Montana Public Service Commission
Docket No. 2024.05.053
Electric and Natural Gas Rate Review

DIRECT TESTIMONY OF

MICHAEL S. McGOWAN

ON BEHALF OF NORTHWESTERN ENERGY

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Exhibits

Witness Information

Q. Please identify yourself, your employer, and your job title.

A. My name is Michael S. McGowan. I am NorthWestern Corporation d/b/a NorthWestern Energy's ("NorthWestern") Director of Transmission Services and Operations Support.

Q. Please provide a description of your relevant employment experience and other professional qualifications.

A. Since 2007, I have held various positions for NorthWestern in the Operations and Transmission Services areas including System Operations Engineer, Supervisor of System Operations, Manager of Electric Transmission Services, Manager of Grid Operations and Services, Manager of Transmission Services and Operations Support, and currently Director of Transmission Services and Operations Support.

I earned a Bachelor of Science degree in General Engineering with a Control Systems Engineering Option from Montana Tech in May of 2002. I currently hold a North American Electric Reliability Corporation System Operator certificate. Prior to joining NorthWestern, I held various positions with other organizations in Oregon and Montana.

Purpose of Testimony

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

A. The purpose of my testimony is to present and describe NorthWestern's system loss studies. NorthWestern performed these studies to identify transmission and distribution loss factors.

System Loss Studies

Q. What is a system loss study?

A. A system loss study determines how much energy is lost in the transmission and distribution systems as a result of transmitting electricity from generation resources to customer loads.

Q. How does NorthWestern's use of the system loss studies affect customers?

A. System losses, which are also commonly referred to as line losses, are meant to reflect the amount of energy lost by transmitting electricity over the transmission and distribution systems from generation to load. NorthWestern must account for these losses in order to ensure there is adequate energy supply to serve customer loads.

Q. When did NorthWestern conduct the system loss studies proposed for use in this docket?

A. NorthWestern completed this study work in May of 2024. NorthWestern used 2023 test year data to perform these studies, which was data from January 1,

2023 through December 31, 2023, and was the most current data set available at the time.

Q. Please describe the methodology used to conduct the system loss studies.

A. For the Distribution Line Loss Study, NorthWestern's engineers obtained metering information from the distribution system to determine system input and output kilowatt-hour ("kWh") values. Meter values at all the varying distribution points serving loads were used to determine the system output. These values were obtained from billed meter usage data. The system input (or supply) also had to be determined by using the meter information from various sources, as available, on the upstream substation meters, such as MV90 meters, relay metering, and estimates. The differences between these meter values were used to determine how much energy was lost by moving electricity through the distribution system to the load.

For the Transmission Line Loss Study, the inputs and outputs were determined similar to the Distribution Line Loss Study. The inputs were determined by taking meter information from the generators and actual imports of energy into the NorthWestern Balancing Authority Area ("BAA"). NorthWestern made an adjustment to include its Transmission System in the Western Area Power Administration BAA on Montana's Hi-Line. The sum of the generation metering and imports represented the inputs. The outputs

were the metered deliveries from the transmission system to the loads. This ensured that only transmission-level customer loads, such as cooperatives and retail load represented at the transmission delivery points, were used in the output for the Transmission Line Loss Study. The difference between the inputs and outputs determined the loss value specific to the transmission system.

NorthWestern performed the transmission and distribution line loss studies based on the total kWh for the 12-month period to determine the average loss values.

Q. What were the results of the system loss studies?

A. The total distribution loss amount is 3.90% (Substation at 0.70%; Primary at 1.15%; and Secondary at 2.05%). The study results are found in Exhibit MSM-1.

Transmission line losses are 3.81%. Exhibit MSM-2 provides the results of the Transmission Line Loss Study. Note that NorthWestern has removed from Exhibit MSM-2 customer-specific names and replaced them with generic identifiers, i.e., Coop Load 1, for example.

Q. Why did NorthWestern conduct the system loss studies?

A. NorthWestern conducted the loss studies to ensure accurate loss values were reflected in this docket using the latest information available at the time the studies were performed.

Q. How did those studies compare to NorthWestern's prior system loss studies?

A. The 2022 general rate review transmission losses were calculated at 3.41%, and they are now 3.81%, whereas the distribution losses were previously 2.56% and they are now 3.90%.

Loss Study Values		
	Distribution	Transmission
2022 Study	2.56%	3.41%
Current Study	3.90%	3.81%

Q. What do the differences between the current system loss studies and the prior system loss studies demonstrate?

A. Several factors contribute to a difference from the previous loss calculations, including changes in the use of the transmission and distribution systems since the 2022 loss studies. Changes in transmission and distribution system loading, use of these systems, and accounting for behind-the-meter generation are the biggest impacts to the different loss values as compared to the previous studies. These are further explained below. NorthWestern has also upgraded metering to MV90 metering over the last several years, which provides for more accurate data for the studies. However, we do not believe

this change in meters has had a major impact on the current studies versus the 2022 studies.

The transmission loss value increased from the previous study. This is mainly attributable to increased loading and use of the transmission system. System loading also affects the distribution loss study. The previous studies used data during the COVID-19 pandemic (November 1, 2020 to November 1, 2021 data). Load was greater during the 2023 test year by approximately 12.92 megawatts ("MW") per hour, on average. Peak system loads were also greater in 2023 versus the previous loss studies period. 2023 was also a colder year than 2021. As such, higher loading results in higher losses.

Physical flows on the transmission system were also greater for the 2023 period versus the 2022 study period. This could be due to load service, wheeling market power, or inadvertent flows. Path 80, our path from Wyoming and the Miles City, Montana area, went from an exporting path in 2021 (982,713 megawatt-hours ("MWh") exported) to an importing one in 2023 (10,862,072 MWh imported). This is a net increase in overall flow on that path. Path 8 flow also increased significantly. Path 8 exports in 2021 were approximately 3,444,952 MWh, whereas they were 7,223,739 MWh in 2023. Increased use and flow on Path 8, including the additions of the Clearwater Wind facility (soon to be 750 MW) contribute to increased losses. Finally, NorthWestern's internal South of Great Falls path experienced

increased flows as well, from 480,442 MWh in 2021 increasing to 972,393 MWh in 2023.

For the distribution loss study, the loading and usage impact will affect the distribution losses, but distributed generation was the primary driver in the increase in the distribution loss values. This includes several 2 and 3 MW solar facilities (totaling approximately 18 MW), along with some other small projects (totaling approximately 1.5 MW). This generation accounts for approximately 19.5 MW of behind-the-meter generation that was not separately accounted for in the 2022 distribution loss study. This generation is intertwined with load behind a common meter on the distribution system. This creates a netting effect, or "negative load" if this generation is not accounted for. We included the impact of this behind-the-meter generation and the load in this study. The addition of this generation provides for more accurate study results, and is the primary reason for the loss increase in the current distribution loss study as compared to the 2022 study. This generation does not include rooftop solar, which, through the first quarter of 2024, is approximately 50 MW of installed capacity.

Q. How does increased line loading contribute to losses?

A. Heavier loading of a line generally causes higher line losses. Increased load and/or physical flow on a line requires more amperage and will increase line losses. There was about a 1% increase in BAA load and an increase in line

flows on our system for the 2023 period. This contributes to increased loss percentages in the current studies.

Q. What does NorthWestern do with the results of the system loss studies?

A. NorthWestern is submitting the results of the loss studies for inclusion in this docket. I understand that these loss values are used to allocate the costs among different customer classes, and this is our most up-to-date analysis.

Conclusion

Q. Please summarize your testimony.

A. NorthWestern performed full transmission and distribution loss studies for this docket. NorthWestern's previous loss studies used November 1, 2020 to November 1, 2021 data for NorthWestern's 2022 general rate review.

NorthWestern's current loss studies provide updated loss percentages based on the most recent data available (from January 1, 2023 to December 31, 2023). The results are a total loss percentage for transmission and distribution equal to 7.71%. The transmission losses are 3.81% and the distribution losses are 3.90% (Substation = 0.70%, Primary = 1.15%, and Secondary = 2.05%).

Q. Does this conclude your direct testimony?

A. Yes, it does.

Verification

This Direct Testimony of Michael S. McGowan is true and accurate to the best of my knowledge, information, and belief.

/s/ Michael S. McGowan
Michael S. McGowan