

1 Montana Public Service Commission
2 Docket No. 2022.07.078
3 Electric and Natural Gas General Rate Review
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7 PRE-FILED DIRECT TESTIMONY
8 OF MICHAEL S. MCGOWAN
9 ON BEHALF OF NORTHWESTERN ENERGY
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¹ Due to concerns with disclosing customer sensitive information, NorthWestern has removed customer names from Exhibit MSM-2 and replaced them with generic identifies.

1 **Witness Information**

2 **Q. Please provide your name, employer, and title.**

3 **A.** My name is Michael S. McGowan. I am NorthWestern Energy's
4 ("NorthWestern") Director of Transmission Services and Operations
5 Support.

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

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

14 I earned a Bachelor of Science degree in General Engineering with a
15 Control Systems Engineering Option from Montana Tech in May of 2002.

16 I currently hold a North American Electric Reliability Corporation System
17 Operator certificate. Prior to joining NorthWestern, I held various positions
18 with other organizations in Oregon and Montana.

19

20

1 **Purpose and Summary of Testimony**

2 **Q. What is the purpose of your testimony in this docket?**

3 **A.** The purpose of my testimony is to present and describe NorthWestern's
4 system loss studies. NorthWestern performed these studies to identify
5 Transmission and Distribution loss factors.
6

7 **Q. Please summarize your testimony.**

8 **A.** NorthWestern performed full Transmission and Distribution loss studies for
9 this docket. NorthWestern's previous loss studies used 2016 data for
10 NorthWestern's 2018 electric general rate review. NorthWestern also
11 used the same Transmission loss study in its Federal Energy Regulatory
12 Commission Docket No. ER19-1756. NorthWestern's new loss studies
13 provide updated loss factors based on more recent data (from November
14 1, 2020 to November 1, 2021). The results are a total loss factor for
15 Transmission and Distribution equal to 5.97%. The Transmission losses
16 are 3.41%, and the Distribution losses are 2.56% (Substation = 0.46%,
17 Primary = 0.75%, and Secondary = 1.35%).
18

19 **System Loss Studies**

20 **Q. What is a system loss study?**

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

1

2 **Q. How does NorthWestern’s use of the system loss studies affect the**
3 **customers?**

4 **A.** As just noted, line losses are meant to reflect the amount of energy lost by
5 transmitting electricity over the transmission and distribution systems from
6 generation to load. NorthWestern must account for these losses in order
7 to ensure there is adequate energy supply to serve customer loads.

8

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

11 **A.** NorthWestern completed this study work in March of 2022. NorthWestern
12 used the latest metering data available at the time to perform these
13 studies, which was data from November 1, 2020 to November 1, 2021.

14

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

17 **A.** For the Distribution Line Loss Study, NorthWestern’s engineers obtained
18 metering information from the distribution system to determine system
19 input and output kilowatt-hour (“kWh”) values. Meter values at all the
20 varying Distribution points serving loads were used to determine the
21 system output. These values were obtained from billed meter usage data.
22 The system input (or supply) also had to be determined by using the meter
23 information from various sources, as available, on the upstream substation

1 meters, such as MV90 meters, relay metering, and estimates. The
2 differences between these meter values were used to determine how
3 much energy was lost by moving electricity through the distribution system
4 to the load.

5
6 For the Transmission Line Loss Study, the inputs and outputs were
7 determined similar to the Distribution Line Loss Study. The inputs were
8 determined by taking meter information from the generators and actual
9 imports of energy into the NorthWestern Balancing Authority Area (“BAA”).
10 NorthWestern made an adjustment to include its Transmission System in
11 the Western Area Power Administration (“WAPA”) BAA on Montana’s Hi-
12 Line. The sum of the generation metering and imports represented the
13 inputs. The outputs were the metered deliveries from the Transmission
14 System to the loads. This ensured that only transmission-level customer
15 loads, such as cooperatives and retail load represented at the
16 transmission delivery points, were used in the output for the Transmission
17 Line Loss Study. The difference between the inputs and outputs
18 determined the loss value specific to the Transmission System.

19
20 NorthWestern performed the study for the Transmission and Distribution
21 portions of the line loss study based on the total kWh for the 12-month
22 period to determine the average loss values.

23

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

2 **A.** The total distribution loss amount was determined to be 2.56% (Substation
3 at 0.46%; Primary at 0.75%; and Secondary at 1.35%). The study results
4 are found in Exhibit MSM-1.

5
6 Transmission line losses are 3.41%. Exhibit MSM-2 provides the results
7 of the Transmission Line Loss Study. Note that NorthWestern has
8 removed from Exhibit MSM-2 customer specific names and replaced them
9 with generic identifiers, i.e., Customer A, for example.

10

11 **Q. Why did NorthWestern conduct the system loss studies?**

12 **A.** NorthWestern conducted the loss studies to ensure accurate loss values
13 were reflected in this docket using the latest information available at the
14 time the study was performed.

15

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

18 **A.** The 2018 electric general rate review Transmission losses were
19 calculated at 2.80%, and they are now 3.41% whereas the Distribution
20 losses were previously 4.52% and they are now 2.56%.

Loss Study Values		
	Distribution	Transmission
Previous Studies	4.52%	2.80%
Current Studies	2.56%	3.41%

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

3 **A.** Several reasons contribute to a difference from previous loss calculations,
4 in addition to changes since 2016. Pertaining to Transmission and
5 Distribution losses, first, NorthWestern has invested in MV90 metering at
6 approximately 70 substations since NorthWestern performed the last loss
7 studies. MV90 metering is more accurate than using monthly estimates
8 from relaying, which was done in the previous studies. This change
9 provides a much better data set. Second, there were changes in system
10 loading. Third, annual re-conductor work and transformer bank upgrades
11 have occurred since the last studies.

12
13 In addition to the previously mentioned items, the following also affects
14 Transmission losses. First, there was an increase in the annual
15 megawatt-hour (“MWh”) use (i.e. “loading”) on the transmission system.
16 Heavier loading contributes to increased Transmission line losses.
17 Second, Transmission wheeling (i.e. energy moved across, but not from
18 NorthWestern’s BAA) can also contribute to increased transmission line
19 losses. Finally, NorthWestern discovered an unintentional error in the
20 previous loss study that resulted in a loss amount (2.80%) that was lower
21 than it should have been. The current Transmission loss number (3.41%)
22 corrects that error.

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Q. How does increased line loading contribute to losses?

A. Heavier loading of a line generally causes higher line losses. Increased load will require more amperage and will increase line losses. The annual MWh BAA load for the current Transmission loss study was equal to 11,495,014, while the annual MWh for the previous loss study was 10,899,923 – a 5.5% increase in annual BAA load. This can contribute to an increased loss percentage in the current study.

Q. Please describe the error in the previous transmission loss study.

A. The previous transmission loss study incorrectly included a transmission loss factor added to some customer loads. Exhibit MSM-2 is a chart that displays the inputs versus the outputs needed to calculate the losses on the Transmission System in the current Transmission loss study. The previous transmission loss study used the same methodology; however, NorthWestern inadvertently added losses to the cooperative customers' loads (i.e., BPA, WAPA, & Basin) in determining the transmission loss value. This made the loads artificially higher than they really were and therefore resulted in a lower loss rate in that study. The current Transmission loss study does not add losses to those loads. This explains, in part, the higher transmission loss rate for this case (3.41%) as compared to the last one (2.80%).

1 **Q. What other factors contributed to the increase in the Transmission**
2 **loss rate?**

3 **A.** Transmission wheeling, as previously described, can contribute to
4 changes in the loss value. Wheeling use of the system was higher in the
5 current loss study versus the prior study, which could contribute to an
6 increased loss percentage in the current study.

7 Higher load demand will also contribute to increases in the loss rate, as
8 previously described.

9

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

12 **A.** NorthWestern is submitting the results of the loss studies for inclusion in
13 this docket. I understand that these loss values are used to allocate the
14 costs among different customer classes.

15

16 **Q. Does this conclude your testimony?**

17 **A.** Yes, it does.

VERIFICATION

This Pre-filed 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