Rebuttal Testimony and Schedules of
Kavita Maini

Before the
Minnesota Public Utilities Commission

In the Matter of Minnesota Power's Certificate of
Need and Route Permit Application for the HVDC Modernization Project

DOCKETS: E015/TL-22-611
E015/CN-22-607

March 11, 2024

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I. Introduction

Q. Please state your name and occupation.

A. My name is Kavita Maini. I am the principal and sole owner of KM Energy Consulting, LLC.

Q. Please state your business address.

A. My office is located at 961 North Lost Woods Road, Oconomowoc, WI 53066.

Q. Are you the same Kavita Maini who has previously filed Direct Testimony in this case?

A. Yes, I filed Direct Testimony on behalf of the Large Power Intervenors (LPI) to help develop the record regarding the size, type and timing related issues associated with Minnesota Power's (or the Company's) proposed High-Voltage Direct-Current (HVDC) Modernization Project (HVDC Project).

Q. What is the purpose of your Rebuttal Testimony?

A. The purpose of my Testimony is to update the record and respond to the Company regarding the size and expansion of the proposed HVDC Modernization Project. I provide an assessment of the need regarding the size capability of the project and options for cost assignment depending on whether the Midcontinent Independent System Operator (MISO) ultimately incorporates the HVDC Project expandability in its long-range planning. MISO's initial proposal for the Long-Range Transmission Plan (LRTP) Tranche 2 was unveiled last week, and it appears the Company may not need the expandability to accommodate regional solutions at the present time. While MISO's proposal is not final and stakeholders have the opportunity to provide alternatives to improve the concepts outlined in its portfolio, it is possible that the HVDC Project may not be utilized as contemplated by the Company in Tranche 2. I provide recommendations for the Minnesota

Public Utilities Commission's (Commission's) consideration if the HVDC System is or is not ultimately included in Tranche 2.

II. Project Size and Expandability

Q. What were your major findings in Direct Testimony regarding the HVDC Modernization Project?

A. I highlighted substantive concerns regarding the double-digit cost impacts to LPI associated with the HVDC Project. I observed that Minnesota Power should have been transparent about its intentions with these investments, resulting in ratepayers like LPI members having no understanding of Minnesota Power's plans for future transmission and infrastructure investments. Specifically, I found that the convertor station capability was sized up to 1500 MW with the expectation that MISO would recognize the regional benefits associated with upgrading the HVDC line and incorporate it in the Tranche 2 portfolio of projects as part of MISO's LRTP. As per the MISO Tariff, transmission expansion projects included in the LRTP portfolio would be eligible for 100% cost sharing across MISO's Midwest subregion. In Direct I indicated that because the MISO Tranche 2 portfolio is not yet known but is to be finalized this year, it would be insightful for the Commission to know whether MISO was including the HVDC System as it deliberates on the Company's Certificate of Need Application. I concluded that to the extent the Project is being constructed for future needs and to benefit other regions, Minnesota ratepayers should not be solely responsible for the upfront and high costs of the HVDC Project that would enable regional solutions. Alternatively, if the HVDC Modernization Project's capabilities and technologies are not included in MISO's LRTP Tranche 2, I requested that Minnesota

Power provide cost sharing proposals and Project alternatives so that Minnesota Power's customers do not pay for something that is not needed.

Q. What did Minnesota Power state about the need for the HVDC Project in Direct Testimony?

A. The Company highlighted aging equipment and indicated that it has experienced HVDC terminal outages due to HVDC converter station component failures, which have been increasing since 2009, and appear to be accelerating.[1]

Q. Is the Company proposing to replace the existing converter station capability of 550 MW with a similar capability?

A. No. The converter station capability is being increased to 1500 MW although the HVDC Line will not be capable of this transfer without modifications or upgrades to the HVDC Line itself.[2]

Q. What is your understanding of the reasons behind Minnesota Power's proposal to increase the converter capability to 1500 MW?

A. As shown in Table 1 below, I understand that the Company has acquired an incremental 350 MW of transmission service requests (TSR). The remaining amount of 600 MW (1500 MW – 550 MW existing – 350 MW TSR) seems to be aimed at coordinating with MISO for regional solutions. I discuss each of these reasons below.

[1] *In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project in Hermantown, Saint Louis County*, Docket No. E-015/CN-22-607; *In the Matter of the Application of Minnesota Power for a Route Permit for a High Voltage Transmission Line for the HVDC Modernization Project in Hermantown, Saint Louis County,* Docket No. E-015/TL-22-611, Direct Testimony of Christian Winter (February 14, 2024) p. 9 (hereinafter "Winter Direct").

[2] *See* Minnesota Power Response to Information Request LPI-3, attached to this Testimony as Schedule 1R.

Table 1:

Existing 550 MW Converter Station Capacity v. Proposed 1500 MW Capacity

Existing Converter Station Capacity	Proposed Converter Station Capacity
550 MW	550 MW Existing
	350 MW Incremental Capacity via 3 New TSRs
	Subtotal 900 MW
	600 MW Incremental Capacity for MISO Regional Coordination
Total 550 MW	Total 1500 MW

A. <u>Company Acquisition of 350 MW TSR</u>

Q. What has Minnesota Power indicated with regards to the 350 MW of incremental converter size capability beyond the existing 550 MW of capacity?

A. The Company indicated in response to Information Request LPI-35 that at present, the 900 MW of capacity associated with the proposed Project is intended to be utilized by Minnesota Power and therefore the costs of the Project will be borne wholly by Minnesota Power's customers. This includes the existing 550 MW of Transmission Service Request (TSR) and the additional 350 MW of TSRs that were recently acquired. At any point in the future Minnesota Power may choose to assign all or a portion of its capacity rights to another party. If Minnesota Power were to assign any of the 350 MW in transmission service requests to another party, Minnesota Power customers would receive the financial benefit of any such transaction.

Based on the above, I gather that (1) the Company has not acquired new wind generation in North Dakota that would require the upgrade to increase the size of the converter stations and (2) it is possible for the Company to assign the TSRs to another party

and get reimbursed pursuant to the MISO tariff. The MISO tariff provisions ensure that whoever is utilizing the line is responsible for paying the cost of the line for any utilization that occurs.[3] I discuss the TSR-related cost assignments further below which could form the basis of the rate to be charged to parties that want to utilize this line.

Q. What are the steps needed to accommodate TSRs at MISO?

A. The Company has indicated that it has secured three TSRs to increase the capacity from 550 MW to 900 MW. Minnesota Power has followed the applicable steps at MISO to secure this additional capacity and the Company conducted the relevant studies which has culminated with a Facilities Construction Agreement (FCA) outlining the terms and obligations associated with constructing the upgrades necessary to accommodate the TSRs.[4] The executed FCA was submitted to the Federal Energy Regulatory Commission (FERC) on March 5, 2024. The FCA is attached to this Testimony as Schedule 3R**.**

Q. Does the Minnesota Commission approve the FCA?

A. No, Minnesota Power indicates that the Commission's applicable statutes and rules do not require Commission approval of the FCA itself. Instead, the Commission has jurisdiction to approve transmission infrastructure projects and cost recovery proceedings[5]

The Commission's approval for the Company's acquisition of an additional 350 MW of TSRs would span two proceedings: the current one where the capacity capability of the convertor stations is subject to the Commission approval, and another proceeding not yet initiated where Minnesota Power will seek cost recovery for upgrading the HVDC

[3] *See* Minnesota Power Response to Information Request DOC IR 18, attached to this Testimony as Schedule 2R.
[4] *See* Winter Direct p. 30.
[5] *See* Minnesota Power Response to Information Request LPI-38, citing Minn. Stat. §§ 216B.243 and 216E; Minn. R. ch.7849 and 7850; and Minn. Stat. ch. 216B, attached to this Testimony as Schedule 3R.

Line itself to 900 MW. The Company indicates that the upgrade of the HVDC Line to 900 MW does not require a Certificate of Need because it involves upgrading an existing transmission line on existing right-of-way without changing the voltage.[6]

Q. What are the costs associated with the TSRs?

A. The FCA shows that the TSR-related costs consist of a portion of the

1) converter station replacement costs,

2) costs to interconnect to the Alternating Current (AC) system and

3) the cost of the transmission line modifications.

All of these components are needed to enable the 350 MW transfer. Table 2 below, uses estimates from the FCA, and shows the cost assignment.

Table 2: Cost of 350 MW TSRs

A	B	C	D	E
TSR Cost Assignment	Estimated Total Upgrade Cost	Amount Assigned to 200 MW TSR	Amount Assigned to 150 MW TSR	Total TSR Cost Assignment
Converter Station Replacement	$705,000,000	$165,000,000	$123,000,000	$288,000,000
Interconnections to AC System (MN,ND)	$115,000,000	$15,000,000	$11,000,000	$26,000,000
Transmission Line Modification	$58,000,000	$25,000,000	$33,000,000	$58,000,000
Internal & Professional Services	(Included	(Included	(Included	(Included
TOTAL (2022 $)	$878,000,000	$205,000,000	$167,000,000	$372,000,000

Table 2, column B shows the total estimated costs of the HVDC Project. Columns C and D show the cost assignment by cost item for 200 MW and 150 MW TSRs respectively. I calculated the sum of the TSR assignments in Column E. These costs indicate that approximately 41% of the converter station costs ($288 million/$705 million) are associated with the 350 MW of TSRs. As it relates to the TSRs, the Commission will approve the $288 million cost of the convertor stations and the $26 million cost to

[6] *See* Minnesota Response to Information Request LPI-34, citing (Minn. R. 7850.1500, subp. 1(B)(2)), attached to this Testimony as Schedule 4R.

interconnect to the AC system in this proceeding, and the $58 million associated with upgrading the HVDC Transmission line will be addressed in a later proceeding. In sum, as part of the Proposed Project and including the HVDC Line Upgrade, Minnesota Power is seeking to upgrade the capacity of the HVDC System by 350 MW to 900 MW for a total incremental cost of $372 million.

Q. Why is it important to know the TSR-related costs?

A. The Company has not identified a specific resource acquisition to use the incremental 350 MW associated with the TSRs, and the Commission should realize the cost to expand the capacity by 350 MW is substantial. If the Company acquires wind in North Dakota to utilize the TSR-related capacity to meet the needs of Minnesota Power customers, the business case to acquire that wind should incorporate these TSR costs to reflect the total costs of interconnecting the wind acquisition. The TSR related cost assignments will help inform the Commission if it should approve the requested Project size, and if so, whether it is more cost effective for Minnesota Power to acquire wind generation in North Dakota to fulfill Minnesota ratepayer needs or instead assign the TSRs to another party which will pay to utilize the line and provide offsetting revenue for Minnesota Power's customers.

B. <u>Incremental 600 MW Size Capability</u>

Q. Aside from the 550 MW to replace the existing aging capacity and the incremental 350 MW for TSRs, what has Minnesota Power indicated with regards to increasing the converter station size capability by another 600 MW to total up to 1500 MW?

A. Although Minnesota Power has not clearly spelled this out, based on the Company's coordinated efforts with MISO's long-range planning, I believe that the incremental 600 MW is aimed at enabling regional transmission solutions. The Company has made

considerable efforts to incorporate long-term expandability and flexibility into the design of the Project to ensure that the planning and development of the HVDC Modernization Project aligns with MISO's planning efforts for the long-term needs of the region.[7] I interpret this to mean that the proposed convertor station expandability from 900 MW to 1500 MW would make it feasible for future expansion of the HVDC Line itself (with additional upgrades)to enable the line to accommodate transfers for regional solutions.[8]

I also note that Minnesota Power's system peak demand is 1600 MW and therefore, increasing the converter capability to 1500 MW seems far in excess of what Minnesota ratepayers need, considering the Company's other generation resources. Furthermore, it is likely Minnesota Power is not intending to use the entire 1500 MW solely to serve Minnesota Power customers because it would make sense to diversify the acquisition of future resources from a siting perspective instead of "putting all eggs in one basket" by relying solely on this HVDC Line especially because the buildout of MISO's LRTP Tranches 1 and 2 will provide more optionality than currently exists today.

The Company has indicated that the physical equipment expandability from 900 MW to 1500 MW related to the converter stations accounts for approximately $100 million.[9] Given that the proposed expansion is laying the groundwork for regional solutions, the costs associated with the expandability beyond the capability needed for Minnesota Power's customers should be subject to cost sharing and assigned to those that benefit.

[7] *See* Winter Direct p. 50.
[8] *See* Minnesota Power Response to Information Request LPI -3, attached to this Testimony as Schedule 1R.
[9] *See* Winter Direct p. 40, footnote 18.

Q. You discussed the cost assignments associated with the TSRs and the expandability portion. What are the total costs associated with 550 MW size capability?

A. Given the lack of transparency and how Minnesota Power has structured its proposal, I am not entirely certain of the total costs. Regarding the converter station costs, I estimated the costs for the 550 MW size capability by deducting the TSRs assigned converter station portion of $288 million and the equipment expandability of $100 million from the total converter station costs of $705 million. In this manner, I isolated the costs associated with the 550 MW and calculated $ 317 million ($705 million - $288 million for 350 MW TSRs - $100 million for expandability beyond 900 MW). I do not know the cost impact associated with the interconnection facilities.

Q. Please summarize your findings regarding the converter station capacity expansion of the HVDC Project.

A. The summary is as follows:

1. ***Existing Capability Size Replacement (550 MW).*** Minnesota Power has identified the need to replace its aging equipment prone to outage failures for 550 MW of existing capacity. My estimates suggest that the converter station cost for this capacity is $317 million excluding the costs associated with the interconnection facilities.
2. ***350 MW TSRs.*** The incremental 350 MW TSRs secured by the Company are not tied to a specific wind generation acquisition. Though the converter station costs for the 350 MW are included in this proceeding, the ability to flow power on the HVDC Line requires upgrading the existing HVDC Line at an estimated cost of $58 million which will be addressed in a separate Commission proceeding. If the Commission approves the Project as proposed the Company can assign this capacity to another party and get reimbursed in

accordance with current MISO tariff provisions. The TSR cost assignments will help inform the Commission if it is more cost effective for Minnesota Power to acquire wind generation in North Dakota to fulfill Minnesota ratepayer needs or instead assign the TSRs to another party to obtain offsetting revenue for Minnesota Power's customers.

3. ***Expandability Portion (600 MW).*** The expandability from 900 MW to 1500 MW is likely meant to be coordinated with MISO to enable regional solutions. If the Commission approves this portion, the costs associated with the expandability beyond fulfilling the size capability needed for Minnesota Power's customers should be subject to cost sharing and assigned to those that benefit. I discuss the relevance of MISO's decisions regarding the utilization of the expandability portion in its LRTP Tranche 2 portfolio and related recommendations later in the testimony.

Q. Based on your findings, what do you conclude regarding the size capability?

A. I conclude the following:

1. The Company has demonstrated the need to replace its existing capacity of 550 MW.

2. The incremental 350 MW TSRs secured by the Company are not tied to a specific wind acquisition. The Company can also assign this capacity to another party and get reimbursed in accordance with the current MISO tariff provisions. While the converter station costs for the 350 MW are included in this proceeding, the ability to flow power on the HVDC Line requires upgrading the existing HVDC Line at an estimated cost of $58 million which will be addressed in a separate proceeding. The TSR cost assignments will help inform the Commission if it is more cost effective for Minnesota Power to acquire wind generation in North Dakota to fulfill Minnesota ratepayer needs or instead assign the

TSRs to another party which would then be used to obtain offsetting revenue for Minnesota Power's customers.

Q. Has Minnesota Power made efforts to mitigate the cost impacts associated with the HVDC Project?

A. Yes. However, it appears that the grant funding maybe directly contingent on the expandability portion versus the rest of the Project configuration.[10] Consequently, these funds will not directly offset the cost of the fundamental need to replace the aging infrastructure associated with the existing capacity. Mitigating costs on investments to serve potential future needs that have not yet been demonstrated by the Company as necessary, or approved by the Commission, while potentially helpful, should not be a justification for approval of those investments in this proceeding. Regardless of the funding, if MISO does not incorporate the expandability in LRTP Tranche 2, I question the need for the expandability in the first instance, especially if the HVDC Line upgrades do not occur to utilize the increased converter station capability.

III. <u>Cost Sharing</u>

Q. In your Direct Testimony, did you propose Minnesota Power should pursue cost sharing opportunities?

A. Yes.

Q. Does Minnesota Power agree that Minnesota Power customers should not bear the full costs of the proposed Project?

[10] *See* Minnesota Power Response to Information Request LPI-36, attached to this Testimony as Schedule 6R.

A. Yes, I believe they do. For example, Daniel Gunderson states in his Direct Testimony when asked about the proposed upgrade to the American Transmission Company (ATC) Arrowhead 345kV Substation, that the upgrades to that substation "should have costs allocated appropriately to all those who receive benefits from the upgrades and surrounding facilities have been appropriately jointly studied and agreed upon by stakeholders."[11]

Q. Is Minnesota Power concerned that some of the Project benefits could flow to entities that are not paying for the Project?

A. Yes, The Company has stated that the ATC Arrowhead Alternative would result in greater power transfers to Wisconsin, even though the Alternative would be funded by Minnesota Power customers. "Wisconsin ratepayers would receive the benefit of this increased transfer capability at the expense [of] Minnesota Power's customers, who would be solely responsible to pay for it."[12]

Q. Do you share the concerns that certain groups could benefit from the Project even though they will not pay for it?

A. I do. As I noted in Direct Testimony, even if the Company builds its proposed substation and does not use the ATC Alternative, Minnesota Power has touted the "regional" benefits the Project will provide, but only customers of Minnesota Power, and not the greater region, are to pay for the Project. Similarly, if the Project is incorporating "future expandability" options, Minnesota Power is asking its customers to pay for future

[11] *In the Matter of the Application of Minnesota Power for a Certificate of Need for the HVDC Modernization Project in Hermantown, Saint Louis County,* Docket No. E-015/CN-22-607; *In the Matter of the Application of Minnesota Power for a Route Permit for a High Voltage Transmission Line for the HVDC Modernization Project in Hermantown, Saint Louis County,* Docket No. E-015/TL-22-611, Direct Testimony of Daniel W. Gunderson (February 14, 2024), p. 9 (hereinafter "Gunderson Direct").
[12] Gunderson Direct p. 27.

optionality from which they might not benefit.[13] This proposed cost assignment is not consistent with Minnesota Power's own view that those who reap the benefits should pay the cost.

A. Coordination with MISO

Q. What are the Company's observations regarding how the HVDC Project fits within MISO's long-range transmission planning, LRTP Tranche 2?

A. The Company indicates that in January 2024, MISO released the latest set of power flow models it has developed and is using for the LRTP Tranche 2 study. MISO has included Minnesota Power's configuration of the HVDC Modernization Project in its base modeling assumptions in these January 2024 models,[14] and MISO has never included a full version of its LRTP roadmap that did not include a concept of a St. Louis County Substation, built as a new substation as the western terminus of a new or upgraded HVDC line from the west.[15]

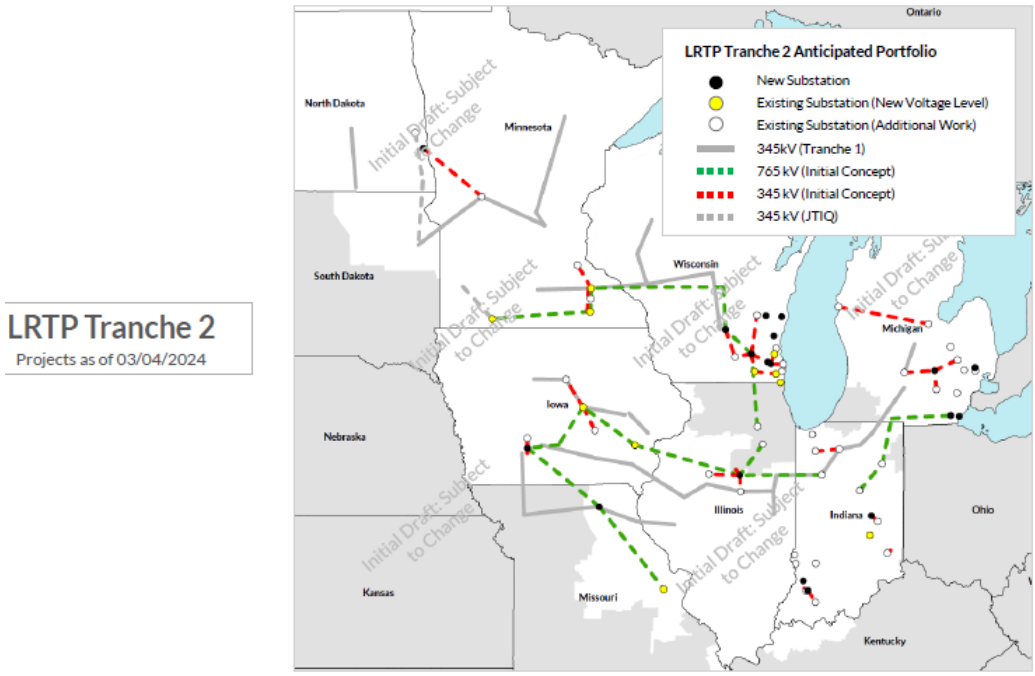
As the Company states: "The MISO LRTP roadmap continues to include a conceptual transmission solution that appears to upgrade the Company's existing HVDC System to potentially expand and adapt its purpose to support the regional transmission system in addition to serving Minnesota Power's customers."[16]

Q. Has MISO provided any indications of the Tranche 2 Portfolio?

[13] *See* Winter Direct p. 15 (stating the Company has endeavored to ensure its investment incorporates consideration for the "long-term needs of the local and regional" transmission network, and the Project is designed with "future local and regional transmission system needs in mind").
[14] Winter Direct p. 46.
[15] Winter Direct p. 49.
[16] Winter Direct p. 50.

A. Yes. On March 4, 2024, MISO unveiled its initial draft proposal for a set of Tranche 2 transmission solutions. The figure below shows the initial draft proposal of the Tranche 2 portfolio.

Figure 1: MISO Initial Draft LRTP Tranche 2



Though this proposal is a draft and subject to change, MISO has not incorporated transmission solutions utilizing the Company's HVDC Project in this draft proposal. MISO has projected a cost range of $17 billion to $23 billion for the Tranche 2 Portfolio. Therefore, Minnesota Power ratepayers will bear cost responsibility for a portion of this significant investment, in addition to bearing exclusive cost responsibility for the HVDC Project. Schedule 7R is a copy of the presentation that MISO intends to discuss at the LRTP workshop on March 15, 2024. On slide 4, MISO notes that "Tranche 2 does not eliminate the consideration of HVDC, 345KV or 765KV for future needs." I interpret this statement to imply that HVDC could be considered for future tranches.

Q. Will there be changes to this initial draft proposal?

A. I do not know. MISO indicates in the press release issued on March 4, 2024, that "Stakeholders have the opportunity to provide alternatives to improve or enhance the concepts outlined in this portfolio and provide additional feedback through LRTP workshops which are fundamental to MISO's comprehensive planning process." Until the final Tranche 2 Portfolio is submitted and approved by the MISO Board of Directors later this year, we will not know to what extent, if any, there are changes.

Q. What are your observations about this latest development?

A. Given that MISO did not incorporate the HVDC Project in its initial proposal, we should consider the real possibility that the Company's infrastructure as proposed in its Certificate of Need Application may not be utilized as Tranche 2 is currently configured. Notwithstanding this possibility, if MISO does ultimately utilize the HVDC Project capability as currently configured in LRTP Tranche 2 the Company needs to pursue either the current method of assigning costs to TSRs or the development of a new tariff to allocate the converter size capability costs to those who will benefit from the HVDC Project. The upgrade of the HVDC Line to accommodate the capability up to 1500 MW would be cost-shared if MISO includes it in its portfolio.

Q. What if MISO continues to exclude regional solutions using the HVDC Project?

A. With regards to the incremental 600 MW of capability beyond the secured TSRs, and notwithstanding the grant funding, it would not be appropriate to build this capability if the HVDC line does not get upgraded accordingly for regional solutions in Tranche 2 or used by others that benefit.

Q. By when will the MISO Tranche 2 portfolio be finalized?

A. In the press release regarding the initial proposal, MISO indicated that it anticipates recommending the final portfolio to the Board of Directors later this year.

B. Additional Cost Mitigation

Q. Are there other measures that should be pursued so that everyone who benefits from this line will pay their fair share of the Project costs?

A. Yes. It is possible, for example, that MISO will create a new tariff to appropriately value and allocate the costs and benefits afforded by HVDC and VSC technologies. The Company should continue to pursue these and other avenues for cost mitigation and I recommend the Commission require the Company to report quarterly on its definitive actions it is taking to reduce customer costs for this Project.

IV. Recommendations and Conclusion

Q. Please summarize your recommendations for the Commission's consideration.

A. The following is a summary of recommendations for the Commission's consideration:

1. The Company has demonstrated the need to replace its existing capacity of 550 MW.
2. The need for incremental capacity beyond replacing the existing capacity is based on the expectation of future benefits, and does not include cost/benefit analytical support, Consequently, the Commission could consider requiring the Company to resize its Project, so the Company is only replacing existing assets without expansion. Alternatively, if the Commission approves the 350 MW for the new TSRs, LPI recommends that before 350 MW capability is utilized, the Commission should require a cost/benefit analysis on whether the 350 MW of incremental capacity is better utilized

by the Company for the benefit of its ratepayers or other entities to whom the TSRs can be assigned.

3. If MISO ultimately utilizes the HVDC Project expandability in LRTP Tranche 2, the Company needs to pursue either the current method of assigning costs to TSRs or the development of a new tariff to allocate the converter size capability costs to those who will benefit from the HVDC Project. The upgrade of the HVDC Line to accommodate the capability up to 1500 MW would be cost shared as per MISO's Tariff provisions if MISO includes it in its portfolio. If however, the expandability is not utilized, and notwithstanding the grant funding, it would not be appropriate to build this capability if the HVDC line does not get upgraded accordingly for regional solutions in Tranche 2 or used by others that benefit.

Q. Does this conclude your rebuttal testimony?

A. Yes.