

January 22, 2019

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, Minnesota 55101

RE: **Comments of the Minnesota Department of Commerce, Division of Energy Resources**
Docket No. E002/M-18-729

Dear Mr. Wolf:

Attached are the comments of the Minnesota Department of Commerce, Division of Energy Resources (Department) in the following matter:

In the Matter of Northern States Power Company dba Xcel Energy-Electric Petition for Approval of Lighting Tariff Revisions to Include Light Emitting Diode (LED) Options.

The Petition was filed on November 21, 2018 by:

Lisa Peterson
Xcel Energy
414 Nicollet Mall, 401 – 7th Floor
Minneapolis, MN 55401
(612) 330-7681

The Department will provide final recommendations in Reply Comments. The Department is available to answer any questions that the Minnesota Public Utilities Commission may have.

Sincerely,

/s/ DANIELLE WINNER
Rates Analyst

/s/ NANCY CAMPBELL
Financial Analyst

NC/DW/jl
Attachment



Before the Minnesota Public Utilities Commission

Comments of the Minnesota Department of Commerce Division of Energy Resources

Docket No. E002/M-18-729

I. INTRODUCTION

On November 21, 2018, Northern States Power dba Xcel Energy- Electric (Xcel or the Company) filed a Petition requesting that the Minnesota Public Utilities Commission (Commission):

- Approve Xcel’s proposal to add Light Emitting Diode (LED) service options to the Company’s Automatic Protective Lighting Service (Rate Code A07);
- Approve Xcel’s proposal to add LED service options to the Company’s Street Lighting Energy Service (Closed) (Rate Code A32), and;
- Approve Xcel’s proposal to close the Street Lighting Service- City of St. Paul (Closed) (Rate Code A37) to new fixtures.

Xcel submitted redlined and clean tariff sheets of the proposed changes, and also provided a cost analysis for the A07 lights. The Department submits these Comments in response to the Company’s proposals.

II. BACKGROUND

On October 15, 2015, Xcel proposed to add LEDs to its Street Lighting System Service tariff (Rate Code A30) in Docket No. E002/M-15-920 (Docket 15-920). In that docket, the Company designed rates using a marginal cost study, similar to the one provided in the instant Petition. In the A30 cost study, the Company captured both the incremental capital costs associated with LEDs and the incremental operational savings due to avoided maintenance, energy, and demand costs associated with the old High Pressure Sodium (HPS) lamps being replaced. The approved LED rates in Docket 15-920 were slightly higher than the original HPS rates, as shown in the following table.

Table 1. Existing HPS vs Approved LED Street Lighting Rates for Rate Code A30

	100W/39W	150W/65W	250W/155W	400W/246W
A30 HPS Street Lighting Rates (monthly rate per light)	\$9.44	\$10.15	\$12.77	\$15.50
A30 LED Street Lighting Rates (monthly rate per light)	\$9.59	\$10.21	\$13.36	\$16.63
Increase/(Decrease)	\$0.15	\$0.06	\$0.59	\$1.13

On November 2, 2015, the Company filed a general rate case in Docket No. E002/GR-15-826 (2015 Rate Case) that included a multi-year rate plan (MYRP) for years 2016-2019. In that filing, the Company included projected LED costs over the MYRP term, as well as LED costs at the beginning of its forecasted 2016 test year, under the assumption that the LED program would begin incurring costs in 2015. Included in these costs were the capital costs of the LEDs; the Company also specified that it had accounted for \$300,000 in operational savings due to avoided costs associated with LEDs.¹

The LED Street Lighting program began later than was expected, and so the Company did not actually incur LED costs in 2015, despite having recorded LED costs at the beginning of the 2016 test year. The Suburban Rate Authority (SRA) and the City of Minneapolis (Minneapolis) filed testimony in the 2015 Rate Case noting this discrepancy.² However, the main concern expressed by the SRA and Minneapolis was that the 2016 LED capital costs represented in the rate case were not significantly offset by operational savings. The SRA and Minneapolis argued that the LED rates had recently been set in Docket 15-920, and that the rates approved in that docket more accurately captured avoided costs.

On August 16, 2016, Xcel, the SRA, and Minneapolis agreed to a Stipulation of Settlement concerning treatment of the LEDs.³ This Settlement stipulated the following:

- The revenue requirements of all capital additions of LED street lighting would be removed from the 2015 Rate Case. The resulting amount would be used to set rates for all non-LED street lighting rates.
- Xcel would create a regulatory asset comprising the revenue requirements of LED capital additions made during the term of the Multi-Year Rate Plan. This would mean that the full undepreciated value of the LEDs would be represented in Xcel's projected November 2019 rate case, the inclusion of which the SRA and the City agreed not to contest. The parties agreed that the regulatory asset would not incur carrying charges.
- LED rates would remain at the levels set in the 15-920 filing levels. LED revenues collected during the term of the MYRP would be credited against the regulatory asset.

¹ See Exhibit E (SRA 22 to Xcel Energy) in June 14, 2016 Direct Testimony of Larry Schedin in Docket No. E002/GR-15-826. *In the Matter of the Application of Northern States Power Company for Authority to Increase Rates for Electric Service in the State of Minnesota.*

² See Page 11 and Exhibit G (SRA 21 to Xcel Energy) in June 14, 2016 Direct Testimony of Larry Schedin in Docket No. E002/GR-15-826.

³ See Attachment A, or Page 9-11, Stipulation of Settlement dated August 16, 2016 in Docket No. E002/GR-15-826.

III. XCEL'S CURRENT PROPOSAL

In the instant docket, the Company proposed to add LED options to two other Street Lighting services: Area Protective Lighting (A07) and Street Lighting Energy Service (Closed) (A32). The Company further proposed to close its Street Lighting Service- City of Saint Paul (A37) to new lights. These rates were not at issue in either the 15-920 docket or the 2015 Rate Case Settlement, both of which focused exclusively on Rate Code A30.

Due to complexities with Xcel's rates in light of its most recent rate case, the following provides a detailed description of the Company's proposed rates.

A. AUTOMATIC PROTECTIVE LIGHTING (A07)

To calculate the LED rates, the Company proposed a treatment similar to what was used for Street Lighting System Service (A30) in Docket 15-920. The Company first ascertained the equivalencies between HPS and LED lamps, determining that 100W HPS was equivalent to a 43W LED, and that 250W HPS was equivalent to a 157W LED. Next, using the current HPS rates as a starting point, the Company added incremental LED costs (comprising the incremental capital revenue requirement of the LED that exceeded the HPS lamps capital revenue requirement) and subtracted avoided HPS costs (avoided maintenance, non-fuel energy-related, and demand-related costs) to derive the proposed LED rates.⁴ This treatment is shown in the following representation:

Current HPS Rate
- Avoided HPS Relamp Maintenance Costs
- Avoided HPS Service Order Maintenance Costs
- Avoided HPS Non-Fuel Energy-Related System Costs
- Avoided HPS Demand-Related System Costs
<u>+ Incremental LED Capital Revenue Requirement Costs</u>
Proposed LED Equivalent Rate

Table 2 below shows the Company's proposed LED rates and the following rate impacts compared to the equivalent HPS lights.

Table 2. 2019 HPS and Proposed LED Equivalent Automatic Protective Lighting Rates

	100W/43W	250W/157W
2019 HPS Automatic Protective Lighting \$/light/month	\$7.71	\$12.30
Proposed LED Automatic Protective Lighting (\$/light/month)	\$7.67	\$11.72
Increase/(Decrease)	(0.04)	(0.58)

⁴ See Attachment B to Petition or Attachment B, Page 6 to these Comments.

Additionally, the Company provided analysis concerning the monthly billing impacts of these rate changes. To do so, the Company started with the current HPS monthly average bill per street light and subtracted the monthly A07 rate, fuel charge, and resource adjustment impacts. The Company calculated that, as a result of converting to LEDs, customers would save \$0.64 per month, per bulb, by converting to 43W LEDs and \$1.80 per month, per bulb, by converting to 157W LEDs.

The following sections detail the Company's A07 rate treatment, and compare it to the A30 rate treatment approved in Docket 15-920.

1. Avoided HPS Maintenance Costs

As shown in Xcel's Attachment B to its Petition, Xcel identified two types of HPS maintenance costs that would be avoided by switching to LEDs: Relamp Maintenance Costs and Service Order Maintenance Costs. The Company assumed that these costs will be the same for 100W HPS lights and 250W HPS lights.

To obtain the Relamp Avoided HPS Maintenance Costs, Xcel divided a Relamp Expense Forecast (\$0) by Number of Rate Code A30 Lights (109,872), resulting in \$0 avoided Relamp Savings.⁵

This was the same calculation used by the Company to calculate the A30 LED Rates, except that in the A30 calculation, the Company used a Relamp Expense Forecast of \$502,344 instead of \$0, resulting in a per-light Relamp Expense Savings of \$4.57 as opposed to \$0.⁶

To obtain the Service Order Avoided HPS Maintenance Costs, Xcel divided Annual HPS Fixture Related Service Order Expense (\$698,703) by No. of Rate Code A30 Street Lights (109,872), resulting in \$6.36 of Service Order Avoided Costs.⁷ This was the same calculation and inputs used to calculate the A30 rates.⁸

2. Avoided HPS Energy Costs (Non-Fuel)

Xcel calculated that the Avoided HPS Non-Fuel Energy Costs are different for the 100W HPS lights and the 250W HPS lights.

To obtain these avoided energy costs, Xcel first determined an energy-related expense rate due to APL lights of 5.050 cents/kWh.⁹ This amount was calculated by adding the total annual 2017 APL Energy Cost (\$1,397) to the total annual 2017 Baseload Cost (\$166), and dividing the result by the total annual 2017 APL energy usage (30,967 MWH). This was the same calculation used

⁵ See Attachment B, page 7.

⁶ See Attachment C, page 3.

⁷ See Attachment B, page 7.

⁸ See Attachment C, page 3.

⁹ See Attachment B, page 12.

to determine the A30 Rates in 15-920, but in that docket, the Company instead used inputs for all 2015 non-APL lighting.¹⁰ Xcel calculated the A30 energy-related expense rate to be 3.646 cents/kWh.

In A07, Xcel assumed that the energy-related expense rate of 5.050 cents/kWh included fuel costs, and therefore backed out a fuel expense rate of 2.165 cents/kWh.¹¹ This calculation was also done in in the A30 calculation, but in that docket Xcel used a fuel expense rate of 2.098 cents/kWh.¹² The resulting non-fuel energy rates are 2.885 cents/kWh for A07 HPS lights and 2.201 cents/kWh for A30 lights.

To determine the avoided A07 annual HPS energy costs, Xcel found the difference between the annual energy usage of HPS lamps and their LED equivalents. Xcel first multiplied the 2.885 cents/kWh rate by the annual energy usage of each lamp (487 kWh and 1,277 kWh, respectively) to produce an annual energy-related cost for each HPS lamp.¹³ Then, Xcel multiplied the same 2.885 cents/kWh by the LED equivalent annual energy usages (179 kWh/year and 653 kWh/year, respectively) to produce an annual energy-related cost for each LED lamp. Finally, Xcel subtracted the annual LED lamp costs from the equivalent annual HPS lamp costs to produce the incremental annual energy cost (or avoided annual energy cost) of operating an HPS lamp instead of its equivalent LED lamp. Xcel calculated these avoided non-fuel energy costs to be \$8.89/year for a 100W HPS lamp instead of a 43W LED lamp, and \$18.00/year to operate a 250W HPS lamp instead of a 157W lamp.¹⁴

Xcel used this same treatment in the A30 lights, but used different annual usages for the LED equivalents, as the A30 lights used a 39W LED equivalent for a 100W HPS and a 155W LED equivalent for a 250W HPS. Although the usage differential was greater between HPS and LEDs for the A30 lights, the lower non-fuel energy rate of 2.201 cents/kWh resulted in lower avoided energy costs for the A30 lights than the A07 lights, at \$7.18/year and \$13.96/year, respectively.¹⁵

3. *Avoided HPS Demand Costs*

Xcel calculated that the Avoided HPS Demand Costs are different for the 100W HPS lights and the 250W HPS lights.

To obtain the demand-related avoided rate per kW for A07, Xcel first calculated \$105 in annual Demand Costs due to 2017 APL lights, derived from \$0 in Peak Costs, \$0 in Transmission Costs,

¹⁰ See Attachment C, page 9.

¹¹ See Attachment B, page 7.

¹² See Attachment C, page 4.

¹³ See Attachment B, page 7.

¹⁴ See Attachment B, page 7.

¹⁵ See Attachment C, page 4.

and \$105 in Distribution Costs.¹⁶ The Company then divided these APL Demand costs by the annual energy usage due to APL lights (30,967 MWH) to obtain a demand rate of 0.341 cents/kWh. Xcel multiplied this result by the number of hours APL lights are assumed to be on for one year (4,160 hours), resulting in an annual demand rate of \$14.17 per APL kW.¹⁷ The Company used this same calculation for the A30 lights, but assumed inputs based on 2015 non-APL lights.¹⁸ This calculation resulted in \$184 in Peak Costs, \$6 in Transmission Costs, and \$1,140 in Distribution Costs, for a total of \$1,140 in non-APL Demand Costs.¹⁹ The Company calculated an annual demand rate of \$38.60 per non-APL kW.

To determine the avoided annual A07 100W and 250W HPS demand costs, Xcel found the difference between the annual demand of HPS lamps and their LED equivalents. Xcel first multiplied the \$14.17/kW rate by the annual demand of each lamp (117W and 307W, respectively) to produce an annual demand-related cost for each HPS lamp.²⁰ Then, Xcel multiplied the same \$14.17/kW by the LED equivalent annual energy usages (43W and 157W, respectively) to produce an annual energy-related cost for each LED lamp. Finally, Xcel subtracted the annual LED demand costs from the equivalent annual HPS demand costs to produce the incremental annual demand cost (or avoided annual demand cost) of operating an HPS lamp instead of an LED lamp. Xcel calculated these avoided demand costs to be \$1.05/year for using a 100W HPS lamp instead of a 43W LED lamp, and \$2.13/year for using a 250W HPS lamp instead of a 157W LED lamp.²¹

Xcel used this same treatment in the A30 lights, but used different annual demands for the 100W HPS and 250W HPS equivalents, as the A30 LEDs were rated at 43W and 157W, respectively. Since the demand differential was greater between HPS and LEDs for the A30 lights, and the demand rate of \$38.60 was much higher for the A30 lights, Xcel calculated the 100W HPS and 250W HPS A30 lights to have greater avoided demand costs than the A07 HPS lights, at \$3.02/year and \$5.89/year, respectively.²²

4. Incremental LED Capital Costs

The incremental LED capital cost revenue requirement was the only cost addition captured in the Company's LED rate design.

To obtain the incremental LED capital cost revenue requirement for the A07 lights, Xcel first determined the net LED installed cost (including fixture, photo control, and installation) of each

¹⁶ See Attachment B, page 12.

¹⁷ See Attachment B, page 12.

¹⁸ See Attachment C, page 9.

¹⁹ See Attachment C, page 9.

²⁰ See Attachment B, page 8.

²¹ See Attachment B, page 8.

²² See Attachment C, page 4.

light: \$157.00 for each 43W lamp and \$195.00 for each 157W lamp.²³ The capital cost of each A07 light was then multiplied by the Company's 29-year Levelized Annual Revenue Requirement (LARR) percentage of 10.05%, resulting in annual per-light capital revenue requirements of \$15.78 for the 43W lamp and \$19.61 for the 157W lamp.²⁴

These amounts compared with A30 LED capital costs of \$202.69 for the 39W LED (100W HPS equivalent) and \$334.01 for the 155W LED (250W HPS equivalent).²⁵ For the A30 lights, the Company calculated an LARR% of 11.32%, resulting in annual per-light capital revenue requirements of \$22.94 for the 39W lamp (100W HPS equivalent) and \$37.81 for the 155W lamp (250W HPS equivalent).²⁶

For both LARR% calculations, the Company assumed \$1,000,000 in capital investment, with \$350,000 in future LED removal costs, with a 29 year book life and a beginning installation date of 2016. For the A07 lights, the Company used a capital structure approved in the 2015 rate case, with a pre-tax rate of return of 7.08% and an after-tax rate of return of 6.43%; the Company used a composite tax rate of 28.74%.²⁷ For the A30 lights, the Company used the capital structure from the Company's 2013 rate case (Docket No. E002/GR-13-868), with a pre-tax rate of return of 7.35% and an after-tax rate of return of 6.42%; the Company used a composite tax rate of 41.37%.²⁸

In both calculations, the Company included the following costs in the calculation of the annual revenue requirement: Debt Return on Rate Base, Equity Return on Rate Base, Depreciation, Deferred Taxes, Net Deferred Income Tax Credit (set at zero), Property Taxes, and Current Tax Revenue Requirement. This calculation resulted in a total revenue requirement for each year in nominal dollars. Xcel then converted these figures into net present value, then levelized and converted back to nominal dollars using the following Capital Recovery Factor equation:

$$LARR = C * \frac{i(1+i)^n}{(1+i)^n - 1}$$

LARR = Levelized Annual Revenue Requirement (\$100,540.95)

C = NPV Revenue Requirement (\$1,307,012)

i = Interest or discount rate (set at 6.4300%, the Company's after-tax weighted cost of capital)

n = Time period (29 years)

²³ See Attachment B, page 7.

²⁴ See Attachment B, page 7.

²⁵ See Attachment C, page 3.

²⁶ See Attachment C, page 3.

²⁷ See Attachment B, page 9.

²⁸ See Attachment C, page 5.

The Company did not show the LARR in net present value, but the Department verified that the revenue requirements for both the levelized and non-levelized revenue requirements matched when considered in net present dollars.

The Company’s calculations resulted in a theoretical \$1,000,000 in A07 lights becoming \$100,540.95 per year, or 10.05%.²⁹ For the A30 lights under the Company’s calculations, a theoretical \$1,000,000 would be \$113,196 per year, or 11.32%.³⁰

A. STREET LIGHTING ENERGY SERVICE (CLOSED) (RATE CODE A32)

For the Street Lighting Energy Service (Closed) (A32), the Company proposed to keep the same rates for the LEDs as they had for the HPS lights. This rate is for customers who own their own lighting facilities, and simply pay for the energy of unmetered street lights. The Company states that this rate is closed to new customers, and that new customers are required to take metered street lighting service.

The Company stated that even though lighting rates wouldn’t be reduced, customers would experience savings through fuel rates. As to why these rates are not proposed to be changed, the Company stated: “Since this rate is closed, additional analysis is required for the non-fuel portion of the rate. The Company intends to revisit the base rate level for the closed service at the time of its next rate case.”³¹

Table 3 shows the existing and proposed rates.

Table 3. Current HPS Energy Service and Xcel’s Proposed LED Energy Service Equivalent Lighting Rates

	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
Energy-Only HPS Rates (\$/light/month)	\$1.74	\$2.32	\$3.17	\$5.34	\$8.12
Energy-Only LED Rates (\$/light/month)	\$1.74	\$2.32	\$3.17	\$5.34	\$8.12
Increase/(Decrease)	0	0	0	0	0

While no savings would occur from the A32 rates themselves under Xcel’s proposal, the Company predicted monthly bill savings resulting from the fuel charge and the resource

²⁹ See Attachment B, page 9.

³⁰ See Attachment C, page 5.

³¹ See Petition, Page 7.

adjustment of: \$0.46 for <30-45W, \$0.64 for 30-45W, \$0.86 for 50-75W, \$1.24 for 110-165W, and \$1.94 for 200-250W.

B. STREET LIGHTING SERVICE- CITY OF SAINT PAUL (A37)

Xcel proposed to close this service to new lights added by the City of Saint Paul (Saint Paul). The Company explained that this rate is approximately 40 years old and is not consistent with the Company's other lighting tariffs. The rate is a hybrid rate with a split ownership and care of the lighting facilities; while the Company owns and maintains the distribution system and fixture hangers, Saint Paul owns and maintains the lamps and lamp units, photocells, and glassware. The Company specified that Saint Paul has reduced the number of lights on this tariff from 2,400 lighting units to 1,700 lighting units over the past 10 years. The existing 1,700 lighting units would remain on the tariff under the Company's proposal, but no new lights would be added. The Company adds that this change would "allow an orderly transition to other lighting services" and would "provide a transition path to LED lighting through other available lighting services."³²

IV. DEPARTMENT ANALYSIS

A. MINNESOTA STATUTES AND RULES

Xcel filed its Petition pursuant to Minn. Rules 7829.0100, subpart 11, which states:

Miscellaneous filing.

"Miscellaneous filing" means a request or notice that does not require determination of a utility's revenue requirement.

A miscellaneous filing includes a filing involving a new service offering; a change in a utility's rates, services, terms, or conditions of service; a change in a utility's corporate structure, assigned service area, or capital structure, when conducted separately from a general rate proceeding; filings made under the rules governing automatic adjustment of charges in chapter 7825; or any related matter.

The inclusion of a particular type of filing in this list does not require a filing that would not otherwise be required or confer jurisdiction that would not otherwise be present.

The "Miscellaneous Filing" Rule's statutory authority comes from Minn. Stat. § 216A.05: Commission Functions and Powers. The Department agrees that Xcel's proposal can be considered a request for "a change in a utility's rates, services, terms, or conditions of service."

³² See Petition, pages 7-8.

As with all filings that include rate changes, Minn. Stat. § 216B.03 applies, which requires that rates must be just and reasonable, and that any doubt as to reasonableness should be resolved in favor of the consumer.

B. 2015 RATE CASE SETTLEMENT

The Department was initially concerned that any proposed changes to LED lights would not conform to the terms of the 2015 Rate Case Settlement. Since the A07 APL rate involves increasing rates due to Xcel's assertion of incremental cost increases in LED fixtures, the Department asked in IR 1-1 how this proposal would be consistent with the settlement regarding LED rates in the 2015 Rate Case.³³ The Department further inquired as to the treatment of revenue resulting from the proposed LED rates: if the Settlement were applicable to the A07 or A32 rates, LED revenues associated with those lights would need to be used to offset the regulatory asset.³⁴

The Company clarified in response that the Settlement only applied to rate code A30, the Street Lighting System Service rate, and did not include either A07 or A32. However, since the LED Street Lighting issues included in the Settlement were issues raised by Suburban Rate Authority and City of Minneapolis, the Department recommends that these parties weigh in on these issues.

Additionally, the Department does not agree with Xcel's calculation of the incremental capital costs for the light fixtures. While this amount is offset by other savings, the calculation of incremental capital costs is too high. Rather than the pre-tax rates of return of 7.08 percent for the A07 lights, the pre-tax rate of return should be 7.00 percent. This amount reflects the Department's calculation of revenue requirements in the 2015 Rate Case on which the settlement in that proceeding was based, and is confirmed by the Department's April 2, 2018 analysis in Docket No. E002/M-17-797. The Department requests that Xcel update its calculated incremental capital costs to reflect a pre-tax rate of return of 7.00 percent.

C. AUTOMATIC PROTECTIVE LIGHTING (A07)

The Department concludes that most of Xcel's proposed rate design is reasonable for the A07 lights.

However, the Department would like clarity regarding peak, transmission, and distribution demand costs for the A07 versus the A30 lights. The Department understands that the A07 lights are much fewer in number than the A30 lights, and so certain demand costs may be de

³³ See Attachment B, page 1.

³⁴ See Attachment B, page 1.

minimis. However, the Company did not specify that this was the case. The Department asks that the Company clarify how it arrived at the A07 demand cost inputs.

Further, the Department is unclear as to why the Company assumed \$0/light in Avoided Relamp Maintenance Costs for A07, but \$4.57/light in Avoided Relamp Maintenance Costs for A30. From the Department's perspective, it may be possible that these costs are different between the two rates, but \$0 is not a reasonable assumption. The Department recommends that Xcel address this concern about the assumed \$0 Avoided Relamp Maintenance Costs in its Reply Comments. Absent another value, the Department concludes that the Company should use the A30 Relamp assumption for the A07 lights.

Finally, the Department requests that in future cost studies, the Company provide references when original inputs are used, such as the weighted cost of capital or the fuel charge.

D. STREET LIGHTING ENERGY-ONLY SERVICE (A32)

The Department concludes that this portion of the Company's proposal is unreasonable.

The Company proposes to keep the A32 LED rates the same as the HPS equivalents, without an analysis supporting this proposal. Xcel has not explained why this proposed treatment differs from the proposal for the A07 and A30 rates. Because the proposed A32 treatment is inconsistent with the reductions in rates for A07 and A30 rates, the Department concludes that Xcel has not justified the differing rate treatments.

In IR 1-8, the Department asked the Company to calculate the costs of the energy-only LEDs as opposed to the equivalent HPS lights, in the same style as the cost study for the Automatic Protective Lighting (A07).³⁵ The Company did not provide the requested cost study, but did note that "The rate design of all existing rates in the flat rate energy-only service tariff Street Lighting Service (Closed) are derived from the metered energy-only lighting tariff Street Lighting Energy Service – Metered (Rate Sheet No. 78). The flat rates are the total of the average monthly kWh per light multiplied by the energy charge per kWh and the monthly customer charge divided by 11 (which assumes an average of 11 lights per meter)."³⁶

In absence of the Company's provision of the requested cost study, the Department provides a proposed calculation of the appropriate rate treatment for the A32 lights, using the same template the Company used for the A07 and A30 lights. Since the A32 lights are customer-owned and maintained, the Department assumed \$0 in avoided maintenance costs and incremental LED capital costs, and instead only captured the avoided non-fuel energy and demand costs of the equivalent HPS lights. The Department used the annual HPS and LED energy usages provided in Docket 15-920, and estimated usage when necessary. The

³⁵ See Attachment B, page 2.

³⁶ See Attachment B, page 4.

Department also used the Company’s “All Lighting” rates calculated in Attachment B, page 12. The results are provided in Attachment D. The Department calculated the following rates:

Table 4. Current HPS Energy Service and Department’s Proposed LED Energy Service Equivalent Lighting Rates

	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
Energy-Only HPS Rates (\$/light/month)	\$1.74	\$2.32	\$3.17	\$5.34	\$8.12
Energy-Only LED Rates (\$/light/month)	\$1.06	\$1.34	\$1.85	\$3.44	\$5.14
Increase/(Decrease)	(0.68)	(0.98)	(1.32)	(1.90)	(2.98)

The Company predicted monthly bill savings resulting from the rate change, the fuel charge, and the resource adjustment of: \$1.00 for <30-45W, \$1.58 for 30-45W, \$2.36 for 50-75W, \$3.12 for 110-165W, and \$5.62 for 200-250W.

Finally, the Department is unclear as to why the Company did not propose an LED rate for 200W equivalent lights, as there appears to be a gap between the 50W-75W LEDs and the 110W-165W LEDs. Some customers may wish to install LEDs rated between 76W and 109W. Unless there is a reason not to include this option, the Department concludes that that an additional rate should be added to cover this gap, and that the rate should be calculated in a similar manner to those shown in Table 4.

E. STREET LIGHTING SERVICE- CITY OF SAINT PAUL (A37)

Xcel’s proposal regarding the City of Saint Paul appears not to be fully explained. The Department asked a series of questions about the proposed tariff. In response to Department IR 1-14, the Company stated that it had spoken with Saint Paul, and that no concerns were raised. However, the Company did not answer the Department’s question in IR-12, where the Department asked who would pay for future meters, should Saint Paul install a new street lighting system or transition existing A37 lights to the A30 tariff.³⁷ Xcel should provide this information in its reply comments.

Further, Xcel’s tariff for the City of Saint Paul does not include options for LEDs. Although the Company states that the 1,700 lights may remain on the A37 tariff, A37 does not have an LED option. Thus, as the Company stated in its Petition, closing the A37 tariff “provides a transition

³⁷ Xcel’s response stated: “Should the city install a new street lighting system, the Company would require that system to take service on the Street Lighting Energy service – Metered tariff. Systems taking service on this Street Lighting Energy Service – Metered tariff are required to be metered.”

path to LED lighting through other available lighting services.”³⁸ It would be helpful for the record to be clear that Xcel has fully informed the City of Saint Paul that it would need to take service under the metered A30 rate if it chooses to use LED lighting.

The Department therefore requests that in Reply Comments, the Company show that it informed the City of Saint Paul about the cost responsibility of future metered lighting, and about what will happen should Saint Paul wish to pursue LED lighting.

V. DEPARTMENT RECOMMENDATIONS

The Department requests that in Reply Comments, the Company provide:

- A discussion addressing concerns raised by the Suburban Rate Authority and the City of Minneapolis in Xcel’s 2015 Rate Case;
- A clarification as to why the peak, transmission, and distribution costs were different between the A07 and A30 calculations,
- An updated calculation of incremental capital costs reflecting a pre-tax rate of return of 7.00 percent and;
- Demonstration that Xcel fully informed the City of Saint Paul regarding the proposal to close A37 to new lights, specifically noting whether Saint Paul was informed about the future costs of metering lights and LED lighting options.

The Department also suggests that the Suburban Rate Authority and the City of Minneapolis may wish to weigh in on the street lighting issues addressed in Xcel’s 2015 Rate Case.

The Department will provide final recommendations in Reply Comments, but at this time expects to recommend that the Commission:

- Approve Xcel’s proposed Automatic Protective Lighting (A07) LED additions, once the Company provides a reasonable estimate for avoided Relamp Maintenance Costs and overall rate of return of 7.00 percent (pre-tax);
- Approve Xcel’s proposed addition of LED options to the Street Lighting Energy Service (A32) rate, using the rates proposed by the Department in Table 4 above, and;
- Add an additional LED option to the Street Lighting Energy Service (A32) rate for 200W equivalent lamps.

/jl
Attachment

³⁸ See Petition, Page 8.

III. BILL PAY ASSISTANCE FOR CUSTOMERS WITH MEDICAL NEEDS

Consistent with the proposal from the ECC, which the Parties believe is appropriate, the Parties agree that Xcel Energy will develop and implement a customer bill payment assistance program exclusively for medical needs customers. The program will use the POWER ON program as a model and will incorporate the following: (1) providing an affordability credit in order to limit the percentage of household income that customers devote to electric costs; (2) providing an arrearage forgiveness component requiring customers to contribute a payment toward arrears (in addition to the affordability payment) in order to receive a matching monthly credit from the Company; (3) setting income eligibility for participation at 50 percent of the State Median Income (“SMI”) and, only if funds remain, allow customers at 60 percent SMI to enroll; (4) providing assistance on a first come/first served basis until the program budget is exhausted; (5) limiting administrative costs to no more than five percent of the annual budget; (6) incorporating reporting and program fund tracking requirements of the current POWER ON program; and (7) recovering program costs on the same basis as the POWER ON program. The Company will file this proposed program within one hundred and fifty (150) calendar days of the Commission’s final, appealable order in this proceeding.

IV. LED STREET LIGHTING

To resolve concerns raised by the City and SRA regarding the Company’s inclusion of costs attributable to LED street lighting in its rate request, the Company, SRA, and City agree as follows:

(1) The revenue requirements related to all capital additions for Light Emitting Diode (“LED”) street lights will be removed from this rate case and the resulting changes to Xcel Energy’s overall revenue requirements will be used in setting final street lighting rates (“LED Capital Cost Removal”).

(2) All LED street lighting installed shall be billed consistent with the Commission’s order in Docket No. M-15-920 and consistent with any final order in this rate case.

(3) The revenue requirement reduction resulting from the LED Capital Cost Removal shall be reflected in final rates consistent with the rate design proposed by Xcel Energy or as otherwise may be ordered by the Commission.

(4) All street lighting costs proposed by Xcel Energy in this proceeding, other than the LED Capital Cost Removal costs, will remain and be reflected in retail rates as allowed by the Commission pursuant to its final order.

(5) Xcel Energy will create a regulatory asset comprised of the revenue requirements directly related to any and all actual LED streetlight capital additions made of during the Term of the MYRP as defined in the Settlement (the “LED Deferral”). Xcel Energy is explicitly permitted to defer the LED Deferral during the term of years for which final rates will be set in this rate case. Xcel Energy agrees that the LED Deferral will accrue no carrying cost or similar time value additive before its next rate case.

(6) Any LED street lighting revenues collected during the Term of the MYRP shall be credited against the LED Deferral.

Xcel Energy estimates the impact of the LED Capital Cost Removal to be approximately \$860,000 on a revenue requirements basis for the 2016 test year. Xcel Energy further estimates that similar revenue requirement reductions will be realized in 2017, 2018, and 2019 and that this revenue requirement reduction shall be separate from and in addition to any other reduction in revenue requirements that applies to the street lighting class, either as a result of the revenue requirement settlement or other reductions ordered by the Commission in this case. The Company provides that the LED Deferral will not affect costs assigned to any other customer class.

The SRA and City of Minneapolis further agree not to contest Xcel Energy’s recovery of the LED Deferral in Xcel Energy’s next rate case subject to the terms of this paragraph. The LED Deferral shall be recognized and recovered as part of the test year of Xcel Energy’s next rate case and such recovery shall be solely from the street lighting class; provided, however, that the SRA and City of Minneapolis retain all rights to review and challenge Xcel Energy’s claimed actual LED costs and cost savings as they affect recovery from the street lighting class in the next rate case using the standards applicable to the utility’s recovery of a regulatory asset. The SRA and City of Minneapolis further retain all rights in the next rate case to challenge Xcel Energy’s proposals regarding the street lighting class cost of service, revenue apportionment and all other aspects of street lighting rates Xcel Energy may propose in its next rate case.

Consistent with this resolution, Xcel Energy shall maintain reasonably detailed records of LED costs and cost savings compared to HPS lighting derived from a) relamping of LEDs, b) LED service orders, c) LED effect on base rate energy and d) demand

allocation; and shall provide all relevant LED cost and cost savings information on street lighting in the next rate case.

The City and SRA explicitly reserve their rights to oppose an increase in the residential customer charge or to challenge other issues directly related to rate design. Xcel Energy acknowledges that the SRA has not sponsored witnesses on any of the other settled issues included with this agreement and has not participated in negotiating the terms of settlement other than LED street lighting.

V. FUEL CLAUSE ADJUSTMENT

The Settling Parties agree that the issue of the Fuel Clause Adjustment (“FCA”) mechanism will be addressed, pursuant to the Commission’s June 2, 2016 Order, in Docket Nos. E999/CI-03-802, E999/AA-12-757, E999/AA-13-599, and E999/AA-14-579.

VI. GENERAL PROVISIONS

A. Confidentiality.

It is understood and agreed that all offers of settlement and discussions related to the mediation conducted by ALJ Cochran and to this Settlement are confidential and privileged and may not be used in any manner in connection with proceedings in this Rate Case or otherwise, except as provided by law. In the event the Commission does not approve this Settlement, this Settlement shall not constitute part of the record in this Proceeding and no part of it may be used by any party for any purpose in this case or in any other proceeding.

B. Complete Agreement.

This Settlement, along with any exhibits, appendices, schedules, and amendments hereto, encompasses the entire agreement of the Settling Parties, and supersedes all previous understandings and agreements between the Settling Parties, whether oral or written.

C. Acceptance of Settlement.

The Settling Parties agree that this Settlement has been entered into as a resolution of the issues between them in order to minimize litigation, regulatory costs, and controversy. The Settling Parties further agree that, unless expressly stated herein or in pre-filed testimony or other exhibits a part of the record, this Settlement may not represent the position, in total or on any individual issue, that the Settling Parties,

- Not Public Document – Not For Public Disclosure
 Public Document – Not Public Data Has Been Excised
 Public Document

Xcel Energy Information Request No. 1
Docket No.: E002/M-18-729
Response To: MN Department of Commerce
Requestor: Nancy Campbell, Danielle Winner
Date Received: November 30, 2018

Question:

Topic: LED lighting tariffs
Reference(s): Xcel Initial Filing in 18-729; Stipulation of Settlement in Docket E002/GR-15-826 pp. 9-11

1. Xcel's Stipulation of Settlement in Docket No. E002/GR-15-826 on pages 9 to 11 discusses in Section IV. LED Street Lighting. The Department notes that part (5) of Section IV requires Xcel to create a regulatory asset for all street lighting capital additions made during the term of the MYRP. Please explain why Section IV of the Settlement would allow Xcel to increase tariffs related to the capital costs of LED street lights as shown on page 6 "Incremental Capital Revenue Requirement" line for "Automatic Protective Lighting" tariff in the above referenced docket.
2. If Xcel is allowed to charge the incremental capital costs for LED street lights, would Xcel use these additional incremental revenues for Automatic Protective Lighting Tariff to reduce the deferred accounting for LED street lighting as provided in Section IV of Xcel's Settlement?
3. Please provide all supporting calculations and assumptions, including installation and costs of old lights and installation and costs of new lights, to support: the "Incremental Capital Revenue Requirement" of \$1.32 for 100W/43W and \$1.63 for 250/157W; the "Maintenance Savings" of (\$0.53) for both 100W/43W and 250W/157W; and, the "System Allocation Cost Reduction" of (\$0.83) for 100W/43W and (\$1.68) for 250/157W. Please provide more information than what was reported in the tables in Attachment B.
4. Please explain if the "incremental capital investment" is for new lighting facilities, old lighting facilities, or both, and explain why recovery for each is appropriate.

5. On page 4 of the Company's filing, the Company states that it has "requirements to meter new lighting systems." Please explain why the unmetered Automatic Protective Lighting Service is still open to new customers.
6. On page 5 of the Company's filing, the Company states that "LED fixtures will be installed after the failure of current HPS and MV lamps in service." Later on that page, the Company states that "Also recognized in the proposed rates, since the LED fixtures will replace current fixtures prior to the end of their useful life, is the revenue requirement for the required incremental capital investment." Please explain whether LED lights will replace HPS and MV lights prior to or after the failure of the original lights.
7. For the "Street Lighting Energy Service" tariff – please provide a description of the types of costs, a breakout of the costs, and detailed support for the LED rates shown on Section 5, 23rd Revised Sheet No. 76 - \$1.74, \$2.32, \$3.17, \$5.34, and \$8.12.
8. For the "Street Lighting Energy Service" tariff, please provide a table of costs per HPS/LED light equivalent for the new lights versus the old lights, as shown in Attachment B, Page 1.
9. Please explain how this "Street Lighting Energy Service" tariff changes for the LED lights is consistent with Section IV of Xcel's Settlement.
10. If Xcel is allowed to charge the capital costs for LED street lights, would Xcel use these additional incremental revenues for Street Lighting Energy Service tariff to reduce the deferred accounting for LED street lighting as provided in Section IV of Xcel's Settlement?
11. For the Street Lighting Service for the City of St. Paul tariff, is the Company's proposal to close this tariff for any new lighting services, but to keep the tariff for the existing 1700 lighting units? Please explain your response.
12. The Company appears to state that the existing 1700 lighting units on this tariff will be transitioned to other lighting services at some point in the future. What lighting services will these units be transitioned to? Will the new services require the 1700 existing lights to be metered, and if so, who will pay for the cost of the meters?
13. For Street Lighting Service for City of St. Paul tariff – please explain in detail all of the tariff changes that are being made and provide support for each change.

14. Has the Company discussed the closing of this tariff to new lights with the City of St. Paul? If so, did the City of St. Paul express any concerns? Please explain and address any concerns.

Response:

1. The LED section of the Settlement Agreement refers only to the LED street lighting cost included in the rate request in the rate case docket. The costs included in the rate request were limited to LED street lighting costs associated with cobra-head style LED street lights on the Street Lighting System Service (A30) tariff which was originally filed in Docket No. E002/M-15-920. The Company's current proposal to convert the Automatic Protective Lighting Service to LED technology was not included in the rate request in Docket No. E002/GR-15-826.
2. No. As discussed in question 1, the Company's current proposal to convert the Automatic Protective Lighting Service to LED technology was not included in the rate request in Docket No. E002/GR-15-826. Under the Company's proposal, the revenue related to incremental capital costs for the Automatic Protective Lighting service would offset the revenue requirement associated with the LED street light fixtures installed under the Automatic Protective Lighting Service tariff.
3. See Attachment A to this response.
4. The Company will procure and install new LED lighting fixtures under the Automatic Protective Lighting Service tariff. The Company proposes to recover the cost of these fixtures through the incremental capital cost requirement portion of the rate. The cost of existing facilities will remain in rate base and will continue to be recovered. The existing facilities were a prudent investment at the time of installation. However, LED technology that has recently become cost effective provides customers with a new opportunity to benefit from increased street lighting performance and lower bills. Since the transition to LED creates a benefit for customers, the Company believes it is reasonable to invest in new technology, bring a new and innovative lighting solution to customers and recover the cost of new and existing facilities used to provide the Automatic Protective Lighting Service. In addition, the Commission already approved this cost recovery treatment in E002/M-15-920.
5. The metering requirement for new lighting systems mentioned on page 4 of Petition was intended as a reference to only Street Lighting Energy Service and not Automatic Protective Lighting Service. We apologize for not clearly making this distinction.

Street Lighting Energy Service provides energy-only service to lighting systems owned by customers. This service is provided through a flat monthly rate on the closed Street Lighting Energy Service (A32) tariff and the open Street Lighting Energy Service - Metered (A34) tariff.

Lighting systems designed for energy-only metered service average more than ten lighting units for each meter to reduce the metering cost per lighting unit. The need to reconfigure existing energy-only lighting systems served with flat rates to connect multiple lighting units to each meter is a significant consideration for transitioning to metered service.

Comparable to Street Lighting System Service (A30), Automatic Protective Lighting Service (A07) is Company-provided full service for lighting that includes equipment, maintenance, repairs, and energy services. These lighting systems are directly connected into the distribution system and are typically located on distribution poles.

6. For the transition to LED technology for Automatic Protective Lighting Service, LED lights will replace HPS and MV lights after the failure of the existing lights.
7. The proposed LED rates are the same as the existing comparable HPS rates. The rate design of all existing rates in the flat rate energy-only service tariff Street Lighting Energy Service (Closed) are derived from the metered energy-only lighting tariff Street Lighting Energy Service – Metered (Rate Sheet No. 78). The flat rates are the total of the average monthly kWh per light multiplied by the energy charge per kWh and the monthly customer charge divided by 11 (which assumes an average of 11 lights per meter).
8. Please see the breakout of costs included in the table below.

	LED 43W	LED 157W	HPS 100W	HPS 250
	[PROTECTED DATA BEGINS			
Fixture				
Photo Cell				
Labor				
	PROTECTED DATA ENDS]			
Total	\$157	\$195	\$154	\$227

9. The Street Lighting Energy Service tariff discussed in the Company's Petition is not included in the Company's Settlement in the most recent rate case. That

settlement included only Street Lighting costs associated with the facilities included in Docket No. E002/M-15-920.

10. No. As discussed in question 9, the Company's current proposal was not included in the rate request in Docket No. E002/GR-15-826. Under the Company's proposal, the revenue related to incremental capital costs for the street lighting service would offset the revenue requirement associated with the LED street light fixtures installed relative to the Company's current petition.
11. Yes, existing streetlights taking service on the Street Lighting Service - City of St. Paul tariff will remain on the tariff. However, if the Company's proposal to close the tariff is approved, it will not be available to other City of St. Paul streetlights.
12. Existing streetlights may continue taking service on Street Lighting Service - City of St. Paul. Should the city install a new street lighting system, the Company would require that system to take service on the Street Lighting Energy Service – Metered tariff. Systems taking service on this Street Lighting Energy Service – Metered tariff are required to be metered.
13. The Company is only requesting the Street Lighting Service - City of St. Paul be closed to new lights. No other changes to the tariff are being requested.
14. The Company discussed the matter with the City of St. Paul, but no concerns were raised.

Certain pricing information from third party vendors is non-public data under Minn. Stat. § 13.37, Subd. 2(a), and is trade secret information as defined by Minn. Stat. §13.37(1)(b). We have thus marked as “Protected” the above material which incorporates this pricing information or would allow others to infer this pricing information. Based on its economic value, the parties have agreed to maintain this pricing information as non-public. This information derives independent economic value from not being generally known or readily ascertainable by others who could obtain a financial advantage from its use.

Preparer: Nick Paluck
Title: Rate Consultant
Department: Regulatory Analysis
Telephone: 612.330.2905
Date: December 10, 2018

Supplement: December 17, 2018

Company-Owned LED Street Lighting System Service Rate Design

Rate Code A07

Monthly LED Street Lighting Rate Design Summary

	NSP-MN	
	Per HPS/LED Street Light Equivalent	
	100W/43W	250W/157W
2019 HPS Automatic Protective Lighting Service Rates (A07) ¹		
<i>Maintenance Expense Impact (Savings)</i>	\$7.71	\$12.30
System Allocation Cost Reduction	(\$0.53)	(\$0.53)
<i>Incremental Capital Revenue Requirement</i>	(\$0.83)	(\$1.68)
Net LED SL Fixture Rate Impact - Company Owned Street Lights	\$1.32	\$1.63
Proposed Monthly LED Automatic Protective Lighting Service Rates	\$7.67	\$11.72
Current HPS Monthly Average Bill Per Street Light - A07	\$8.66	\$14.80
LED Fixture Impact on HPS Street Lighting Rate	(\$0.04)	(\$0.58)
Fuel & Resource Adj. Savings Estimate	(\$0.60)	(\$1.22)
Total Monthly Bill Impact (savings)	(\$0.64)	(\$1.80)
Proposed LED Monthly Average Bill Per Street Light - A07	\$8.02	\$13.00
<i>Percentage Savings (increase)</i>	7.4%	12.1%

Annual Impact of LED Fixtures on the A30 Street Lighting System Service Rate

	NSP-MN	
	Per HPS/LED Street Light Equivalent	
	100W/43W	250W/157W
Maintenance Savings		
Relamp Expense Savings	\$0.00	\$0.00
Service Order Expense Savings	\$6.36	\$6.36
Total Maintenance Savings	\$6.36	\$6.36
<i>Monthly Savings (increase)</i>	\$0.53	\$0.53
System Allocation Cost Reduction		
Energy Related System Allocation Cost Reduction	\$8.89	\$18.00
Demand Related System Allocation Cost Reduction	\$1.05	\$2.13
Total System Allocation Cost Reduction	\$9.94	\$20.13
<i>Monthly Savings (increase)</i>	\$0.83	\$1.68
Incremental Capital Revenue Requirement	(\$15.78)	(\$19.61)
<i>Monthly Savings (increase)</i>	(\$1.32)	(\$1.63)
LED SL Base Rate Savings (Increase)	\$0.52	\$6.88
<i>Monthly Savings (increase)</i>	\$0.04	\$0.58
Fuel & Resource Adj. Savings Estimate	\$7.23	\$14.64
<i>Monthly Savings (increase)</i>	\$0.60	\$1.22
Annual Bill Savings - LED Street Lights	\$7.75	\$21.52
<i>Monthly Savings (increase)</i>	\$0.64	\$1.80

¹ Automatic Protective Lighting Service Rates proposed to be effective January 1, 2019 as filed in Docket No. E002/GR-18-729

Company-Owned LED Street Lighting System Service Rate Design

Rate Code A07

		NSP-MN	
		Per HPS/LED Street Light Equivalent	
Relamp Expense	Total	100W/43W	250W/157W
Relamp Exp Forecast	\$0		
No. of Rate Code A30 Street Lights	109,872		
Relamp Expense Savings	\$0.00	\$0.00	\$0.00
Service Order Expense			
Annual HPS Fixture Related Service Order Expense	\$698,703		
No. of Rate Code A30 Street Lights	109,872		
Service Order Expense Savings	\$6.36	\$6.36	\$6.36
Incremental Fixture & Installation Cost			
Net LED Installed Cost (Includes Fixture, Photo Control and Installation)		\$157.00	\$195.00
29-Year LARR %		10.05%	10.05%
LED Fixture Incremental Annual Revenue Requirement		\$15.78	\$19.61
Incremental Monthly Capital Related Revenue Requirement		\$1.32	\$1.63
		NSP-MN	
		Per HPS/LED Street Light Equivalent	
Base Rate Energy Related System Cost Allocation	Total	100W/43W	250W/157W
Energy Related Expense Rate (Cents/kWh)	5.050¢		
Fuel Expense Rate(Cents/kWh)	2.165¢		
Base Rate Energy System Allocation Cost Rate (Cents/kWh)	2.885¢		
HPS Annual Energy Usage (kWh)		487	1,277
Base Rate Energy Related System Allocation Rate (Cents/kWh)		2.885¢	2.885¢
HPS Base Rate Energy Related System Allocation Cost		\$14.05	\$36.84
LED Annual Energy Usage (kWh)		179	653
Base Rate Energy Related System Allocation Rate (Cents/kWh)		2.885¢	2.885¢
LED Base Rate Energy Related System Allocation Cost		\$5.16	\$18.84
Base Rate Energy Related System Cost Allocation Reduction		\$8.89	\$18.00

Company-Owned LED Street Lighting System Service Rate Design

Rate Code A07

	100W/43W	250W/157W
Base Rate Demand Related System Cost Allocation		
HPS Demand (Watts)	117	307
Base Rate Demand Related System Allocation Rate (Cents/kWh)	\$14.17	\$14.17
HPS Base Rate Demand Related System Allocation Cost	\$1.66	\$4.35
LED Annual Demand (Watts)	43	157
Base Rate Demand Related System Allocation Rate (Cents/kWh)	\$14.17	\$14.17
LED Base Rate Demand Related System Allocation Cost	\$0.61	\$2.22
Demand Related System Cost Allocation Reduction	\$1.05	\$2.13
Based Cost of Energy Estimated Savings (FCC)		
HPS Annual Energy Usage (kWh)	487	1,277
Base Cost of Energy Street Lighting Rate (Cents/kWh)	2.165¢	2.165¢
Base Cost of Energy Related Expense	\$10.54	\$27.65
<i>Monthly Base Cost of Energy Related Expense</i>	<i>\$0.88</i>	<i>\$2.30</i>
LED Annual Energy Usage (kWh)	179	653
Base Cost of Energy Street Lighting Rate (Cents/kWh)	2.165¢	2.165¢
Base Cost of Energy Related Expense	\$3.88	\$14.14
<i>Monthly Base Cost of Energy Related Expense</i>	<i>\$0.32</i>	<i>\$1.18</i>
Base Cost of Energy Related Expense Savings	\$6.67	\$13.51
Resource Adjustment Estimated Cost Avoidance		
HPS Annual Energy Usage (kWh)	487	1,277
Resource Adjustment Street Lighting Rate (Cents/kWh)	0.1813¢	0.1813¢
Resource Adjustment Expense	\$0.88	\$2.32
<i>Monthly Base Cost of Energy Related Expense</i>	<i>\$0.07</i>	<i>\$0.19</i>
LED Annual Energy Usage (kWh)	179	653
Resource Adjustment Street Lighting Rate (Cents/kWh)	0.1813¢	0.1813¢
Resource Adjustment Expense	\$0.32	\$1.18
<i>Monthly Base Cost of Energy Related Expense</i>	<i>\$0.03</i>	<i>\$0.10</i>
Resource Adjustment Cost Avoidance	\$0.56	\$1.13

Levelized Annual Revenue Requirement Percentage Calculation

LED Streetlighting Investment

Capital Structure	Rate	Ratio	Pre-tax Weighted Cost	After-Tax Weighted Cost									
Long Term Debt	4.7500%	45.8100%	2.1760%										
Short Term Debt	4.3100%	1.6900%	0.0730%										
Preferred Stock	0.0000%	0.0000%	0.0000%										
Common Equity	9.2000%	52.5000%	4.8300%										
Required Rate of Return			7.0800%	6.4300%									
MN Composite Tax rate	28.74%												
Book Life	29												
ITC Rate	0%												
20 Yr MACRS	100.00%	0.0375	0.0722	0.0668	0.0618	0.0571	0.0529	0.0489	0.0452	0.0446	0.0446	0.0446	0.0446
Capital Investment	\$ 1,000,000												
Net Salvage	-35.0%												
		1	2	3	4	5	6	7	8	9	10	11	12
Totals		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Plant In-service													
Boy		-	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Eoy		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Average		500,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Depreciation Reserve													
Boy		0	23,276	69,828	116,379	162,931	209,483	256,034	302,586	349,138	395,690	442,241	488,793
Eoy		23,276	69,828	116,379	162,931	209,483	256,034	302,586	349,138	395,690	442,241	488,793	535,345
Average		11,638	46,552	93,103	139,655	186,207	232,759	279,310	325,862	372,414	418,966	465,517	512,069
Accumulated Deferred Taxes													
Boy		0	4,088	11,456	17,267	21,641	24,681	26,491	27,160	26,778	26,222	25,664	25,109
Eoy		4,088	11,456	17,267	21,641	24,681	26,491	27,160	26,778	26,222	25,664	25,109	24,551
Average		2,044	7,772	14,362	19,454	23,161	25,586	26,826	26,969	26,500	25,943	25,387	24,830
Average Rate Base		486,318	945,676	892,535	840,891	790,632	741,655	693,864	647,169	601,086	555,091	509,096	463,101
Debt Return		10,937	21,268	20,073	18,912	17,781	16,680	15,605	14,555	13,518	12,484	11,450	10,415
Equity Return		23,489	45,676	43,109	40,615	38,188	35,822	33,514	31,258	29,032	26,811	24,589	22,368
Book Depreciation	1,350,000	23,276	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552
20 Yr MACRS Tax Depr	1,000,000	37,500	72,190	66,770	61,770	57,130	52,850	48,880	45,220	44,620	44,610	44,620	44,610
Removal Costs	350,000												
SL for Deferred	1,350,000	23,276	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552
Deferred Taxes	-	4,088	7,368	5,811	4,374	3,040	1,810	669	(383)	(555)	(558)	(555)	(558)
Net Deferred ITC	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M (input by year) captured separately	-	-	-	-	-	-	-	-	-	-	-	-	-
Property Taxes (input by year)	-	11,900	11,900	11,900	11,900	11,900	11,900	11,900	11,900	11,900	11,900	11,900	11,900
Current Tax RR		5,385	11,053	11,576	12,007	12,361	12,637	12,847	12,990	12,264	11,371	10,472	9,579
Total Revenue Requirements		67,176	143,818	139,021	134,359	129,822	125,401	121,087	116,872	112,712	108,560	104,408	100,256
NPV Rev Req	\$ 1,307,012	63,117	126,965	115,315	104,715	95,067	86,281	78,280	70,990	64,327	58,214	52,605	47,461
LARR	\$ 100,541	100,541	100,541	100,541	100,541	100,541	100,541	100,541	100,541	100,541	100,541	100,541	100,541
LARR%	10.05%												

Total to collect from customer \$ 1,307,012

Annual ongoing charge \$ 100,541

28 2043	29 2044	30 2045
1,000,000	1,000,000	1,000,000
<u>1,000,000</u>	<u>1,000,000</u>	<u>-</u>
1,000,000	1,000,000	500,000
1,233,621	1,280,172	1,326,724
<u>1,280,172</u>	<u>1,326,724</u>	<u>-</u>
1,256,897	1,303,448	663,362
(67,143)	(80,522)	(93,901)
<u>(80,522)</u>	<u>(93,901)</u>	<u>-</u>
(73,832)	(87,211)	(46,950)
(183,064)	(216,237)	(116,412)
(4,117)	(4,863)	(2,618)
(8,842)	(10,444)	(5,623)
46,552	46,552	23,276
-	-	-
46,552	46,552	350,000
(13,379)	(13,379)	23,276
-	-	93,901
-	-	-
11,900	11,900	11,900
9,813	9,167	(96,168)
41,927	38,932	24,667
7,323	6,389	3,804
100,541	100,541	

NSP(M) - Electric Utility - State of Minnesota
Street Lighting Power Costs
TY 2017 CCOSS

	<u>APL Only</u>	<u>All Ltg</u>
1 Energy Cost	\$1,397	\$7,499
2 Baseload Cost	\$166	\$892
3 Energy + BL	\$1,564	\$8,391
4 MWH	30,967	165,868
5 Energy + BL per kWh	5.050¢	5.059¢
6 Peak Cost	\$0	\$0
7 Transmission Cost	\$0	\$0
8 Distribution Cost	\$105	\$1,181
9 Demand Cost Total	\$105	\$1,181
10 Unit Demand Cost per kWh	0.341¢	0.712¢
11 Unit Demand Cost per kW /Year	\$14.17	\$29.63
Energy + BL + Peak	\$1,564	\$8,391
	5.050¢	5.059¢
Peak Cost	0.000¢	0.000¢
Transmission Cost	0.000¢	0.000¢
Distribution Cost	0.341¢	0.712¢
	5.390¢	5.771¢
Fuel	2.165	2.165
less Fuel	3.225	

- Non Public Document – Contains Trade Secret Data**
 Public Document – Trade Secret Data Excised
 Public Document

Xcel Energy

Docket No.: E002/M-15-920

Response To: Department of Commerce Information Request No. 1

Requestor: Samuel Wils

Date Received: December 2, 2015

Question:

Please provide detailed cost support data for each of the cost savings/increases shown in Attachment A of Xcel's initial petition.

Response:

Please see the attached spreadsheets to this response for the supporting data to Attachment A of the Company's initial petition. Workpapers for the LED streetlighting rate system service rate design are detailed in Attachment A and key input data is included in Attachment B (levelized annual revenue requirement) and Attachment C (energy and demand rates) to this response.

Preparer: Nick Paluck

Title: Rate Consultant

Department: Regulatory Analysis

Telephone: (612) 330-2905

Date: December 14, 2015

Company-Owned LED Street Lighting System Service Rate Design

Rate Code A30

Monthly LED Street Lighting Rate Design Summary

	NSP-MN			
	Per HPS/LED Street Light Equivalent			
	100W/39W	150W/65W	250W/155W	400W/246W
Current HPS Street Lighting Overhead Rates	\$9.44	\$10.15	\$12.77	\$15.50
<i>Maintenance Expense Impact (Savings)</i>	(\$0.91)	(\$0.91)	(\$0.91)	(\$0.91)
System Allocation Expense Savings	(\$0.85)	(\$1.14)	(\$1.65)	(\$2.58)
<i>Incremental Capital Revenue Requirement</i>	\$1.91	\$2.11	\$3.15	\$4.62
Net LED SL Fixture Rate Impact - Company Owned Street Lights	\$0.15	\$0.06	\$0.59	\$1.13
Proposed Monthly LED SL Overhead Rates	\$9.59	\$10.21	\$13.36	\$16.63
Current HPS Monthly Average Bill Per Street Light - Overhead	\$10.34	\$11.46	\$15.12	\$19.19
LED Fixture Impact on HPS Street Lighting Rate	\$0.15	\$0.06	\$0.59	\$1.13
Fuel & Resource Adj. Savings Estimate	(\$0.60)	(\$0.81)	(\$1.17)	(\$1.82)
Total Monthly Bill Impact (savings)	(\$0.45)	(\$0.75)	(\$0.58)	(\$0.69)
Proposed LED Monthly Average Bill Per Street Light - Overhead	\$9.89	\$10.70	\$14.54	\$18.50
<i>Percentage Savings (increase)</i>	4.4%	6.6%	3.9%	3.6%
<i>Memo: LED Fixture Rate Impact - Pre Pay Option</i>	(\$1.76)	(\$2.05)	(\$2.56)	(\$3.49)

Annual Impact of LED Fixtures on the A30 Street Lighting System Service Rate

	NSP-MN			
	Per HPS/LED Street Light Equivalent			
	100W/39W	150W/65W	250W/155W	400W/246W
Maintenance Savings				
Relamp Expense Savings	\$4.57	\$4.57	\$4.57	\$4.57
Service Order Expense Savings	\$6.36	\$6.36	\$6.36	\$6.36
Total Maintenance Savings	\$10.93	\$10.93	\$10.93	\$10.93
<i>Monthly Savings (increase)</i>	\$0.91	\$0.91	\$0.91	\$0.91
System Allocation Cost Savings				
Base Rate Energy Charge Savings	\$7.18	\$9.66	\$13.96	\$21.80
Demand Related Expense Savings	\$3.02	\$4.08	\$5.89	\$9.19
Total Maintenance Savings	\$10.20	\$13.74	\$19.85	\$30.99
<i>Monthly Savings (increase)</i>	\$0.85	\$1.14	\$1.65	\$2.58
Incremental Capital Revenue Requirement	(\$22.94)	(\$25.34)	(\$37.81)	(\$55.49)
<i>Monthly Savings (increase)</i>	(\$1.91)	(\$2.11)	(\$3.15)	(\$4.62)
LED SL Base Rate Savings (Increase)	(\$1.81)	(\$0.67)	(\$7.03)	(\$13.57)
<i>Monthly Savings (increase)</i>	(\$0.15)	(\$0.05)	(\$0.59)	(\$1.12)
Fuel & Resource Adj. Savings Estimate	\$7.20	\$9.70	\$14.00	\$21.86
<i>Monthly Savings (increase)</i>	\$0.60	\$0.81	\$1.17	\$1.82
Annual Bill Savings - LED Street Lights	\$5.39	\$9.03	\$6.97	\$8.29
<i>Monthly Savings (increase)</i>	\$0.45	\$0.76	\$0.58	\$0.70

Company-Owned LED Street Lighting System Service Rate Design

Rate Code A30

		NSP-MN Per HPS/LED Street Light Equivalent			
		100W/39W	150W/65W	250W/155W	400W/246W
Relamp Expense	Total				
Relamp Exp Forecast	\$502,344				
No. of Rate Code A30 Street Lights	109,872				
Relamp Expense Savings	\$4.57	\$4.57	\$4.57	\$4.57	\$4.57
Service Order Expense					
	Total				
Annual HPS Fixture Related Service Order Expense	\$698,703				
No. of Rate Code A30 Street Lights	109,872				
Service Order Expense Savings	\$6.36	\$6.36	\$6.36	\$6.36	\$6.36
Incremental Fixture & Installation Cost					
		100W/39W	150W/65W	250W/155W	400W/246W
Net LED Installed Cost		\$202.69	\$223.85	\$334.01	\$490.19
29-Year LARR %		11.32%	11.32%	11.32%	11.32%
LED Fixture Incremental Annual Revenue Requirement		\$22.94	\$25.34	\$37.81	\$55.49
Incremental Monthly Capital Related Revenue Requirement		\$1.91	\$2.11	\$3.15	\$4.62

Company-Owned LED Street Lighting System Service Rate Design

Rate Code A30

	Total	NSP-MN Per HPS/LED Street Light Equivalent			
		100W/39W	150W/65W	250W/155W	400W/246W
Base Rate Energy Related Expense					
Energy Related Expense Rate (Cents/kWh)	4.299¢				
Fuel Expense Rate(Cents/kWh)	2.098¢				
Base Rate Energy Related Expense Rate (Cents/kW)	2.201¢				
HPS Annual Energy Usage (kWh)		487	711	1,277	2,005
Base Rate Energy Related Expense Rate (Cents/kWh)		2.201¢	2.201¢	2.201¢	2.201¢
HPS Base Rate Energy Related Expense		\$10.72	\$15.65	\$28.11	\$44.14
LED Annual Energy Usage (kWh)		161	272	643	1,015
Base Rate Energy Related Expense Rate (Cents/kWh)		2.201¢	2.201¢	2.201¢	2.201¢
LED Base Rate Energy Related Expense		\$3.54	\$5.99	\$14.15	\$22.34
Base Rate Energy Related Expense Saving		\$7.18	\$9.66	\$13.96	\$21.80
Demand Related Expense Savings					
HPS Demand (Watts)		117	171	307	482
HPS Demand Expense Rate (\$/kW)		\$38.60	\$38.60	\$38.60	\$38.60
HPS Demand Expense (\$/kW)		\$4.52	\$6.60	\$11.85	\$18.60
LED Annual Demand (Watts)		39	65	155	244
LED Demand Expense Rate (\$/kW)		\$38.60	\$38.60	\$38.60	\$38.60
LED Demand Expense (\$/kW)		\$1.49	\$2.52	\$5.96	\$9.42
Demand Related Expense Savings		\$3.02	\$4.08	\$5.89	\$9.19
Based Cost of Energy Estimated Savings (FCC)					
HPS Annual Energy Usage (kWh)		487	711	1,277	2,005
Base Cost of Energy Street Lighting Rate (Cents/kWh)		2.098¢	2.098¢	2.098¢	2.098¢
Base Cost of Energy Related Expense		\$10.22	\$14.92	\$26.79	\$42.06
<i>Monthly Base Cost of Energy Related Expense</i>		<i>\$0.85</i>	<i>\$1.24</i>	<i>\$2.23</i>	<i>\$3.50</i>
LED Annual Energy Usage (kWh)		161	272	643	1,015
Base Cost of Energy Street Lighting Rate (Cents/kWh)		2.098¢	2.098¢	2.098¢	2.098¢
Base Cost of Energy Related Expense		\$3.38	\$5.71	\$13.49	\$21.29
<i>Monthly Base Cost of Energy Related Expense</i>		<i>\$0.28</i>	<i>\$0.48</i>	<i>\$1.12</i>	<i>\$1.77</i>
Base Cost of Energy Related Expense Savings		\$6.84	\$9.21	\$13.30	\$20.77
Resource Adjustment Estimated Savings					
HPS Annual Energy Usage (kWh)		487	711	1,277	2,005
Resource Adjustment Street Lighting Rate (Cents/kWh)		0.1108¢	0.1108¢	0.1108¢	0.1108¢
Resource Adjustment Expense		\$0.54	\$0.79	\$1.41	\$2.22
<i>Monthly Base Cost of Energy Related Expense</i>		<i>\$0.04</i>	<i>\$0.07</i>	<i>\$0.12</i>	<i>\$0.19</i>
LED Annual Energy Usage (kWh)		161	272	643	1,015
Resource Adjustment Street Lighting Rate (Cents/kWh)		0.1108¢	0.1108¢	0.1108¢	0.1108¢
Resource Adjustment Expense		\$0.18	\$0.30	\$0.71	\$1.12
<i>Monthly Base Cost of Energy Related Expense</i>		<i>\$0.01</i>	<i>\$0.03</i>	<i>\$0.06</i>	<i>\$0.09</i>
Resource Adjustment Expense Savings		\$0.36	\$0.49	\$0.70	\$1.10

Levelized Annual Revenue Requirement Percentage Calculation

LED Streetlighting Investment

Docket No. E002/M-15-920
 Information Request No. DOC-001

Attachment B

	<u>Rate</u>	<u>Ratio</u>	<u>Pre-tax Weighted Cost</u>	<u>After-Tax Weighted Cost</u>				
<u>Capital Structure</u>								
Long Term Debt	4.9000%	45.6000%	2.2340%					
Short Term Debt	0.6200%	1.9000%	0.0120%					
Preferred Stock	0.0000%	0.0000%	0.0000%					
Common Equity	9.7200%	52.5000%	5.1030%					
Required Rate of Return			7.3500%	6.4200%				
MN Composite Tax rate	41.37%							
Book Life	29							
ITC Rate	0%							
20 Yr MACRS	100.00%	0.0375	0.0722	0.0668	0.0618	0.0571	0.0529	0.0489
Capital Investment	\$ 1,000,000							
Net Salvage	-35.0%							
		1	2	3	4	5	6	7
		2016	2017	2018	2019	2020	2021	2022
<u>Plant In-service</u>								
Boy		-	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Eoy		1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Average		500,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
<u>Depreciation Reserve</u>								
Boy		0	23,276	69,828	116,379	162,931	209,483	256,034
Eoy		23,276	69,828	116,379	162,931	209,483	256,034	302,586
Average		11,638	46,552	93,103	139,655	186,207	232,759	279,310
<u>Accumulated Deferred Taxes</u>								
Boy		0	5,885	16,491	24,855	31,151	35,527	38,133
Eoy		5,885	16,491	24,855	31,151	35,527	38,133	39,096
Average		2,942	11,188	20,673	28,003	33,339	36,830	38,615
<u>Average Rate Base</u>		485,420	942,260	886,223	832,342	780,454	730,411	682,075
<u>Debt Return</u>		10,903	21,163	19,905	18,694	17,529	16,405	15,319
<u>Equity Return</u>		24,771	48,084	45,224	42,474	39,827	37,273	34,806
<u>Book Depreciation</u>	1,350,000	23,276	46,552	46,552	46,552	46,552	46,552	46,552
20 Yr MACRS Tax Depr	1,000,000	37,500	72,190	66,770	61,770	57,130	52,850	48,880
Removal Costs	350,000							
SL for Deferred	1,350,000	23,276	46,552	46,552	46,552	46,552	46,552	46,552
<u>Deferred Taxes</u>	-	5,885	10,607	8,364	6,296	4,376	2,606	963
<u>Net Deferred ITC</u>	-	-	-	-	-	-	-	-
<u>O&M (input by year)</u>	-	-	-	-	-	-	-	-
<u>Property Taxes (input by year)</u>	-	16,000	16,000	16,000	16,000	16,000	16,000	16,000
<u>Current Tax RR</u>		11,594	23,322	23,546	23,675	23,726	23,695	23,597
<u>Total Revenue Requirements</u>		76,428	165,727	159,591	153,691	148,009	142,530	137,237
NPV Rev Req	\$ 1,473,029	71,817	146,334	132,415	119,827	108,436	98,122	88,779
<u>LARR</u>	\$ 113,196	113,196	113,196	113,196	113,196	113,196	113,196	113,196
<u>LARR%</u>		11.32%						
Total to collect from customers	\$ 1,473,029							
Annual ongoing charge	\$ 113,196							

Levelized Annual Revenue Requirement Percentage Calculation

LED Streetlighting Investment

Docket No. E002/M-15-920
 Information Request No. DOC-001

Attachment B

Capital Structure
 Long Term Debt
 Short Term Debt
 Preferred Stock
 Common Equity
 Required Rate of Return

MN Composite Tax rate
 Book Life
 ITC Rate
 20 Yr MACRS
 Capital Investment
 Net Salvage

	8 2023	9 2024	10 2025	11 2026	12 2027	13 2028	14 2029	15 2030	16 2031
Plant In-service	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>
	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Depreciation Reserve	302,586	349,138	395,690	442,241	488,793	535,345	581,897	628,448	675,000
	<u>349,138</u>	<u>395,690</u>	<u>442,241</u>	<u>488,793</u>	<u>535,345</u>	<u>581,897</u>	<u>628,448</u>	<u>675,000</u>	<u>721,552</u>
	325,862	372,414	418,966	465,517	512,069	558,621	605,172	651,724	698,276
Accumulated Deferred Taxes	39,096	38,545	37,746	36,943	36,144	35,340	34,541	33,738	32,939
	<u>38,545</u>	<u>37,746</u>	<u>36,943</u>	<u>36,144</u>	<u>35,340</u>	<u>34,541</u>	<u>33,738</u>	<u>32,939</u>	<u>32,136</u>
	38,821	38,146	37,344	36,543	35,742	34,941	34,140	33,338	32,537
Average Rate Base	635,317	589,440	543,690	497,939	452,189	406,438	360,688	314,937	269,187
Debt Return	14,269	13,239	12,211	11,184	10,156	9,129	8,101	7,073	6,046
Equity Return	32,420	30,079	27,745	25,410	23,075	20,741	18,406	16,071	13,737
Book Depreciation	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552
20 Yr MACRS Tax Depr	45,220	44,620	44,610	44,620	44,610	44,620	44,610	44,620	44,610
Removal Costs									
SL for Deferred	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552
Deferred Taxes	(551)	(799)	(803)	(799)	(803)	(799)	(803)	(799)	(803)
Net Deferred ITC	-	-	-	-	-	-	-	-	-
O&M (input by year)	-	-	-	-	-	-	-	-	-
Property Taxes (input by year)	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Current Tax RR	23,427	22,023	20,380	18,729	17,085	15,434	13,791	12,139	10,496
Total Revenue Requirements	132,117	127,094	122,084	117,075	112,065	107,056	102,046	97,037	92,027
NPV Rev Req	80,311	72,596	65,528	59,048	53,112	47,677	42,704	38,158	34,005
LARR	113,196	113,196	113,196	113,196	113,196	113,196	113,196	113,196	113,196
LARR%									

Total to collect from customers

Annual ongoing charge

Levelized Annual Revenue Requirement Percentage Calculation

LED Streetlighting Investment

Docket No. E002/M-15-920
 Information Request No. DOC-001

Attachment B

Capital Structure
 Long Term Debt
 Short Term Debt
 Preferred Stock
 Common Equity
 Required Rate of Return

MN Composite Tax rate
 Book Life
 ITC Rate
 20 Yr MACRS
 Capital Investment
 Net Salvage

	17 2032	18 2033	19 2034	20 2035	21 2036	22 2037	23 2038	24 2039	25 2040
Plant In-service	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>
	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
Depreciation Reserve	721,552	768,103	814,655	861,207	907,759	954,310	1,000,862	1,047,414	1,093,966
	<u>768,103</u>	<u>814,655</u>	<u>861,207</u>	<u>907,759</u>	<u>954,310</u>	<u>1,000,862</u>	<u>1,047,414</u>	<u>1,093,966</u>	<u>1,140,517</u>
	744,828	791,379	837,931	884,483	931,034	977,586	1,024,138	1,070,690	1,117,241
Accumulated Deferred Taxes	32,136	31,336	30,533	29,734	28,931	18,902	(357)	(19,615)	(38,874)
	<u>31,336</u>	<u>30,533</u>	<u>29,734</u>	<u>28,931</u>	<u>18,902</u>	<u>(357)</u>	<u>(19,615)</u>	<u>(38,874)</u>	<u>(58,132)</u>
	31,736	30,935	30,133	29,332	23,916	9,273	(9,986)	(29,244)	(48,503)
Average Rate Base	223,436	177,686	131,935	86,185	45,049	13,141	(14,152)	(41,445)	(68,739)
Debt Return	5,018	3,991	2,963	1,936	1,012	295	(318)	(931)	(1,544)
Equity Return	11,402	9,067	6,733	4,398	2,299	671	(722)	(2,115)	(3,508)
Book Depreciation	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552
20 Yr MACRS Tax Depr	44,620	44,610	44,620	44,610	22,310	-	-	-	-
Removal Costs									
SL for Deferred	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552	46,552
Deferred Taxes	(799)	(803)	(799)	(803)	(10,029)	(19,258)	(19,258)	(19,258)	(19,258)
Net Deferred ITC	-	-	-	-	-	-	-	-	-
O&M (input by year)	-	-	-	-	-	-	-	-	-
Property Taxes (input by year)	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000	16,000
Current Tax RR	8,845	7,201	5,550	3,907	11,651	19,732	18,749	17,766	16,783
Total Revenue Requirements	87,017	82,008	76,998	71,989	67,485	63,991	61,002	58,014	55,025
NPV Rev Req	30,214	26,757	23,607	20,740	18,269	16,278	14,582	13,031	11,614
LARR	113,196	113,196	113,196	113,196	113,196	113,196	113,196	113,196	113,196
LARR%									

Total to collect from customers

Annual ongoing charge

Levelized Annual Revenue Requirement Percentage Calculation

LED Streetlighting Investment

Docket No. E002/M-15-920
 Information Request No. DOC-001
 Attachment B

Capital Structure
 Long Term Debt
 Short Term Debt
 Preferred Stock
 Common Equity
 Required Rate of Return

MN Composite Tax rate
 Book Life
 ITC Rate
 20 Yr MACRS
 Capital Investment
 Net Salvage

	26 2041	27 2042	28 2043	29 2044	30 2045
Plant In-service	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>1,000,000</u>	<u>-</u>
	1,000,000	1,000,000	1,000,000	1,000,000	500,000
Depreciation Reserve	1,140,517	1,187,069	1,233,621	1,280,172	1,326,724
	<u>1,187,069</u>	<u>1,233,621</u>	<u>1,280,172</u>	<u>1,326,724</u>	<u>-</u>
	1,163,793	1,210,345	1,256,897	1,303,448	663,362
Accumulated Deferred Taxes	(58,132)	(77,390)	(96,649)	(115,907)	(135,166)
	<u>(77,390)</u>	<u>(96,649)</u>	<u>(115,907)</u>	<u>(135,166)</u>	<u>-</u>
	(67,761)	(87,020)	(106,278)	(125,537)	(67,583)
Average Rate Base	(96,032)	(123,325)	(150,618)	(177,912)	(95,779)
Debt Return	(2,157)	(2,770)	(3,383)	(3,996)	(2,151)
Equity Return	(4,901)	(6,293)	(7,686)	(9,079)	(4,888)
Book Depreciation	46,552	46,552	46,552	46,552	23,276
20 Yr MACRS Tax Depr	-	-	-	-	-
Removal Costs					350,000
SL for Deferred	46,552	46,552	46,552	46,552	23,276
Deferred Taxes	(19,258)	(19,258)	(19,258)	(19,258)	135,166
Net Deferred ITC	-	-	-	-	-
O&M (input by year)	-	-	-	-	-
Property Taxes (input by year)	16,000	16,000	16,000	16,000	16,000
Current Tax RR	15,801	14,818	13,835	12,852	(138,615)
Total Revenue Requirements	52,036	49,048	46,059	43,071	28,788
NPV Rev Req	10,321	9,141	8,066	7,088	4,452
LARR	113,196	113,196	113,196	113,196	
LARR%					

Total to collect from customers

Annual ongoing charge

NSPM - Electric Utility - State of Minnesota

Street Lighting Power Costs

2015 Test Year

	2015
	Non-APL
	<u>Lighting</u>
1 Energy Cost	\$5,228
2 Baseload Cost	<u>\$936</u>
3 Energy + BL	\$6,164
4 MWH	143,362
5 Energy + BL per kWh	4.299¢
Energy Only	3.646¢
6 Peak Cost	\$184
7 Transmission Cost	\$6
8 Distribution Cost	<u>\$1,140</u>
9 Demand Cost Total	\$1,330
10 Unit Demand Cost per kWh	0.928¢
11 Unit Demand Cost per kW	\$38.60

LED Energy-Only Rate Design (Department Proposal)

Rate Code A32

Monthly LED Street Lighting Rate Design Summary

	NSP-MN				
	Per HPS/LED Street Light Equivalent				
	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
2019 HPS Automatic Protective Lighting Service Rates (A32)	\$1.74	\$2.32	\$3.17	\$5.34	\$8.12
<i>Maintenance Expense Impact (Savings)</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
System Allocation Cost Reduction	(\$0.68)	(\$0.98)	(\$1.32)	(\$1.90)	(\$2.98)
<i>Incremental Capital Revenue Requirement</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Net LED SL Fixture Rate Impact - Company Owned Street Lights	(\$0.68)	(\$0.98)	(\$1.32)	(\$1.90)	(\$2.98)
Proposed Monthly LED Automatic Protective Lighting Service Rates	\$1.06	\$1.34	\$1.85	\$3.44	\$5.14
Current HPS Monthly Average Bill Per Street Light - A32	\$2.40	\$3.27	\$4.56	\$7.84	\$12.04
LED Fixture Impact on HPS Street Lighting Rate	(\$0.68)	(\$0.98)	(\$1.32)	(\$1.90)	(\$2.98)
Fuel & Resource Adj. Savings Estimate	(\$0.32)	(\$0.60)	(\$1.04)	(\$1.22)	(\$2.64)
Total Monthly Bill Impact (savings)	(\$1.00)	(\$1.58)	(\$2.36)	(\$3.12)	(\$5.62)
Proposed LED Monthly Average Bill Per Street Light - A32	\$1.40	\$1.69	\$2.20	\$4.71	\$6.43
<i>Percentage Savings (increase)</i>	41.7%	48.2%	51.8%	39.9%	46.6%

Annual Impact of LED Fixtures on the A32 Street Lighting System Service Rate

	NSP-MN				
	Per HPS/LED Street Light Equivalent				
	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
Maintenance Savings					
Relamp Expense Savings	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Service Order Expense Savings	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total Maintenance Savings	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Monthly Savings (increase)</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
System Allocation Cost Reduction					
Energy Related System Allocation Cost Reduction	\$6.57	\$9.43	\$12.71	\$18.35	\$28.65
Demand Related System Allocation Cost Reduction	\$1.63	\$2.31	\$3.14	\$4.50	\$7.05
Total System Allocation Cost Reduction	\$8.20	\$11.74	\$15.85	\$22.85	\$35.70
<i>Monthly Savings (increase)</i>	\$0.68	\$0.98	\$1.32	\$1.90	\$2.98
Incremental Capital Revenue Requirement	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<i>Monthly Savings (increase)</i>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
LED SL Base Rate Savings (Increase)	\$8.20	\$11.74	\$15.85	\$22.85	\$35.70
<i>Monthly Savings (increase)</i>	\$0.69	\$0.98	\$1.32	\$1.91	\$2.98
Fuel & Resource Adj. Savings Estimate	\$3.78	\$7.23	\$12.48	\$14.64	\$31.72
<i>Monthly Savings (increase)</i>	\$0.32	\$0.60	\$1.04	\$1.22	\$2.64
Annual Bill Savings - LED Street Lights	\$11.98	\$18.97	\$28.33	\$37.49	\$67.42
<i>Monthly Savings (increase)</i>	\$1.01	\$1.58	\$2.36	\$3.13	\$5.62

1 Automatic Protective Lighting Service Rates proposed to be effective January 1, 2019 as filed in Docket No. E002/GR-18-729

LED Energy-Only Rate Design (Department Proposal)

Rate Code A32

		NSP-MN				
		Per HPS/LED Street Light Equivalent				
	Total	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
Relamp Expense						
Relamp Exp Forecast	\$0					
No. of Rate Code A30 Street Lights	109,872					
Relamp Expense Savings	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Service Order Expense						
Annual HPS Fixture Related Service Order Expense	\$0					
No. of Rate Code A30 Street Lights	109,872					
Service Order Expense Savings	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Incremental Fixture & Installation Cost						
Net LED Installed Cost (Includes Fixture, Photo Control and Installation)		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
29-Year LARR %		10.05%	0.00%	0.00%	10.05%	0.00%
LED Fixture Incremental Annual Revenue Requirement		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Incremental Monthly Capital Related Revenue Requirement		\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
		NSP-MN				
		Per HPS/LED Street Light Equivalent				
	Total	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
Base Rate Energy Related System Cost Allocation						
Energy Related Expense Rate (Cents/kWh)	5.059¢					
Fuel Expense Rate(Cents/kWh)	2.165¢					
Base Rate Energy System Allocation Cost Rate (Cents/kWh)	2.894¢					
HPS Annual Energy Usage (kWh)		340	487	711	1,277	2,005
Base Rate Energy Related System Allocation Rate (Cents/kWh)		2.894¢	2.894¢	2.894¢	2.894¢	2.894¢
HPS Base Rate Energy Related System Allocation Cost		\$9.84	\$14.09	\$20.58	\$36.96	\$58.02
LED Annual Energy Usage (kWh)		113	161	272	643	1,015
Base Rate Energy Related System Allocation Rate (Cents/kWh)		2.894¢	2.894¢	2.894¢	2.894¢	2.894¢
LED Base Rate Energy Related System Allocation Cost		\$3.27	\$4.66	\$7.87	\$18.61	\$29.37
Base Rate Energy Related System Cost Allocation Reduction		\$6.57	\$9.43	\$12.71	\$18.35	\$28.65

LED Energy-Only Rate Design (Department Proposal)

Rate Code A32

	70W/<30W	100W/30-45W	150W/50-75W	250W/110-165W	400W/200-250W
Base Rate Demand Related System Cost Allocation					
HPS Demand (Watts)	82	117	171	307	482
Base Rate Demand Related System Allocation Rate (Cents/kWh)	\$29.63	\$29.63	\$29.63	\$29.63	\$29.63
HPS Base Rate Demand Related System Allocation Cost	\$2.43	\$3.47	\$5.07	\$9.10	\$14.28
LED Annual Demand (Watts)					
LED Annual Demand (Watts)	27	39	65	155	244
Base Rate Demand Related System Allocation Rate (Cents/kWh)	\$29.63	\$29.63	\$29.63	\$29.63	\$29.63
LED Base Rate Demand Related System Allocation Cost	\$0.80	\$1.16	\$1.93	\$4.59	\$7.23
Demand Related System Cost Allocation Reduction	\$1.63	\$2.31	\$3.14	\$4.50	\$7.05
Based Cost of Energy Estimated Savings (FCC)					
HPS Annual Energy Usage (kWh)					
HPS Annual Energy Usage (kWh)	340	487	711	1,277	2,005
Base Cost of Energy Street Lighting Rate (Cents/kWh)					
Base Cost of Energy Street Lighting Rate (Cents/kWh)	2.165¢	2.165¢	2.165¢	2.165¢	2.165¢
Base Cost of Energy Related Expense					
Base Cost of Energy Related Expense	\$7.36	\$10.54	\$15.39	\$27.65	\$43.41
<i>Monthly Base Cost of Energy Related Expense</i>					
<i>Monthly Base Cost of Energy Related Expense</i>	\$0.61	\$0.88	\$1.28	\$2.30	\$3.62
LED Annual Energy Usage (kWh)					
LED Annual Energy Usage (kWh)	179	179	179	653	653
Base Cost of Energy Street Lighting Rate (Cents/kWh)					
Base Cost of Energy Street Lighting Rate (Cents/kWh)	2.165¢	2.165¢	2.165¢	2.165¢	2.165¢
Base Cost of Energy Related Expense					
Base Cost of Energy Related Expense	\$3.88	\$3.88	\$3.88	\$14.14	\$14.14
<i>Monthly Base Cost of Energy Related Expense</i>					
<i>Monthly Base Cost of Energy Related Expense</i>	\$0.32	\$0.32	\$0.32	\$1.18	\$1.18
Base Cost of Energy Related Expense Savings	\$3.49	\$6.67	\$11.52	\$13.51	\$29.27
Resource Adjustment Estimated Cost Avoidance					
HPS Annual Energy Usage (kWh)					
HPS Annual Energy Usage (kWh)	340	487	711	1,277	2,005
Resource Adjustment Street Lighting Rate (Cents/kWh)					
Resource Adjustment Street Lighting Rate (Cents/kWh)	0.1813¢	0.1813¢	0.1813¢	0.1813¢	0.1813¢
Resource Adjustment Expense					
Resource Adjustment Expense	\$0.62	\$0.88	\$1.29	\$2.32	\$3.64
<i>Monthly Base Cost of Energy Related Expense</i>					
<i>Monthly Base Cost of Energy Related Expense</i>	\$0.05	\$0.07	\$0.11	\$0.19	\$0.30
LED Annual Energy Usage (kWh)					
LED Annual Energy Usage (kWh)	179	179	179	653	653
Resource Adjustment Street Lighting Rate (Cents/kWh)					
Resource Adjustment Street Lighting Rate (Cents/kWh)	0.1813¢	0.1813¢	0.1813¢	0.1813¢	0.1813¢
Resource Adjustment Expense					
Resource Adjustment Expense	\$0.32	\$0.32	\$0.32	\$1.18	\$1.18
<i>Monthly Base Cost of Energy Related Expense</i>					
<i>Monthly Base Cost of Energy Related Expense</i>	\$0.03	\$0.03	\$0.03	\$0.10	\$0.10
Resource Adjustment Cost Avoidance	\$0.29	\$0.56	\$0.96	\$1.13	\$2.45

CERTIFICATE OF SERVICE

I, Marcella Emeott, hereby certify that I have this day served copies of the following document on the attached list of persons by electronic filing, e-mail, or by depositing a true and correct copy thereof properly enveloped with postage paid in the United States Mail at St. Paul, Minnesota.

MINNESOTA DEPARTMENT OF COMMERCE – COMMENTS

Docket No. **E002/M-18-729**

Dated this **22nd** Day of **January 2019**.

/s/Marcella Emeott

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