

7 PRE-FILED DIRECT TESTIMONY
8 OF JOHN E. CARMODY
9 ON BEHALF OF NORTHWESTERN ENERGY
10

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20 Witness Information

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

22 **A.** My name is John E. Carmody. I am NorthWestern Energy's
23 ("NorthWestern" or "Company") Director of Asset Management.
24

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

1 **A.** I have 35 years of utility experience since graduating from Montana State
2 University with a Bachelor of Science degree in Electrical Engineering. I
3 worked in distribution field operations for 14 years before joining the Asset
4 Management team in 2000. I became the Director of Asset Management
5 in 2012.

6

7

Purpose and Summary of Testimony

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

9 **A.** My testimony is to present how NorthWestern evaluates distribution
10 system operating metrics and the necessary funding to maintain system
11 performance. System metrics take into account system reliability, safety,
12 and customer requirements, as examples. My testimony provides
13 additional details regarding NorthWestern's major distribution initiative and
14 presents the associated cost information for it for the 2021 test year and
15 adjustments for projected 2022 known and measurable expenses.

16

17 **Q.** Please summarize your testimony.

18 **A.** I provide an overview of distribution initiatives as well as describe
19 NorthWestern's asset management programs and how they support safe
20 and reliable electric and natural gas service for customers. I also describe
21 NorthWestern's infrastructure management approach for project selection
22 and asset planning for distribution assets.

23

1 **Overview of Distribution Initiatives**

2 **Q. Please describe NorthWestern’s current electric and natural gas**
3 **distribution initiatives.**

4 **A.** NorthWestern’s distribution initiatives are used to describe an asset
5 maintenance (replacement) strategy for the different asset types that are
6 necessary for the delivery of safe and reliable services to our customers.
7 These initiatives generally address assets that require yearly investments
8 to maintain safe and reliable delivery. Asset types that fall into this
9 category include poles, underground cables, tree trimming, system
10 patrols, natural gas mains and services. In addition to our core initiatives
11 that apply year over year, Asset Management develops new initiatives to
12 deal with changes necessary to meet the evolving needs of our customers
13 such as the LED Lighting Project (“LED Project”), discussed by Lloyd Blain
14 Nicholls, the Montana Meter Upgrade Project (“Meter Project”) discussed
15 by Jonathon R. Shafer and the Enhanced Wildfire Mitigation Plan
16 discussed by Gregory F. Bailly and Nathaniel P. Linder.

17
18 **Q. What does NorthWestern need to implement and support those**
19 **initiatives as a whole?**

20 **A.** NorthWestern’s approach for managing these initiatives begins with the
21 establishment of operational metrics that determine requirements needed
22 to ensure our ability to deliver safe and reliable service to our customers.
23 Next, we collect information related to the metrics to determine

1 performance of the asset and whether and when the asset should be
2 repaired and replaced. The purpose of developing asset strategies is to
3 define how we want to manage the asset and the work that is required to
4 achieve the desired results.

5
6 Operational metrics can be based on time, inspection information, or
7 system performance criteria. Time-based metrics include life of the asset,
8 such as equipment battery replacements or tree trimming cycles, for
9 example. Inspection-based criteria is utilized for our pole assets. For
10 example, poles are inspected on a routine cycle and information is
11 collected for all poles with the ones that do not meet the proper standards
12 being identified for replacement. An example of performance metrics
13 includes underground cable failures or leaks per segment of gas main.
14 NorthWestern tracks these metrics by outage counts/leaks per main and
15 when a segment of cable or gas main hits the set criteria (number of
16 failures on a section of cable or leaks per main), it is scheduled for
17 replacement.

18

19 **Q. How do these distribution initiatives compare to NorthWestern's**
20 **distribution initiatives in the last rate reviews?**

21 **A.** The core asset management initiatives each year as a whole have not
22 changed significantly since the last rate reviews, a 2018 electric rate
23 review and a 2016 natural gas rate review. NorthWestern continues to

1 manage the requirements of the asset strategy to similar time-based,
2 inspection-based, and performance criteria noted above. Some changes
3 since the last rate reviews include a general escalation in costs for both
4 materials and labor.

5
6 Additional changes from the last rate reviews include new initiatives being
7 added due to changing system requirements and customer needs. As
8 previously noted, some of these new distribution initiatives include the
9 LED Project, the Meter Project, and the Enhanced Wildfire Mitigation Plan.

10

11 **Q. Why have costs changed since the last rate reviews?**

12 **A.** Beyond the impact of the new distribution initiatives mentioned above and
13 the general increase in costs of materials and labor since the prior rate
14 reviews, costs related to Asset Management vary depending on the
15 results of our asset evaluations. The costs of the programs generally
16 change due to slight variability in the inspection cycles and the assets
17 being evaluated. Costs can change also due to the number of assets that
18 have been identified that are not meeting or performing to the
19 specifications set forth in the operating guidelines/asset strategies for
20 each asset.

21

22 **Q. What benefits do these initiatives provide customers?**

1 **A.** The core initiatives for the most part are focused on the fundamental
2 assets of the delivery system and focus on maintaining adequate integrity,
3 reliability, and deliverability of services to customers. In addition to these
4 core drivers, the safety of the delivery system is tied to well-maintained
5 assets. An example of this is in our natural gas system integrity plan,
6 which incorporates the Distribution Integrity Management Process for
7 evaluating and ranking our system components and developing the plan to
8 replace the highest risk components on our system.

9

10

Selection of Distribution Initiatives

11

Q. Please describe NorthWestern's process for selecting and implementing electric and natural gas distribution projects.

12

13

A. NorthWestern has developed and implemented an infrastructure management approach (portfolio management) to evaluate and rank capital projects for budget approval. The infrastructure management approach has a 16 grid matrix, which asks 16 specific questions in four major categories to determine a project's ranking.

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The four major categories are:

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- **Asset Life:** Effectively managing asset life issues ensures that assets do not wear out and therefore cannot perform their function with the appropriate safety factor established by manufacturer or industry;

21

22

23

- 1 • **Asset Reliability:** Effectively managing delivery issues ensures
2 that the system meets acceptable performance metrics for our
3 customers;
- 4 • **Capacity:** Effectively managing capacity ensures that the system
5 can allow for new construction growth while maintaining the ability
6 to pick up other line segments during outages; and
- 7 • **Compliance:** Compliance monitoring ensures that the system is
8 managed to ensure compliance with regulations and Company
9 asset strategies and guidelines. Regulations and strategies are
10 designed to ensure safe and reliable service for our customers.

11
12 NorthWestern then evaluates each project on the score received in each
13 category as well as the total score. From the information gathered in the
14 16 questions, NorthWestern also determines a risk score. All individual
15 projects use this process to help rank the most important projects for each
16 year's capital budget.

17
18 **Q. How does the Asset Management Team assess an asset's life for**
19 **replacement and maintenance investments?**

20 **A.** Asset life category establishes life cycles for each major asset.
21 NorthWestern then evaluates where in the life cycle the individual asset is
22 using inspections, system data, time in service, and changes in system
23 design. Evaluating life cycle status is also known as determining the

1 critical health of an asset. By determining critical health assessments, it
2 allows NorthWestern to prioritize asset replacements amongst the
3 organizational requests.

4

5 **Q. How does the Asset Management Team assess a potential**
6 **investment's contribution to the reliability of the system?**

7 **A.** NorthWestern has established system performance metrics (guiding
8 principles) for the overall system, individual circuits in general, and we are
9 now working on electric and natural gas sections. NorthWestern
10 combines system information at the section level and identifies the critical
11 reliability score for each section, which NorthWestern then prioritizes for
12 refurbishment/replacement.

13

14 **Q. What role does capacity planning play in this process?**

15 **A.** Capacity on the distribution system is managed to ensure that
16 NorthWestern can meet the customers' needs on each natural gas and
17 electric service, main/circuit, and substation/gate station. Asset
18 management uses guiding principles to establish how much capacity we
19 want to maintain for new growth and system reconfigurations. This
20 capacity is in the form of larger conductors or pipes, bigger substation
21 transformers, or gate stations. NorthWestern distribution planners work
22 directly with operations to identify capacity issues, which do not meet the
23 established operating metrics for deliverability.

1 The latent capacity requirements vary depending on the system design:
2 radial feed, loop feed, reliability substation/gate station, etc. NorthWestern
3 establishes these metrics based on the load requirements for each
4 system, planning horizon being utilized, and the growth rates in the area.

5
6 Project requests are evaluated using the infrastructure methodology (16
7 grid matrix) to determine project need scores and then they are prioritized
8 in the capital budget process.

9

10 **Q. How does the Asset Management Team address NorthWestern's**
11 **obligation to maintain system compliance with statutory and**
12 **regulatory requirements?**

13 **A.** The Asset Management Team manages and assesses the major assets to
14 ensure they are in compliance with regulatory and industry standards.
15 NorthWestern monitors our delivery system during routine patrols,
16 inspections, and routine maintenance practices. NorthWestern assesses
17 projects for compliance issues and are scored based on compliance with
18 NorthWestern's standards, industry standards, and regulatory standards.
19 The project's need score is then established and prioritized.

20

21 **Q. How does this selection process benefit customers?**

22 **A.** The infrastructure methodology process described above allows
23 NorthWestern to prioritize projects across the different departments in the

1 Company. The process also monitors all capital submittals for safety and
2 reliability improvements. Using this process has allowed NorthWestern to
3 improve the overall reliability, deliverability, and safety of our system.
4

5 **Q. Did the Asset Management Team follow the selection process**
6 **discussed above for NorthWestern’s distribution initiatives**
7 **discussed in this testimony?**

8 **A.** Yes, the infrastructure methodology evaluates both the needs of the
9 natural gas and electric systems as well as the needs of other
10 departments.
11

Advanced Distribution Management System

12
13 **Q. Please describe NorthWestern’s Advanced Distribution Management**
14 **System.**

15 **A.** The Advanced Distribution Management System (“ADMS”) is a software
16 system that will provide greater situational awareness for the distribution
17 system, improved outage restoration/management, operational benefits,
18 engineering analysis, and operational control over the distribution system.
19 Specifically, the ADMS software combines an Outage Management
20 System (“OMS”), with distribution Supervisory Control and Data
21 Acquisition (“SCADA”), together with network modeling software, and also
22 has the capability to perform several advanced functions such as Fault
23 Location, Isolation, and System Restoration (FLISR).

1 Phase 1 of ADMS included implementing the OMS, and transitioning from
2 the old OMS to the new one. That occurred on January 29, 2020. Phase
3 2 will include integrating the SCADA, followed by the Distribution
4 Operation Control Center (“DOCC”) centrally directing more of the field
5 switching, all the while utilizing the ADMS for greater situational
6 awareness. Phase 2 of this project is scheduled for implementation in the
7 fall of 2022. Phase 3 will transition the DOCC to allow the controllers to
8 operate certain field devices directly through the SCADA, as well as
9 placing “tags” on field devices. Phase 3 of this project is currently
10 scheduled for implementation in the second quarter of 2023. The Phase 4
11 transition will move the ADMS from a mode where it recommends
12 advanced functions for the operators to implement, allowing the software
13 to perform the function autonomously. These functions can be selectively
14 chosen so as to move into this as slowly or quickly as desired. Phase 4 of
15 the project is currently scheduled for late 2024. The final phase, Phase 4,
16 of this project requires significant change management and training
17 activities in the field to be completed as well as fully commissioning the
18 field equipment. The ADMS is an electric only system. Natural gas
19 SCADA is separate.

20

21 **Q. How much has NorthWestern spent and is anticipated to spend on**
22 **the ADMS project since 2018?**

1 **A.** This project has been delayed due to system integration issues as well as
2 software upgrades. The original project estimate was \$4.8 million with a
3 projected go-live date in 2018. Base software was installed in 2019 as we
4 continued to work on the additional functionality. The following are the
5 yearly expenditures:

6 2018: \$2.6 million
7 2019: \$1.9 million
8 2020: \$2.0 million
9 2021: \$1.7 million
10 2022: projected \$ 1.0 million

11
12 The project delays have mainly been due to the comprehensive updates
13 from the vendor's original software proposal and the new proposal where
14 the entire system components are all included in one software platform,
15 instead of three separate stand-alone software programs. The benefits to
16 an integrated system are the increased situational awareness of having all
17 of the system performance information on one screen and one set of
18 reporting tables. The outcome from combined the software is improved
19 operator performance and safety.

20
21 **Q. Please describe how the ADMS project will benefit NorthWestern's**
22 **electric distribution system and customers.**

23 **A.** As of today, NorthWestern expects the project to close out in 2022 with
24 the implementation of the software. This would include the final two
25 milestone payments to the vendor and then project completion.

1 When the ADMS software is fully implemented at the end of 2022, the
2 Distribution Operations Center (“DOC”) will have increased situational
3 awareness on our distribution system. The DOC will be able to see what
4 is happening because of the addition of smart devices throughout our
5 operating area. For example, these smart devices will let DOC know
6 when they have operated and inform the DOC of outages in real time as
7 they occur. Crews can be dispatched to the problem area more quickly.
8 Increased situational awareness allows NorthWestern to improve the
9 overall deliverability and reliability of the system. As stated earlier,
10 increased reliability and deliverability equates to improved safety for
11 everyone.

12
13 **Q. Does this conclude your testimony?**

14 **A. Yes, it does.**

VERIFICATION

This Pre-filed Direct Testimony of John E. Carmody is true and accurate to the best of my knowledge, information, and belief.

/s/ John E. Carmody
John E. Carmody