

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

In the Matter of Union Electric Company)
d/b/a Ameren Missouri's 2nd Filing to)
Implement Regulatory Changes in) File No. EO-2015-0055
Furtherance of Energy Efficiency as)
Allowed by MEEIA)

CHANGE REQUEST FOR ADJUSTMENTS TO THE FINAL EM&V REPORT

Comes now Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri" or "Company") and submits its *Change Request for Adjustments to the Final EM&V Report* ("Change Request") to the Missouri Public Service Commission ("Commission"). In support of its position, Ameren Missouri states as follows.

1. On February 5, 2016, Ameren Missouri and the parties to this proceeding either signed or stated that they did not object to a *Unanimous Stipulation and Agreement* ("*MEEIA 2 Stipulation*") submitted to the Commission for approval. The Commission approved the *MEEIA 2 Stipulation* by order issued February 10, 2016.

2. The *MEEIA 2 Stipulation* provides, in relevant part, that Ameren Missouri will complete annual Evaluation, Measurement, and Verification ("EM&V") reports on its MEEIA programs and submit final EM&V reports 135 days after the end of each MEEIA program year. Ameren Missouri retained The Cadmus Group, Inc. ("Cadmus") to evaluate its residential programs, and ADM Associates, Inc. ("ADM") to evaluate its business programs. The EM&V reports for the second implementation year of MEEIA 2 (collectively, "PY2017 EM&V Report") were provided by the evaluators on July 13, 2018, and filed in this case on July 16, 2018.

3. Pursuant to 4 CSR 240-20.093(8), the Commission hired Evergreen Economics ("Auditor"), "to audit and report on the work" of Ameren Missouri's independent EM&V

contractors. On July 24, 2018, the Auditor filed its *Independent EM&V Audit of the Ameren Missouri PY2017 Program Evaluations* ("Auditor Report").

4. Appendix C of the *MEEIA 2 Stipulation* provides a time frame, within which any stakeholder who believes a change should be made to the impact evaluation portion of a final EM&V Report, to file a request for such change, setting forth all reasons for the changes and providing support for the requested change.¹

5. Ameren Missouri has identified certain items significant enough to merit the submission of this Change Request.² Therefore, in accordance with the *MEEIA 2 Stipulation*, Ameren Missouri requests two changes to the EM&V Reports for a total change in first year energy and demand savings of 2,796 MWh and 1.286 MW:

- Calculation of residential Electronically Commutated Motor (ECM) fan motor savings; and
- Calculation of residential pipe wrap savings.

The specific changes and rationale for each are discussed in more detail below.

A. Requested Change to ECM Savings

6. The impact evaluation method for calculating the energy savings for an ECM fan changed in PY2017 as compared to prior years. Prior evaluations had adjusted the savings for fans set to auto mode based upon a comprehensive metering study conducted in 2013 and 2014. This is noted as recently as PY2016 in Table 37 of the Heating and Cooling evaluation report for that year. The 2013 study found that fans typically set to auto mode are occasionally set to operate in

¹ The Company notes that the time frames have changed slightly due to requested two-day extensions by the Commission's Staff and by the Office of the Public Counsel. With no objection lodged to either extension, Ameren Missouri acknowledges Wednesday, August 15, 2018, as the new due date for change requests.

² The Company's request for changes to only two items is not an acknowledgement of complete accuracy of the remainder of the report. Rather, the identification of only two changes means that only these two items warranted the Company's submission of a change request.

continuous mode. Without conducting additional research, accounting for this type of fan operation was abandoned in the PY2017 EM&V Report as discussed on page 47 of the file named "Ameren Missouri PY17 Heating and Cooling Evaluation – Final - 13July18.pdf" ("H&C Evaluation"):

For PY17, Cadmus updated its assumption that automatic fans operated continuously at least 10% of the time, and used the contractor noted operation instead.

7. The flaw with this approach is that the contractor reports only what the setting was when she left the home. She does not know if the customer changes that setting after she leaves and certainly does not know if the customer periodically changes that setting. That is exactly what the metering study showed – that customers who normally leave their fans on auto mode may occasionally change them to operate in continuous mode. An example of this would be for a customer to use the fan in the shoulder season when they do not need heating or cooling to help circulate the air or to help filter the air from allergens. Further, some thermostats, such as the Nest, explicitly have a setting that allows users to set a schedule to have their fans turn on when not heating or cooling to circulate the air in the home.³ There are likely to be more homes with thermostats that use this setting now than in 2013 when the metering study was conducted, so if anything, the 10% assumption may be understated.

8. In addition, the results of the aforementioned comprehensive metering study are still being used to calculate savings for all other relevant equipment; indicating there is no reason to believe those results should be abandoned. For example, the results of the metering study are a key element to calculate savings for central air conditioners, as shown on page 38 of the H&C Evaluation:

³ <https://nest.com/support/article/How-do-I-use-Nest-to-turn-on-my-fan-without-heating-or-cooling>.

$$\Delta kWh_{CAC} = \frac{\text{Metered kWh Savings Cooling} * \text{Installed Tons} * \text{Installed SEER}}{\text{Metered SEER Cooling} \times \text{Metered Tons Cooling}}$$

9. The PY2017 evaluated savings assume that customers never operate their systems in continuous mode for systems where a contractor-reported initial setting of "auto." Based upon the metering study and the fact that thermostats are starting to include a setting specifically to allow periodically running the fan to circulate air, it is unreasonable to assume continuous mode is never used in conjunction with auto mode.

10. Adjusting the PY2017 ECM savings to account for this change request would change the first year energy and demand savings reported in the H&C Evaluation as follows:

MWh	EM&V Reported		Change Request		Diff from PY2017	
	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net
ECM	5,656	5,306	8,588	8,056	2,932	2,750

kW	EM&V Reported		Change Request		Diff from PY2017	
	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net
ECM	2,636	2,473	4,003	3,755	1,367	1,282

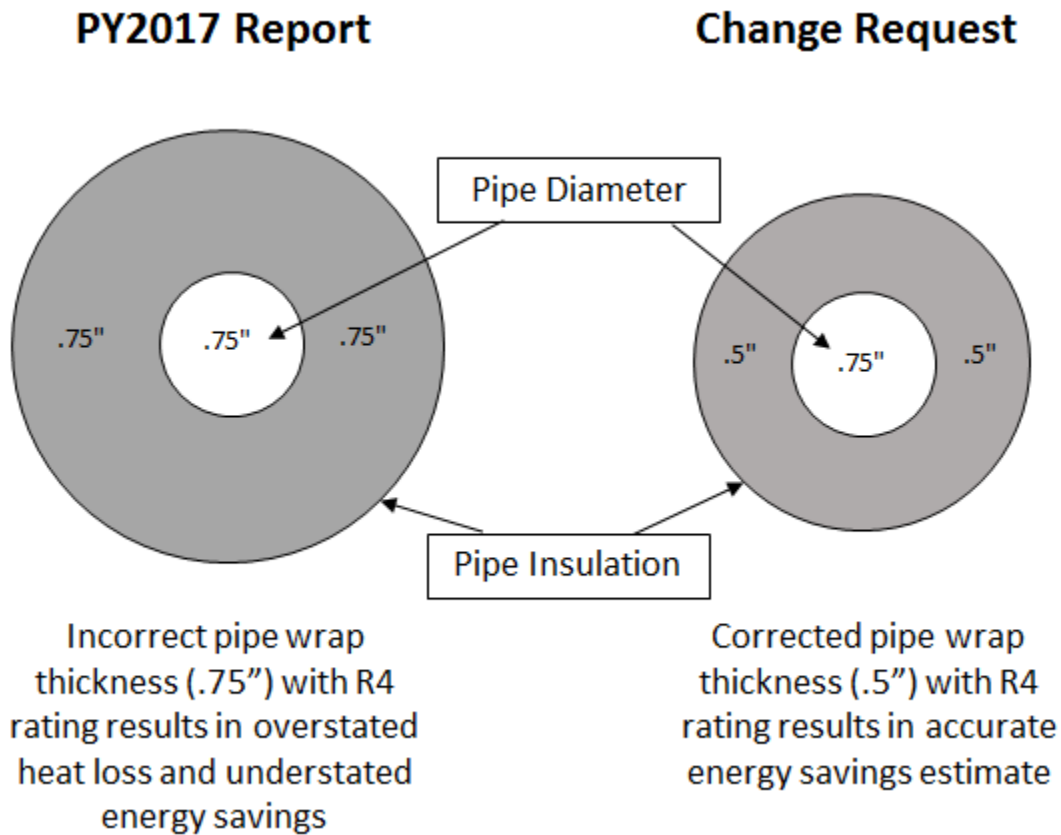
B. Requested Change to Pipe Wrap

11. The equation to calculate pipe wrap savings on page 39 of the file named "Ameren Missouri PY17 Energy Efficiency Kits Evaluation Final 13July18 Evaluation.pdf" ("EEK Evaluation") is shown as:

$$\Delta kWh = ((C_{Base}/R_{Base} - C_{EE}/R_{EE}) * L * \Delta T * Hours) / (\eta_{DHW_{Elec}} * 3,412)$$

× ISR × Sat × Util

The savings calculated using this equation are dependent upon the circumference of the pipe with and without the pipe wrap, C_{EE} and C_{Base} , respectively. A larger circumference results in a larger surface area, and higher heat loss. This is demonstrated in the graphic below, which shows the same 0.75" inch pipe with both 0.75" thick pipe wrap and 0.5" thick pipe wrap.



12. On page 40 of the EEK Evaluation, the definition of C_{EE} is equal to the circumference of the insulated pipe in feet – calculated as the diameter in inches multiplied by π divided by 12. In Table 29 on page 41 of the EEK Evaluation, the circumference is 0.589 for both School Kits and Multifamily Kits. In order for this to be correct, and with a pipe diameter of 0.75 inches, the thickness of the pipe wrap would have to be 0.75 inches:

$$(.75 + 2*.75)*\pi/12 = 0.589$$

Both the School Kits and the Multifamily Kits that Ameren Missouri distributes contain pipe wrap with a thickness of 0.5 inches. Adjusting the PY2017 pipe wrap savings to account for correcting the pipe wrap thickness would change the first year energy and demand savings reported in the EEK Evaluation as follows:

MWh	EM&V Reported		Change Request		Diff from PY2017	
	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net
School Kits Pipe Wrap	122	128	163	171	41	43
Multifamily Pipe Wrap	11	11	14	14	3	3
Pipe Wrap Total	133	139	177	185	44	46

kW	EM&V Reported		Change Request		Diff from PY2017	
	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net	Ex Post Gross	Ex Post Net
School Kits Pipe Wrap	11	11	14	15	4	4
Multifamily Pipe Wrap	1	1	1	1	0	0
Pipe Wrap Total	12	12	16	16	4	4

C. Conclusion

13. Accordingly, Ameren Missouri request a revision to these portions of the impact evaluation, reflecting an increase in first year energy and demand savings of 2,750 MWh and 1.282 MW for ECM, and 46 MWh and 0.004 MW for Pipe Wrap.

WHEREFORE, for the reasons stated above, Ameren Missouri requests the approval of the requested changes for ECM savings and for pipe wrap, as described above.

Respectfully submitted,

/s/ Paula N. Johnson _____

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CERTIFICATE OF SERVICE

I do hereby certify that a true and correct copy of the foregoing document has been hand-delivered, transmitted by e-mail, or mailed, First Class, postage prepaid, this 15th day of August 2018, to counsel for all parties on the Commission's service list in this case.

/s/ Paula N. Johnson _____