Exhibit No.:	_____
Issue(s):	Generating Capacity/ Renewable Energy Standards/ Operational Issues/ Project Timing
Witness/Type of Exhibit:	Burdge/Rebuttal
Sponsoring Party:	Public Counsel
Case No.:	EA-2016-0208

REBUTTAL TESTIMONY

OF

J. RICHMOND BURDGE

Submitted on Behalf of
The Office of the Public Counsel

UNION ELECTRIC COMPANY D/B/A AMEREN MISSOURI

Case No. EA-2016-0208

August 25, 2016

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of the Application of Union Electric Company d/b/a Ameren Missouri for Permission and Approval of a Certificate of Public Convenience and Necessity Authorizing it to Offer a Pilot Distributed Solar Program and File Associated Tariff.	))))))	**File No. EA-2016-0208**

AFFIDAVIT OF J. RICHMOND BURDGE

STATE OF MISSOURI)
) ss
COUNTY OF COLE)

J. Richmond Burdge, of lawful age and being first duly sworn, deposes and states:

1. My name is J. Richmond Burdge. I am a Research Analyst for the Office of the Public Counsel.

2. Attached hereto and made a part hereof for all purposes is my rebuttal testimony.

3. I hereby swear and affirm that my statements contained in the attached testimony are true and correct to the best of my knowledge and belief.

J. Richmond Burdge
J. Richmond Burdge

Subscribed and sworn to me this 7th day of September 2016.

NOTARY PUBLIC NOTARY SEAL STATE OF MISSOURI

JERENE A. BUCKMAN
My Commission Expires
August 23, 2017
Cole County
Commission #13754037

Jerene A. Buckman
Jerene A. Buckman
Notary Public

My Commission expires August 23, 2017.

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REBUTTAL TESTIMONY

OF

J. RICHMOND BURDGE

UNITED ELECTRIC d/b/a AMEREN MISSOURI

CASE NO. EA-2016-0208

I. INTRODUCTION

Q. Please state your name and business address.

A. My name is J. Richmond Burdge and my business address is P.O. Box 2230, Jefferson City, Missouri 65102.

Q. By whom are you employed and in what capacity?

A. I am employed by the Missouri Office of the Public Counsel ("OPC") as a Research Analyst.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the OPC.

Q. Please describe your experience and your qualifications.

A. I worked as an Environmental Specialist in the Water Protection Program of the Missouri Department of Natural Resources from July 2002 to November 2012. After receiving my M.A. in Sociology from Ball State University in July 2015, I was employed by OPC in January 2016 where I research many aspects of electric, water, and natural gas utility regulation - particularly distributed generation and smart grid technology, community solar projects, and marketing. I have also been involved in several electric and water utility case negotiations.

Q. Have you previously provided testimony before the Public Service Commission ("the Commission")?

A. Yes, I provided rebuttal testimony in KCP&L—Greater Missouri Operations' ("GMO") rate case ER-2016-0156 concerning Advanced Meter Infrastructure ("AMI") implementation.

Q. What is the purpose of this testimony?

A. The purpose of this testimony is to respond to the direct testimony provided by Michael W. Harding and William J. Barbieri on behalf of Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") in this case and the non-unanimous stipulation and agreement filed by Ameren Missouri.

Q. What is Ameren Missouri requesting?

A. Ameren Missouri is requesting a Certificate of Convenience and Necessity ("CCN") related to a project Ameren Missouri calls the "Solar Partnership Pilot" involving the building and installing of utility-owned solar generation facilities on select commercial or industrial customers' properties. The generation from the facilities would be transmitted directly to Ameren Missouri's distribution system and the customer providing the site would receive no financial compensation.

Q. What is your recommendation to the Commission?

A. OPC recommends that the Commission reject Ameren Missouri's proposed Solar Partnership project, for reasons I will discuss.

II. GENERATING CAPACITY

Q. Does Ameren Missouri currently have enough generating capacity to meet its needs?

A. Yes. In its 2014 Integrated Resource Plan ("IRP"), Ameren Missouri states it "currently has sufficient resources to meet our customers' demand and provide sufficient reserve capacity to ensure reliability of electric generation and support sales into the Midcontinent Independent System Operator ("MISO") market."[1]

Q. What, in your professional analysis, is the basis for Ameren Missouri's claim that its generating capacity is sufficient?

A. The IRP describes "diminished" customer growth, and says that the need for new generation "will be driven primarily by 1) renewable energy ***needed to comply with the RES*** [Renewable Energy Standard] and 2) replacement of retired generation when appropriate" (emphasis added).[2] Ameren Missouri plainly describes the sufficiency of its capacity elsewhere when it says:

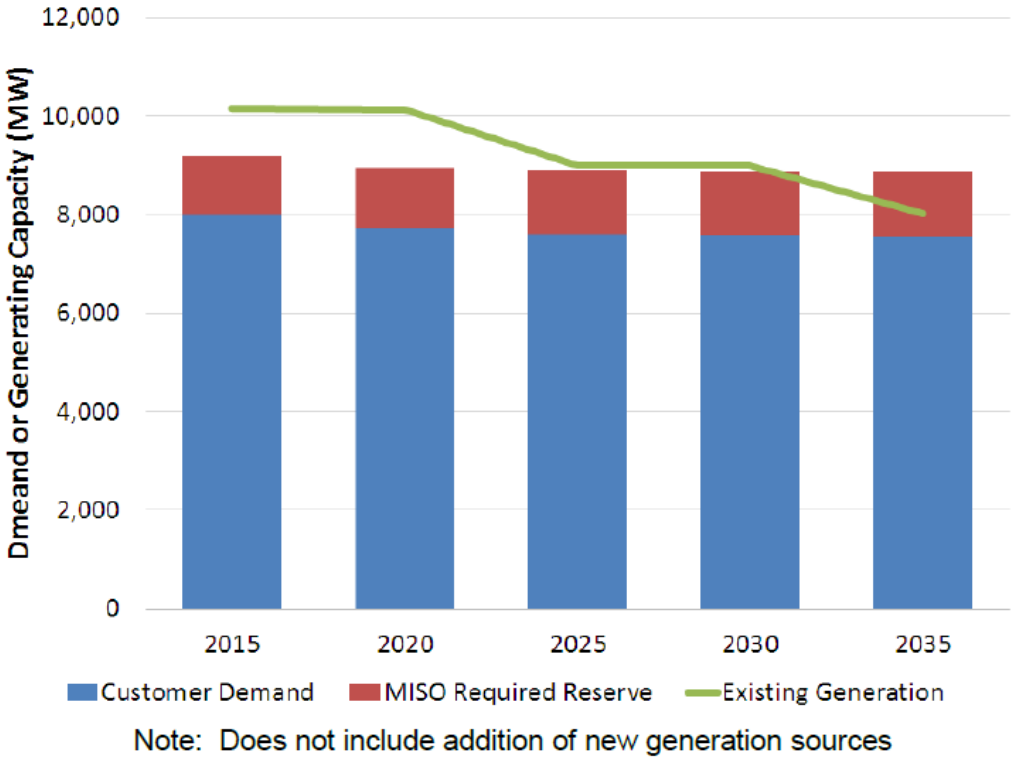
> "Ameren Missouri does not need to add resources, even if all of its existing renewable resources disappeared…The Company expects to be <u>long</u> on capacity by enough of a margin that even the removal of 150 MW of existing capacity would not trigger the need to add new capacity." (emphasis as quoted)[3]

[1] EO-2015-0084, Ameren Missouri 2014 Integrated Resource Plan, §1.2.
[2] *Ibid*.
[3] EO-2016-0286, Response to Comments of Parties, pp. 2-3.

Q. How long is Ameren Missouri likely to have sufficient capacity?

A. A graph from the IRP shows how required capacity is not expected to equal existing generation until after retirement of Sioux Energy Center in 2033.[4] This graph was based on estimates made prior to the closure of Noranda Aluminum in March 2016, leaving Ameren Missouri with an even greater surplus of generation.

Figure 1.2 Customer Demand, Reserve and Generation



Note: Does not include addition of new generation sources

Q. Does this graph include generating capacity from any new sources?

A. No. As the Note indicates, it only shows capacity from currently existing sources.

[4] EO-2015-0084, Ameren Missouri 2014 Integrated Resource Plan, §1.2.

III. RENEWABLE ENERGY STANDARDS

Q. Does Ameren Missouri need this project to comply with Missouri's Renewable Energy Standards?

A. No. Ameren Missouri states in its Renewable Energy Standard Compliance Plan 2016-2018 and in response to a Staff data request for the Solar Subscriber program that it will continue to use existing solar generation facilities to comply with Solar Renewable Energy Credit ("S-REC") requirements through 2018.[5]

Q. Would this project lead to a corresponding reduction in carbon-emitting generation?

A. No. As Ameren Missouri has stated in its *Response to Comments of Parties* in EO-2016-0286:

> "[B]ecause Ameren Missouri operates in the Midcontinent Independent System Operator, Inc. ("MISO") footprint, the addition of renewable resources does not mean that the Company's non-renewables will generate less as part of a RES-compliant portfolio. In fact, there will be no discernable *(sic)* change, meaning no impact (positive or negative) to greenhouse gases."[6]

IV. OPERATIONAL ISSUES

Q. In operating this project, will Ameren Missouri gain significant knowledge about incorporating either utility-scale or distributed solar into its grid in the future?

A. Currently, the proposal is not designed to meet Ameren Missouri's stated learning objectives. The estimated size of the proposed project, though based on "no specific

[5] EO-2016-0286, p. 9; EA-2016-0207, DR MPSC 0004 C Eubanks.
[6] p. 9.

analysis," is "approximately 5 MWs."[7] Ameren Missouri's O'Fallon solar facility has a capacity of 5.7 MW. If the Company prefers building this project using only a few locations, it is difficult to see what operational knowledge the Company would gain that it does not already have from operating a larger facility.[8] In its non-unanimous stipulation and agreement, the company agrees to file periodic reports on "learning opportunities" and "key questions". Notably, Ameren Missouri lists the "opportunities" and "questions" but provides no methodology to evaluate what it learns. Moreover, Ameren Missouri does not explain why investigating these "opportunities" and "questions" provides any benefit to ratepayers. Instead, the focus seems to be on collecting marketing data.[9] It is crucial to note Ameren Missouri has not reported learning anything from the O'Fallon solar plant except for the vaguely defined "data regarding…operational performance." In fact, Mr. Barbieri states of the O'Fallon facility in response to DR OPC 14 T Opitz:

> "I am not aware of any specific lessons learned documents being created…[.]"[10]

Q. Did the Company provide sufficient details about the location and construction of this project?

A. No. In its direct testimony, the Company did not provide names of any of the customers that "have expressed interest" in this type of program or even say how many there were.[11] Ameren Missouri did not conduct market research in order to gauge interest in this program or various other models for financing or ownership of solar projects on the

[7] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 5 T Opitz
[8] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 7 T Opitz
[9] EA-2016-0208, Non-Unanimous Stipulation and Agreement, Appendix B
[10] Ameren Missouri's Response to OPC Data Request OPC 14 T Opitz
[11] EA-2016-0208, Direct Testimony of Michael W. Harding, p. 4, lines 22-23.

premises of commercial and industrial customers.[12] In response to a data request, Ameren Missouri listed three customers with which it has held discussions concerning the project.[13] However, the Company was unable to produce written evidence of any agreement or commitment on the part of any of these customers.

As it stands, the details of this project are vague or nonexistent. It is not known at this point:

- How many discrete sites the project will occupy;[14]
- Whether the installations will take place on the ground or on rooftops;
- Whether any upgrades to the grid at the prospective sites would be necessary or how much they would cost;[15]
- Who the contractor(s) for construction will be; and
- No contract to be used with participating customers has yet been provided.[16]

The signing of the Non-Unanimous Stipulation and Agreement ("Stipulation") on August 31, 2016, does nothing to change any of these conditions.

In its testimony, the Company provides only outdated per-watt cost estimates for the Project based on estimates for a utility-scale solar facility that was proposed in 2015 but never built.[17] The Stipulation does lower the estimated cost of the Project to equal that

[12] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 4 T Opitz
[13] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 2 T Opitz
[14] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 7 T Opitz
[15] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 10 T Opitz
[16] EA-2016-0208, Ameren Missouri's Response to OPC Data Request OPC 8 T Opitz
[17] EA-2016-0208: Direct Testimony of Michael W. Harding, p. 3, lines 2-4.

quoted for the Solar Subscriber Pilot Project.[18] Even in that project, however, the number is presented without justification.

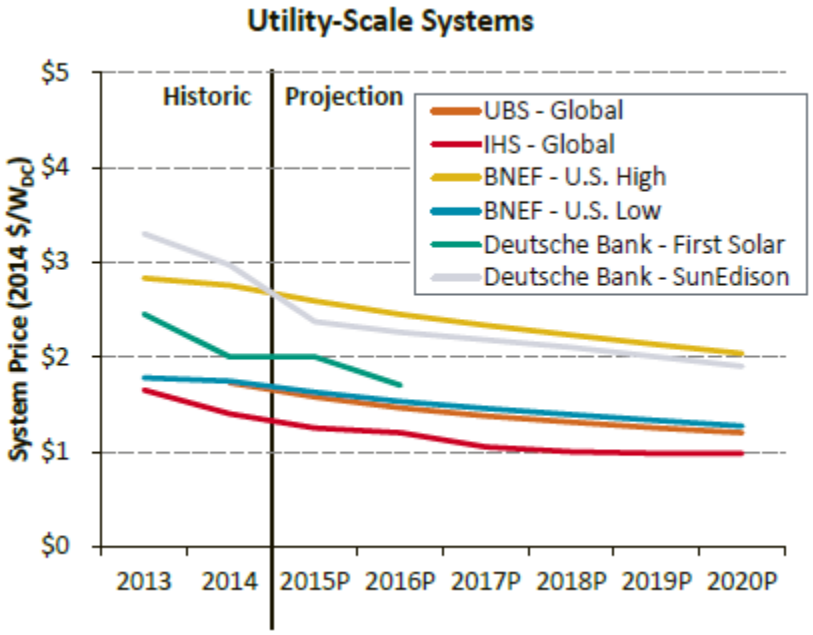
The application does not provide the information listed in the Missouri Filing Requirements for Electric Utility Applications for a CCN, which state that any application for electrical production facilities must include "plans and specifications for the complete construction project and estimated cost of the construction project or a statement of the reasons the information is currently unavailable and a date when it will be furnished".[19] The Site documentation included in the Non-Unanimous Stipulation and Agreement as "Appendix A" does not resolve this issue. In fact, it recognizes that the company has not filed "information required by 4 CSR 240-3.105(B)[.]"[20] Ameren Missouri, at a minimum, has not provided plans and specifications for the Project or a date when such plans will be furnished.

V. PROJECT TIMING

Q. If Ameren Missouri were to build this project, would there be any advantage to waiting a few years?

A. Yes. The price of building solar generation has been falling and that is expected to continue. This trend is shown in the following graph.[21]

[18] EA-2016-0207: Direct Testimony of Michael W. Harding, p. 4, Table, "Cost of Solar Generation".
[19] 4 CSR 240-3.105(1)(B)2.
[20] EA-2016-0208: Non-Unanimous Stipulation and Agreement, Appendix A, par. A.
[21] "Photovoltaic System Pricing Trends", August 25, 2015, U.S. Department of Energy. https://emp.lbl.gov/sites/all/files/pv_system_pricing_trends_presentation_0.pdf



The yellow and blue lines represent the high and low costs for utility-scale solar construction in the United States. According to these forecasts, the longer Ameren Missouri were to delay the Solar Partnership project, the less it would cost to build.

Q. Would Ameren Missouri still be able to take advantage of federal tax incentives if it waited?

A. Absent a significant policy change, yes. The current thirty percent (30%) Business Energy Investment Tax Credit for utility-scale solar projects lasts through 2019. In 2020, this will be 26 percent, and in 2021 it will be 22 percent. Beginning in 2022, this tax credit drops to 10 percent.[22]

[22] U.S. Department of Energy. http://energy.gov/savings/business-energy-investment-tax-credit-itc

Q. Are there any other reasons that it would make sense to delay this project?

A. Assuming that the Clean Power Plan ("CPP") is implemented in its current timeframe, this project or a similarly-situated project would earn Emission Rate Credits ("ERCs") (assuming Missouri takes a rate-based approach) or allowance equivalents (for a mass-based approach) if it were built by 2022. On top of that, it would receive matching credit (half from the state and half from the federal government) from the Clean Energy Incentive Program ("CEIP") for generating early, during 2020 or 2021.[23] Therefore, as concerns the Clean Power Plan, there would be no disadvantage to delaying the Project to 2020.

VI. SUMMARY

Q. Please summarize your testimony.

A. The Solar Partnership project should be rejected for the following reasons:

- Ameren Missouri currently carries sufficient generating capacity, and will until 2033;
- Ameren Missouri currently meets its required quota of S-RECs;
- The Solar Partnership project will not result in any reduction in Ameren Missouri's carbon-generating emissions;
- Ameren Missouri did not provide sufficient information concerning siting and construction of the project;

[23] U.S. Environmental Protection Agency, "Renewable Energy in the Clean Power Plan" https://www.epa.gov/sites/production/files/2015-11/documents/fs-cpp-renewable-energy.pdf

- Project construction in 2020 would allow the price of solar generation to come down and would allow Ameren Missouri to re-evaluate its need for solar generation while still taking advantage of federal tax and emission credits; and
- This Project would not help Ameren Missouri gain any significant operational knowledge of solar generation.

Q. What is your recommendation?

A. For all of the above reasons, this project represents an unnecessary burden on Ameren Missouri's ratepayers and should be rejected.

Q. Does this conclude your testimony?

A. Yes, it does.

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 4 T Opitz

Did Ameren conduct any market research among its commercial and industrial customers in order to gauge interest in various arrangements of financing and ownership for its distributed solar projects? If so, please provide the complete results.

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy, Policy & Generation
Date: July 28, 2016

No such research was conducted.

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 5 T Opitz

Provide Ameren's target for production capacity from these projects? Please include all work papers and calculations performed to arrive at the target.

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy, Policy & Generation
Date: July 28, 2016

Internal discussions revolved around the idea that enough solar development would be needed to gauge effectiveness and therefore a target of approximately 5 MWs of generation was chosen based on a possible willingness to fund these types of solar projects not to exceed $10 million. There was no specific analysis done to reach this conclusion.

RB-R-2

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 7 T Opitz

How many customers does Ameren expect will be required to complete this pilot project?

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy, Policy & Generation
Date: July 28, 2016

We would anticipate between 2-5 total customers participating with a maximum funding of $10 million.

RB-R-3

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 8 T Opitz

Does Ameren have a contract it will sign with customers participating in this program? If so, provide copies of such contract.

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy, Policy & Generation
Date: July 28, 2016

A contract is currently being developed and will be provided once finalized.

RB-R-4

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 10 T Opitz

Has Ameren performed an evaluation to determine if other system upgrades would be required to support each solar facility? If so, please provide: a. the type of upgrades needed, and; b. the projected cost of upgrades.

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy, Policy & Generation
Date: July 28, 2016

As no specific facilities have yet been selected, no such analysis has been performed. However, all such factors and costs would be part of the overall analysis in determining the viability of any particular site that is ultimately chosen.

RB-R-5

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 13 T Opitz

Mr. Barbieri's Direct testimony at p. 5 explains this project is a part of the Company's plans to gain experience with different kinds of solar installations. Please provide Ameren's plan to document and preserve the experience gained and lessons learned from this project.

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy, Policy & Generation
Date: July 28, 2016

Solar Partnership

Learning Opportunities:

1. Gain insight and knowledge about the unique benefits and challenges of distributed generation in general and, more specifically, benefits and challenges related to the deployment of Ameren Missouri-owned solar generation on properties owned by Ameren Missouri customers.
2. Learn about distributed generation, how it impacts the Company's electrical grid and to test the level of customer interest in sharing in the investment necessary to install this type of renewable generation.
3. Gain an understanding of how distributed generation functions on an electrical grid designed primarily for centralized generation.
4. Ameren Missouri should also be able to determine if there are any specific financial benefits from this form of solar generation or if utility-scale central station generation will continue to provide a more economic means of solar electrical supply.

Key Questions to Explore:

5. Are customers willing to invest money into utility-owned renewable generation?

RB-R-6

6. Does Ameren Missouri retaining ownership of the associated RECs impact customer desire for this program?
7. What contract terms are necessary in order to make this type of arrangement work?
8. Can Ameren Missouri identify a system reliability benefit arising from the addition of these generation assets?
9. Are there any distribution system challenges associated with the use of distributed generation?

Planned Activities to Gain Insights:

Ameren Missouri intends to conduct marketing surveys along with interviews of customers participating in the program to learn first-hand their thoughts about the workings of the program. Routine follow-ups on the customers' perceptions of how the program is working and the benefits that the customers are experiencing will assist Ameren Missouri with potential future program design changes that may be necessary.

Ameren Missouri will use the Division Directors responsible for the areas in which each generator is ultimately located under this pilot to track the operational benefits and challenges related to having the facilities on the distribution system (versus on the transmission system).

Ameren Missouri's
Response to OPC Data Request
Docket No. EA-2016-0208
Solar Partnership Pilot

Data Request No.: OPC 14 T Opitz

Does Ameren maintain a repository containing documents tracking the experience gained and lessons learned from its other kinds of solar installations? If so, provide: a. Any documents in such repository for the experience gained and lessons learned from Ameren's O'Fallon solar facility and; b. Any documents in such repository for the experience gained and lessons learned from customer-owned roof-top solar on Ameren's system.

RESPONSE

Prepared By: William Barbieri
Title: Director, Renewable Strategy Policy & Generation
Date: July 28, 2016

Data regarding the operational performance of the O'Fallon solar facility is tracked. I am not aware of any specific lessons learned documents being created, however the facility is still relatively new. I am not aware of any experience gained or lessons learned from customer owned roof-top solar as those systems are not controlled by Ameren Missouri. The only data that I am aware of that is tracked and recorded would be the generational output for those customer systems that have a second meter which reports actual generation in kWhs.

RB-R-7