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Rebuttal Testimony and Schedule
Philip Joseph "P.J." Martin

Before the Public Utilities Commission
of the State of South Dakota

In the Matter of Commission Staff's Request to Investigate
Northern States Power Company d/b/a Xcel Energy's
Proposed Fuel Clause Rider

Docket No. EL16-037
Exhibit___(PJM-2)

Resource Planning

August 8, 2017

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Schedules

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND TITLE.

A. My name is Philip Joseph "P.J." Martin. I am the Director, Resource Planning, for Northern States Power Company-Minnesota (NSPM or Xcel Energy or the Company).

Q. HAVE YOU PREVIOUSLY PROVIDED TESTIMONY IN THIS PROCEEDING?

A. Yes. I filed Direct Testimony on behalf of Northern States Power Company (Xcel Energy or the Company) to provide economic analyses and context supporting the Aurora Solar, North Star Solar, and Marshall Solar resources. I also provided context for the various processes that were used to select these resources.

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

A. I describe some of the potential pricing methodologies that could be explored for the resources in question. I also provide additional information and analysis on one specific proxy pricing methodology known as the market energy and capacity pricing methodology.

Q. HOW IS YOUR REBUTTAL TESTIMONY ORGANIZED?

A. I identify the potential proxy pricing options, examine the market energy and capacity pricing methodology and demonstrate how this method would apply to the North Star Solar Power Purchase Agreement (PPA).

II. PROXY PRICING METHODOLOGY OPTIONS

Q. WHAT IS PROXY PRICING?

A. When I refer to proxy pricing, I am referring to a methodology to reprice a particular resource that recognizes the costs and benefits of that resource while also recognizing that reasonable minds may view those costs and benefits differently due to legal, public policy or other factors. Proxy pricing is achieved by replacing the actual cost of the resource with a different or "proxy" price.

For example, the Company entered into the North Star Solar Power Purchase Agreement (PPA), and South Dakota Public Utilities Commission Staff is proposing to disallow recovery of those costs from the fuel clause. Under a proxy pricing outcome, the actual costs of the North Star Solar PPA could be replaced with a different pricing structure that would be recovered through the Company's South Dakota Fuel Clause Rider (FCR). This would help ensure that our South Dakota customers are paying a reasonable cost for the capacity and energy provided to the NSP System for the North Star Solar PPA. The Company may seek to recover the difference between the proxy price and actual price from other jurisdictions depending on the facts and circumstances unique to each resource decision. Company Witness Mr. Aakash Chandarana provides further discussion regarding the Company's experience with proxy pricing in his Rebuttal Testimony.

Q. WHAT ARE SOME OF THE POTENTIAL PROXY PRICING OPTIONS THAT COULD BE UTILIZED AS PART OF THE ALTERNATIVE PATH IDENTIFIED IN MR. CHANDARANA'S TESTIMONY?

A. Some of the methods available include:

1. System average cost,
2. Midcontinent Independent System Operator, Inc. (MISO) Market, Locational Marginal Price (LMP), and
3. Market energy and capacity

This is not meant to represent an exhaustive list, as other options are certainly available and can be explored if the Company and Staff agree to pursue the alternative resolution path.

Q. CAN YOU DESCRIBE THE SYSTEM AVERAGE COST METHODOLOGY?

A. The system average cost approach would result in our South Dakota customers paying the NSP system average fuel cost, adjusted to exclude the PPA at issue, for each MWh of energy production rather than the PPA contract price. System average cost in $/MWh terms is reflective of all fuel and purchased power costs divided by total MWh of retail sales. System average fuel costs are currently in the $25/MWh range, so this methodology would result in a fairly steep discount to some of the contracts in question.

This methodology is consistent with the system average cost of fuel methodology used to calculate the amounts to be recovered through our South Dakota FCR. However, this methodology reflects historical costs of the system and therefore does not account for the prevailing market conditions under which the resource decision is made. Additionally, the system average cost methodology does not fully account for the capacity value of a particular resource at the time of evaluation as a system addition.

Q. CAN YOU DESCRIBE THE MARKET LMP METHODOLOGY?

A. The market LMP cost approach is similar to the system average cost methodology as it results in our South Dakota customers paying a predefined market nodal LMP cost for each MWh of energy production rather than the PPA contract price. The most likely LMP that would be used in this case would be the NSP.NSP load node, as this is the current load node where the majority of the Company's load is bid into MISO. Since the energy production from these resources is typically displacing fuel that would be burned or market purchases that otherwise would have been transacted, our South Dakota customers are receiving the benefits of avoided fuel and purchases and therefore should pay something in return. NSP.NSP and other MISO nodal LMP averages are currently in the $25/MWh range, so this methodology would also result in a fairly significant discount relative to the pricing associated with some of the contracts in question.

This methodology is more complex to implement than system average proxy pricing but it is more reflective of actual market conditions and the marginal unit of energy that the Company would have needed but for the proxy priced resource. However, much like the system average cost methodology, using only LMP as a proxy price does not capture any of the capacity benefits that a PPA provides to the NSP System.

III. THE MARKET ENERGY AND CAPACITY PRICING METHODOLOGY

Q. CAN YOU DESCRIBE THE ENERGY AND CAPACITY PRICING METHODOLOGY?

A. The market energy and capacity pricing methodology is slightly different

from the system average cost and market LMP methodologies, as it establishes a proxy price that is inclusive of both energy and capacity at the time that a resource decision is made.

Q. WHAT ARE THE PROXY ENERGY AND CAPACITY PRICES BASED ON?

A. There are many potential arguments for different sources upon which to base the energy and capacity pricing. One potential example would be to base energy pricing on the Minnesota Hub forward curve and capacity pricing on the MISO cost of new entry (CONE) values that are provided annually as part of the MISO Planning Resource Auction.

Q. WHY SHOULD RESOURCE ADDITIONS BE JUDGED FOR BOTH ENERGY AND CAPACITY VALUE?

A. These resource additions were judged for both the energy and capacity value that they provide to the system, at the time of resource selection. The Company either buys or builds energy and capacity resources to meet MISO capacity planning reserve requirements and also to serve as an energy hedge for customers. Generation and PPA hedges are therefore intended to reduce risk and ensure that customers are not at the mercy of the market. As such, it is important to consider both the energy and capacity value of resources when judging their prudency, as these relate to resource adequacy.

Q. WHAT IS THE MISO CONE?

A. CONE is an industry-wide term used to indicate the current, annualized capital cost of constructing a new power plant and specifically a combustion turbine resource with a low assumed capacity factor. CONE is calculated through a formula utilized by MISO pursuant to its Tariff, and it is used by

MISO for various reasons, primarily as the maximum offer and maximum clearing price in the Annual Capacity Planning Resource Auctions.

Q. WHY IS CONE AN APPROPRIATE PROXY FOR CAPACITY COSTS?

A. MISO CONE serves as a good proxy for capacity costs in MISO because it is a publicly available, independently developed, market representation of the actual capacity costs associated with adding a new combustion turbine. As a combustion turbine is generally the cheapest form of capacity that can be added, CONE serves as a good representation of the long-term costs associated with adding capacity to the NSP System.

While it is true that spot capacity prices in MISO are currently depressed with all zones clearing at $1.50/MW-day in the most recent auction, the annual capacity values published by MISO are not a good representation of the costs of adding a long-term capacity resource. First, MISO's auction prices are for single-year capacity purchases, which do not necessarily reflect the cost of long-term capacity. Second, the bilateral capacity market generally transacts capacity in shorter timeframes (generally five years) than the Company's usual PPA term or the useful life of new generation. Consequently, market pricing mechanisms for capacity tend not to reflect the long-term capacity value of Company resources.

Further, the capacity market is oversupplied right now, and it is possible that it will be undersupplied in the future. In light of these potential market dynamics, the Company must ensure that it has sufficient capacity available to safeguard that customers are not overly exposed to the market in the event that the market becomes capacity deficient at some point. In addition, it is not possible for the Company to buy or build a new resource

and only expect to pay $1.50/MW-day for the capacity, as that is not representative of the true costs of owning a resource or acquiring a PPA on a resource.

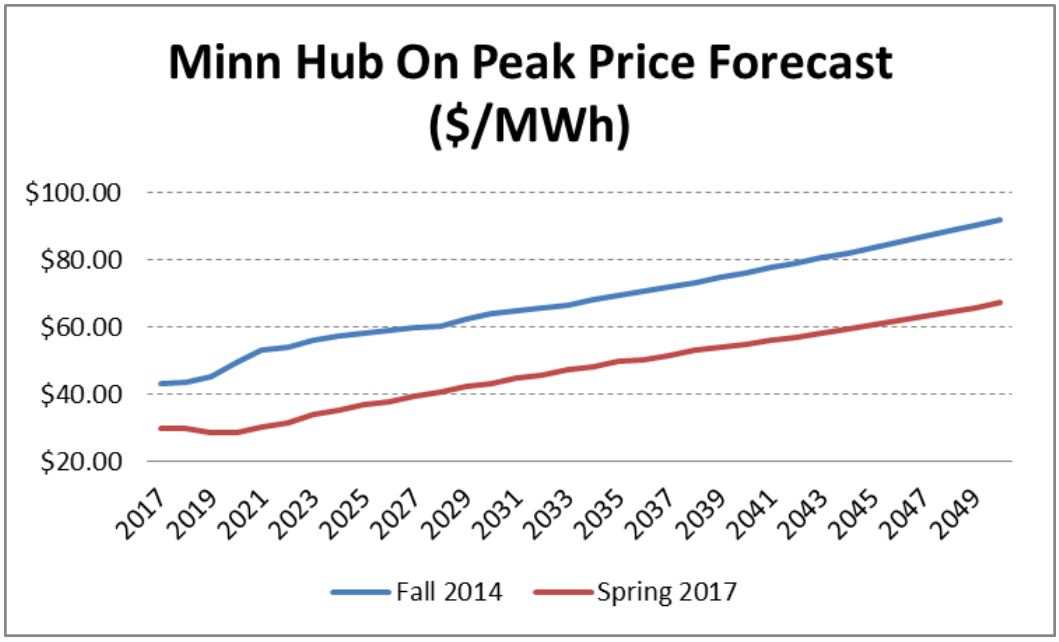
Q. WHY IS IT IMPORTANT THAT THE ENERGY AND CAPACITY PRICING IS BASED ON FORECASTS THAT COINCIDE WITH THE TIME THAT THE RESOURCE DECISION IS MADE?

A. The outlook for energy and capacity market pricing is constantly changing due to economic, political, social and other drivers. As a result, it is very important to judge resource additions against the conditions under which they were made. As Mr. Chandarana and Commission Staff Witness Mr. John Thurber both discuss in their Direct Testimonies, this is also the standard which the Commission should apply to any prudence determination. The market conditions under which many of the Company's past resource addition decisions were made were very different in many respects than market conditions today.

Q. CAN YOU GIVE AN EXAMPLE?

A. Yes. Figure 1 below represents the change in on-peak Minnesota Hub energy prices from Fall 2014 relative to the current outlook. The Fall 2014 forecast was produced on September 8, 2014, and was used for the preparation of the solar Request for Proposal (RFP) analysis. The Spring 2017 forecast reflects the most recent update and is being used for the current Strategist analyses.

Figure 1
Minnesota Hub Energy Price Forecasts



It is clear that the outlook for energy prices was very different in 2014 than it is now. Two major drivers in 2014 influenced the outlook for power prices at the time. First, the polar vortex winter of 2013-2014 resulted in a significant increase in natural gas prices and pushed gas storage to very low levels, which resulted in a corresponding uptick in power prices. Second, in June 2014, the Environmental Protection Agency (EPA) proposed the Clean Power Plan, which also provided support for prices, as the policy was expected to result in more natural gas generation relative to coal and consequently higher demand for natural gas.

Three years later, we have seen fairly mild peak seasons result in ample natural gas supplies in storage; this has muted forward price expectations and pushed down both the natural gas and power curves. In addition, in March 2017, President Donald Trump mandated a review of the Clean Power Plan by the EPA, injecting additional long-term uncertainty in the

market. As a result, the conditions under which resources decisions are made today are indeed very different than the conditions of 2014.

IV. NORTH STAR SOLAR EXAMPLE

Q. HOW WOULD THE ENERGY AND CAPACITY PRICING METHODOLOGY APPLY TO THE NORTH STAR SOLAR PPA?

A. The Company filed for approval of the North Star Solar PPA (along with the Marshall Solar PPA) in October of 2014. Therefore, using the Minnesota Hub forward on-peak prices from the Fall of 2014 and the Zone 1 MISO CONE value for Planning Year 2013-2014 of $89,500 per MW-year or $245/MW-day escalated 2 percent annually to 2017 and beyond, the energy and capacity value of the North Star PPA was calculated as shown in Figure 2 below. Exhibit___(PJM-2), Schedule 1 also includes all of the calculations in full spreadsheet format.

Figure 2
North Star 2014 Market Energy and Capacity Value

North Star Energy Value	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**
Fall 2014 Minnesota Hub On Peak Forecast	$43.01	$43.59	$45.26	$49.23	$53.05	$53.71	$55.84	$57.09	$57.87	$58.97
	[Protected Data Begins:									
North Star Annual MWh										
North Star Annual Energy Value										
										:Protected Data Ends]
North Star Capacity Value										
PY 14-15 MISO CONE $/MW-day esc. 2% annually	$255.12	$255.12	$260.22	$265.43	$270.74	$276.15	$281.67	$287.31	$293.05	$298.91
North Star Accredited Capacity MW	50	50	50	50	50	50	50	50	50	50
North Star Annual Capacity Value	$4,655,940	$4,655,940	$4,749,059	$4,844,040	$4,940,921	$5,039,739	$5,140,534	$5,243,345	$5,348,212	$5,455,176
	[Protected Data Begins:									
Total Annual Implied Energy and Capacity Value										
										:Protected Data Ends]
	[Protected Data Begins:									
$/MWh Implied Market Value in 2014										
PPA Contract $/MWh Cost										
Difference										
										:Protected Data Ends]

Looking at just the first five years of the contract, the implied market value using the MISO CONE capacity prices (at 50 percent accreditation) and the 2014 vintage on-peak Minnesota Hub energy price forecast indicates that the PPA contract price was competitive with the market at the time. I think it is fair to say that, at the time in 2014, the North Star Solar PPA was a prudent resource addition in that it was priced close to its market value and would provide protection against future upward movements in natural gas pricing if another polar vortex or carbon policy initiative were to materialize.

I acknowledge that the on-peak Minnesota Hub prices, which are limited to weekday hours, do not precisely match solar production. Also, due to the seasonal nature of solar and the fact that the production profile in the winter is very different than the summer, the assumption of on-peak prices could likely be refined. However, given that solar is likely producing more energy during the super-peak hours in the summer, which offsets some of the lower pricing realized during weekend peak hours, the on-peak pricing should serve as a reasonable proxy.

Q. IS THE MARKET ENERGY AND CAPACITY PRICING METHODOLOGY SUPERIOR TO THE OTHER OPTIONS?

A. Not necessarily. It is superior in the sense that it captures the capacity value of resource additions, which I believe is very important to recognize. However, on the energy side, it is difficult to accurately shape the forward Minnesota Hub curve to exactly match the expected production profile of a solar resource.

As a result, it is important to reiterate that the Company is very interested in further exploring all of the potential options with Staff and very supportive of the alternative path resolution.

V. CONCLUSION

Q. DOES THIS CONCLUDE YOUR PRE-FILED REBUTTAL TESTIMONY?

A. Yes, it does.