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APPLICATION OF SOUTHWESTERN PUBLIC SERVICE COMPANY TO AMEND ITS CERTIFICATE OF CONVENIENCE AND NECESSITY TO CONVERT HARRINGTON GENERATING STATION FROM COAL TO NATURAL GAS	**§ § § § § § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

DIRECT TESTIMONY

of

BEN ELSEY

on behalf of

SOUTHWESTERN PUBLIC SERVICE COMPANY

(*Filename:* ElseyDirect.docx, *Total Pages: 50*)

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GLOSSARY OF ACRONYMS AND DEFINED TERMS

Acronym/Defined Term	Meaning
Commission	Public Utility Commission of Texas
DISIS	Definitive Interconnection System Impact Study
DSI	Dry Sorbent Injection
GIA	Generator Interconnection Agreement
GW	gigawatt
Harrington	Harrington Generating Station
kW	kilowatt
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NYMEX	New York Mercantile Exchange
PVRR	present value revenue requirement
RFI	Request for Information
SDA	Spray Dryer Absorber
SPS	Southwestern Public Service Company, a New Mexico corporation
TCEQ	Texas Commission on Environmental Quality
VOM	Variable Operation and Maintenance
Xcel Energy	Xcel Energy Inc.

LIST OF ATTACHMENTS

Attachment	Description
BRE-1	2021 Harrington Analysis – PVVR Tables (*File Name:* BRE-1.xlsx*)*

DIRECT TESTIMONY

OF

BEN ELSEY

I. WITNESS IDENTIFICATION AND QUALIFICATIONS

Q. Please state your name, business address, and job title.

A. My name is Ben R. Elsey. My business address is 1800 Larimer, Denver, Colorado, 80202. I am employed by Xcel Energy Inc. ("Xcel Energy") as Manager, Resource Planning & Bidding.

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.

Q. Please briefly outline your responsibilities as Manager, Resource Planning & Bidding.

A. My duties include managing analysts and planners in the development of strategic resource planning, including need assessment, planning, and financial analysis of various resource and purchase/sales options. I am also responsible for managing various state resource planning processes to ensure that regulatory requirements are fulfilled.

Q. Please summarize your educational background.

A. I graduated from City College, Plymouth in Great Britain with a Higher National Certificate in Building Studies. Since relocating to the United States, I have

graduated with an Associate Degree in Business Administration and a bachelor's degree in accounting.

Q. Please describe your professional experience.

A. I began employment with Xcel Energy in June 2012 as a Project Control Specialist in the Engineering and Construction department within Energy Supply. In 2015, I moved into the role of Construction Estimator within the same department. In 2017, I entered the role of Resource Planning Analyst II, and I was promoted to my current role of Manager, Resource Planning and Bidding in 2020. Prior to joining Xcel Energy, I worked for various construction companies in Great Britain and the United States as an estimator, quantity surveyor, and contracts manager.

Q. Have you testified before any regulatory authorities?

A. Yes. I filed testimony with the New Mexico Public Regulation Commission in SPS's 2018, 2019, 2020, and 2021 Renewable Portfolio Standard filings, Case Nos. 18-00201-UT, 19-00134-UT, 20-00143-UT, and 21-00172-UT.

II. PURPOSE AND SUMMARY OF TESTIMONY AND RECOMMENDATIONS

Q. What is the purpose of your testimony in this proceeding?

A. As part of my testimony, I will:

- provide a summary of economic and additional benefits of converting Harrington to operate on natural gas;
- describe SPS's resource planning process;
- describe SPS's forecasted capacity and reserve margin requirements;
- describe how the Harrington Generating Station ("Harrington") units will continue to contribute to SPS's reserve margin requirements;
- provide an overview of SPS's 2019 economic analysis performed prior to the finalized Agreed Order with the Texas Commission on Environmental Quality ("TCEQ") in October 2020; and
- present SPS's 2021 updated economic analysis supporting SPS's decision to convert the Harrington units to operate on natural gas.

SPS's decision to convert the Harrington units to natural gas is based on analysis conducted over a two-year period related to regulatory actions in New Mexico and Texas. In Texas, SPS and the TCEQ entered into an Agreed Order in October 2020 that requires SPS to cease coal-fired operations at Harrington by 2025. SPS witnesses William A. Grant and Jeffrey L. West address the environmental issues in more detail in their direct testimonies.

Q. Please summarize the conclusions and recommendations in your testimony.

A. The 2021 updated Harrington Analysis continues to demonstrate that converting the Harrington Units to operate on natural gas is a prudent solution to achieving National Ambient Air Quality Standards ("NAAQS") compliance and preserving the capacity and other benefits of the Harrington Units. I recommend the Public Utility

Commission of Texas ("Commission") grant SPS's request to amend its certificate of convenience and necessity to convert Harrington from coal-fired generation to natural gas-fired generation.

Q. Was Attachment BRE-1 prepared by you or under your direct supervision and control?

A. Yes.

III. SUMMARY OF ECONOMIC AND ADDITONAL BENEFITS OF CONVERTING HARRINGTON TO OPERATE ON NATURAL GAS

Q. Please briefly summarize the economic and additional benefits of converting the Harrington units to operate on natural gas rather than coal.

A. Converting the Harrington units to operate on natural gas is a prudent solution for NAAQS compliance that is in the public interest. Converting the Harrington units to operate on natural gas preserves over 1 gigawatt ("GW") of year-round, dispatchable and reliable capacity and energy, at an estimated cost of between approximately $65M and $75M or $62/kilowatt ("kW") to $71/kW. The capital outlay for converting Harrington to operate on natural gas is far less than the cost of installing environmental controls that would be needed if Harrington were to remain a coal-fired unit, which is estimated to cost anywhere between $255M - $555M, or $243/kW - $529/kW, depending on the type of control equipment installed.

Without an economically viable option for maintaining coal operations at Harrington, the only feasible alternative solution to a gas conversion is to retire the Harrington Units at the end of 2024 to comply with the TCEQ Agreed Order. The retirement of the Harrington Units 12 to 16 years ahead of their current schedule would cause high customer rate impacts due to the need for replacement capacity and the need to accelerate collection of the remaining depreciation expense associated with the Harrington assets. In addition, any decommissioning costs associated with Harrington would need to be incurred 12 to 16 years sooner than would otherwise occur. Converting the units to operate on natural gas maintains the currently-approved depreciation dates of the Harrington Units, therefore deferring the need for

new capacity, and mitigating accelerated depreciation expense and decommissioning costs.

As I address in detail in Section VII, converting the Harrington Units to operate on natural gas ensures SPS has adequate firm capacity and dispatchable energy to meet its planning reserve margin requirements and reliably serve customers. If the Harrington Units were retired by the end of year 2024, SPS would not meet its planning reserve margin requirements, necessitating the immediate need for replacement resources. It is highly doubtful whether SPS could acquire the replacement resources required in the timeframe necessary, and if so, at what cost. If SPS were to retire the Harrington Units by 2025, the replacement portfolio of generating resources would most likely include new firm and dispatchable thermal resources with a scheduled life beyond 2045. Maintaining the Harrington Units through the end of their currently-scheduled depreciation dates defers the need for new thermal generation and serves as a bridge while carbon-free alternative firm and dispatchable technologies mature.

IV. SPS'S RESOURCE PLANNING PROCESS AND EVALUATION METHODS

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

A. In its simplest form, electric resource planning uses customer electric demand and energy forecasts to determine the appropriate sources of electric supply that should be developed to meet customer requirements in a cost-effective and reliable fashion. In conducting resource planning, SPS compares its existing firm generating resources, including owned generating capacity and firm purchased power, to its projected annual peak firm load obligation over the planning period. Required reserve margins are included to determine SPS's capacity position.

Q. Please describe the reserve margin requirement.

A. To provide reliable service, all electric utilities must have more capacity available than the projected peak load to allow for system contingencies, including generating unit or transmission outages and potential increases in actual load. The available capacity in excess of the projected peak load is referred to as the "reserve margin." Reserve margin requirements are frequently specified by the group of interconnected utilities to which the utility belongs. SPS is a member of the Southwest Power Pool, which currently requires each member to have a planning reserve margin of at least 12% of its peak demand forecast, pursuant to Southwest Power Pool's rules for net planning capability. Compliance with the Southwest Power Pool planning reserve margin is one of many considerations in the resource planning process and does not substitute for overall resource planning approaches that are necessary to ensure SPS

customers' needs will be met. Other considerations include operational constraints, such as congestion management and transmission stability, and ensuring there is ample energy available to serve the load in all hours.

Q. What process does SPS use to assess its electric resource needs to serve customer load?

A. SPS's assessment of electric resource need includes determining both the magnitude of need as well as the type of resources needed (i.e., peaking, intermediate, or baseload). Additionally, resource need assessment must, depending on the jurisdiction, be conducted in accordance with regulatory requirements specifying resource assessment processes and resource-specific acquisitions (e.g., requirements for integrated resource planning and the amount of renewable resources in a supply portfolio). SPS previously used Strategist for its resource planning and now uses the EnCompass production cost modeling software in its evaluation of the economic value of resource alternatives.

Q. Why is SPS now using EnCompass and not Strategist?

A. Strategist is no longer a supported product by its vendor. Also, as the mix of generating resources dynamically changes throughout the industry, with increasing reliance on intermittent and storage resources, there is a need for more detailed analyses regarding the impact of plans on operations, which EnCompass provides.

Q. What is EnCompass?

A. EnCompass is a production costing model that uses an algorithm to determine the least-cost resources for a utility system from a prescribed set of resource technologies

under given sets of constraints and assumptions. The EnCompass model includes: (1) a modern "solve anything" algorithm; (2) hourly operation detail; and (3) enhanced storage logic and ancillary services. The model is also able to perform utility capital accounting (revenue requirements).

In addition to the usual input variables needed for a production costing model, EnCompass incorporates a wide variety of resource expansion planning parameters to develop a coordinated, integrated plan that best suits the utility system being analyzed. For example, EnCompass incorporates resource expansion planning parameters such as alternative generation technologies available to meet future needs; renewable energy resources; unit capacity sizes; heat rates; load management; conservation programs; reliability limits; and environmental compliance options.

Q. Did SPS use EnCompass for the 2021 updated economic analysis presented in this case?

A. Yes.

Q. Has SPS previously presented a Harrington Economic Analysis before this Commission?

A. Yes. As I describe in Section VI, in Docket No. 51802,[1] SPS presented its 2019 Harrington Economic Analysis in support of SPS's request to accelerate depreciation of the coal assets at Harrington. The analysis presented in Docket No. 51802, and referenced in this testimony, was conducted in Strategist prior to SPS's conversion to

[1] *See Application of Southwestern Public Service Company for Authority to Change Rates*, Docket

the new modeling software.

Q. Do both analyses support SPS's request to convert the Harrington units to operate on natural gas?

A. Yes. Both the Strategist and EnCompass analyses, conducted using separate models and different modeling inputs, assumptions, and vintages support converting the Harrington units to operate on natural gas.

Q. Has SPS previously filed an updated Harrigton Economic Analysis before any other Commision?

A. Yes. SPS filed an updated Harrington Economic Analysis in New Mexico Case No. 21-00200-UT. Although SPS has fewer commission-approved generating resources in Texas compared to New Mexico, the impact of that difference to this analysis is largely immaterial. Therefore, for consistency and to be conservative, SPS is submitting identical analyses in each jurisdiction using the number of commission-approved generating resources in New Mexico.

Q. Please describe the costs that SPS incorporates into the EnCompass model.

A. The EnCompass model includes the critical generation costs SPS incurs to provide electric service to its customers. The following lists summarize the costs that are typically included in the EnCompass model.

1. fuel costs for all electric power supply resources (owned and purchased) and market energy costs (which are forecasted based on gas prices);
2. purchased energy costs for all electric power supply resources;

No. 51802.

3. capacity costs of purchased power;

4. variable operation and maintenance ("VOM") costs of purchased power;

5. capital costs for new electric generation facilities added to meet future load;

6. energy costs for new wind and solar generation facilities added to meet future energy need;

7. electric transmission interconnection and network upgrade costs for new generation;

8. fixed operation and maintenance costs for existing and new generation facilities;

9. VOM costs for existing and new generation facilities; and

10. remaining book value of SPS-owned generating units.

Q. What are some of the major assumptions that influence EnCompass's evaluation of the least-cost resource mix?

A. (1) **Natural Gas Price Forecast** – The price of natural gas is an important 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 S&P Global. 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 current weightings for each component at various time intervals of the forecast period are shown in Table BRE-1 below:

Table BRE-1: Natural Gas Forecast Weightings

Months	NYMEX	IHS Energy	S&P Global	Wood MacKenzie
Current Year + 2 Years	100.0%	0.0%	0.0%	0.0%

Thereafter	25.0%	25.0%	25.0%	25.0%

(2) **Coal Price Forecast** – Coal price forecasts are developed using two major inputs: (1) 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 proposal 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 Southwest Power Pool, which 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.

SPS uses a simple average of long-term on-peak and off-peak implied heat rate forecasts provided by Wood Mackenzie, S&P Global and IHS Markit for Southwest Power Pool South Hub. The implied heat rates, denominated in million British thermal units/megawatt-hour, are then multiplied by SPS's long-term natural gas price forecast to convert the implied heat rate values into energy prices. This process is repeated for all months, distinguishing between on and off-peak prices, through the end of the modeling period.

(4) **Demand and Energy Forecast** – Projections of future energy sales and coincident peak demand are fundamental inputs into SPS's resource need assessment. SPS forecasts retail energy sales and customers by rate class for each jurisdiction. Retail coincident peak demand is forecasted in the aggregate at the total SPS level. The wholesale energy sales and coincident peak demand forecasts are developed at the individual customer level of detail. SPS models its forecasts on a monthly basis and uses monthly historical data to develop the customer, energy sales, and coincident peak demand forecasts. Annual energy sales are an aggregation of the monthly energy sales estimates. Energy sales are forecasted at the delivery point and peak demand is forecasted at the generating source.

(5) **Electric Transmission Interconnection and Network Upgrade Costs for New Generation** – SPS's anticipated cost of new generating resources includes an estimated cost for applicable electric transmission interconnection and network upgrades. As Southwest Power Pool is currently assigning extremely high transmission network upgrade costs to new generation resources, this assumption has

a significant influence on EnCompass's evaluation of the least-cost resource mix.

Q. Regarding Table BRE-1 above, why does SPS rely entirely on NYMEX for its near-term natural gas pricing forecast?

A. SPS relies on market prices in the near-term portion of the forecast to reflect current market conditions. The first three years of the natural gas market as reflected by NYMEX are relatively liquid and actively quoted in the marketplace. Thus, NYMEX accurately reflects the near-term market outlook for natural gas prices.

Q. Regarding Table BRE-1 above, why does SPS rely on a blend of fundamental natural gas forecasts for the long-term natural gas forecast?

A. Absent robust (and heavily traded) market trade data, it is reasonable to rely on fundamental natural gas price forecasts that consider projected changes in supply and demand conditions for long-term natural gas forecasts. SPS uses a blend of the fundamental natural gas forecasts to capture multiple fundamental views in the forecasting process and to mitigate the impact of relying too heavily on a single forecast.

V. HARRINGTON'S CONTRIBUTION TO SPS'S PLANNING RESERVE MARGIN REQUIREMENTS

Q. Please briefly describe the Harrington generating units.

A. Harrington consists of three coal-powered steam turbines, located in Potter County, Texas. The Harrington Units provide a total, year-round, net capacity of 1,050 megawatts ("MW"). Individually, the units are as follows:

- Harrington Unit 1 has a net capacity of 340 MW;
- Harrington Unit 2 has a net capacity of 355 MW; and
- Harrington Unit 3 has a net capacity of 355 MW.

Q. Does Harrington contribute towards SPS's planning reserve margin requirement?

A. Yes. SPS counts the entire 1,050 MW towards the planning reserve margin requirement described earlier in my testimony.

Q. In the absence of Harrington, would SPS meet its planning reserve margin requirement?

A. No. If all three Harrington units were retired by the end of 2024, that would create an immediate capacity need, requiring SPS to immediately seek replacement resources.

Q. Could SPS acquire replacement resources before SPS's obligation to comply with the TCEQ Agreed Order requiring SPS to cease coal-fired operations at Harrington by 2025?

A. It is highly doubtful, and if it were possible, it is uncertain at what cost.

Q. Why is it highly doubtful whether replacement resources can be acquired by 2025?

A. First, as I explained earlier, SPS is a member of the Southwest Power Pool, which has the responsibility to manage and study requests for interconnecting new generation resources to determine the need and costs of any new transmission network upgrades to accommodate interconnection to the transmission grid. The Southwest Power Pool interconnection study process continues to be overwhelmed by numerous requests that have created a backlog in processing and studying new generator applications. For example, after four years, Southwest Power Pool is still evaluating the 2017-01 Definitive Interconnection System Impact Study ("DISIS"). Due to this backlog, to achieve commercial operation before 2025, SPS would almost certainly have to restrict replacement generation to generators that already possess, or that do not require, a new Generator Interconnection Agreement ("GIA"). Restricting generator replacement options in this way would potentially negatively impact SPS's customers.

Second, even without the delays in obtaining a new GIA, it would be very challenging to complete a competitive procurement process, receive regulatory approval, permit, and construct the replacement generating facilities before 2025.

Q. Has SPS been proactive in evaluating options for discontinuing coal operations at Harrington since SPS determined Harrington would not likely meet NAAQS in 2019?

A. Yes. As I describe in Section VI below, SPS's 2019 analysis supported converting the Harrington units to operate on natural gas. Therefore, at the time, it was determined that replacement resources were not necessary, which means SPS would not need to obtain approval from Southwest Power Pool to interconnect a new generation resource. As I address in Section VII below, SPS's updated analysis for 2021 continues to show conversion to natural gas is an optimal compliance solution.

Q. Can you address SPS's prior experience with the Southwest Power Pool process for obtaining approval to interconnect a new generation resource?

A. SPS has been proactive and has successfully navigated that process with Southwest Power Pool in the past, as evidenced by recent generation interconnection approvals for SPS's Hale and Sagamore wind generation facilities and the Bonita purchased power agreement. SPS's own experiences in navigating the Southwest Power Pool interconnection process support SPS's determination that it is doubtful that new generation proposals can complete the Southwest Power Pool interconnection process and achieve commercial operation prior to January 1, 2025.

Q. Above you state restricting generator replacement options could potentially negatively impact SPS's customers. Please explain this.

A. Restricting generator replacement options to only resources that possess, or that do not require, a new GIA would greatly reduce the number of viable proposals, which could significantly increase the cost of new generating resources. For example, if only a single proposal met these requirements, this proposal could dictate exorbitant costs, knowing SPS had no alternative than to accept the proposal to meet its planning reserve margin requirement. Preserving the capacity value of Harrington provides SPS the option of not entering into high-cost or unfavorable agreements.

Q. Are there any other risks of requiring replacement resources by 2025 to meet SPS's planning reserve margin requirements?

A. Yes. Once projects navigate through the back-logged Southwest Power Pool study process they are often assigned cost-prohibitive transmission network upgrade costs. Therefore, even if replacement generators were able to obtain a GIA in the timeframe necessary to replace Harrington, the cost of the replacement resources may incorporate the current high transmission network upgrade costs. In the absence of Harrington, SPS would be forced to accept the high transmission network upgrade costs to meet planning reserve margin requirements. Preserving the capacity value of Harrington, once again, provides SPS the option of not entering into high-cost or unfavorable agreements.

Q. In summary, would the retirement of the Harrington Units by the end of 2024 increase risk to SPS's customers?

A. Undoubtedly, yes. Retiring over 1GW of firm and dispatchable capacity in less than 3.5 years will necessitate an aggressive and potentially unsuccessful search for replacement resources. For the reasons I explain above, this represents an unnecessary risk for SPS and its customers.

Q. Does converting the Harrington units to operate on natural gas mitigate this risk?

A. Yes. Preserving the capacity value of Harrington by converting the units to operate on natural gas provides SPS a prudent option to wait to acquire new resources. Maintaining the Harrington units for the next 12 to 16 years does not prevent SPS from acquiring new resources sooner should they provide economic or other benefits.

VI. 2019 ECONOMIC ANALYSIS OF THE HARRINGTON GENERATING UNITS

Q. What topic do you discuss in this section of your testimony?

A. In this section, I briefly introduce SPS's 2019 Economic Analysis of the Harrington generating units that was presented in Docket No. 51802.

Q. Is SPS relying upon the 2019 Economic Analysis in this case?

A. No. As described in Section VII, SPS is presenting an updated economic analysis in this case. The sole intent of addressing the 2019 analysis is to provide a brief overview of the economic analysis that was performed prior to the finalized Agreed Order with the TCEQ in October 2020. The 2019 Economic Analysis also supported SPS's request in Docket No. 51802 to cease coal operations at Harrington by 2025.

Q. Can you provide a brief overview of the circumstances that led to SPS's 2019 Economic Analysis?

A. Yes. As Mr. West describes in his direct testimony, in 2016, the TCEQ installed a monitor in the vicinity of Harrington and monitored emissions from 2017-2019. Towards the end of the monitoring period, it become evident that sulfur dioxide emissions at Harrington would exceed NAAQS. With input from the Environmental Services organization, Resource Planning began its 2019 economic analysis to evaluate each of the compliance solutions for bringing Harrington into NAAQS compliance.

Q. What NAAQS compliance solutions did SPS consider in the 2019 economic analysis?

A. SPS determined compliance solutions that included: (1) maintaining coal operations by installing environmental controls to comply with NAAQS; or (2) ceasing coal operations, by either converting the units to operate on natural gas or by retiring the units. SPS also considered a combination of these solutions, for example, installing environmental controls on two units and retiring the remaining unit.

Finally, SPS evaluated, and continues to explore ways, to maximize the use of existing generator interconnection rights. For example, SPS is exploring the opportunity of utilizing surplus interconnection availability to install new solar generation at the Harrington location. This solar generation would be in addition to the three Harrington Units, not as a replacement to the Harrington Units.

Q. Can you summarize the conclusions of the 2019 Economic Analysis?

A. Yes. The 2019 Economic Analysis conclusively demonstrated that installing the necessary capital-intensive environmental controls required to maintain coal operations on one or more units was among the highest cost options and, therefore, least favorable solutions. Therefore, SPS reasonably concluded it should cease coal operations at Harrington before 2025. Of the remaining compliance options (i.e., the conversion to operate on natural gas or retirement by end of 2024), converting the Harrington units to operate on natural gas is a reasonable and prudent solution for NAAQS compliance. Once converted, the Harrington units will continue to provide: (1) low-cost capacity towards SPS's planning reserve margin, (2) dispatchable

energy, and (3) transmission reliability benefits. The conversion to natural gas also provides additional environmental benefits, such as a significant reduction in carbon dioxide emissions, when compared to continued coal operations.

VII. UPDATED 2021 ECONOMIC ANALYSIS OF THE HARRINGTON GENERATING UNITS

Q. What topics do you discuss in this section of your testimony?

A. In this section of my testimony, I present the updated 2021 Economic Analysis that: (1) continues to support SPS's request in New Mexico Case No. 20-00238-UT[2] to cease coal operations at Harrington by 2025, and (2) supports SPS's request to convert the Harrington Units to operate on natural gas after the cessation of coal operations.

Q. How does the 2021 updated Economic Analysis compare to the 2019 Economic Analysis described above?

A. The analyses are fundamentally the same – both analyses utilize a similar approach to evaluate potential NAAQS compliance solutions at Harrington and ultimately reach the same conclusions. However, the 2021 updated Economic Analysis does incorporate several changes. First, as I described in Section IV, the updated analysis was conducted in SPS's new production cost modeling software, EnCompass. Second, the 2021 updated analysis incorporated updated modeling inputs and assumptions, including critical inputs, such as an updated gas forecast and load forecast. Third, when evaluating the cost of replacement resources, SPS incorporated pricing received from a recently issued Request for Information ("RFI"). Finally, SPS's 2021 Harrington analysis included the oversight of an Independent Evaluator,

[2] *See in the Matter of Southwestern Public Service Company's Application for: (1) Revision of its Retail Rates Under Advice Notice No. 292; (2) Authorization and Approval to Abandon its Plant X Unit 3 Generating Station; and (3) Other Associated Relief*, Case No. 20-00238-UT.

Guidehouse (formerly known as Navigant Consulting).

Q. Please describe the overarching compliance solutions SPS considered in the 2021 updated Harrington Economic Analysis.

A. SPS evaluated the same overarching NAAQS compliance solutions that were used in the 2019 Harrington Economic Analysis, specifically: (1) maintaining coal operations by installing environmental controls, or (2) ceasing coal operations, by either converting the Harrington units to operate on natural gas or by retiring the Harrington units.

Q. Did SPS also evaluate a combined approach for NAAQS compliance?

A. Yes. SPS evaluated two different scenarios that incorporated the retirement of one or two Harrington Units and the conversion of the remaining unit(s) to operate on natural gas. The first combined scenario included the retirement of one unit by the end of 2024 (Harrington Unit 1) and the conversion of the remaining two units to operate on natural gas (Harrington Units 2 & 3). The second combined scenario included the retirement of two units by the end of 2024 (Harrington Units 1 & 2) and the conversion of the remaining unit to operate on natural gas (Harrington Unit 3).

Based on information obtained from the 2019 economic analysis, SPS decided against any further evaluation of installing any partial environmental control scenarios after reviewing the results of the costs of installing environmental controls on all three Harrington Units, which showed an extremely high cost of doing so.

Q. Please briefly outline the initial capital expenditure associated with each compliance solution.

A. As SPS witness Mark Lytal describes in his direct testimony, the capital cost of converting the three units to operate on natural gas is estimated to be approximately $65M - $75M (Total Company), or $62/kW - $71/kW. In comparison, SPS evaluated two different environmental control solutions: Dry Sorbent Injection ("DSI") and Spray Dryer Absorber ("SDA"). The cost of installing DSI on all three units was estimated to be $255M - $270M, or $243/kW - $257/kW, and the cost of installing SDA was estimated to be $510M - $555M, or $486/kW - $529/kW. Retiring all three Harrington units would most likely necessitate the acquisition of replacement firm peaking generation, or battery energy storage. Firm peaking generation, such as a 200 MW combustion turbine, is estimated to cost approximately $100M, or $500/kW, per combustion turbine, and battery energy storage is estimated to cost approximately $1,500/kW. Converting the Harrington Units to operate on natural gas requires significantly less investment than the installation of environmental controls or the construction of new firm and dispatchable generation.

Q. Please summarize the scenarios SPS evaluated in the updated 2021 Harrington Analysis.

A. The six scenarios evaluated in the updated Harrington Analysis are as follows:

- Scenario 1: Retirement of all three Harrington Units (EOY 2024)
- Scenario 2: Conversion of all three Harrington Units to operate on natural gas (EOY 2024)
- Scenario 3: Installation of DSI on all three Harrington Units (EOY 2024)
- Scenario 4: Installation of SDA on all three Harrington Units (EOY 2024)
- Scenario 5: Retirement of Harrington Units 1 & 2 / Convert Harrington Unit 3 to operate on natural gas (EOY 2024)
- Scenario 6: Retirement of Harrington Unit 1 / Convert Harrington Units 2 & 3 to operate on natural gas (EOY 2024).

Q. Did SPS conduct any sensitivity analyses?

A. Yes. Natural gas price forecasts, market energy price forecasts, and load forecasts are important modeling assumptions that warrant additional evaluation. As such, SPS conducted several sensitivity analyses for each of the compliance solutions, including base, low, and high natural gas price forecasts and market energy price forecasts, and financial and planning load forecasts.

In addition, SPS also evaluated different assumptions for the cost of transmission network upgrades ($200/kW, $400/kW, and $600/kW). I will explain the need for different transmission network upgrade costs later in my testimony.

Q. How did SPS calculate its low and high natural gas price forecasts and market energy price forecasts?

A. For the low and high natural gas price cases, the base gas forecast for Henry Hub was adjusted down by 50% of the growth (escalation) in the base gas case to represent the low gas case, and adjusted up by 150% of the growth in the base gas to represent the high gas case. SPS's market price forecast is dependent on the gas price forecast used. As such, the market price forecast was adjusted with the low and high gas sensitivity analyses.

Q. What is the difference between the financial load forecast and the planning load forecast?

A. SPS has traditionally used a single demand and energy forecast for financial planning and resource planning purposes. Although oil and gas development in the New Mexico portion of the Permian Basin continues to experience growth, the projected load growth is not 100% certain to materialize due to volatility in the industry. The fluctuating plans for capital expansion in the oil sector directly impact SPS's resource planning. A conservative approach (to generation resource planning) is to design a system capable of serving the most likely oil-related load growth, but no more than the most likely load growth, which could result in SPS's inability to provide service to some new loads (including non-oil loads). Another approach is to design a generation resource plan capable of covering the most likely load growth plus some level of load growth uncertainty.

The choice between a conservative and flexible approach to generation

resource planning depends upon many competing factors, including the risks created due to the size of the potential variability in new load growth, the rate and timing of this new load growth, and the cost of the ability to reliably serve this additional new load growth variability.

Accordingly, SPS now prepares two demand and energy forecasts – the financial load forecast and the planning load forecast. As the name suggests, the financial load forecast is primarily used for financial planning, while the planning load forecast is predominantly used for resource planning evaluations and includes the additional oil and gas loads.

Q. Please summarize the results of the 2021 updated Harrington Economic Analysis using the planning load forecast.

A. Table BRE-2 presents the results of the 2021 updated Harrington Economic Analysis, using the planning load forecast, base natural gas price forecast, and the mid-point transmission network upgrade costs. The results are presented over two different periods: (1) a 3-year period (2022 – 2024), and (2) a 20-year period (2022-2041).

Table BRE-2: Results of 2021 Updated Harrington Economic Analysis using Planning Load Forecast

Scenario	Description	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022-2041
Scenario 2	Convert all Harrington Units to natural gas	$0	$2,450	$0	$11,949
Scenario 1	Retire all Harrington Units	$168	$2,618	$123	$12,072
Scenario 3	Install DSI on all Harrington Units	($10)	$2,440	$439	$12,388
Scenario 4	Install SDA on all Harrington Units	($10)	$2,440	$695	$12,644
Scenario 5	Convert 1 Unit to gas / Retire 2 Units	$92	$2,542	$62	$12,011
Scenario 6	Convert 2 Units to gas / Retire 1 Unit	$39	$2,490	($5)	$11,944

Q. Why is SPS presenting the present value revenue requirement ("PVRR") cost impacts over two different periods?

A. Resource planning analyses often evaluate decisions that will impact SPS's customers for years to come. Therefore, it is imperative to evaluate the impact of any decisions over a long-term planning horizon. Table BRE-2 presents the results over a 20-year planning period (2022 – 2041), which goes beyond the latest proposed retirement date of any Harrington unit and also matches the planning period required in SPS's 2021 New Mexico Integrated Resource Plan that was filed July 16, 2021.

Despite the long-term nature of resource planning, SPS must also consider the short-term cost impact of its decisions. Therefore, Table BRE-2 also presents the results over a 3-year planning period (2022 – 2024). This period reflects the immediate cost impact between now and the deadline in the Agreed Order with the

TCEQ to cease coal operations at Harrington, which Mr. Grant addresses in his testimony.

Q. Do the results of SPS's 2021 updated Harrington Analysis continue to support SPS's decision to cease coal operations by 2025?

A. Yes. In keeping with the results of the 2019 Harrington Analysis, Table BRE-2 clearly demonstrates that the installation of environmental controls on all three units is the highest cost and, therefore, least favorable compliance solution (Scenario 3 plus Scenario 4). The large capital investment necessary for environmental controls far exceeds the small cost savings that occur the first 3-years and over a 20-year period. Installing DSI (Scenario 3) or SDA (Scenario 4) on all three Harrington units is $439M and $695M higher, respectively, in cost, on a PVRR basis, than converting all three units to operate on natural gas (Scenario 2). Thus, SPS's 2021 updated Economic Analysis continues to support ceasing coal operations by 2025.

Q. Do the results of SPS's 2021 updated Harrington analysis support SPS's proposal to convert all three Harrington units to operate on natural gas?

A. Yes. Over a 20-year period, converting all three Harrington units to operate on natural gas and preserving the capacity value (Scenario 2) is $123M lower in cost than the retirement of all three Harrington units (Scenario 1). Furthermore, SPS's customers will incur $168M of additional costs between now and the end of 2024, on a PVRR basis, if all three Harrington Units are retired instead of converting the units to operate on natural gas. The high customer rate impact in the first three years is due to the need to accelerate collection on the remaining depreciation expense and

any decommissioning costs associated with Harrington 12 to 16 years earlier than currently planned.

The partial retirement and partial gas conversion scenarios (Scenarios 5 and 6) fare better than the retirement of all three Harrington units (Scenario 1). Over a 20-year period, converting Harrington Unit 3 to operate on natural gas and preserving 355 MW of capacity, while retiring Harrington Units 1 and 2 (Scenario 5) is $62M higher than converting all three units to operate on natural gas, on a PVRR basis. Over a 20-year period, converting Harrington Units 2 & 3 to operate on natural gas and preserving 710 MW of capital capacity, while retiring Harrington Unit 1 (Scenario 6) is approximately $5M lower cost than converting all three units to operate on natural gas on a PVRR basis. However, SPS's customers will incur $39M in higher costs between now and 2025, on a PVRR basis, if Harrington Unit 1 is retired.

Q. What capital expenditure is included for the cost of converting all Harrington units to operate on natural gas?

A. Earlier, I stated the estimated capital expenditure for converting all Harrington units to operate on natural gas is between approximately $65M and $75M (Total Company and including allowance for funds used during construction). All economic analyses presented in my direct testimony include approximately $65M in capital expenditure for converting all Harrington Units to operate on natural gas. The results of the analysis do not fundamentally change if the actual costs are at the other end of the estimated price range.

Q. Do the conclusions of SPS's 2021 updated Harrington analysis differ when using the financial load forecast?

A. No, they are fundamentally the same. Table BRE-3 presents the results using the financial load forecast, base natural gas forecast and the mid-point transmission network upgrades.

Table BRE-3: Results of 2021 Updated Harrington Economic Analysis using Financial Load Forecast

Scenario	Description	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022-2041
Scenario 2	Convert all Harrington Units to natural gas	$0	$2,295	$0	$10,388
Scenario 1	Retire all Harrington Units	$165	$2,460	$47	$10,435
Scenario 3	Install DSI on all Harrington Units	($10)	$2,284	$443	$10,831
Scenario 4	Install SDA on all Harrington Units	($10)	$2,284	$698	$11,085
Scenario 5	Convert 1 Unit to gas / Retire 2 Units	$92	$2,386	$27	$10,415
Scenario 6	Convert 2 Units to gas / Retire 1 Unit	$40	$2,334	($29)	$10,358

Q. Can you summarize the results of the 2021 updated Harrington Economic Analysis using the financial forecast?

A. Yes. Once again, the installation of environmental controls is the highest cost and therefore, least favorable compliance option.

Over a 20-year period, converting all three units to operate on natural gas is

$47M lower in cost than the early retirement of all three Harrington Units, on a PVRR basis. Furthermore, SPS's customers will incur $165M of additional costs on a PVRR basis, between now and the end of 2024 if all three Harrington Units are retired.

Again, the partial retirement and partial gas conversion scenarios (Scenarios 5 and 6) fare better than the retirement of all three Harrington units. Over a 20-year period, converting Harrington Unit 3 to operate on natural gas and retiring Harrington Units 1 and 2 (Scenario 5) is $27M higher in cost than converting all three units to operate on natural gas, on a PVRR basis. Over a 20-year period, converting Harrington Units 2 & 3 to operate on natural gas and retiring Harrington Unit 1 (Scenario 6) is approximately $29M lower in cost than converting all three units to operate on natural gas on a PVRR basis. However, SPS's customers will incur $40M in higher costs between now and 2025, on a PVRR basis, if Harrington Unit 1 is retired.

Q. Can you provide the results of the other sensitivities evaluated?

A. Yes, the results of the other sensitivities evaluated are presented in Attachment BRE-1.

Q. If the retirement of Harrington Unit 1 is a slightly lower cost than converting all three Harrington units using both the financial and planning load forecast, why is SPS proposing to convert all three Harrington units?

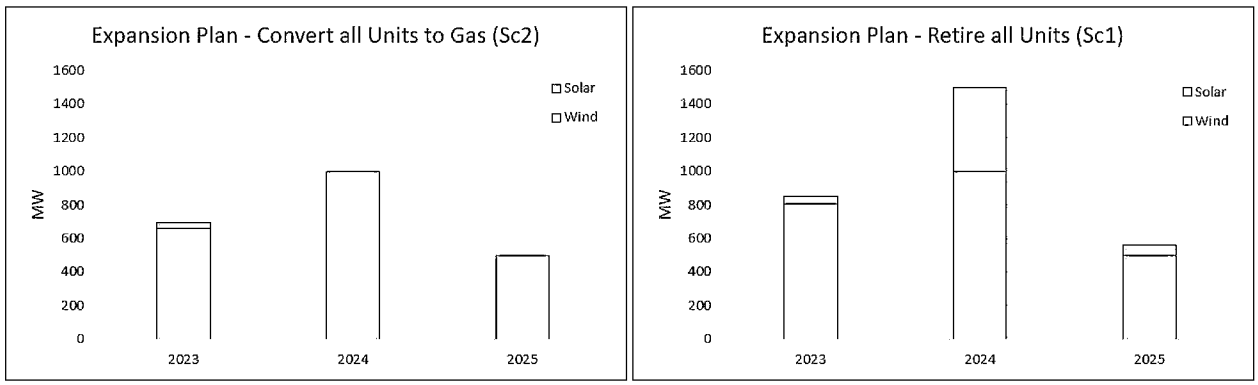
A. First, as Mr. Lytal explains in his direct testimony, the same diameter natural gas pipeline is required regardless of whether SPS converts two or three units to operate on natural gas. In other words, there is no incremental pipeline cost to convert Harrington Unit 1 to operate on natural gas and preserve 340 MW of firm capacity and dispatchable energy. Second, as the results of the analysis demonstrate, a potential $5M - $29M PVRR savings over a 20-year period will result in $39M - $40M PVRR of additional costs for SPS's customers before the end of year 2024. The high initial customer cost impact is largely driven by the accelerated depreciation expense and decommissioning costs, which are certain to occur, while potential energy savings in the future are less certain to materialize. Third, the updated analysis assumes SPS will add significant amounts of renewable generation to the system between the end of 2023 and the end of 2025. It is doubtful whether SPS could acquire this generation in the timeframe analyzed.

Q. Please elaborate on your statement "the updated analysis assumes SPS will add significant amounts of renewable generation to the system between the end of 2023 and the end of 2025."

A. As part of the uncontested comprehensive stipulation approved in New Mexico Case No. 19-00170-UT,[3] SPS was required to submit an analysis of the possible abandonment and replacement of SPS's other coal facility, Tolk Station. The Tolk Analysis required the cost of replacement resources to incorporate the results of an RFI. As the 2021 updated Harrington Economic Analysis was conducted simultaneously with the Tolk Analysis, SPS incorporated the results of the RFI into the Harrington analysis. As shown in Figure 1, regardless of the NAAQS compliance solution evaluated, using the pricing received in the RFI, each scenario added a significant amount of renewable generation, predominately wind, between the end of 2023 and the end of 2025.

[3] *In the Matter of Southwestern Public Service Company's Application for (1) Revision of its Retail Rates Under Advice Notice No. 282; (2) Authorization and Approval to Shorten the Service Life of and Abandon its Tolk Generating Station Units; and (3) Other Related Relief,* Case No. 19-00170-UT, Final Order Adopting Certification of Stipulation (May 20, 2020).

Figure 1. Scenario 2 and Scenario 3 Optimized Expansion Plans



Q. Was it appropriate to use the results of the Tolk Analysis RFI for the purposes of the 2021 updated Harrington Analysis?

A. Yes. Considering – (1) both analyses were conducted simultaneously, (2) the Tolk and Harrington facilities are approximately the same size, and (3) the retirement dates being evaluated are only a year apart – it was appropriate to use the results of the Tolk Analysis RFI for the 2021 updated Harrington Analysis. Furthermore, the Tolk Analysis required SPS to consider a scenario in which all of SPS's coal-burning units (i.e., Tolk and Harrington) are retired or replaced before 2030. Therefore, SPS's RFI included a "maximum net capacity need" of "approximately 2,200 MW beginning summer 2025," which includes Harrington.

Q. Please elaborate on your statement that "[i]t is uncertain whether SPS will acquire this generation in the timeframe analyzed."

A. SPS's 2021 updated Harrington Analysis and Tolk Analysis were conducted at a time of heightened uncertainty in the cost and timing of future generation, particularly renewable generation.

First, renewable generation currently benefits from favorable federal tax credits that are scheduled to expire or step down by the end of 2025. For the purposes of the 2021 updated Harrington Analysis, SPS assumed the federal tax credits would expire or step down based on the currently-approved schedule, resulting in a sharp and sudden overnight increase in the cost of renewables, particularly wind generation, at the end of 2025. Therefore, it is no surprise that the optimized expansion plans for each scenario incorporated a significant acquisition of new wind generation before the tax credits expired (i.e., the end of 2025). Should wind production tax credits be extended, the acquisition of new wind resources most likely would be delayed in most scenarios.

Second, it is Southwest Power Pool's responsibility to manage and study requests for interconnecting new generation resources to determine the need and costs of any new transmission network upgrades required to accommodate the interconnection of the new resource to the transmission system. This study process is extremely backlogged. For example, Southwest Power Pool is currently studying the 2017-01 DISIS. In addition to the substantial backlog, new generators in SPS's territory are currently being assigned extremely high transmission network upgrade costs. For example, for the 1st and 2nd phase study of the 2017-01 DISIS, Southwest Power Pool assigned an average of $934/kW in network upgrade costs. To put this in context, construction of a new solar generating facility is approximately $1,000/kW. Presumably as a result of the extremely high transmission network upgrade costs, when the projects in the 2017-01 DISIS were required to put down a

20% deposit, all but one 200 MW project withdrew. The long delay and the extremely high cost of transmission network upgrades is, at best challenging, and at worst, makes retiring Harrington by end of year 2024 infeasible if replacement resources are not available.

Q. Did all of the proposals submitted in the RFI that would require network upgrade costs reflect the high network upgrade costs?

A. No. The majority of the proposals received during the RFI that require network upgrade costs either omitted the cost of transmission network upgrades or included significantly lower costs than described above.

Q. What actions did SPS take when evaluating the proposals?

A. SPS analyzed three different cost sensitivity analyses for transmission network upgrade costs. Proposals requiring a new GIA were assigned either $200/kW, $400/kW, or $600/kW, depending on the sensitivity analysis. Proposals that already possess a GIA or build-transfer proposals that interconnected at SPS's existing generator locations were exempt from the additional network upgrade costs. The same transmission network upgrade costs were added to future generic solar, wind, and combined cycle resources. Future generic combustion turbines and battery energy storage resources were exempt from the additional network upgrade costs on the assumption they would utilize generator replacement rules.

Q. How do transmission network upgrade cost and schedule uncertainty impact SPS's recommendation to convert all three units to natural gas?

A. As I discussed earlier in my testimony, in the absence of Harrington (i.e., the units

are retired end of year 2024), SPS will require new resources to meet its planning reserve margin requirements. The early retirement of the Harrington Units exposes SPS's customers to unnecessary risk, as it is uncertain whether replacement resources could acquire a GIA within the required timeframe, and if so, at what cost. Converting the units to operate on natural gas mitigates this risk, allowing SPS to only acquire additional resources when they are reasonably expected to economically benefit SPS's customers or are necessary for reliability or regulatory purposes.

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

A. Yes.

AFFIDAVIT

STATE OF COLORADO)
Arapahoe)
COUNTY OF ~~JEFFERSON~~)
AS

BEN ELSEY, first being sworn on his oath, states:

I am the witness identified in the preceding testimony. I have read the testimony and the accompanying attachment(s) and am familiar with the 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.

BEN ELSEY

Subscribed and sworn to before me this 26th day of August, 2021 by BEN ELSEY

Notary Public, State of Colorado

ANDREW BAKER
NOTARY PUBLIC - STATE OF COLORADO
NOTARY ID 20134024908
MY COMMISSION EXPIRES APR 19, 2025

My Commission Expires: 04/19/2025

CERTIFICATE OF SERVICE

I certify that August 27, 2021 this instrument was filed with the Public Utility Commission of Texas and a true and correct copy of it was served on the Staff of the Public Utility Commission of Texas, the Office of Public Utility Counsel, and all parties in SPS's current base rate proceeding, PUC Docket No. 51802, by hand delivery, Federal Express, certified mail, electronic mail, or facsimile transmission.

Southwestern Public Service Company

2021 Harrington Analysis - PVVR Tables

Planning Load Forecast (Base Gas - $400/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,450	$0	$ 11,949
Scenario 1	$168	$ 2,618	$123	$ 12,072
Scenario 3	($10)	$ 2,440	$439	$ 12,388
Scenario 4	($10)	$ 2,440	$695	$ 12,644
Scenario 5	$92	$ 2,542	$62	$ 12,011
Scenario 6	$39	$ 2,490	($5)	$ 11,944

Financial Load Forecast (Base Gas - $400/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,295	$0	$ 10,388
Scenario 1	$165	$ 2,460	$47	$ 10,435
Scenario 3	($10)	$ 2,284	$443	$ 10,831
Scenario 4	($10)	$ 2,284	$698	$ 11,085
Scenario 5	$92	$ 2,386	$27	$ 10,415
Scenario 6	$40	$ 2,334	($29)	$ 10,358

Planning Load Forecast (Low Gas - $400/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,443	$0	$ 11,504
Scenario 1	$165	$ 2,608	$181	$ 11,685
Scenario 3	($10)	$ 2,433	$485	$ 11,989
Scenario 4	($10)	$ 2,433	$754	$ 12,258
Scenario 5	$92	$ 2,535	$71	$ 11,575
Scenario 6	$39	$ 2,483	($31)	$ 11,473

Southwestern Public Service Company

2021 Harrington Analysis - PVVR Tables

Financial Load Forecast (Low Gas - $400/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,294	$0	$ 10,115
Scenario 1	$160	$ 2,453	$92	$ 10,207
Scenario 3	($10)	$ 2,283	$495	$ 10,610
Scenario 4	($10)	$ 2,283	$765	$ 10,880
Scenario 5	$92	$ 2,385	($5)	$ 10,111
Scenario 6	$40	$ 2,333	($29)	$ 10,086

Planning Load Forecast (High Gas - $400/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,479	$0	$ 12,398
Scenario 1	$173	$ 2,653	$51	$ 12,449
Scenario 3	($10)	$ 2,469	$328	$ 12,726
Scenario 4	($10)	$ 2,469	$581	$ 12,979
Scenario 5	$92	$ 2,571	$18	$ 12,416
Scenario 6	$39	$ 2,519	($24)	$ 12,375

Financial Load Forecast (High Gas - $400/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,329	$0	$ 10,638
Scenario 1	$160	$ 2,489	$24	$ 10,662
Scenario 3	($10)	$ 2,319	$352	$ 10,990
Scenario 4	($10)	$ 2,319	$605	$ 11,243
Scenario 5	$92	$ 2,421	$17	$ 10,656
Scenario 6	$40	$ 2,369	($28)	$ 10,611

Southwestern Public Service Company

2021 Harrington Analysis - PVVR Tables

Planning Load Forecast (Base Gas - $200/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,452	$0	$ 11,803
Scenario 1	$160	$ 2,612	$67	$ 11,870
Scenario 3	($10)	$ 2,442	$418	$ 12,221
Scenario 4	($10)	$ 2,442	$675	$ 12,478
Scenario 5	$92	$ 2,544	($5)	$ 11,798
Scenario 6	$39	$ 2,491	($26)	$ 11,777

Financial Load Forecast (Base Gas - $200/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,302	$0	$ 10,258
Scenario 1	$160	$ 2,462	$16	$ 10,275
Scenario 3	($10)	$ 2,292	$459	$ 10,718
Scenario 4	($10)	$ 2,292	$686	$ 10,944
Scenario 5	$92	$ 2,394	($18)	$ 10,240
Scenario 6	$40	$ 2,342	($18)	$ 10,240

Planning Load Forecast (Low Gas - $200/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,448	$0	$ 11,398
Scenario 1	$163	$ 2,610	$63	$ 11,462
Scenario 3	($8)	$ 2,440	$493	$ 11,892
Scenario 4	($13)	$ 2,435	$759	$ 12,157
Scenario 5	$95	$ 2,542	$19	$ 11,418
Scenario 6	$39	$ 2,487	($19)	$ 11,379

Southwestern Public Service Company

2021 Harrington Analysis - PVVR Tables

Financial Load Forecast (Low Gas - $200/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,294	$0	$ 10,023
Scenario 1	$163	$ 2,456	$26	$ 10,049
Scenario 3	($11)	$ 2,283	$495	$ 10,519
Scenario 4	($11)	$ 2,283	$764	$ 10,788
Scenario 5	$92	$ 2,385	$27	$ 10,050
Scenario 6	$43	$ 2,336	($36)	$ 9,988

Planning Load Forecast (High Gas - $200/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,462	$0	$ 12,100
Scenario 1	$160	$ 2,622	($1)	$ 12,099
Scenario 3	($10)	$ 2,452	$357	$ 12,457
Scenario 4	($10)	$ 2,452	$614	$ 12,714
Scenario 5	$92	$ 2,554	$34	$ 12,134
Scenario 6	$40	$ 2,502	($20)	$ 12,080

Financial Load Forecast (High Gas - $200/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,302	$0	$ 10,493
Scenario 1	$168	$ 2,471	($100)	$ 10,393
Scenario 3	($10)	$ 2,292	$343	$ 10,837
Scenario 4	($10)	$ 2,292	$591	$ 11,084
Scenario 5	$92	$ 2,394	($40)	$ 10,453
Scenario 6	$40	$ 2,342	($55)	$ 10,438

Southwestern Public Service Company

2021 Harrington Analysis - PVVR Tables

Planning Load Forecast (Base Gas - $600/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,446	$0	$ 12,076
Scenario 1	$160	$ 2,605	$175	$ 12,251
Scenario 3	($10)	$ 2,435	$417	$ 12,492
Scenario 4	($10)	$ 2,435	$665	$ 12,741
Scenario 5	$92	$ 2,537	$87	$ 12,163
Scenario 6	$39	$ 2,485	($31)	$ 12,044

Financial Load Forecast (Base Gas - $600/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,295	$0	$ 10,467
Scenario 1	$160	$ 2,454	$106	$ 10,573
Scenario 3	($10)	$ 2,284	$443	$ 10,911
Scenario 4	($10)	$ 2,284	$698	$ 11,165
Scenario 5	$92	$ 2,387	$20	$ 10,487
Scenario 6	$40	$ 2,334	($31)	$ 10,437

Planning Load Forecast (Low Gas - $600/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,443	$0	$ 11,575
Scenario 1	$160	$ 2,603	$266	$ 11,841
Scenario 3	($10)	$ 2,433	$498	$ 12,073
Scenario 4	($10)	$ 2,433	$765	$ 12,340
Scenario 5	$103	$ 2,546	$125	$ 11,700
Scenario 6	$40	$ 2,483	($13)	$ 11,562

Southwestern Public Service Company

2021 Harrington Analysis - PVVR Tables

Financial Load Forecast (Low Gas - $600/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,294	$0	$ 10,167
Scenario 1	$171	$ 2,465	$141	$ 10,308
Scenario 3	($10)	$ 2,283	$491	$ 10,658
Scenario 4	($10)	$ 2,283	$761	$ 10,928
Scenario 5	$92	$ 2,385	$17	$ 10,185
Scenario 6	$39	$ 2,333	($16)	$ 10,151

Planning Load Forecast (High Gas - $600/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,520	$0	$ 12,585
Scenario 1	$126	$ 2,646	$125	$ 12,710
Scenario 3	($56)	$ 2,464	$277	$ 12,862
Scenario 4	($44)	$ 2,476	$537	$ 13,122
Scenario 5	$51	$ 2,570	$53	$ 12,638
Scenario 6	$40	$ 2,559	($14)	$ 12,571

Financial Load Forecast (High Gas - $600/kW network upgrades)

	Action Period		Planning Period	
Scenario	Delta ($M)	NPV ($M) 2022-2024	Delta ($M)	NPV ($M) 2022 - 2041
Scenario 2	$0	$ 2,315	$0	$ 10,768
Scenario 1	$160	$ 2,475	$86	$ 10,854
Scenario 3	($10)	$ 2,305	$346	$ 11,114
Scenario 4	($10)	$ 2,305	$598	$ 11,366
Scenario 5	$92	$ 2,407	$16	$ 10,784
Scenario 6	$40	$ 2,355	($24)	$ 10,745