

7 PRE-FILED DIRECT TESTIMONY
8 OF LLOYD BLAIN NICHOLLS
9 ON BEHALF OF NORTHWESTERN ENERGY
10

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22 Witness Information

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

24 **A.** My name is Lloyd Blain Nicholls. I am the Director of the Project
25 Management Program in NorthWestern Energy’s (“NorthWestern”)
26 Distribution Operations Infrastructure Department.

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

3 **A.** I hold a Mechanical Engineering degree from Montana State University
4 and am a registered Professional Engineer and Project Management
5 Professional. I have over 30 years of professional experience in
6 engineering and management on a variety of projects and programs. I am
7 a Project Manager Director and provide oversight to a team of project
8 managers who manage electric distribution projects and natural gas
9 transmission projects. Prior to this, I worked on multiple natural gas and
10 electric projects and was the project manager of the Distribution System
11 Infrastructure Project, known as DSIP, which was a seven-year initiative
12 investing over \$300 million in our distribution system including electric
13 circuit refurbishments, substation communications, and natural gas
14 distribution in operation areas. In addition to utility work, I have experience
15 in aerospace, nuclear, and other various engineering-related industries.

16

17 **Purpose and Summary of Testimony**

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

19 **A.** My testimony provides more information regarding NorthWestern's LED
20 Lighting Project ("LED Project") and presents the associated cost
21 information for a 2021 test year and adjustments for projected 2022 known
22 and measurable changes.

23

1 **Q. Please summarize your testimony.**

2 **A.** This testimony explains why NorthWestern made the decision to move
3 forward with the conversion of our existing high-pressure sodium lights
4 (“HPS”) and metal halide fixtures to new LED fixtures. It describes why the
5 adoption of LED technology was right for NorthWestern customers, the
6 growing challenges associated with maintaining existing HPS lights as
7 they are being phased out by the industry at large, and finally why the
8 costs of LED lighting was the right investment for our customers.

9

10

LED Lighting Project

11 **Q. What is the LED Project?**

12 **A.** The LED Project is a statewide, multi-year initiative to replace, where
13 possible, approximately 43,000 NorthWestern-owned HPS street lights
14 and approximately 40,000 yard/area HPS lights with LED lights in
15 Montana.¹ It includes replacing light fixtures as well as poles and
16 underground cables, when required. It also requires coordination of
17 multiple data systems for customer billing and mapping to be performed to
18 effectively manage the customer experience.

19

20 In summary, the LED Project scope includes:

¹ More information on the LED project can be found in the video at:
<https://www.youtube.com/watch?v=p6mudFWHj7M>

- 1 • Converting existing NorthWestern-owned HPS lights and HPS
- 2 yard/area lights to LED lights identified in NorthWestern's standard
- 3 offerings;
- 4 • Replacing poles, as required;
- 5 • Replacing underground cable, as required or needed to ensure
- 6 reliability;
- 7 • Reconciling records between customer billing software and
- 8 mapping;
- 9 • Developing beta sites, which is the installation of sample LED lights
- 10 in major operating areas to demonstrate to the public the LED
- 11 lighting characteristics;
- 12 • Developing internal and external stakeholder communication plans;
- 13 • Developing internal and external change management plans;
- 14 • Developing engineering guidelines; and
- 15 • Developing construction standards.

16

17 **Q. What is the status of the LED Project?**

18 **A.** NorthWestern has converted over 90% of the HPS lights to LED and is
19 expected to complete the conversion to LED by the fourth quarter of 2022.

20

21 **Q. Please explain the difference between a street light and a yard/area**
22 **light.**

1 **A.** For the LED Project, a street light is a light that is part of a Special
2 Improvement Lighting District (SILD), Special Improvement &
3 Maintenance Lighting District (SILMD), or Rural Special Improvement
4 District (RSID) to illuminate the street. A yard/area light is a light installed
5 in residential or commercial areas to illuminate the customer's property.

6

7 **Q. Please explain the difference between a NorthWestern-owned street
8 light and a customer-owned street light.**

9 **A.** A NorthWestern-owned street light is owned and maintained by
10 NorthWestern whereas a customer-owned street light is owned by the
11 customer and may have historically been maintained by NorthWestern.

12

13 **Q. What motivated the LED Project?**

14 **A.** The request to move forward with the LED Project was driven by several
15 factors, including increased customer requests, the declining costs of
16 LEDs, and growing dominance of a previously emerging technology.
17 Additionally, the HPS lights were being phased out by vendors making it
18 difficult and expensive to find replacement parts in the event of a failure.
19 The LED Project keeps NorthWestern in alignment with industry trends as
20 historical lighting practices are phased out. NorthWestern was also
21 motivated to move forward with the LED Project because future operation
22 and maintenance costs will be reduced.

23

1 **Q. You mentioned that besides replacing the actual light fixtures, the**
2 **LED Project replaces poles and underground infrastructure. Why**
3 **were these items included in the project?**

4 **A.** NorthWestern performed field inspections on the majority of street lights
5 prior to converting them to LEDs. The field team took this opportunity to
6 identify any light poles or underground cables that may be in need of
7 replacement. NorthWestern performed this work to ensure public safety
8 and improve reliability.

9
10 **Q. Please describe the work NorthWestern performed for the LED**
11 **Project.**

12 **A.** At a high level, the following is some, but not all, of the work done by the
13 internal teams at NorthWestern for the LED Project:

- 14 • NorthWestern engineers reviewed and selected LED fixtures to
15 replace existing HPS lights. The selected LED fixtures will also
16 be NorthWestern's standard offerings for future lighting
17 customers.
- 18 • Field assessments were performed by field engineers to review
19 installs, confirm records are accurate, and identify any unique
20 situations the construction crews may face.
- 21 • Project analysts reviewed field information, customer billing
22 records, and Geographic Information System data to reconcile
23 records, if needed.

- 1 • Project analysts prepared orders for the work to be performed.
- 2 • Construction engineers ordered materials and prepared
- 3 construction packages, including materials lists and construction
- 4 maps.
- 5 • Community relations managers notified communities of the work
- 6 being performed and answered questions about the project.
- 7 • Construction crews performed fixtures conversions in the field.
- 8 Light poles and underground cables were replaced, if needed
- 9 based on field inspections.
- 10 • HPS lights that were removed were placed in bins for recycling
- 11 by a local company.
- 12 • Project analysts closed orders and updated records in all
- 13 systems including billing being adjusted for less usage from the
- 14 LED fixtures.

15

16 **Q. What was the purpose of the beta sites?**

17 **A.** There were several reasons for the beta sites. NorthWestern installed

18 them to show the public and customers the new line of LED lighting

19 solutions that it would be installing. The beta sites also provided the ability

20 to have a reasonable visual comparison between the then-existing HPS

21 lights and new LED lights. NorthWestern also used these sites to help

22 explain why the conversion was necessary and the benefits of waiting until

23 2019 to begin the conversion. Finally, NorthWestern used the beta sites to

1 indicate that it may phase in additional lighting projects as the availability
2 of HPS continued to decrease.

3

4 **Q. Please expand on NorthWestern's communications related to the**
5 **LED Project.**

6 **A.** NorthWestern took a multi-pronged approach to communication efforts for
7 the LED Project. First, NorthWestern held meetings with local
8 governments and communities and installed sample LED lights in Billings
9 and Helena.

10

11 Each Montana division office was also given tools to assist with their
12 communication outreach to use as needed to best fit the communication
13 with their individual communities. NorthWestern's community relations
14 managers and Lighting Committee members conducted outreach in
15 communities in advance of conversion and kept local governments
16 updated on the conversion progress.

17

18 For the general public, NorthWestern published articles in our Energy
19 Connections bill stuffer and had a document on our website about the
20 project. We also handled individual calls from citizens who had questions
21 about the project and developed a Question and Answer document to
22 assist our employees in answering questions. NorthWestern utilized

1 opportunities for media with news stories about the LED Project and its
2 benefits, as those opportunities became available.

3

4 NorthWestern worked with employees by holding lighting training
5 sessions, circulating lighting training materials, and providing research on
6 local community outdoor lighting and dark sky ordinances.

7

8 **Q. What reactions and/or comments did NorthWestern receive from its**
9 **communities?**

10 **A.** The reactions from local governments were very positive. Some
11 customers even contacted NorthWestern to thank us for changing the
12 lights in their neighborhoods. We did have a few customers who called
13 about a specific LED light that they thought was too bright. In response,
14 we installed shields on the lights. In communities that have implemented
15 dark sky lighting ordinances, some of our lighting fixtures required
16 NorthWestern to research and find a dark sky-compliant fixture to install in
17 those communities to meet local ordinances. Finally, NorthWestern
18 received requests to install lower temperature lights such as a 3000 Kelvin
19 rather than the 4000 Kelvin lights that were more popular at the time.
20 NorthWestern eventually incorporated 2700 Kelvin cobrahead lights as
21 they became available.

22

1 **Q. Why did NorthWestern choose LEDs as the appropriate replacement**
2 **light fixture?**

3 **A.** LED street lights use significantly less electricity than HPS lights and are
4 expected to last two to three times longer. They have also become the
5 primary light type that vendors offer.

6

7 **Q. How did NorthWestern select the specific LED lights installed as part**
8 **of the LED Project?**

9 **A.** In 2018, NorthWestern’s Asset Management Team issued a Request for
10 Information (“RFI”) to the major LED outdoor lighting vendors.
11 NorthWestern already had a relationship with most of these vendors since
12 they were supplying our then-existing lighting fixtures. The purpose of the
13 RFI was twofold: (1) to identify cost-effective like-for-like LED replacement
14 fixtures for the then-current lights, and (2) to seek out information on best
15 practices for LED specifications, including but not limited to color
16 temperature, overvoltage protection, and warranties. Attached as Exhibit
17 LBN-1 is the RFI that NorthWestern issued in 2018.

18

19 From the results of the RFI, NorthWestern was able to (1) produce a
20 specification document for LED lighting, and (2) compare LED fixtures as
21 like-for-like replacements for our existing lights. Going forward,
22 NorthWestern’s Purchasing Department was then able to obtain price

1 quotations from multiple vendors on an as-needed basis for each fixture
2 type identified through the RFI process.

3

4 **Q. What do you mean when using the term “like-for-like replacement
5 fixture” in your previous answer?**

6 **A.** NorthWestern sought LED light fixtures that were comparable to the
7 existing lights in style, light pattern, and effective lumens projected on the
8 ground. Said differently, the LED Project was not a complete redesign of
9 the then-current lighting system and instead focused on finding similar
10 lights that could replace the existing lights without significant change in
11 design.

12

13 **Q. What standards did NorthWestern create for the LED Project?**

14 **A.** NorthWestern created an LED specifications document to guide its
15 Standards and Purchasing teams with details for the specific LED fixtures
16 available for installation on NorthWestern’s system. This document
17 became NorthWestern’s LED Standard Offerings, which provides a
18 “menu” of available fixtures for customers to choose from when installing
19 lights. NorthWestern also created LED Construction Standards to guide
20 field crews and field engineering with the installation of LED fixtures.

21

22 **Q. Please expand on the development of the LED Standard Offerings.**

1 **A.** NorthWestern’s LED Standard Offerings document not only features like-
2 for-like replacements, but it improves on NorthWestern’s light offerings by
3 incorporating industry best practices into the specifications. This includes
4 the dark sky-compliant options for all lighting styles when available, with
5 some styles changed exclusively to dark sky fixtures. The project team
6 spent significant time on the LED color temperature, as previously
7 mentioned, and ultimately refined the offering after working with
8 communities and customers. NorthWestern also anticipates this document
9 will evolve over time to reflect industry standards and new fixture styles,
10 as needed. Attached as Exhibit LBN-2 is NorthWestern’s current LED
11 Standard Offerings.

12
13 **Q. What is the total expected cost of the LED Project?**

14 **A.** NorthWestern anticipates that the total project cost will be approximately
15 \$28.9 million with \$25.4 million incurred through the end of 2021 and \$3.5
16 million expected for 2022, as reflected in the table below.

Table 1: LED Project Costs by Year

2018	2019	2020	2021	2022
\$746,754	\$3,448,608	\$11,792,875	\$9,913,261	\$3,498,992

17 **Q. Please provide details on the specific costs.**

18 **A.** On average, each LED light fixture costs approximately \$210. This
19 average cost was based on the RFI responses. When you add in labor

1 and other administrative costs, the average cost per fixture was
2 approximately \$326. NorthWestern based the average labor rate for work
3 performed on lights with no replacement of poles or underground wiring on
4 an estimate that a two-person crew could replace two and half lights per
5 hour. For lights requiring the replacement of poles or underground wiring,
6 average unit costs were typically between \$500 and \$2,000 based on the
7 additional work required.

8

9 **Q. How does the cost of the LED fixtures purchased by NorthWestern**
10 **for the LED Project compare to the prior costs of LED fixtures?**

11 **A.** At the time NorthWestern started working on the LED Project, LED light
12 fixtures had become significantly more cost-competitive. In 2009,
13 NorthWestern reported that the costs of LED fixtures ranged between
14 approximately \$700 and \$1,600 per fixture. By 2016, NorthWestern's
15 research had shown that the cost of certain light fixtures had dropped
16 significantly (to approximately \$200 to \$250 per fixture), which resulted in
17 NorthWestern kicking off the initial work associated with the LED Project.

18

19 **Q. Is there a warranty on the light fixtures selected by NorthWestern for**
20 **the LED Project?**

21 **A.** Yes. NorthWestern obtained a 10-year warranty on the lights it purchases
22 from manufacturers. This means that if a light fails in the field in the first 10
23 years after the purchase date, NorthWestern can process a warranty claim

1 with the manufacturer who, in turn, must provide a new fixture without
2 charging NorthWestern.

3

4 **Q. Have there been any challenges experienced during the LED**
5 **Project?**

6 **A.** Yes. A handful of issues have arisen over the life of the project. Many
7 cities and counties have adopted dark sky ordinances, light trespass
8 constraints (amount of light projected onto neighboring properties), and
9 stringent lighting guidelines. Although the LED Project was a like-for-like
10 replacement, NorthWestern worked closely with those entities to meet
11 their requirements during the project.

12

13 **Q. How did NorthWestern comply with these local ordinances and**
14 **respond to customer concerns?**

15 **A.** As mentioned earlier in my testimony when discussing the communication
16 efforts, NorthWestern selected dark sky-compliant options that eliminate
17 or minimize up light and meet the requirements of the International Dark-
18 Sky Association as well as the local ordinances. NorthWestern met light
19 trespass requirements by selecting proper light patterns. NorthWestern
20 also had metal shields manufactured for lights that were found to have
21 light trespass based on the local ordinances. Finally, for some areas, we
22 hired engineering consultants from HDR Inc. to perform lighting studies for
23 multiple combinations of lighting scenarios.

1 **Q. What has NorthWestern done with the lights it is replacing?**

2 **A.** After issuing several Requests for Proposals, NorthWestern contracted
3 with Four Corners Recycling in Bozeman to handle all the recycling needs
4 for the LED Project. This service included transporting the bin rentals to
5 the requested work locations, picking up full bins, and recycling the HPS
6 fixtures, which included disassembling the bulbs from the fixture heads.
7 Four Corners Recycling has offered commercial and residential scrap
8 metal recycling since 2004. They offer a full-service process center and
9 worked in conjunction with Helena Recycling LLC and Earth First Aid to
10 ensure all recycling bins and materials were transported and handled in a
11 safe manner. Helena Recycling LLC, in business since 2009, is able to
12 collect and process all of its recyclables on site and at their facility. Earth
13 First Aid, in business for over a decade and located in Billings, also
14 manages both commercial and residential customers and offers
15 convenient recycling drop-off locations. This vendor has helped with
16 transport and service needs in areas such as Havre and Glasgow.

17
18 With communication from the project managers, Four Corners Recycling
19 coordinated the delivery and pick-up of recycling bins in our Montana
20 service territories where work was being performed for the LED Project.
21 This company also handled all the invoicing of units recovered,
22 transportation costs, and bin rentals. Invoices are then processed by
23 NorthWestern project managers to communicate and manage costs, track

1 plan counts versus recovered units processed, and ensure proper billing
2 of invoices are received. From project commencement to date, we have
3 recycled close to 58,000 HPS light fixtures.

4

5 **Q. Have there been any benefits to customers from the LED Project?**

6 **A.** Yes, the new LED fixtures are more reliable and much more energy
7 efficient. NorthWestern also incorporated city and county ordinances into
8 the LED Project to bring a better overall lighting experience to our
9 customers. All LED lighting has also been installed with seven pin
10 connectors to allow for future technology, such as auto dimming, to be
11 incorporated in the future.

12

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

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

VERIFICATION

This Pre-filed Direct Testimony of Lloyd Blain Nicholls is true and accurate to the best of my knowledge, information, and belief.

/s/ Lloyd Blain Nicholls
Lloyd Blain Nicholls