

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In The Matter of Union Electric Company d/b/a)	
Ameren Missouri's Request to Extend Date to Provide)	<u>File No. EO-2013-0367</u>
LED Street Lighting Information)	Tariff No. YE-2014-0152

STAFF RECOMMENDATION TO APPROVE TARIFF SHEETS

COMES NOW Staff of the Missouri Public Service Commission ("Staff"), by and through the undersigned counsel, and submits this Staff Recommendation ("Recommendation") to the Missouri Public Service Commission ("Commission"). In support of the Recommendation, Staff respectfully states the following:

Background

1. On September 30, 2013,¹ Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") filed tariff sheets to add an optional Light Emitting Diode ("LED") energy only rate for 6(M) customer-owned street and outdoor area lighting. The tariff sheets bear an effective date of October 30.
2. As discussed in Staff's *Memorandum* attached hereto and fully incorporated herein, the tariff sheets are a product of Ameren Missouri's work under the Commission's directive in its *Report and Order* in Case No. ER-2011-0028, as well as a *Stipulation and Agreement* approved by the Commission in Case No. ER-2012-0166.
3. On October 1, the Commission issued its *Order Establishing Time To File Recommendation* ("Order") that directed Staff, along with any other interested party, to file a recommendation regarding Ameren Missouri's LED street lighting tariff no later than October 18. This filing complies with the Commission's *Order*.

¹ All dates herein refer to calendar year 2013, unless otherwise specified.

Authority and Recommendation

4. Section 393.140 (11), RSMo 2000 requires utilities to file a tariff or tariff sheets with an effective date of at least 30-days from issuance.

5. The Commission has the statutory authority to supervise, regulate and control public utilities within its jurisdiction by approval of rate schedules filed with the Commission.²

6. As stated in the Staff *Memorandum*, Staff supports Ameren Missouri's decision to make this filing, agrees with the calculation of the energy only rates for the 6(M) service in the tariff sheets and agrees with Ameren Missouri's decision to continue its evaluation of LED Street and Area Lighting economics for its 5(M) company-owned street and outdoor area lighting service. As such Staff recommends the Commission issue an order approving the tariff sheets to go into effect on October 30.

7. Offering a LED option to customer-owned lighting serves the public interest better than providing no options at all. As Ameren Missouri has indicated it intends to continue to monitor the technological advances, cost curves and economics of LED lighting, Staff also recommends the Commission continue its directive to Ameren Missouri from Case No. ER-2011-0028.³ To do so, Staff recommends the Commission order Ameren Missouri to continue to monitor the various critical assumptions identified

² *State ex. rel Utility Consumers Council of Missouri, Inc. v. Public Service Commission*, 585 S.W.2d 41 (1979).

³ Case No. ER-2011-0028, *Report and Order*, p.94. "The Commission agrees with Staff that LED street lighting is an exciting technology that should be examined and implemented if appropriate. Staff does not ask the Commission to order Ameren Missouri to immediately file an LED tariff and the Commission will not do so. Instead, Staff asks the Commission to order Ameren Missouri to continue examining the potential of LED lighting and to either file a tariff within one year, or file a status report indicating when it will be able to file such a tariff. Staff's request is reasonable and the Commission will direct Ameren Missouri to either file an LED street lighting tariff by July 31, 2012, or to provide a status report to Staff by that date, indicating when it will be able to file such a tariff."

through the analysis in its July 31 *Light Emitting Diode (LED) Street and Area Lighting Report*, to update its analysis annually and to report the results of its annual update to Staff.

8. Staff has verified that Ameren Missouri has filed its calendar year 2012 Annual Report and paid its first quarterly installment of its fiscal year 2014 assessment.

WHEREFORE, Staff files this Recommendation for the Commission's information and consideration and recommends the Commission approve the filed tariff sheets with Tariff Tracking No. YE-2014-0152 to go into effect on October 30, 2013, and order Ameren Missouri to continue to monitor the various critical assumptions identified through the analysis in its July 31 *Light Emitting Diode (LED) Street and Area Lighting Report*, to update its analysis annually and to report the results of its annual update to Staff.

Respectfully submitted,

**STAFF OF THE MISSOURI PUBLIC
SERVICE COMMISSION**

/s/Jennifer Hernandez

Jennifer Hernandez
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Missouri Bar No. 59814

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served electronically on this **18th day of October, 2013** to the parties of record as set out on the official Service List maintained by the Data Center of the Missouri Public Service Commission for this case.

/s/Jennifer Hernandez

MEMORANDUM

TO: Missouri Public Service Commission Official Case File
File No. EO-2013-0367, Tariff Tracking No. YE-2014-0152
Union Electric Company d/b/a Ameren Missouri

FROM: Hojong Kang, Regulatory Economist III

/s/ John Rogers 10/18/2013 /s/ Jennifer Hernandez 10/18/2013
Energy Resource Analysis Unit/Date Staff Counsel Department/Date

SUBJECT: Staff Recommendation for **Approval** of Tariff Sheets to Revise Service Classification No. 6(M), Street and Outdoor Area Lighting – Customer-Owned.

DATE: October 18, 2013

Summary

On September 30, 2013, Union Electric Company d/b/a Ameren Missouri (“Ameren Missouri” and “Company”) filed two (2) proposed tariff sheets bearing an effective date of October 30, 2013. The Missouri Public Service Commission (“Commission”) assigned the tariff sheets Tariff Tracking No. YE-2014-0152. With these tariff sheets Ameren Missouri is proposing to include an option for customer-owned unmetered Light Emitting Diode (“LED”) Street Lighting energy only rates in the Company’s current Service Classification No. 6(M), Street and Outdoor Area Lighting – Customer-Owned (“6(M)”), tariff. The Commission Staff (“Staff”) recommends that the Commission issue an order approving the proposed tariff sheets to go into effect on October 30, 2013.

Because of: 1) the technological advances and advantages of LED street lights, 2) the declining cost curve for LED lighting systems, and 3) the expectation that the economics of LED street lights for Ameren Missouri will continue to improve, Staff also recommends that the Commission order the Company to continue to monitor the various critical assumptions identified through the analyses in the 2013 Report, to update its analysis annually and to report the results of its annual update to Staff.

Background

As part of the Company’s 2011 general rate case in Case No. ER-2011-0028, the Commission ordered Ameren Missouri to analyze LED Street Lighting technologies and assess whether the Company should offer a LED Street Lighting service to its customers. The Commission’s July 13, 2011 *Report and Order* in Case No. ER-2011-0028 states¹:

The Commission agrees with Staff that LED street lighting is an exciting technology that should be examined and implemented if appropriate. Staff does not ask the Commission to order Ameren Missouri to immediately file an LED

¹ ER-2011-0028, Report and Order, p.94.

tariff and the Commission will not do so. Instead, Staff asks the Commission to order Ameren Missouri to continue examining the potential of LED lighting and to either file a tariff within one year, or file a status report indicating when it will be able to file such a tariff. Staff's request is reasonable and the Commission will direct Ameren Missouri to either file an LED street lighting tariff by July 31, 2012, or to provide a status report to Staff by that date, indicating when it will be able to file such a tariff.

The Commission emphasizes that Ameren Missouri does not have to file a tariff until it is appropriate to do so. If its further study of the potential of LED street lighting reveals that such lighting will not be a benefit to its customers, Ameren Missouri may inform the Staff of that conclusion in its status report.

On July 31, 2012, Ameren Missouri sent via email to Staff its *Report to Staff* ("2012 Report") to comply with the Commission's *Report and Order* in Case No. ER-2011-0028. Ameren Missouri identified several issues in its 2012 Report that the Company wanted to evaluate further prior to completing its analysis and/or offering a LED Street Lighting service including: first costs, operational issues, procurement issues, lighting types, and cost-effectiveness.

Also, in Ameren Missouri's 2012 general rate case in Case No. ER-2012-0166, Ameren Missouri and parties entered into a Stipulation and Agreement ("Stipulation") which was filed on September 28, 2012, and approved by the Commission on October 10, 2012, and which includes the following:

4. The Company accepts the recommendations in the surrebuttal testimony of Staff witness Hojong Kang and agrees to complete and provide to Staff, not later than January 31, 2013, its evaluation of all issues the Company identified in its July 31, 2012 Report to Staff and either file an LED street lighting tariff or a status report as to when the Company anticipates filing such a tariff no later than March 31, 2013.

As Ameren Missouri worked through the issues it identified in its 2012 Report, the Company realized the analysis required was more complex than it had previously anticipated and would require longer than the March 31, 2013 due date for a tariff filing or status report to be completed. Therefore, on January 28, 2013, the Company made the following request in File No. EO-2013-0367, which was approved by the Commission on January 30, 2013:

4. Ameren Missouri asks the Missouri Public Service Commission to extend the dates previously approved. The Company asks to have until July 31, 2013 to complete its evaluation of all issues identified in its July 31, 2012 Report to Staff. Additionally, the Company requests to have until September 30, 2013 to file an LED street lighting tariff or status report. Between the time of this filing and the September 30, 2013 date, the Company agrees to meet (either in person or by telephone) with Staff at least every two months on this issue. The purpose of this meeting is to update Staff on the Company's progress and to allow Staff to comment on the work as it is in process.

Staff Review

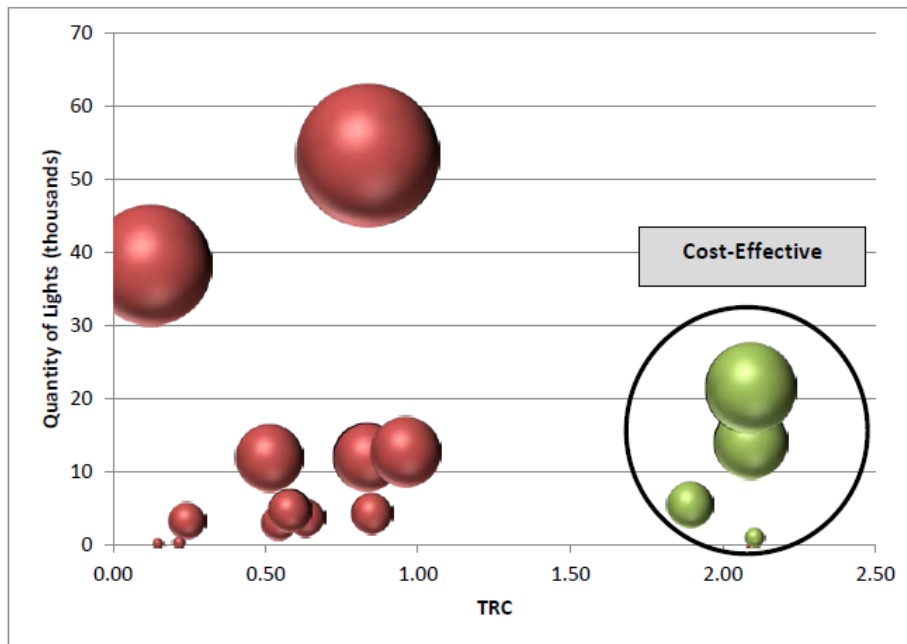
Prior to making this tariff filing, Ameren Missouri completed its evaluation of all issues identified in its 2012 Report, had LED study update discussions with Staff on April 5, 2013, and on July 25, 2013 and filed its Light Emitting Diode (LED) Street and Area Lighting Report (“2013 Report”) on July 31, 2013, in File No. EO-2013-0367. Staff appreciates the Company’s cooperation and transparency during the review and feedback process.

During 2009 – 2012, Ameren Missouri participated in the Electric Power Research Institute’s (“EPRI”) 36-month long pilot program that was part of a larger national effort to assess the performance of LED street lighting technology.

Overall, EPRI’s pilot program study indicated that the LED street lights technology was “ready for energy efficiency programs for utilities.” However, the EPRI study did not evaluate the economics of LED street lights technology. Therefore, Ameren Missouri undertook a study of the economics of replacing all of its existing Ameren Missouri street lighting systems under Service Classification No. 5(M), Street and Outdoor Area Lighting – Company-Owned (“5(M)”), with LED street lighting systems.

Ameren Missouri used two stages of analysis to evaluate the cost-effectiveness of changing all of its Company-owned street lights to LEDs; the first stage was a detailed screening analysis using the DSMore modeling tool and the second stage was an Excel-based revenue requirement model built by the Company. DSMore is the industry leading software package used to evaluate energy and demand savings from and cost-benefit ratios for demand-side measures and programs and is the same tool that Ameren Missouri used to evaluate its recently approved energy efficiency programs under the Missouri Energy Efficiency Investment Act (“MEEIA”) filing.

By using the DSMore, the Company found that approximately 44,000 lights are cost-effective out of the entire 5(M) population of 186,411, with 34,000 MWh of cost-effective energy savings. The 24 percent cost-effective street lighting upgrades to LED street lights are depicted in the green circles in the following chart.



<Figure 1> LED Measure Cost Effectiveness Summary²

For the Excel-based revenue requirement model, the Company designed three implementation scenarios only with the lights that passed the cost-effectiveness analysis. The three scenarios chosen included:

- a. 100% of cost-effective lights over three years, starting in 2016³
- b. 100% of cost-effective lights over five years, starting in 2016
- c. 100% of cost-effective lights over five years; delayed installation for three years until 2019

Ameren Missouri then modeled the economics of changing each type of existing Company-owned street light (classified by wattage, fixture type, technology type and rate class) that passed cost-effectiveness screening in the DSMore model to LED street lights to include: the capital costs, maintenance savings and energy savings. The results of the economic modeling are in the following table and chart which indicate there is a slight net benefit for each of the three scenarios and that the simple payback is between 12 and 14 years for the scenarios.

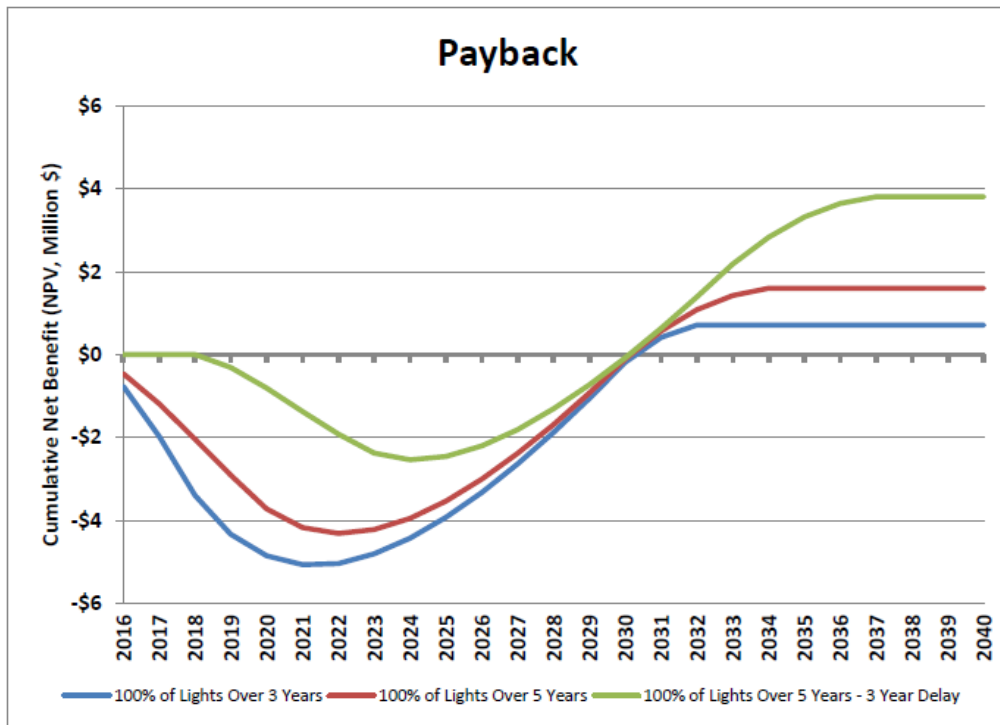
Scenario	Net Benefit (NPV)	LED Capital (NPV)
100% of cost-effective lights over 3 years	\$0.72 million	\$30.07 million
100% of cost-effective lights over 5 years	\$1.60 million	\$28.25 million
100% of cost-effective lights over 5 years; delayed 3 years	\$3.81 million	\$23.26 million

<Table 1> Stock Accounting Approach⁴

² Light Emitting Diode (LED) Street and Area Lighting Report, July 2013, p.12.

³ 2016 was chosen as a start date to accommodate additional time required to procure lights and create a detailed project plan

⁴ Light Emitting Diode (LED) Street and Area Lighting Report, July 2013, p.13.



<Figure 2> Risk & Uncertain Factors Approach⁵

Ameren Missouri then evaluated the risk and uncertainty related to the following four uncertain factors in its analysis: capital expenditure labor rates, maintenance trip times, LED cost trends, and LED life spans. Each uncertain factor was assigned values and probabilities for “base”, “favorable” and “unfavorable” outcomes. This analysis suggested that delaying implementation of LED street lighting is expected to result in improved overall economics and improved earnings opportunities for the Company. However, the Company’s analysis of risk and uncertainty for the three implementation scenarios studied with current assumptions results in the following “risk adjusted” after tax earnings:

Implementation Scenario	NPV of After Tax Earnings
100% over 3 years	-\$1.44 million
100% over 5 years	-\$1.42 million
100% over 5 years; 3 year delay	-\$1.38 million

<Table 2> Financial Impacts Approach⁶

Based on its “risk adjusted” revenue requirement modeling, the Company determined that none of the implementation scenarios translate into a positive financial decision for the Company.

⁵ Light Emitting Diode (LED) Street and Area Lighting Report, July 2013, p.17.

⁶ Light Emitting Diode (LED) Street and Area Lighting Report, July 2013, p.18.

Therefore, the overall conclusion of Ameren Missouri is that while LEDs appear to be a viable technology, current economics and associated uncertainty do not support near-term adoption.

In the 2013 Report, Ameren Missouri states that the Company will continue to monitor the various critical assumptions identified through these analyses, and will update the analysis as needed.

In the meantime, Ameren Missouri filed the tariff sheets in Tariff Tracking No. YE-2014-0152, that will allow 6(M) customers the choice to install unmetered LED street lights when the LED light is purchased, owned, and maintained by the customer and to receive energy only rates for unmetered LED street lights.

	Watts	Burn Hours	Energy Consumption	6(M) Energy Rate	Annual Cost	Monthly Rate
		Annual	Annual kWh	(\$/kWh)		
2,500 Lumens, 40 W	40	4000	160	\$0.0431	\$6.90	\$0.57
5,000 Lumens, 70 W	70	4000	280	\$0.0431	\$12.07	\$1.01
4,250 Lumens, 85 W Post Top	85	4000	340	\$0.0431	\$14.65	\$1.22
12,500 Lumens, 180 W	180	4000	720	\$0.0431	\$31.03	\$2.59
19,000 Lumens, 260 W	260	4000	1040	\$0.0431	\$44.82	\$3.74

<Table 3> LED street lights tariff rate ⁷

Staff reviewed Ameren Missouri’s 2012 Report and 2013 Report including work papers for the DSMore modeling tool and the Excel-based revenue requirement model for the LED street light system evaluation and the inputs for and calculations of the energy only rates for the proposed Sheet No. 59. As a result of its review, Staff supports Ameren Missouri’s decision to make this tariff filing, agrees with the calculation of the energy only rates for the 6(M) service in this tariff filing and agrees with the Company’s decision to continue its evaluation of LED street lights economics for its 5(M) service.

Staff Recommendation

While the Company’s tariff filing adds a service offering only to the customer-owned unmetered LED street lights without a 5(M) LED street lights tariff rate at this time, the public interest is better served by this option than by no options at all.

The Staff has reviewed the proposed tariff sheets and the related workpapers, as filed on September 30, 2013, and recommends that the Commission issue an order approving the following proposed tariff sheets to go into effect on October 30, 2013, the requested effective date:

⁷ Work Paper named “LED Rate Calcs.xlsx”, Tariff Tracking No. YE-2014-0152

MO.P.S.C. SCHEDULE NO. 5

1 st Revised Sheet No. 59	Cancelling	Original Sheet No. 59
1 st Revised Sheet No. 59.1	Cancelling	Original Sheet No. 59.1

Because of: 1) the technological advances and advantages of LED street lights, 2) the declining cost curve for LED lighting systems, and 3) the expectation that the economics of LED street lights for Ameren Missouri will continue to improve, Staff also recommends that the Commission order the Company to continue to monitor the various critical assumptions identified through the analyses in the 2013 Report, to update its analysis annually and to report the results of its annual update to Staff.

The Staff has verified that Ameren Missouri has filed its 2012 annual report and is not delinquent on the quarterly payment of its assessment. Staff is not aware of any other matter before the Commission that affects or is affected by this filing.

**BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI**

In the Matter of Union Electric)	
Company d/b/a Ameren Missouri's)	Case No. EO-2013-0367
Request to Extend Date to Provide)	File No. YE-2014-0152
LED Street Lighting Information)	

AFFIDAVIT OF HOJONG KANG

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

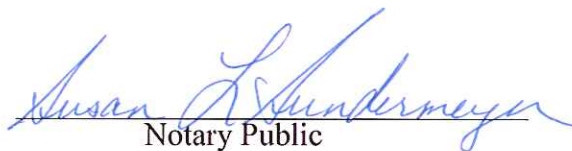
Hojong Kang, of lawful age, on oath states: that he participated in the preparation of the foregoing Staff Recommendation in memorandum form, to be presented in the above case; that the information in the Staff Recommendation was provided to him; that he has knowledge of the matters set forth in such Staff Recommendation; and that such matters are true to the best of his knowledge and belief.



Hojong Kang

Subscribed and sworn to before me this 18th day of October, 2013.

SUSAN L. SUNDERMEYER
Notary Public - Notary Seal
State of Missouri
Commissioned for Callaway County
My Commission Expires: October 03, 2014
Commission Number: 10942086



Notary Public