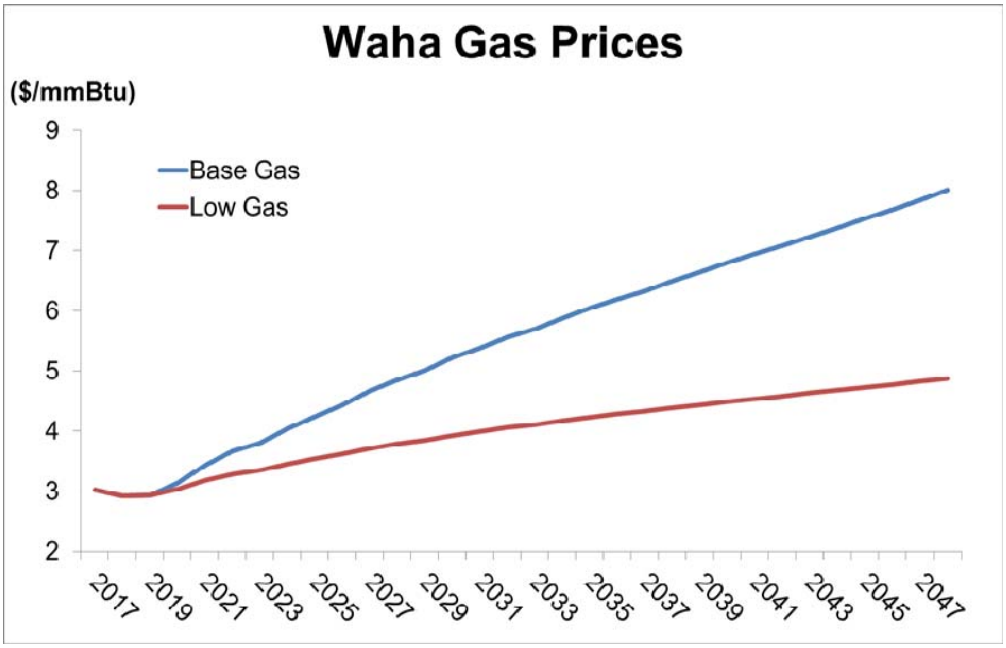
Figure JSA-4 – Displaced Energy from Wind Projects and PPA



Q. What were the gas forecasts used in SPS's sensitivity analysis?

A. In addition to modeling the Wind Resources against the Base Gas forecast, which is the primary forecast used, SPS also developed a low gas forecast. Figure JSA-5 (next page) contains a plot of the gas prices for each of the gas assumptions (i.e., base and low). The levelized cost for SPS's base gas forecast is $4.90/MMBtu over the life of the Wind Resources. The low gas price assumption was developed by reducing the rate of growth by 50% beginning in 2020 following the period in which the gas forecast is 100% market based. The levelized cost for the low gas sensitivity is $3.76/MMBtu.

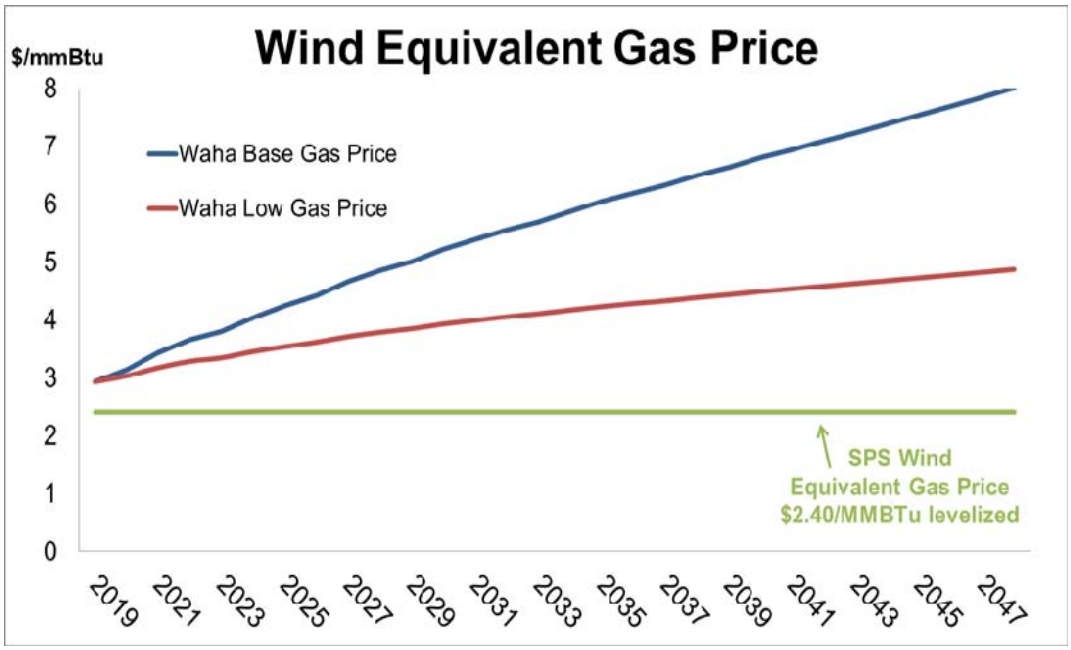
Figure JSA-5 – Range of Gas Price Forecasts



Q. How does the $2.40/MMBtu gas value of the project discussed earlier in your testimony compare with the range of gas prices in Figure JSA-6?

A. Figure JSA-6 (next page) illustrates how the equivalent gas value is lower than the gas price forecasts. In other words, Figure JSA-6 indicates that the proposed Wind Resources will provide wind generation to the system that in essence locks in an equivalent gas price significantly below the low gas price forecast. The $2.40 is the average gas price value over the life of the Wind Resources.

Figure JSA-6 – Wind Equivalent Gas Price vs. Forecasts



Q. How does the $1.19 billion of projected savings change under lower gas price assumptions?

A. As would be expected, the projected savings from the Strategist modeling shows lower savings in the low gas price sensitivity scenario. However, the analysis shows that even under the lower gas price assumptions, the Wind Resources still provide $703 million in PVRR savings to customers. Please refer to Attachment JSA-3 for the annual savings and PVRR results of this analysis as modeled by Strategist. The workpapers to this analysis are provided on Attachment JSA-9(CD) in the folder labeled JSA-3 WP. Table JSA-3 summarizes the changes in PVRR when modeled for natural gas prices shown in Figure JSA-6.

Table JSA-3 – Gas Price Sensitivity Analysis

Gas Price Forecast	PVRR Savings ($Millions)
Base	$1,191
Low	$703

Q. How does the distribution of costs and savings change under the low gas price assumption?

A. The distribution of annual costs and savings follows the same general pattern as that for base gas prices in Figure JSA-2. The pattern of costs and savings that comprise the $703 million to $1.191 billion in PVRR savings from Table JSA-3 are illustrated in Figure JSA-7.

Figure JSA-7 – Gas Price Sensitivity Analysis of Wind Projects and PPA

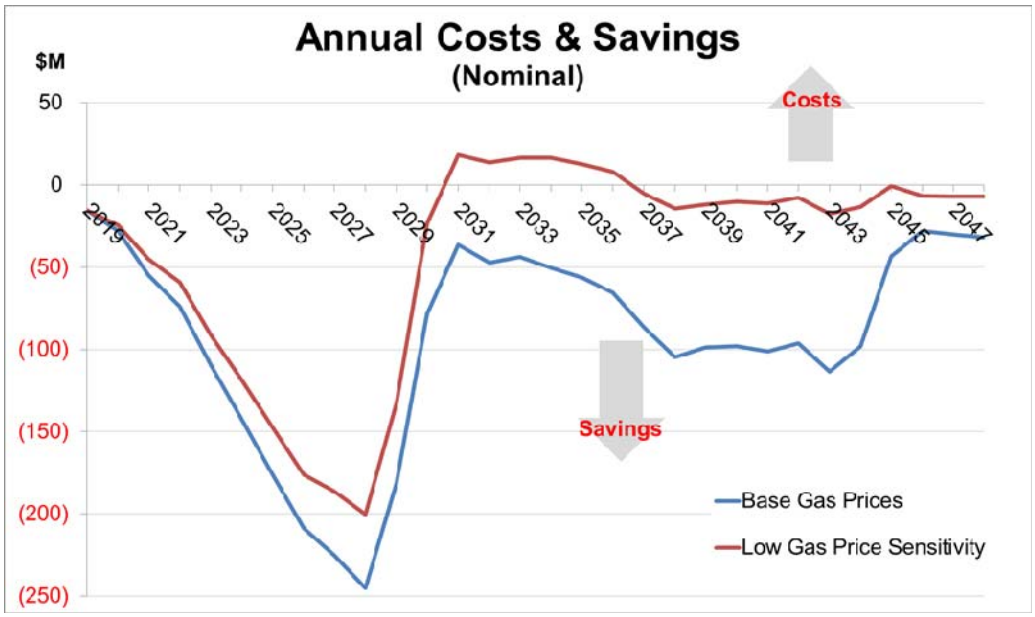


Figure JSA-7 shows that the general pattern of costs and savings for the range of gas prices modeled is considerable net savings each year during the 2019-2030 timeframe that the PTCs are available to the Wind Projects. Beyond 2030 after the PTCs expire, under the lower gas price forecasts the modeling shows moderate net

costs in certain years (e.g., 2031-2036) and moderate net savings in other years (e.g., 2037-2043 and beyond). However, the Wind Projects still show considerable, front weighted, cost savings to customers.

Q. Did SPS model any other gas sensitivity cases in Strategist? If so, please describe that case and its results.

A. Yes. SPS modeled a "flat" gas assumption as an additional sensitivity case. The "flat" gas price assumption was developed by beginning with the fifth year base gas price and escalating that value by the general inflation rate. In other words, the cost of gas remains "flat" in terms of today's dollars. The "flat" gas forecast levelized cost is $3.62/MMBtu over the life of the Wind Resources. The results of the flat gas forecast in Strategist still show a significant savings to customers of $634 million PVRR.

Q. Earlier you described that the base case used for the Strategist cost-effectiveness analysis reflects the retirement of the Tolk generating plant by EOY 2030. Did SPS perform any additional analysis reflecting alternative operations of the Tolk plant?

A. Yes. SPS developed an "alternative" case that assumes the Tolk generating units remain available to their scheduled retirement dates EOY 2042 and 2045, respectively and are capable to operate at full output through end of life. SPS then added the Wind Resources to the alternative case to determine the PVRR savings. The addition of the Wind Resources results in a PVRR savings of $1.14 billion. Please refer to Attachment JSA-4 for the annual savings and PVRR results of this

analysis. The workpapers to this analysis are provided on Attachment JSA-9(CD) in the folder labeled JSA-4 WP.

Q. How does the $1.14 billion of projected savings change under lower gas price assumptions in the alternative case?

A. As would be expected, the projected savings from the alternative case shows lower savings in the low gas price sensitivity scenario, similar to the base case. However, the analysis shows that even under lower gas price assumptions and continued operation of Tolk through the end of current scheduled retirement dates, the Wind Resources still provide over $654 million in PVRR savings to customers. Please refer to Attachment JSA-5 for the annual savings and PVRR results. The workpapers to this analysis are provided on Attachment JSA-9(CD) in the folder labeled JSA-5 WP. Table JSA-4 summarizes the changes in PVRR when modeled at the low forecast for natural gas prices.

Table JSA-4 – Alternative Case with Tolk through End-of-Life, Gas Sensitivity Results

Gas Price Forecast	PVRR Savings ($Millions)
Base	$1,144
Low	$654

Q. Did SPS model the flat gas price in the Tolk sensitivity? If so, please describe that case and its results.

A. Yes. The results of the flat gas forecast in Strategist and assuming the Tolk units are operational to the end of their current scheduled retirement dates still shows a significant savings to customers of $588 million PVRR.

Q. What do you conclude from the Strategist modeling you have presented?

A. Based on extensive modeling with Strategist, which is a thorough utility planning tool that has been extensively used by utilities to support resource planning decisions, the Wind Resources provide significant customer benefits under a broad range of sensitivities analyzed.

VI. PROMOD COST-EFFECTIVENESS EVALUATION

Q. What is the purpose of this section of your testimony?

A. In this section of my testimony, I describe the additional cost effectiveness analyses performed for the Wind Resources using the Promod modeling tool. After describing the Promod views developed by SPS, I provide the results of that analysis, which demonstrates a projected $1.04 billion in PVRR customer savings and corroborates the results of SPS's Strategist analysis. Lastly, I discuss additional sensitivity cases run by SPS in Promod to validate the projected customer savings.

A. Description of Promod and Modeling Assumptions

Q. Please describe the Promod model.

A. Promod is a fundamental electric market simulation that incorporates extensive details in generating unit operating characteristics, the make-up of the transmission grid and constraints, and market system operations. Promod performs an 8760-hour commitment and dispatch recognizing both generation and transmission impacts at the nodal level. The transmission grid is fully integrated with the commitment and dispatch algorithm, so that generators are scheduled, started and cycled while enforcing realistic transmission constraints. Promod forecasts hourly energy; congestion and loss prices; unit generation, revenues and fuel consumption; external market transactions; and transmission flows. The hourly LMPs may be output for any transmission or generator bus in the system.

Q. Please describe the basic approach SPS employed to evaluate the cost-effectiveness of the SPS Wind Projects and the Bonita PPA utilizing Promod.

A. Promod is used at the SPP for its Integrated Transmission Planning ("ITP") process. SPP develops, and provides to its transmission-owning members, a database including all known generation and transmission expansion projects and generation retirements expected to materialize that are located within the SPP. SPP's 2017 ITP ten-year ("ITP10") database is the most recent database and includes valid data to accurately model the years 2020 and 2025.

SPS made refinements to the SPP 2017 ITP10 database for the years 2020 and 2025 to reflect consistent general assumptions being used in the Strategist analysis. Specifically, there are timing differences in the development of the data used by Promod and Strategist, as well as differences in the primary sources for some of the data. The refinements made in the model align the same fundamental assumptions (e.g., load and gas price forecasts) in order to provide meaningful comparisons of the output data and overall results. For the base case, these adjustments were matching the SPS load forecast, the gas and coal price forecasts and the operations of the Tolk generating units in Promod consistent with the Strategist assumptions. SPS added the Wind Resources at their respective interconnection points in the change case.

A Promod simulation was executed for both the base case and the change case, and SPS analyzed the resulting LMP hourly prices for the specific busses of the Wind Resources, as well as the system-wide cost savings between the cases.

Q. What is an LMP price?

A. The LMP is the marginal cost of supplying the next increment of electric demand at a specific location (node) on the electric power network. That value includes the cost of producing energy and the cost of its delivery (congestion and losses). The LMP includes three cost components:

1) marginal energy cost ("MEC"): represents the effective value of delivering that increment of load, from the reference bus.

2) marginal congestion cost ("MCC"): represents the economic impact of network congestion when delivering that increment of load, measured between that location and the reference bus. Congestion occurs when the desired amount of electricity is unable to flow due to physical limitations, and

3) marginal loss cost ("MLC"): represents the economic impact of incurred losses when delivering that increment of load, measured between that location and the reference bus.

The calculation for LMP is expressed as follows, with "i" referring to the incremental values being used:

$$\mathbf{LMP_i = MEC_i + MCC_i + MLC_i}$$

When congestion occurs on a transmission system, the generation will be redispatched out of merit in order to meet the load requirements. The LMP price reflects the full costs resulting from the redispatch. Generally there are two methods to help alleviate congestion; either by new transmission build or the addition of new generation.

Q. Is Strategist able to model LMPs?

A. No. Strategist does not have a detailed representation of the transmission system and thus cannot directly forecast or model LMPs. However, regional electric market price forecasts are developed and used as an input into the Strategist model and the model forecasts sale and purchase interactions with the overall regional market based on these price inputs. Strategist will dispatch the SPS system higher or lower in response to the price signals from the SPS generation fleet compared to the market price forecast.

To provide additional verification that the Strategist representation is providing valid analyses of the benefits of the Wind Resources, SPS conducted a LMP analysis of the Wind Resources using Promod, which contains detailed transmission network information and can forecast LMPs and interactions with an LMP market.

Q. Are there other reasons for conducting an LMP analysis of the Wind Resources?

A. Yes. Integrating wind resources into a regional electric system can modify existing market dynamics and alter LMP prices and the movement of power. SPS utilized the Promod model to discern these potential impacts on its projected avoided cost savings. Additionally, Promod modeling provides the net benefit (costs) of the Wind Resources under a market-based view by directly comparing the expected revenue from the SPP market to the costs of the Wind Resources.

Q. Please discuss further the analysis using the forecasted bus LMPs for the years 2020 and 2025.

A. Using the resulting hourly LMP prices at the Wind Resources locations, SPS calculated the annual weighted LMP price for the Wind Resources for the years 2020 and 2025 as these years had the complete data set required, as provided by the SPP. Next, SPS calculated the average annual natural gas price for the years 2020 and 2025. Finally, SPS divided the weighted LMP price of the Wind Resources by the average annual natural gas price for 2020 and 2025 to determine a gas implied heat rate for the respective years. The resulting gas implied heat rate for 2020 is 8.1MMBtu/MWh and for 2025 is 7.8MMBtu/MWh.

Q. What is a gas implied heat rate?

A. A gas implied heat rate is the electric price divided by the natural gas price over a specific time period. For this analysis, it represents the conversion rate for translating a gas price forecast into an equivalent power price (i.e., LMP) that would be realized by the Wind Resources.

Q. How did SPS use the gas implied heat rates that you have presented earlier to derive avoided costs for each of the forecast years (2019-2048)?

With respect to the LMP analysis for year 2020, SPS: first multiplied the projected annual natural gas price by the LMP gas implied heat rate; and then multiplied the result by the total Wind Resource production (gigawatt-hours) to determine the annual energy market revenues for the year. In the market-based analysis, this energy market revenue (LMP * generation) is assumed to be equivalent to the avoided

energy costs for that year. SPS repeated the same approach a second time, using the gas implied heat rate for the year 2025.

To determine the appropriate heat rate to use for the other years in the expected life of the Wind Projects and PPA, SPS trended the gas implied heat rate from 2020 to 2025 to develop the heat rates for 2021-2024. The gas implied heat rates for the years after 2025 used the same annual change (i.e., 0.059 MMBtu/MWh) to reduce the post 2025 gas implied heat rates to estimate future year values.

Q. Why did SPS use the Promod case that included the Wind Resources to determine the gas implied heat rates for 2020 and 2025?

A. Attachment JSA-6 to my testimony includes contour maps for the base case and the change case (i.e., the base case modified to include the Wind Resources) that represent annual weighted average of all LMP nodes in the SPS service territory produced from the Promod output. The contour maps illustrate the change in LMP prices for the years 2020 and 2025 when the Wind Resources are added to system. As can be seen from the attachment, adding additional generation at new nodes changes the dynamics for the system, which in turn changes the LMP at the nodes. Using the case that includes the additional Wind Resources accurately reflects the LMPs with this new generation.

B. Results of Promod Analysis and Sensitivity Cases

Q. Please briefly describe the results of SPS's Promod analysis.

A. SPS used Promod to develop two distinct views of the cost-effectiveness of the Wind Resources. I will refer to the first analysis as the "LMP analysis" and the second as the "avoided energy cost analysis." Both analyses show customer benefit and independently validate the results from the Strategist evaluation.

Q. Please describe SPS's market-based LMP analysis using Promod.

A. The LMP analysis is a market-based view of the cost effectiveness of the Wind Resources using the projected LMP at the specific locations the Wind Resources are projected to be connected to the SPP system. This analysis compares the forecasted market revenue from the resources against the costs to own and operate them, and in the case of the Bonita PPA, to purchase the power.

Q. What are the results from the market-based LMP analysis using Promod?

A. The addition of SPS's proposed Wind Projects and PPA resulted in $1.04 billion in PVRR savings. These results, which are shown in Table JSA-5 (next page), are similar to the Strategist results and help validate the consistency of the forecasted net benefits to customers. The results of SPS's Promod analysis are included as Attachment JSA-7 to my direct testimony. The workpapers to this analysis are provided on Attachment JSA-9(CD) in the folder labeled JSA-7 WP.

Table JSA-5 – Comparison of Promod Market-Based LMP Analysis to Strategist

	Promod LMP Analysis	Strategist
PVRR Savings ($millions)	$1,041	$1,191

Q. Please describe SPS's avoided energy cost analysis in Promod.

A. SPS's avoided energy cost analysis in Promod was developed by using the total production cost and the total avoided energy cost from the addition of the Wind Resources in the years 2020 and 2025. Only 2020 and 2025 were simulated in Promod as those were the years that a vetted database was available from SPP.

Q. What are the results from the avoided energy cost analysis using Promod?

A. SPS's Promod avoided energy cost analysis shows customer net savings for the years 2020 and 2025. These results compare reasonably well to the results obtained by the Strategist model. This serves to further validate the Strategist results by comparing the results from the two models in those given years.

Specifically, the results from these two years can be compared to the results from Strategist for these years to validate the Strategist results. As can be seen in Table JSA-6 (next page), the models yield very similar results. Most importantly, despite using different modeling approaches, the results consistently show significant customer savings.

Table JSA-6 – Promod vs Strategist Avoided Energy Cost

	Promod	Strategist
2020 Avoided Costs ($/MWh)	$25.04	$26.36
2020 Avoided Energy Cost, Equiv Wind Gen ($M)	$113	$119
2025 Avoided Costs ($/MWh)	$29.88	$35.20
2025 Avoided Energy Cost, Equiv Wind Gen ($M)	$168	$198

Q. Did SPS perform the market-based LMP analysis and avoided energy cost analysis with the low gas price assumption and, if so, what are the results?

A. Yes. The low gas price assumption when input into Promod continues to show significant savings in the LMP Analysis, as shown in my Attachment JSA-8. The workpapers to this analysis are provided on Attachment JSA-9(CD) in the folder labeled JSA-8 WP.

The avoided energy cost analysis also validates the low gas Strategist analysis. The results of this analysis and comparison is shown below in Tables JSA-5a and JSA-6a below, which relate to Tables JSA-5 and JSA-6 discussed previously in my testimony.

Table JSA-5a – Promod vs Strategist Low Gas Price Results

	Promod LMP Analysis	Strategist
PVRR Savings ($millions)	$855	$703

Table JSA-6a – Promod vs. Strategist Avoided Energy Costs Low Gas Price Results

	Promod	Strategist
2020 Avoided Costs ($/MWh)	$24.10	$25.61
2020 Avoided Energy Cost, Equiv Wind Gen ($M)	$109	$116
2025 Avoided Costs ($/MWh)	$25.66	$30.05
2025 Avoided Energy Cost, Equiv Wind Gen ($M)	$144	$169

Q. What do you conclude from the Promod LMP evaluation of the cost-effectiveness of the Wind Resources?

A. The results of the Promod LMP evaluation corroborate the results of the Strategist analysis with all models showing significant customer savings.

The Promod LMP analysis also shows that adding additional generation in the proposed locations will provide some congestion relief and overall lowering of LMPs. In addition to lowering congestion costs, this could possibly mitigate requirements for some future transmission construction.

VII. COST REASONABLENESS OF THE WIND PROJECTS

Q. What is the purpose of this section of your testimony?

A. In this section of my testimony, I describe SPS's evaluation of the cost-reasonableness of the Wind Resources. Specifically, I demonstrate that the Wind Resources at a levelized cost of $19.59/MWh are reasonable compared to the cost of the most recent wind PPAs that SPS executed as a result of its March 2013 wind RFP ("2013 Wind RFP").

Q. How did SPS assess whether the Wind Projects can be provided at a reasonable cost to customers?

A. SPS assessed the reasonableness of the wind cost from a few different perspectives. In his direct testimony, Mr. Hill discusses a comparison of the construction cost of the Wind Projects compared to other Xcel Energy projects, as well and an independent survey of wind costs by the Lawrence Berkeley National Laboratory. Additionally, SPS assessed the cost-reasonableness of the Wind Projects through a $/MWh LCOE comparison with the three wind PPAs that SPS executed as a result of its 2013 Wind RFP.

Q. How is LCOE calculated?

A. The LCOE is equal to the present value of forecasted annual revenue requirements (as described in the direct testimony of Mr. Freitas) divided by the present value of forecasted energy production (as described in the direct testimonies of Mr. DeLuca and Mr. Hill). The forecasted annual revenue requirements and production for the Wind Projects are over 25 years, and the forecasted annual revenue requirements and production for the Bonita PPA are over 30 years.

Q. Did SPS select any wind bids from the 2013 Wind RFP that resulted in power purchase agreements?

A. Yes. SPS selected three bids representing a total of approximately 700 MW. PPAs were executed for these three projects in 2013, which I will refer to as the "700MW Wind PPAs." The average LCOE for the 700MW Wind PPAs was $23.05/MWh.[6]

Q. Is it fair to compare the LCOE of the 700MW Wind PPAs that began commercial operation in 2014 and 2015 with the LCOE of the Wind Resources which will begin commercial operation in 2019 and 2020?

A. Yes. Although there are a number of variables that may change over time, a fair comparison can be made between projects that are developed and placed in-service within a reasonably close timeframe using LCOE as a comparison metric.

Q. How does the LCOE of the 700MW Wind PPAs compare to the current Wind Resources?

A. The LCOE of the 700MW Wind PPAs is $23.05/MWh and the LCOE of the Wind Resources is $19.59/MWh.

[6] SPS submitted the PPAs resulting from of the 2013 Wind RFP in its pending fuel reconciliation case at the Commission, Docket No. 46025. Under the Unopposed Stipulation (Section II) currently pending for the Commission's approval in that docket, those Wind PPAs are approved. In addition, SPS submitted the results of the 2013 Wind RFP at the New Mexico Public Regulation Commission requesting approval of the selected projects in July 2013, and the request was approved in November 2013. *In the Matter of Southwestern Public Service Company's Application for Authority to: (1) Enter into Separate Purchased Power Agreements with NextEra Energy Resources' Mammoth Plains and Palo Duro Wind Energy Centers and Infinity Wind Power's Roosevelt Wind Ranch for Wind Energy; and (2) Recover the Associated Energy Costs through Its Fuel and Purchased Power Cost Adjustment Clause*, Case No. 13-00233-UT, Final Order on Recommended Decision (Nov. 13, 2013).

Q. What do you conclude from your evaluation of the cost-reasonableness of the Wind Projects and PPA?

A. Overall, the LCOEs of the Wind Resources is shown to be very reasonable in comparison to the LCOEs of the 700MW Wind PPAs.

Q. Does this conclude your pre-filed direct testimony?

A. Yes.

VERIFICATION

STATE OF COLORADO)
) ss.
COUNTY OF DENVER)

JONATHAN S. ADELMAN, first being sworn on his oath, states:

I am the witness identified in the preceding testimony. I have read the testimony and the accompanying attachments and am familiar with their contents. Based upon my personal knowledge, the facts stated in the testimony are true. In addition, in my judgment and based upon my professional experience, the opinions and conclusions stated in the testimony are true, valid, and accurate.

JONATHAN S. ADELMAN

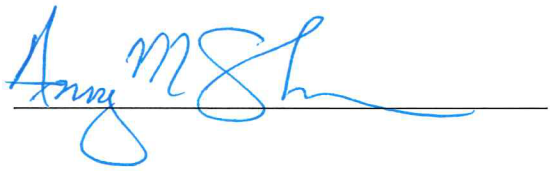
SUBSCRIBED AND SWORN TO before me this 20 day of March 2017.

YRENE A NUÑEZ
NOTARY PUBLIC
STATE OF COLORADO
NOTARY ID 19874149394
MY COMMISSION EXPIRES FEBRUARY 23, 2021

Notary Public, State of Colorado
My Commission Expires: 2/23/21

CERTIFICATE OF SERVICE

I certify that on March 21, 2017, this instrument was filed with the Public Utility Commission of Texas, and a true and correct copy of it was served by hand delivery on the Staff of the Public Utility Commission of Texas and the Office of Public Utility Counsel, and by hand delivery, next business day courier delivery, or first class mail on each party of record in SPS's most recent base rate case, Docket No. 45524.



SPS Loads & Resources Table
Based on October 2016 Forecast

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Existing Generation	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485	4,485
Purchased Capacity	1486	1083	1083	1083	1083	1075	856	845	836	812	770	770	770	770	734	177	177	149	136	136
Expansion Plan	9	9	(86)	(173)	(171)	(283)	(171)	(264)	(516)	(498)	(677)	(788)	(786)	(2,087)	(2,327)	(2,326)	(2,544)	(2,802)	(2,770)	(3,107)
Net Dependable Capacity	5,980	5,577	5,482	5,395	5,397	5,277	5,170	5,066	4,805	4,799	4,578	4,467	4,469	3,168	2,892	2,336	2,118	1,832	1,851	1,514
Full Requirements Load:																				
Retail	3526	3549	3613	3681	3744	3807	3868	3933	3991	4049	4110	4180	4247	4316	4380	4446	4512	4582	4651	4724
Total Wholesale	1,014	399	408	416	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DSM Impact	(2)	(3)	(4)	(5)	(6)	(8)	(9)	(11)	(13)	(15)	(17)	(20)	(23)	(26)	(30)	(34)	(38)	(42)	(46)	(50)
Interruptibles	(42)	(43)	(43)	(43)	(44)	(44)	(44)	(45)	(44)	(44)	(43)	(42)	(42)	(37)	(37)	(36)	(36)	(35)	(34)	(34)
Total SPS Firm Load	4,496	3,903	3,974	4,048	3,694	3,755	3,814	3,877	3,933	3,990	4,050	4,118	4,183	4,252	4,313	4,376	4,439	4,506	4,571	4,641
Firm Partial Req. Load:	-	170	172	174	326	328	280	283	185	187	189	192	194	196	199	201	203	206	208	211
Firm Load Obligation	4,496	4,073	4,146	4,223	4,020	4,083	4,095	4,160	4,118	4,178	4,240	4,310	4,377	4,448	4,512	4,577	4,642	4,711	4,780	4,851
Planning Reserve Margin	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
Target Capacity (MW)	540	489	498	507	482	490	491	499	494	501	509	517	525	534	541	549	557	565	574	582
Other Reserves = NM Coops	15	15	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Required Reserves	555	504	513	522	482	490	491	499	494	501	509	517	525	534	541	549	557	565	574	582
Existing Excess Capacity	1,484	1,504	1,335	1,172	1,377	1,194	1,075	906	687	622	338	157	92	(1,280)	(1,620)	(2,241)	(2,524)	(2,879)	(2,929)	(3,338)
Cap Position: Long (Short)	*929*	*1001*	*823*	*651*	*895*	*704*	*584*	*407*	*193*	*121*	*(171)*	*(360)*	*(433)*	*(1814)*	*(2162)*	*(2790)*	*(3081)*	*(3445)*	*(3502)*	*(3920)*

Strategist Analysis - Annual Savings, PVRR, and Gas Breakeven (Base Gas)

Contract Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
($000)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Hale + Sagamore All-In $/MWh	$18.48	$20.32	$18.44	$16.25	$9.86	$5.68	$0.15	($4.00)	($4.83)	($6.10)	$6.38	$31.03	$38.96	$37.96	$37.66
Bonita $/MWh	$18.10	$18.46	$18.83	$19.21	$19.59	$19.98	$20.38	$20.79	$21.21	$21.63	$22.06	$22.51	$22.96	$23.41	$23.88
Cost of 1230 MW Wind	$36,766	$91,146	$104,074	$94,417	$65,453	$46,765	$21,650	$2,992	($416)	($5,851)	$51,973	$165,720	$202,653	$199,100	$197,610
Avoided Cost	$52,289	$118,991	$158,965	$168,157	$175,163	$189,001	$197,910	$211,675	$224,577	$239,125	$233,139	$244,238	$239,068	$246,251	$241,205
Energy Savings (Costs)	$15,522	$27,845	$54,891	$73,739	$109,710	$142,236	$176,260	$208,684	$224,993	$244,976	$181,166	$78,518	$36,415	$47,151	$43,595
Wind GWh	2,010	4,515	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623
Gas Price $/MMBTu	$3.0	$3.2	$3.4	$3.7	$3.8	$4.1	$4.3	$4.5	$4.7	$4.8	$4.9	$5.1	$5.2	$5.3	$5.4

Contract Year	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*
($000)	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**
Hale + Sagamore All-In $/MWh	$37.60	$36.69	$35.87	$35.16	$34.81	$33.95	$33.46	$32.95	$32.42	$31.29	$33.78	$41.88			
Bonita $/MWh	$24.36	$24.85	$25.34	$25.85	$26.37	$26.90	$27.43	$27.98	$28.54	$29.11	$29.69	$30.29	$30.89	$31.51	$32.14
Cost of 1230 MW Wind	$197,828	$194,164	$191,428	$188,138	$187,080	$183,665	$182,503	$180,171	$178,304	$173,689	$149,324	$77,922	$31,741	$32,378	$33,115
Avoided Cost	$248,325	$250,647	$256,854	$274,429	$291,629	$282,243	$280,572	$281,190	$274,576	$287,005	$247,174	$121,432	$59,847	$62,533	$64,791
Energy Savings (Costs)	$50,498	$56,483	$65,426	$86,290	$104,549	$98,579	$98,069	$101,019	$96,272	$113,316	$97,850	$43,510	$28,106	$30,155	$31,676
Wind GWh	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	4,657	2,145	1,028	1,028	1,030
Gas Price $/MMBTu	$5.6	$5.8	$5.9	$6.0	$6.2	$6.3	$6.5	$6.6	$6.7	$6.9	$7.0	$7.1	$7.3	$7.5	$7.6

	2017 -2054 NPV ($000)
Cost of Owned Wind	$1,216,832
Avoided Cost	$2,408,122
Energy Savings	$1,191,290

	30 Yr Levelized ($000)	**GWh**	**$/MWh**
Cost of 1230 MW Wind	$93,437	4748	$19.68
Avoided Cost	$184,913	4748	$38.94
Energy Savings	$91,476	4748	$19.26
Gas Price $/MMBtu			$4.79
Avoided Cost Implied Heat Rate			8.13
Break-Even Delivered Gas Price	($/MMBtu)		$2.40

Strategist Analysis - Annual Savings and PVRR (Low Gas)

Contract Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
($000)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Hale + Sagamore All-In $/MWh	$18.48	$20.32	$18.44	$16.25	$9.86	$5.68	$0.15	($4.00)	($4.83)	($6.10)	$6.38	$31.03	$38.96	$37.96	$37.66
Bonita $/MWh	$18.10	$18.46	$18.83	$19.21	$19.59	$19.98	$20.38	$20.79	$21.21	$21.63	$22.06	$22.51	$22.96	$23.41	$23.88
Cost of 1230 MW Wind	$36,766	$91,146	$104,074	$94,417	$65,453	$46,765	$21,650	$2,992	($416)	($5,851)	$51,973	$165,720	$202,653	$199,100	$197,610
Avoided Cost	$52,289	$115,627	$149,298	$153,396	$156,905	$165,149	$168,977	$179,084	$185,854	$194,362	$184,346	$189,191	$184,433	$185,431	$181,033
Energy Savings (Costs)	$15,522	$24,480	$45,224	$58,979	$91,452	$118,383	$147,327	$176,093	$186,270	$200,213	$132,373	$23,471	($18,220)	($13,670)	($16,576)
Wind GWh	2,010	4,515	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623
Gas Price $/MMBTu	$3.0	$3.1	$3.2	$3.3	$3.4	$3.5	$3.6	$3.6	$3.7	$3.7	$3.8	$3.8	$3.8	$3.9	$3.9

Contract Year	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*
($000)	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**
Hale + Sagamore All-In $/MWh	$37.60	$36.69	$35.87	$35.16	$34.81	$33.95	$33.46	$32.95	$32.42	$31.29	$33.78	$41.88			
Bonita $/MWh	$24.36	$24.85	$25.34	$25.85	$26.37	$26.90	$27.43	$27.98	$28.54	$29.11	$29.69	$30.29	$30.89	$31.51	$32.14
Cost of 1230 MW Wind	$197,828	$194,164	$191,428	$188,138	$187,080	$183,665	$182,503	$180,171	$178,304	$173,689	$149,324	$77,922	$31,741	$32,378	$33,115
Avoided Cost	$181,461	$181,511	$183,436	$193,374	$201,367	$195,424	$192,602	$191,466	$185,887	$191,301	$162,464	$78,608	$38,452	$39,314	$40,155
Energy Savings (Costs)	($16,367)	($12,652)	($7,992)	$5,235	$14,287	$11,760	$10,099	$11,296	$7,583	$17,612	$13,140	$686	$6,711	$6,936	$7,040
Wind GWh	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	4,657	2,145	1,028	1,028	1,030
Gas Price $/MMBTu	$4.0	$4.0	$4.1	$4.1	$4.2	$4.2	$4.3	$4.3	$4.4	$4.4	$4.4	$4.5	$4.5	$4.6	$4.6

	2017 -2054 NPV ($000)
Cost of Owned Wind	$1,216,832
Avoided Cost	$1,919,912
Energy Savings	$703,081

Strategist Analysis - Annual Savings, PVRR, and Gas Breakeven (Base Gas, Tolk Alternative Case)

Contract Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
($000)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Hale + Sagamore All-In $/MWh	$18.48	$20.32	$18.44	$16.25	$9.86	$5.68	$0.15	($4.00)	($4.83)	($6.10)	$6.38	$31.03	$38.96	$37.96	$37.66
Bonita $/MWh	$18.10	$18.46	$18.83	$19.21	$19.59	$19.98	$20.38	$20.79	$21.21	$21.63	$22.06	$22.51	$22.96	$23.41	$23.88
Cost of 1230 MW Wind	$36,766	$91,146	$104,074	$94,417	$65,453	$46,765	$21,650	$2,992	($416)	($5,851)	$51,973	$165,720	$202,653	$199,100	$197,610
Avoided Cost	$47,804	$112,961	$150,393	$158,465	$166,331	$175,136	$184,950	$195,538	$207,940	$218,073	$222,588	$233,170	$241,238	$244,071	$249,699
Energy Savings (Costs)	$11,038	$21,815	$46,319	$64,047	$100,878	$128,371	$163,300	$192,547	$208,356	$223,924	$170,615	$67,450	$38,585	$44,971	$52,089
Wind GWh	2,010	4,515	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623
Gas Price $/MMBTu	$3.0	$3.2	$3.4	$3.7	$3.8	$4.1	$4.3	$4.5	$4.7	$4.8	$4.9	$5.1	$5.2	$5.3	$5.4

Contract Year	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*
($000)	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**
Hale + Sagamore All-In $/MWh	$37.60	$36.69	$35.87	$35.16	$34.81	$33.95	$33.46	$32.95	$32.42	$31.29	$33.78	$41.88			
Bonita $/MWh	$24.36	$24.85	$25.34	$25.85	$26.37	$26.90	$27.43	$27.98	$28.54	$29.11	$29.69	$30.29	$30.89	$31.51	$32.14
Cost of 1230 MW Wind	$197,828	$194,164	$191,428	$188,138	$187,080	$183,665	$182,503	$180,171	$178,304	$173,689	$149,324	$77,922	$31,741	$32,378	$33,115
Avoided Cost	$244,309	$261,685	$279,951	$275,837	$282,098	$296,007	$306,329	$308,581	$299,889	$307,001	$250,884	$124,787	$63,715	$61,891	$64,400
Energy Savings (Costs)	$46,481	$67,521	$88,523	$87,698	$95,018	$112,343	$123,826	$128,410	$121,585	$133,312	$101,560	$46,864	$31,974	$29,513	$31,284
Wind GWh	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	4,657	2,145	1,028	1,028	1,030
Gas Price $/MMBTu	$5.6	$5.8	$5.9	$6.0	$6.2	$6.3	$6.5	$6.6	$6.7	$6.9	$7.0	$7.1	$7.3	$7.5	$7.6

	2017 -2054 NPV ($000)
Cost of Owned Wind	$1,216,832
Avoided Cost	$2,360,770
Energy Savings	$1,143,938

	30 Yr Levelized ($000)	**GWh**	**$/MWh**
Cost of 1230 MW Wind	$93,437	4748	$19.68
Avoided Cost	$181,277	4748	$38.18
Energy Savings	$87,840	4748	$18.50
Gas Price $/MMBtu			$4.79
Avoided Cost Implied Heat Rate			7.97
Break-Even Delivered Gas Price	($/MMBtu)		$2.50

Strategist Analysis - Annual Savings and PVRR (Low Gas, Tolk Alternative Case)

Contract Year	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
($000)	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**
Hale + Sagamore All-In $/MWh	$18.48	$20.32	$18.44	$16.25	$9.86	$5.68	$0.15	($4.00)	($4.83)	($6.10)	$6.38	$31.03	$38.96	$37.96	$37.66
Bonita $/MWh	$18.10	$18.46	$18.83	$19.21	$19.59	$19.98	$20.38	$20.79	$21.21	$21.63	$22.06	$22.51	$22.96	$23.41	$23.88
Cost of 1230 MW Wind	$36,766	$91,146	$104,074	$94,417	$65,453	$46,765	$21,650	$2,992	($416)	($5,851)	$51,973	$165,720	$202,653	$199,100	$197,610
Avoided Cost	$47,804	$109,518	$140,972	$144,048	$148,265	$151,435	$156,201	$162,375	$168,767	$174,094	$176,484	$180,817	$186,181	$188,208	$187,257
Energy Savings (Costs)	$11,038	$18,372	$36,898	$49,630	$82,812	$104,670	$134,551	$159,383	$169,183	$179,945	$124,511	$15,097	($16,472)	($10,892)	($10,353)
Wind GWh	2,010	4,515	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623
Gas Price $/MMBTu	$3.0	$3.1	$3.2	$3.3	$3.4	$3.5	$3.6	$3.6	$3.7	$3.7	$3.8	$3.8	$3.8	$3.9	$3.9

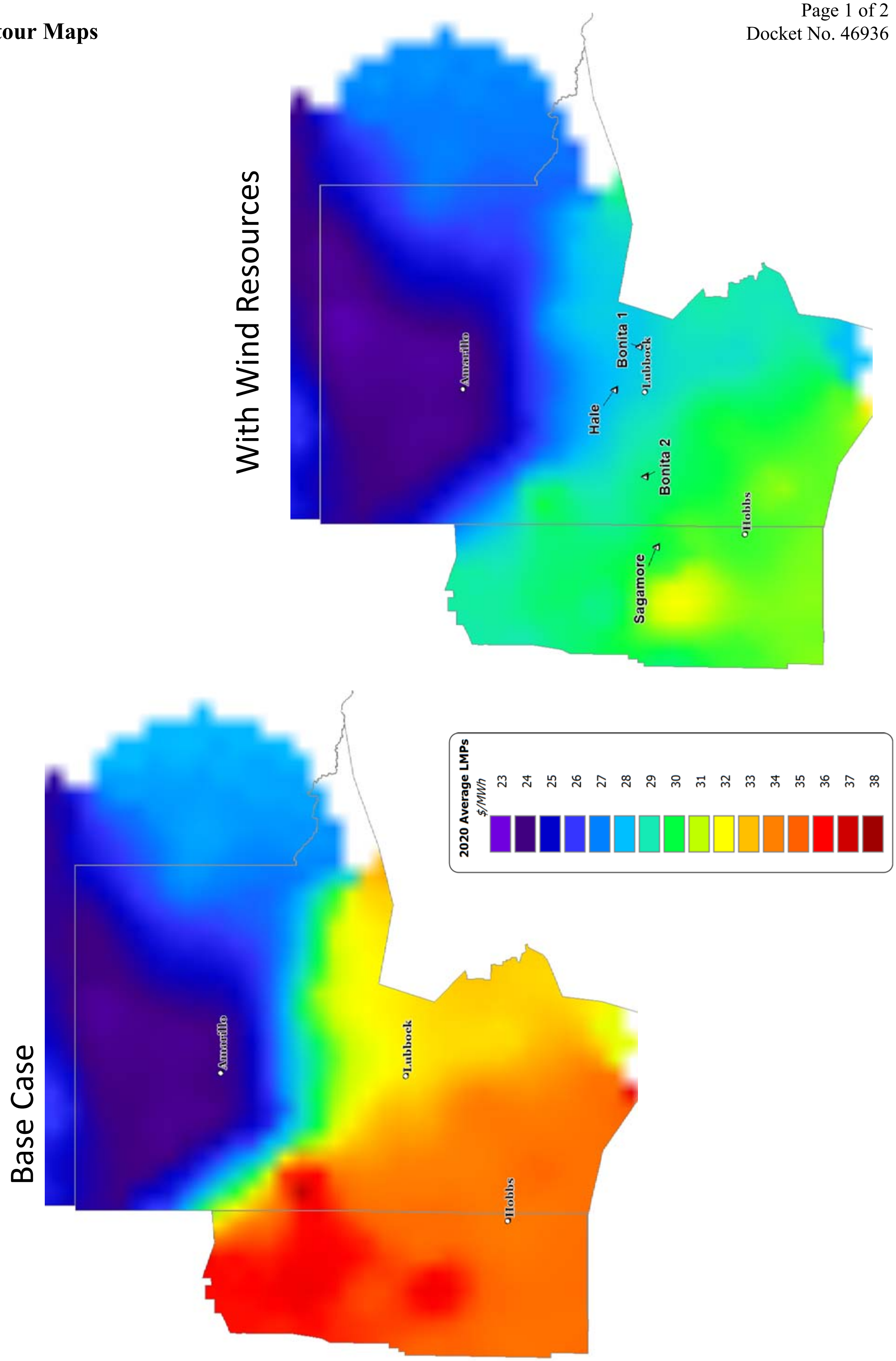
Contract Year	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*
($000)	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**	**2040**	**2041**	**2042**	**2043**	**2044**	**2045**	**2046**	**2047**	**2048**
Hale + Sagamore All-In $/MWh	$37.60	$36.69	$35.87	$35.16	$34.81	$33.95	$33.46	$32.95	$32.42	$31.29	$33.78	$41.88			
Bonita $/MWh	$24.36	$24.85	$25.34	$25.85	$26.37	$26.90	$27.43	$27.98	$28.54	$29.11	$29.69	$30.29	$30.89	$31.51	$32.14
Cost of 1230 MW Wind	$197,828	$194,164	$191,428	$188,138	$187,080	$183,665	$182,503	$180,171	$178,304	$173,689	$149,324	$77,922	$31,741	$32,378	$33,115
Avoided Cost	$182,538	$189,623	$199,232	$197,493	$200,591	$205,505	$210,955	$210,043	$204,164	$204,355	$166,259	$81,066	$40,544	$39,189	$40,031
Energy Savings (Costs)	($15,289)	($4,541)	$7,804	$9,354	$13,511	$21,840	$28,452	$29,873	$25,860	$30,666	$16,935	$3,144	$8,803	$6,811	$6,916
Wind GWh	5,623	5,623	5,639	5,623	5,623	5,623	5,639	5,623	5,623	5,623	4,657	2,145	1,028	1,028	1,030
Gas Price $/MMBTu	$4.0	$4.0	$4.1	$4.1	$4.2	$4.2	$4.3	$4.3	$4.4	$4.4	$4.4	$4.5	$4.5	$4.6	$4.6

	2017 -2054 NPV ($000)
Cost of Owned Wind	$1,216,832
Avoided Cost	$1,870,485
Energy Savings	$653,653

Attachment JSA-5
Page 1 of 1
Docket No. 46936

Contour Maps

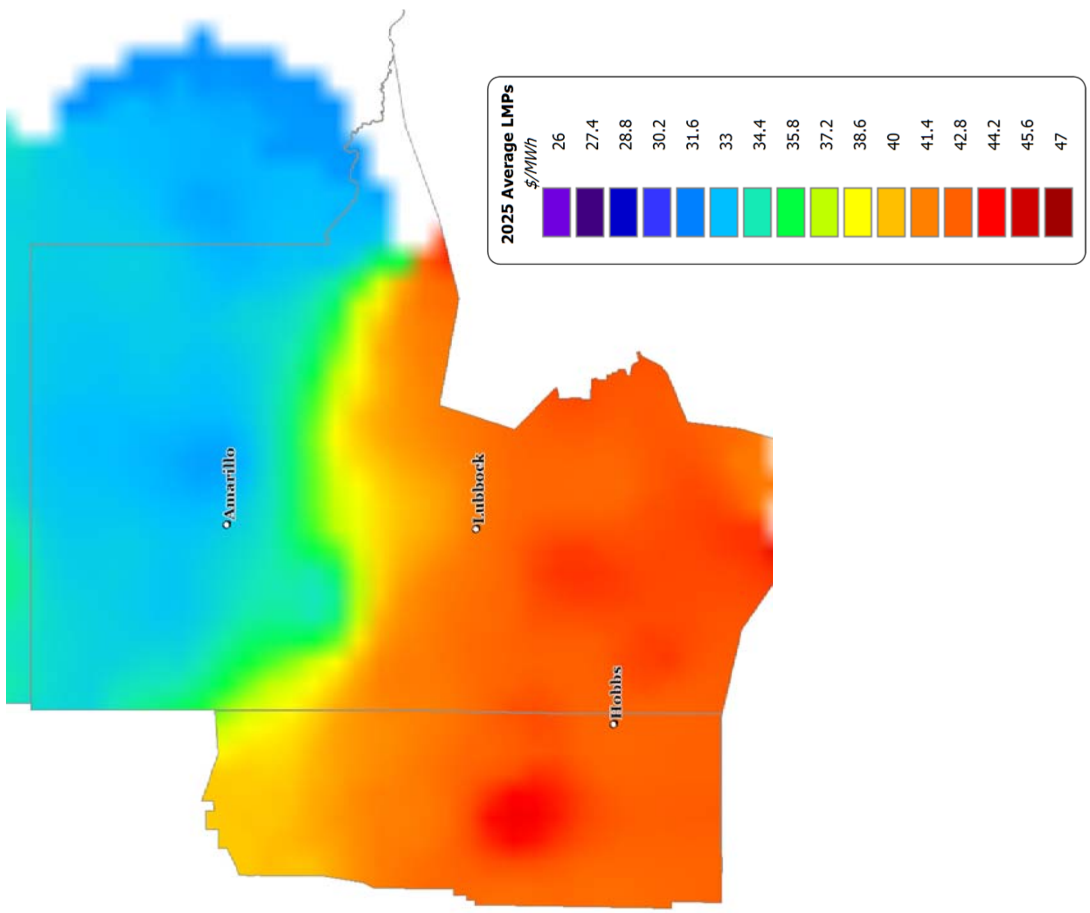
2020 Annual Average LMPs
Base Gas



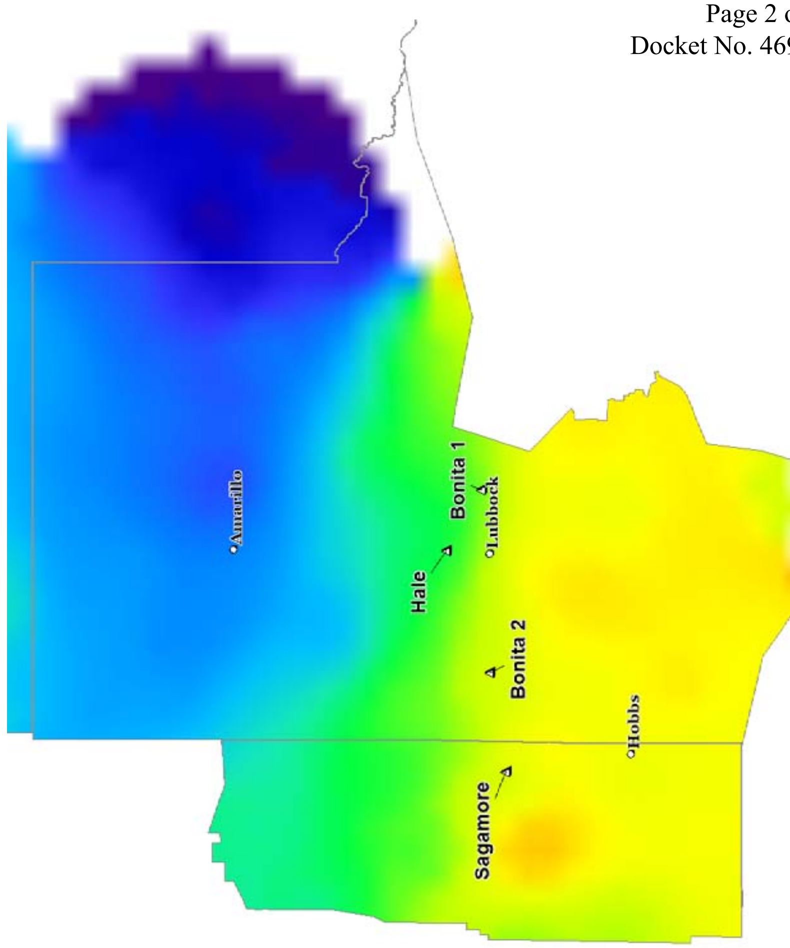
Contour Maps

2025 Annual Average LMPs
Base Gas

Base Case



With New Wind



Promod IV LMP Market Analysis (Base Gas)

Avoided Cost Savings SPS Updated NYMEX + Basis
2020 and 2025 LMP Gas Implied Heat Rate ($,000)
Base Gas Forecast

NPV ($,000)		**61,829**	**$2,257,202**	**$0**	**$1,216,642**	**($1,040,560)**	**($1,040,560)**

YEAR	SPS NYMEX + Basis	Forecasted Implied HR	Wind GWh	Avoided Energy Cost	Avoided Capacity Cost	Wind Cost	Savings Incl. Capacity	Savings Excl. Capacity
2017	$3.02	8.097	0	$0	$0	$ -	$ -	$ -
2018	$2.92	8.097	0	$0	$0	$ -	$ -	$ -
2019	$2.93	8.097	2010	$47,764	$0	$ 36,766	$ (10,998)	$ (10,998)
2020	$3.14	8.097	4512	$114,549	$0	$ 91,096	$ (23,452)	$ (23,452)
2021	$3.43	8.038	5623	$154,880	$0	$ 104,075	$ (50,804)	$ (50,804)
2022	$3.66	7.979	5623	$164,394	$0	$ 94,415	$ (69,979)	$ (69,979)
2023	$3.80	7.919	5623	$169,154	$0	$ 65,455	$ (103,698)	$ (103,698)
2024	$4.04	7.860	5637	$179,103	$0	$ 46,713	$ (132,390)	$ (132,390)
2025	$4.24	7.801	5623	$186,140	$0	$ 21,654	$ (164,486)	$ (164,486)
2026	$4.43	7.741	5623	$192,806	$0	$ 2,993	$ (189,813)	$ (189,813)
2027	$4.67	7.682	5623	$201,562	$0	$ (419)	$ (201,981)	$ (201,981)
2028	$4.85	7.623	5637	$208,399	$0	$ (5,910)	$ (214,309)	$ (214,309)
2029	$5.01	7.563	5623	$213,007	$0	$ 51,977	$ (161,030)	$ (161,030)
2030	$5.22	7.504	5623	$220,279	$0	$ 165,715	$ (54,564)	$ (54,564)
2031	$5.39	7.445	5623	$225,483	$0	$ 202,648	$ (22,835)	$ (22,835)
2032	$5.56	7.385	5637	$231,397	$0	$ 199,039	$ (32,358)	$ (32,358)
2033	$5.70	7.326	5623	$234,843	$0	$ 197,613	$ (37,231)	$ (37,231)
2034	$5.88	7.267	5623	$240,161	$0	$ 197,828	$ (42,333)	$ (42,333)
2035	$6.05	7.207	5623	$245,064	$0	$ 194,161	$ (50,903)	$ (50,903)
2036	$6.20	7.148	5637	$249,689	$0	$ 191,361	$ (58,328)	$ (58,328)
2037	$6.33	7.089	5623	$252,175	$0	$ 188,140	$ (64,035)	$ (64,035)
2038	$6.49	7.029	5623	$256,662	$0	$ 187,078	$ (69,584)	$ (69,584)
2039	$6.64	6.970	5623	$260,252	$0	$ 183,660	$ (76,591)	$ (76,591)
2040	$6.81	6.911	5637	$265,125	$0	$ 182,430	$ (82,695)	$ (82,695)
2041	$6.95	6.851	5623	$267,598	$0	$ 180,173	$ (87,425)	$ (87,425)
2042	$7.09	6.792	5623	$270,718	$0	$ 178,306	$ (92,412)	$ (92,412)
2043	$7.23	6.733	5623	$273,853	$0	$ 173,692	$ (100,162)	$ (100,162)
2044	$7.38	6.673	4654	$229,248	$0	$ 149,246	$ (80,002)	$ (80,002)
2045	$7.53	6.614	2145	$106,870	$0	$ 77,921	$ (28,949)	$ (28,949)
2046	$7.69	6.555	1028	$51,778	$0	$ 31,746	$ (20,032)	$ (20,032)
2047	$7.85	6.495	1028	$52,361	$0	$ 32,381	$ (19,981)	$ (19,981)
2048	$8.01	6.436	1028	$52,947	$0	$ 33,028	$ (19,919)	$ (19,919)
2049	$8.17	6.377	0	$0	$0	$ -	$ -	$ -
2050	$8.34	6.317	0	$0	$0	$ -	$ -	$ -
2051	$8.51	6.258	0	$0	$0	$ -	$ -	$ -
2052	$8.68	6.199	0	$0	$0	$ -	$ -	$ -

Promod IV LMP Market Analysis (Low Gas)

Avoided Cost Savings SPS Updated NYMEX + Basis
2020 and 2025 LMP Gas Implied Heat Rate ($,000)
Low Gas Forecast

NPV ($,000)		**61,829**	**$2,071,584**	**$0**	**$1,216,642**	**($854,943)**		**($854,943)**

YEAR	SPS NYMEX + Basis	Forecasted Implied HR	Wind GWh	Avoided Energy Cost	Avoided Capacity Cost	Wind Cost	Savings Incl. Capacity	Savings Excl. Capacity
2017	$3.13	8.255	0	$0	$0	$ -	$ -	$ -
2018	$2.99	8.255	0	$0	$0	$ -	$ -	$ -
2019	$2.97	8.255	2010	$49,317	$0	$ 36,766	$ (12,551)	$ (12,551)
2020	$3.07	8.255	4512	$114,396	$0	$ 91,096	$ (23,299)	$ (23,299)
2021	$3.18	8.317	5623	$148,618	$0	$ 104,075	$ (44,543)	$ (44,543)
2022	$3.29	8.378	5623	$154,900	$0	$ 94,415	$ (60,485)	$ (60,485)
2023	$3.35	8.440	5623	$158,932	$0	$ 65,455	$ (93,476)	$ (93,476)
2024	$3.46	8.502	5637	$165,685	$0	$ 46,713	$ (118,972)	$ (118,972)
2025	$3.54	8.563	5623	$170,667	$0	$ 21,654	$ (149,014)	$ (149,014)
2026	$3.62	8.625	5623	$175,692	$0	$ 2,993	$ (172,699)	$ (172,699)
2027	$3.72	8.687	5623	$181,723	$0	$ (419)	$ (182,142)	$ (182,142)
2028	$3.79	8.749	5637	$187,102	$0	$ (5,910)	$ (193,012)	$ (193,012)
2029	$3.86	8.810	5623	$191,061	$0	$ 51,977	$ (139,084)	$ (139,084)
2030	$3.94	8.872	5623	$196,501	$0	$ 165,715	$ (30,787)	$ (30,787)
2031	$4.00	8.934	5623	$201,036	$0	$ 202,648	$ 1,612	$ 1,612
2032	$4.07	8.995	5637	$206,178	$0	$ 199,039	$ (7,139)	$ (7,139)
2033	$4.12	9.057	5623	$209,763	$0	$ 197,613	$ (12,150)	$ (12,150)
2034	$4.18	9.119	5623	$214,487	$0	$ 197,828	$ (16,659)	$ (16,659)
2035	$4.24	9.181	5623	$219,070	$0	$ 194,161	$ (24,909)	$ (24,909)
2036	$4.30	9.242	5637	$223,837	$0	$ 191,361	$ (32,476)	$ (32,476)
2037	$4.34	9.304	5623	$227,152	$0	$ 188,140	$ (39,012)	$ (39,012)
2038	$4.40	9.366	5623	$231,694	$0	$ 187,078	$ (44,616)	$ (44,616)
2039	$4.45	9.427	5623	$235,873	$0	$ 183,660	$ (52,213)	$ (52,213)
2040	$4.51	9.489	5637	$240,978	$0	$ 182,430	$ (58,548)	$ (58,548)
2041	$4.55	9.551	5623	$244,462	$0	$ 180,173	$ (64,290)	$ (64,290)
2042	$4.60	9.612	5623	$248,577	$0	$ 178,306	$ (70,272)	$ (70,272)
2043	$4.65	9.674	5623	$252,751	$0	$ 173,692	$ (79,059)	$ (79,059)
2044	$4.69	9.736	4654	$212,679	$0	$ 149,246	$ (63,433)	$ (63,433)
2045	$4.74	9.798	2145	$99,663	$0	$ 77,921	$ (21,742)	$ (21,742)
2046	$4.79	9.859	1028	$48,540	$0	$ 31,746	$ (16,794)	$ (16,794)
2047	$4.84	9.921	1028	$49,347	$0	$ 32,381	$ (16,967)	$ (16,967)
2048	$4.89	9.983	1028	$50,166	$0	$ 33,028	$ (17,138)	$ (17,138)
2049	$4.94	10.044	0	$0	$0	$ -	$ -	$ -
2050	$4.99	10.106	0	$0	$0	$ -	$ -	$ -
2051	$5.04	10.168	0	$0	$0	$ -	$ -	$ -
2052	$5.10	10.229	0	$0	$0	$ -	$ -	$ -

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Application of Southwestern Public Service Company for: a Certificate of Convenience and Necessity Authorizing Construction and Operation of Wind Generation and Associated Facilities in Texas and New Mexico, and Related Ratemaking Principles; and Approval of a Purchased Power Agreement to Obtain Wind-Generated Energy

Attachment JSA-9 (CD)