

Exhibit No.:  
Issue(s):  
Witness: Michael W. Harding  
Sponsoring Party: Union Electric Company  
Type of Exhibit: Direct Testimony  
File No.: EA-2016-0207  
Date Testimony Prepared: April 27, 2016

**MISSOURI PUBLIC SERVICE COMMISSION**

**File No. EA-2016-0207**

**DIRECT TESTIMONY**

**OF**

**MICHAEL W. HARDING**

**ON**

**BEHALF OF**

**UNION ELECTRIC COMPANY  
d/b/a Ameren Missouri**

April 27, 2016

1 **DIRECT TESTIMONY**

2 **OF**

3 **MICHAEL W. HARDING**

4 **FILE NO. EA-2016-0207**

5 **Q. Please state your name and business address.**

6 A. My name is Michael W. Harding. My business address is One Ameren Plaza,  
7 1901 Chouteau Avenue, St. Louis, Missouri 63103.

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

9 A. I am employed by Ameren Services Company (“Ameren Services”), a subsidiary  
10 of Ameren Corporation, as General Executive, Renewable Energy.

11 **Q. Please describe your duties and responsibilities as General Executive,**  
12 **Renewable Energy.**

13 A. My primary responsibilities are the development of renewable energy projects and  
14 programs in support of Ameren’s subsidiary companies. Additionally, I support the department  
15 to ensure Ameren Missouri is in full compliance with the requirements of the Missouri  
16 Renewable Energy Standard (“RES”).

17 **Q. What is the purpose of your direct testimony?**

18 A. The purpose of my direct testimony is to describe the proposed Ameren Missouri  
19 Subscriber Solar Pilot Program and how it would operate.

20 **Q. Please briefly summarize the proposed pilot program.**

21 A. The pilot program is called Subscriber Solar. Under the program, participants  
22 will be able to purchase the equivalent of up to 50% of their average annual usage from a solar  
23 facility owned by Ameren Missouri. Solar power will be purchased in blocks of 100 kilowatt-

1 hours (“kWh”). The total kWh of subscribed solar blocks will reduce the participant’s standard  
2 energy charge by an equal amount of kWh. Participants will be enrolled on a first-come, first-  
3 served basis. Participants may cancel at any time with the cancellation taking effect at the  
4 beginning of the customer’s next monthly bill, provided that Ameren Missouri received the  
5 notification at least 20 days prior to the new billing cycle. Should a customer opt out of the  
6 program, they will be precluded from re-entering the program for a period of three months.

7 **Q. Who can subscribe to this pilot program?**

8 A. Customers must qualify for service under one of the Company’s Service  
9 Classifications, Residential Service 1(M) or Small General Service 2(M). Ameren Missouri is  
10 limiting this program to its smaller customers so that one large use customer, such as an  
11 industrial or large commercial customer, does not subscribe to a majority of the generation. This  
12 pilot is being offered for customers who otherwise may not have the ability to install solar  
13 generation. Most industrial and large commercial customers have that ability.

14 **Q. Are there other qualifications for subscribers besides size?**

15 A. Yes. Customers must not have had a disconnection notice within twelve months  
16 preceding their application. These customers may already have difficulty paying their bills and  
17 Ameren Missouri does not wish to add to that difficulty. This program is also not available to  
18 customers who are participating in net energy metering, as those customers already have their  
19 own renewable generation and are not the target of this pilot.

20 **Q. What will a subscriber pay for a solar block?**

21 A. Under Service Classification Residential 1(M), the cost of a 100 kWh solar block  
22 is \$15.78 per month. Under Service Classification Small General 2(M), the cost of a 100 kWh  
23 solar block is \$14.93 per month.

1           **Q.     Does the purchase of a solar block affect any other charges on the bill?**

2           A.     Yes, the customers' total monthly generation amount that is billed under their  
3 normal Service Classification rate will be reduced by the kWh amount of solar blocks  
4 subscribed. If a customer uses 500 kWh in a month and is subscribed to one solar block, that  
5 customer will only be billed for 400 kWh at the usual Service Class energy charge. An  
6 additional line will be added to the bill indicating the solar block subscription and charge. No  
7 other charges on the bill will change.

8           **Q.     How was the price of a solar block determined?**

9           A.     Basically, the Company is proposing to use existing rates but replace the  
10 embedded cost of its existing generation with the levelized cost of the solar generation.  
11 Therefore, the price of a solar block is the sum of two major parts:

12                   1) The "Cost of Solar Generation" which is composed of the cost to build and  
13 maintain the solar facility, market the program, upgrade the billing system, and  
14 administer the program, which is all calculated into a fixed Levelized Cost of Electricity  
15 ("LCOE") over a 25 year life; and

16                   2) A "Total Facilities Charge" which is composed of Ameren Missouri's  
17 embedded cost of Transmission and Distribution based on the Company's class cost of  
18 service study from the Company's most recent rate case.

1 The following tables show how each block was calculated:

Cost of Solar Generation	
Capacity MWAC	1
Assumed Life(years)	25
\$/watt build cost	\$2.20
Year 1 Capacity Factor	18.3%
Degradation	0.5%
ITC	30.0%
O&M Cost (\$/kWh)	\$0.01
Size of Solar Block (kWh)	100
Total kWhs	44,763,062
Monthly Solar Blocks Available	1,492
<b>LCOE per kWh</b>	<b>\$0.1270</b>

746.05103

Facilities Charges					Solar Block Charge	
Residential Customer Class	13,268,023,700 kWh Load				Residential Customer Class	\$
<i>Cost Category</i>	<i>\$ in 1000s</i>	<i>ClassRate</i>	<i>Alloc%</i>	<i>Alloc Rate</i>	<b>Cost of Solar Generation</b>	<b>0.127</b> 12.70
Customer	\$219,158	0.017	100%	0.017	Total Facilities Charge	0.031 3.08
<i>Customer Offset</i>				-0.008	Total Solar Block Rate	0.158 15.78
Production - Fixed	\$555,553	0.042	0%	0.000	kWhs per Block -- 100	
Production - Variable	\$284,958	0.021	0%	0.000	<b>Cost of 1 Solar Block</b>	<b>\$15.78</b>
Transmission - Demand	\$53,173	0.004	100%	0.004		
Distribution - Demand	\$236,584	0.018	100%	0.018		
<b>Total Facilities Charge</b>	<b>\$1,349,427</b>	<b>0.102</b>		<b>0.031</b>		
					<b>Solar Block Charge</b>	
SGS Customer Class	3,441,087,469 kWh Load				SGS Customer Class	\$
<i>Cost Category</i>	<i>\$ in 1000s</i>	<i>ClassRate</i>	<i>Alloc%</i>	<i>Alloc Rate</i>	<b>Cost of Solar Generation</b>	<b>0.127</b> 12.70
Customer	\$33,968	0.010	100%	0.010	Total Facilities Charge	0.022 2.23
<i>Customer Offset</i>				-0.006	Total Solar Block Rate	0.149 14.93
Production - Fixed	\$130,573	0.038	0%		kWhs per Block -- 100	
Production - Variable	\$74,036	0.022	0%		<b>Cost of 1 Solar Block</b>	<b>\$ 14.93</b>
Transmission -- Demand	\$11,770	0.003	100%	0.003		
Distribution -- Demand	\$51,560	0.015	100%	0.015		
<b>Total Facilities Charge</b>	<b>\$301,907</b>	<b>0.088</b>		<b>0.022</b>		

2 "Customer Offset" refers to the revenues collected in the monthly Customer Charge.

3 **Q. Can the price of a solar block change?**

4 A. Yes, the Facilities Charge portion of the rate could change based on future rate  
5 proceedings. Any changes to the Customer, Transmission, or Distribution portions of the cost  
6 that make up total Solar Block cost may increase or decrease depending on the outcome of those  
7 rate proceedings. The Cost of Solar Generation portion will only change if additional solar  
8 generation is added to or retired from the pilot program. A new weighted average cost would be  
9 calculated for the cost of Solar Generation portion based on the existing LCOE of the asset and

1 the additional or retiring assets' LCOE. This cost could go up or down depending on the cost of  
2 solar generation in the future.

3 **Q. Will a participant receive a monetary benefit or net benefit on their future**  
4 **bills from their solar block subscription?**

5 A. The program does not promise or advertise any economic or monetary gain from  
6 participating in the program. The benefit of the pilot is providing customers with an ability to  
7 directly support additional renewable energy.

8 **Q. Who receives the Solar Renewable Energy Credits associated with the solar**  
9 **blocks?**

10 A. Ameren Missouri will retain all Solar Renewable Energy Credits generated from  
11 facilities under this pilot for the benefit of all Ameren Missouri customers.

12 **Q. How will Ameren Missouri determine the number of blocks of power**  
13 **available for purchase under the Subscriber Solar pilot?**

14 A. The total number of solar blocks will be based on the total estimated kWh output  
15 of the solar facility over a 25 year life, which also assumes 0.5% annual panel degradation over  
16 the life of the facility. The total 25-year kWh output is divided by the life of the plant in months  
17 (300 months), and then again by 100 (the size of the solar block) to reach the number of monthly  
18 blocks available. The number of solar blocks available is not adjusted based on the actual annual  
19 production of the facility. The number of subscribers in the initial four-month subscription  
20 window will determine the capacity of the solar facility and subsequent available blocks in the  
21 Subscriber Solar Program.

1           **Q.     How will the initial four-month subscription window work?**

2           A.     Once the program is open for subscription, the initial capacity to be constructed,  
3 up to 1 megawatt (“MW”), will be determined by the subscriptions during that four-month  
4 period. The maximum size of the facility is 1 MW. If the program subscriptions reach the 1  
5 MW of capacity before the end of the initial four-month sign up period, construction will  
6 commence prior to the close of the initial subscription window. Any additional subscriptions  
7 after the 1 MW of capacity has been subscribed will go onto a waiting list in the order they are  
8 received.

9           If the program does not achieve the minimum subscription level of 500 kilowatt (“kW”)  
10 prior to the end of the four-month window, a project would not be constructed until the  
11 subscription level reached this milestone.

12           If the level of subscriptions is above the 500 kW minimum and below the 1 MW  
13 maximum at the end of the initial four-month subscription window, a project for only 500 kW  
14 would be constructed and customers who signed up after the initial 500 kW would remain on the  
15 waiting list until an additional 500 kW had been fully subscribed or space becomes available on  
16 the initial 500 kW build. Additions to the pilot will be added in 500 kW blocks.

17           **Q.     What happens if someone applies for solar blocks under the pilot and there**  
18 **are no blocks available?**

19           A.     Customers will receive notification and go onto a waiting list in the order they  
20 apply in the event additional capacity is added to the program or solar blocks become available  
21 from other customers leaving the Subscriber Solar Program. In either case, if solar blocks  
22 become available, customers on the waiting list will be notified to re-affirm their interest in the  
23 program prior to their enrollment.

1           **Q.     What happens if a customer is subscribed but no longer wants to participate**  
2 **in the program?**

3           A.     Customers may cancel their subscriptions without penalties. The customer must  
4 give notice at least 20 days prior to end of the customer’s billing cycle and it will become  
5 effective with the customer’s subsequent billing cycle. The 20-day lead time is necessary to  
6 update the customer’s bill and transfer the blocks to another customer on the waiting list or  
7 update the subscriber solar bank with the unsubscribed blocks.

8           **Q.     Where is the Company going to build the solar facility to supply this pilot**  
9 **program?**

10          A.     Ameren Missouri is currently looking for sites that have little to no acquisition  
11 cost and are located within the St. Louis metropolitan area. Existing Ameren Missouri-owned  
12 sites, brownfield sites and already developed sites that have the potential to share the space with  
13 solar generation are all being considered. To keep cost at a minimum and productivity at a  
14 maximum, any site considered will need to have accessible distribution facilities nearby and no  
15 significant shading or siting issues. The site will require four to five acres if the project is fully  
16 subscribed up to 1 MW of capacity.

17          **Q.     When does Ameren Missouri expect to select a site and how will the Missouri**  
18 **Public Service Commission (“Commission”) be notified of that selection?**

19          A.     Ameren Missouri is planning to finalize the site selection by the end of June of  
20 2016. Because Ameren Missouri must still file its request for a Certificate of Convenience and  
21 Necessity (“CCN”), the Commission and any parties to this case will be aware of the site that is  
22 selected.



1           **Q.     When does Ameren Missouri expect to launch the program?**

2           A.     We anticipate subscriptions would begin being offered by, if not before, July 1,  
3 2016, depending on when the tariff goes into effect. Actual charges on bills would not take place  
4 until the facility is constructed and in-service.

5           **Q.     How much time will elapse between when a customer signs up for the**  
6 **program and when the solar facility is operational?**

7           A.     Presuming the application for the CCN does not become delayed, once the  
8 minimum subscription level is achieved and the initial subscription window ends, the pilot will  
9 begin generation as soon the solar facility can be built and brought on-line, which Ameren  
10 Missouri believes will take approximately three to four months for a project of this size.

11          **Q.     Does this conclude your direct testimony?**

12          A.     Yes, it does.

**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 and a Certificate of Public Convenience and ) EA-2016-0207  
Necessity Authorizing it to Offer a Pilot Subscriber )  
Solar Program and File Associated Tariff. )

**AFFIDAVIT OF MICHAEL W. HARDING**

STATE OF MISSOURI )  
 ) ss  
CITY OF ST. LOUIS )

Michael W. Harding, being first duly sworn on his oath, states:

1. My name is Michael W. Harding. I am employed by Union Electric Company, d/b/a Ameren Missouri as General Executive, Renewable Energy.

2. Attached hereto and made a part hereof for all purposes is my Direct Testimony on behalf of Union Electric Company, d/b/a Ameren Missouri, consisting of 8 pages (and Schedules N/A), all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

3. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

  
\_\_\_\_\_  
Michael W. Harding

Subscribed and sworn to before me this 26<sup>th</sup> day of April, 2016.

  
\_\_\_\_\_  
Notary Public

My commission expires: 2-21-18

