Union Electric Company
d/b/a Ameren Missouri

Renewable Energy Standard
Compliance Plan
2019-2021

Prepared in Compliance with 4 CSR 240-20.100

April 15, 2019

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Introduction

The Missouri Renewable Energy Standard (RES) began as a public initiative and was placed on the Missouri ballot during the November 4, 2008 election. Labeled as Proposition C, it requires the three investor owned utilities (IOUs) in the state (Union Electric Company d/b/a Ameren Missouri (Ameren Missouri or Company), Empire District Electric Company and Kansas City Power & Light Company) to acquire renewable energy resources or renewable energy credits (RECs) equal to a percentage of the total retail sales that each utility makes to its customers in the state.

In 2010 the Missouri Public Service Commission (Commission) approved a rule to implement the RES requirements. Section 8(B) of the rule requires that each IOU file a plan annually that addresses its planned compliance measures for the current year plus the following two years.

There are two basic forms of compliance that are required under the RES. The first is compliance with "non-solar" RES which allows the use of Renewable Energy Credits (RECs) from all forms of qualified renewable generation resources (wind, hydro, biomass, solar, etc.) as certified by the Missouri Department of Economic Development. The other requirement is the "solar" RES, which requires the use of solar RECs (S-RECs) for compliance.

Compliance is achieved by providing enough RECs to meet the megawatt-hour (MWh) requirements of the RES. However, a utility will be deemed to be in compliance with the RES once the cost of compliance is equal to or greater than a 1% rate cap calculation. Thus a utility could fall short of meeting the MWhs that would otherwise be required if the 1% rate cap is met.

The following table details the renewables percentage of the retail electric sales requirements for the non-solar and solar RES:

Time Period	Total Renewable Requirement	Solar*
2011-2013	2%	2%
2014-2017	5%	2%
2018-2020	10%	2%
2021-forward	15%	2%

**Solar percentages are applied to the Total Renewable Requirement amounts.*

As referenced above, the Missouri Department of Economic Development is responsible for certifying all eligible renewable resources that can be utilized to meet the requirements of the RES. MoDED 4 CSR 240-20.100(1)(N), contains the list of all eligible renewable resources that are eligible to meet the compliance with the RES. Ameren Missouri's compliance with the RES, as demonstrated in this report, adheres to the use of only those renewable resources that are eligible under the above-referenced rule.

In addition, the RES rules allow for the banking of RECs for up to a three-year time period. This allows for the use of eligible RECs generated from January 1, 2016 to the current time period to meet the RES requirements for calendar year 2019.

Any RECs from a Missouri renewable generation resource are entitled to a factor of 1.25 applied to each MWh.

The following information in this report demonstrates the specific means by which Ameren Missouri intends to meet its obligations under both the non-solar and solar RES for the calendar years 2019-2021. A part of each section will address the necessary information required for each individual year.

Planned RES Compliance
Section (8) (B) 1 A

Non-Solar RES

Ameren Missouri currently operates or has contracted for generation with the following eligible renewable resources:

- Keokuk Hydro-Electric Generation Station
- Horizon (EDPR) Pioneer Prairie II Wind Farm
- Maryland Heights Renewable Energy Center (Landfill Gas)

The Ameren Missouri Keokuk Hydro-Electric Generation Station is located on the Mississippi River in Keokuk, Iowa. The station consists of 15 separate generators. The individual nameplate ratings range from 7.2 to 8.8 megawatts (MWs). This generation facility is wholly owned by Ameren Missouri and has been operational since 1913. The estimated generational output of the facility 2019-2021 is approximately 1,000,000 MWh annually.

In June, 2009, Ameren Missouri and Pioneer Prairie Wind Farm I LLC entered into a 15-year power purchase agreement. Ameren Missouri is purchasing 102.3 MWs of generation from the Pioneer Prairie Wind Farm consisting of 65 turbines located in Northeast Iowa. The facility site covers approximately 10,000 acres of land located in Mitchell County, Iowa in Wayne and Stacyville Townships. The estimated generational output of the facility in 2019-2021 is approximately 320,000 MWh annually.

On June 16, 2012, the Maryland Heights Renewable Energy Center (MHREC) became commercially operational. This facility burns methane gas produced by the IESI Landfill in Maryland Heights, Missouri in three Solar 4.9 MW Mercury 50 gas turbines to produce electricity. In 2019-2021, this facility is expected to produce an average of approximately 50,000 MWh annually.

Planned Actions

For the 2019-2021 compliance years, Ameren Missouri will utilize the generational output from the Keokuk, MHREC and Pioneer Prairie facilities. Ameren Missouri will continue to place RECs associated with the actual 2019 generation from Keokuk, MHREC, and the Pioneer Prairie facilities into the North American Renewable Registry (NARR) account. Additional REC purchases are likely to be needed in the 2019-2021 timeframe for Ameren Missouri to comply with the RES requirements.

Currently, Ameren Missouri has finalized two contracts for wind generation projects and expect to finalize a third contract soon. These projects are expected to be owned by Ameren Missouri and fully operational by the end of 2020. The three contracts currently total a maximum capacity of 857 MW's, however the actual MW capacity at completion may be lower due to the risks inherent in project development and construction of large wind projects. The minimum total capacity for the three possible projects may be as low as 530

MW's, thereby limiting the energy generated from the three projects. The 1% model reflects the assumed costs and performance parameters used for each of the wind projects for which a Certificate of Convenience and Necessity has been received and for future expected regulatory filings.

It is expected that the production from these new renewable resources, along with production from existing renewable resources, will be used to meet Ameren Missouri's non-solar RES requirement starting in 2021.

Solar RES

In late 2010, Ameren Missouri completed the installation of approximately 100 kilowatts (kW) of solar generation capacity at its headquarters facility located in St. Louis. Generation from this facility will be utilized to help meet the solar requirements of the RES.

In addition, Ameren Missouri filed a Standard Offer Contract (SOC) tariff with the Commission in November, 2011. This tariff became effective on January 1, 2012. Under the terms of the tariff, Ameren Missouri bought S-RECs from its electric customers who installed or are installing net metered solar facilities (100 kW or less) at their homes and/or businesses. The price per S-REC was $50 per S-REC and the program was funded to a total of $2.0 million. The program was fully subscribed in 2012.

Based on the success of the program, a revised tariff was filed in November 2012 with additional funding of $1 million to continue the purchase of S-RECs from customers during the 2013 calendar year. Due to various factors influencing pricing for installations, the price per S-REC was reduced to $5 per S-REC. For systems 10 kW or larger installed prior to January 1, 2013, a five-year contract was used but an additional meter was required and customers are paid based on actual production. For systems 10 kW or larger installed after January 1, 2013 and before August 28, 2013, the contract term was extended to 10 years. Due to the implementation of the provisions associated with House Bill 142 (HB 142), systems greater than 10 kW that are installed after August 28, 2013 no longer require a second meter and their generational output is determined in the same fashion as systems less than 10 kW, utilizing the PV Watts formula.

However, on August 28, 2013, due to the passage of HB 142, the RES law was amended. That amendment provided that if a customer accepts a solar rebate from the utility, the S-RECs transfer to the utility. All S-RECs associated with the customer installed net metered systems, as well as the generation at the Ameren Missouri headquarters facility, are entitled to the 1.25 multiplier as they represent Missouri based generation.

During calendar year 2018 Ameren Missouri acquired 57,373 S-RECs from customers. Ameren Missouri anticipates receiving approximately 70,000 S-RECs annually over the 2019-2021 time period from customer supplied S-RECs.

In 2018 Senate Bill 564 (SB 564) became law. One of the provisions of this law is that $28 million in solar rebates be made available to customers who install solar generation on their property from 2019-2023. Ameren Missouri expects to receive the S-RECs from these customer owned resources pursuant to the provisions of SB 564. Ameren Missouri has made an estimate of the expected S-RECs it expects to receive from these resources. 2019 - 14,016 S-RECs, 2020 - 44,010 S-RECs and 2021 - 76,247 S-RECs. The $28 million of rebate costs have been included as a RES compliance cost and are accounted for in the Company's 1% calculation.

In addition to the rebate dollars, SB 564 requires Ameren Missouri to invest at least $14 million in additional utility-owned solar generation. This additional $14 million of solar generation has been accounted for in the 1% calculation.

Ameren Missouri completed construction of its first utility scale solar generation project, the O'Fallon Renewable Energy Center (OREC) which became fully operational in November, 2014. This 5.7 MW (DC) facility is located at the site of the Ameren Missouri O'Fallon substation in O'Fallon, Missouri. The annual output in 2018 was 6,148 MWh.

Planned Actions

For the 2019-2021 compliance years Ameren Missouri will use the generation from OREC and the S-RECs received from Ameren Missouri customers.

Additionally, Ameren Missouri has plans to install solar at certain substations throughout its service territory as a non-wires solution to various operational restrictions/concerns. These projects are not being done for RES compliance (and so the costs are not included in the 1% calculation), but the RECs obtained from these facilities can be used in RES compliance.

List of Executed Contracts
Section (8) (B) 1 B

Table 1 provides a summary of all contracts which are being utilized by Ameren Missouri to procure certified RECs as well as RECs with associated energy.

Table 1
List of Executed Contracts

Contracting Party	Resource Type	Contract Type	Contract Duration	Time Period	Expected REC's	Terms
Horizon Pioneer Prairie	Wind	Energy/REC's	09/01/09-08/31/24	2019	320,000	Deliveries of energy and RECs began 09/01/09. Term is 15 years with an option to extend based on mutually acceptable terms & conditions.
				2020	320,000	
				2021	320,000	
Various Residential & Commercial Customers	Solar	S-REC only	10 year	2019	70,000	
				2020	70,000	
				2021	70,000	
Note: All S-RECs procured from customers are entitled to the additional factor of 1.25.						

Ameren Missouri has executed only one third-party contract (2009) associated with the purchase and delivery of renewable energy to the Ameren Missouri system that is being used to meet the non-solar RES compliance provisions. This is a 15-year power purchase agreement between Ameren Missouri and Horizon's Pioneer Prairie Wind Farm.

Through the time period ending August 28, 2013, Ameren Missouri executed 1,965 agreements with its customers who have installed small scale solar net metered systems and have chosen to accept the terms and conditions of the SOC. However, on August 28, 2013, due to the passage of HB 142, the RES law was amended. That amendment provided that if a customer accepts a solar rebate from the utility, the S-RECs transfer to the utility. Due to this change, the program was discontinued and the $1 million SOC cap was not reached.

Projected Retail Sales
Section (8) (B) 1 C

Table 2 below shows the current forecasted total retail electric sales by year and the corresponding portfolio requirements in MWhs for both the non-solar and solar RES.

Table 2
Forecasted Retail Electric Sales and RES Requirements **

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Comparison to Preferred Resource Plan
Section (8) (B) 1 D

The RES Compliance Plan detailed in this report substantially mirrors the renewables plan in the Integrated Resource Plan (IRP) filed by Ameren Missouri on October 1, 2017 and provides greater detail regarding new wind resource additions along with how Senate Bill 564 will be incorporated.

An exception is a corrected Forecast of Retail Electric Sales and RES Requirements has been reflected in this model. There are two corrections to the load shown in the model filed with the October 2017 IRP that have been reflected in the current RES model. The first is the inclusion of lighting load. The lighting load was inadvertently omitted from the RES model used in the IRP and has been included in this model. Second, the probability

weightings of the low, base, and high loads were applied incorrectly in the model used in the IRP and have been corrected in this filing. The net effect of these changes on load caused the probability weighted average load to increase from what was used in the 2017 IRP RES model. These changes can be seen on the GAA tab of the RES model and specifically on rows 21-23 and were reflected in the April 2018 Ameren Missouri RES Compliance Plan.

Additionally, the capacity value rating of wind resources in Midcontinent Independent System Operator, Inc. (MISO) has been updated to 15.7% based on the 2019 Wind Capacity Report provided by MISO. Also, the tax rate used to determine revenue requirements was adjusted down to 25.45% to reflect the changes in tax law and was reflected in the April 2018 Ameren Missouri RES Compliance Plan.

RES Compliance Plan Cost
Section (8) (B) 1 E

The ability to utilize renewable resources that currently exist in rate base places Ameren Missouri and its customers in a unique position regarding compliance cost. As provided in the RES statute and rule, though the megawatt hours from these renewable resources can be utilized to meet the compliance requirements, some costs were incurred prior to the compliance requirements and are already included in the current rate base. Consequently, these particular renewable resources will have no cost applicable to RES compliance and therefore will result in no cost impact to the plan or the rate cap limitation of 1%.

The cost of the RES Compliance Plan for the 2019-2021 Compliance Plan periods is comprised of the following items:

Solar Rebates paid to residential and commercial customers
Purchase of solar RECs from residential and commercial customers
Cost to register RECs with the North American Renewable Registry
Fixed, Fuel and O&M associated with the MHREC
Fixed and O&M associated with the OREC
Purchase of non-solar RECs
Fixed and O&M costs associated with new wind resources
Fixed and O&M costs associated with new solar resources required by Senate Bill 564

Standard Offer Contract

The price per REC ($5 per MWh) that was offered under the Ameren Missouri SOC was determined by taking into account the total cost to install solar in the region, the rebate required by statute, and the eligibility for the federal tax credit in 2013. Total funding for the 2013 program was capped at $1 million.

However, on August 28, 2013, due to the passage of HB 142, the RES law was amended. That amendment provided that if a customer accepts a solar rebate from the utility, the S-RECs transfer to the utility. Due to this change, the program was discontinued and the $1 million SOC cap was not reached.

Solar Rebates

Solar rebates required by statute were at $2.00 per watt and limited to an individual maximum of $50,000. This amount per watt was adjusted downward based on the provisions of HB 142. The rebate amount was reduced to $1.50 per watt for systems that became operational between July 1, 2014, and June 30, 2015. A further reduction was made to $1.00 per watt for systems that became operational between July 1, 2015 and June 30, 2016 and to $0.50 per watt for systems that become operational between July 1, 2016 and June 30, 2019; and $0.25 per watt for systems that become operational between July 1 2019, and June 30, 2023. The final stages of these rebates are due to the implementation of SB 564.

On November 26, 2013, Rider SR of the Solar Rebate Tariff was implemented. A $91.9 million rebate cap was agreed upon by Ameren Missouri, the Commission Staff and various stakeholders. The cap encompasses all rebate applications received after August 1, 2012. On December 17, 2013, the $91.9 million cap was reached based on applications received. Rebates continue to be paid through calendar year 2018 based on the queue of applications received as of December 17, 2013.

REC Registration Fees

In accordance with 4 CSR 240-20.100 Section (3) (F), utilities are to use a commission designated common central third-party registry for REC accounting of the RES requirements. The North American Renewable Registry (NARR) was selected by the Commission for this purpose. Tracking and registration fees are charged by NARR for all RECs deposited and then retired from the utilities' accounts.

RES Retail Rate Impact
Section (8) (B) 1 F

The *10 Year MO RES Compliance Model 2019* (provided to Staff and others as a work paper to this filing) calculates the retail rate impact, as required by 4 CSR 240-20.100(5). The "report" tab of the model sets forth the size and timing of the new renewable resources that would be needed in the next 10 years to fully meet the unconstrained RES requirements along with the size and timing of those renewable resources that can be built while meeting the 1% retail rate impact limitation. The model includes the projection of generation, costs and benefits from existing resources including Keokuk hydropower, Maryland Heights

landfill gas generation (LFG), Ameren Missouri's headquarters solar, Pioneer Prairie Wind, along with three new wind resource projects and the utility scale solar investment required by SB 564. A detailed projection of the solar REC purchases from customer installed solar projects and third-party purchases is shown in the "Cust&3rd Party Solar" tab. Additionally, many assumptions needed to develop RES compliance projections, including Ameren Missouri's projected revenue requirements (adjusted for exclusion of costs for existing renewable energy resources), market values for capacity and energy and costs for new wind and solar resources, are also included.

The "Term 1" tab in the spreadsheet is where a 10-year sum of Ameren Missouri's annual costs for compliance are summarized to provide a framework to determine the amount of renewables that can be built to meet RES compliance and yet stay within the 1% rate impact limitation. This tab summarizes annual ongoing costs, including administrative, solar rebate, REC and existing renewable generation resource costs. The tab also includes an interactive section that allows for assumed wind and solar projects in each of the 10 years to determine the impact of adding additional renewable resources in the plan based on assumptions identified in the plan. This interactive section allows Ameren Missouri to input a compliance plan that shows the dollar impact to the rate impact limitation.

With this information, it is possible to develop an annual projection of the amount of wind and solar renewable energy resources that can be built to meet the planning needs of the utility and yet remain within the rate impact limits of the renewable energy standard if so needed. In addition, there is a tab labeled "Test" that provides an overall view of year-by-year targets, how they are determined and how they will be met for both the solar and non-solar REC requirements. These tabs are also repeated in the model for an unconstrained view of the amount of wind and solar generation that would be built to fully meet the RES if there were no rate cap limitations imposed. This model is used to provide a view of RES compliance and the amount of additional generation needed for both an unconstrained and constrained view of compliance. Due to the utilization of new wind resources expected to be on line by the end of 2020 and the use of customer owned solar REC's received, we do not expect to need other renewable resources to be fully compliant with the Missouri Renewable Energy Standard.

Compliance with Air, Water or Land Use Requirements
Section (8) (B) 1 G

All generating facilities utilized by Ameren Missouri to meet the requirements of the Missouri Renewable Energy Standard have been certified by the Missouri Department of Economic Development in accordance with 393.1030.4, RSMo.