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 Furtherance of Energy Efficiency as Allowed by MEEIA	))))	**File No. EO-2015-0055**

STAFF'S CHANGE REQUEST FOR ADJUSTMENT TO THE CADMUS REPORT OF PROGRAM YEAR 2017 ANNUAL NET ENERGY AND DEMAND SAVINGS FROM MEEIA PROGRAMS

COMES NOW the Staff of the Missouri Public Service Commission, by and through the undersigned counsel, and files this Change Request with the Missouri Public Service Commission to state as follows:

OVERVIEW

1. On February 5, 2016, Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") and the parties to this case filed (or did not object to) a *Unanimous Stipulation and Agreement* ("*Cycle 2 Stipulation*"), which was approved by the Commission on February 10, 2016.[1]

2. The *Cycle 2 Stipulation* provided for Ameren Missouri's implementation of 11 Demand-Side Management Programs pursuant to the Missouri Energy Efficiency Investment Act ("MEEIA Programs"). The *Cycle 2 Stipulation* requires Ameren Missouri to complete annual Evaluation, Measurement, and Verification Reports ("EM&V Report") on its MEEIA Programs and file final EM&V Reports 135 days after the end of each MEEIA program year.

[1] The Cycle 2 Stipulation has been modified through three Commission Orders: 1. *Order Approving Stipulation and Agreement* filed July 7, 2017, 2. *Order Approving Request to Revise Technical Resource Manual*filed June 6, 2017, and 3. *Order Approving Non-Unanimous Stipulation and Agreement Regarding Use of R&D Funds and Modification of Measure Incentives* filed April 13, 2017.

3. In 2016, Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") hired The Cadmus Group, Inc. ("Cadmus") to evaluate residential energy efficiency programs, and it hired ADM Associates, Inc. ("ADM") to evaluate the business energy efficiency programs. On July 13, 2018, Cadmus and ADM ("Evaluators") provided their PY2017 EM&V final reports to the Auditor, Ameren Missouri and stakeholders. [2]

4. In accordance with Commission Rule 4 CSR 240-20.093(7), on May 1, 2017, the Commission hired Evergreen Economics to serve in the capacity of its independent contractor ("Auditor") to audit and report on the work of each independent EM&V contractor hired by utilities with Commission-approved MEEIA programs. On July 24, 2018, the Auditor filed its PY2017 EM&V final report in this case.

STAFF'S CHANGE REQUEST

5. The *Cycle 2 Stipulation* requires any stakeholder group that wants a change to the impact evaluation portion of a final EM&V Report to file a request before the Commission within 21 days of the filing of a final EM&V Report ("Change Request"). [3]

6. Staff completed a limited review of the Evaluators' reports and the Auditor's report. With the exception of the Auditor's recommended mid-life adjustments, ADM and the Auditor appear to be in complete agreement on the annual net energy and

[2] The Cadmus and ADM PY2017 EM&V final reports were filed in Case No. EO-2015-0055 on July 16, 2018.

[3] Staff, Public Counsel, and Ameren Missouri agreed to extend the projected due date two days from August 13, 2018 to August 15, 2018 for filing an impact change request. This was necessitated by the late filing of Cadmus' workpapers and is addressed in Staff's Notice of Two Day Extension of the EM&V Timeline Projected Date For Filing Final Auditor Report For Program Year 2017 filed on July 18, 2018 (EFIS Item No. 519) and Office of Public Counsel's Motion for a Commensurate Two-Day Extension filed on July 19, 2018 (EFIS Item No.520).

demand savings for the BizSavers programs and CommunitySavers program. Staff agrees with those results. Conversely, the Auditor recommended changes to Cadmus' PY2017 annual net energy and demand savings. With one exception described in Staff's *Memorandum* (attached hereto as Appendix A and incorporated by reference), Staff agrees with the Auditor's recommended changes to the annual net energy savings. It is Staff's position that if changes are approved for the Cadmus and/or ADM annual net energy savings, the Cadmus DSMore® Model should be re-run to determine the annual net demand savings as a result of the changed annual net energy savings.

STAFF'S RECOMMENDATION

7. As described in Staff's *Memorandum*, Staff recommends the Commission accept the Auditor's recommended changes to Cadmus' PY2017 annual net energy savings with one exception. The exception is the methodology used to allocate the residential portfolio total non-participant spillover ("NPSO") annual energy savings to individual residential programs. Staff recommends the Even Allocation methodology described in the Cadmus PY2017 EM&V final reports be used to allocate the Auditor's residential portfolio's NPSO annual energy savings to individual residential programs.

8. Staff proposes the following Auditor supported adjustments to the Cadmus EM&V results for PY 2017:

a. Set the participant spillover for the Residential Lighting program to zero, which changes the Cadmus Residential Lighting program first year annual energy and demand savings of 22,256 MWh and 3.618 MW, respectively, to Staff's requested Residential Lighting program first year

annual energy and demand savings of 12,704 MWh and 2,035 MW, respectively.

b. Reduce the savings for the Residential Heating and Cooling program by 2 percent. This will change the Cadmus Heating and Cooling program first year annual energy and demand savings of 42,640 MWh and 29,324 MW, respectively, to Staff's requested Heating and Cooling program first year annual energy and demand savings of 41,799 MWh and 28,659 MW, respectively.

9. Staff also recommends that the Auditor and Evaluators agree on:

a. A complete list of measures where a mid-life savings adjustment is applicable for PY2017 measures and the mid-life adjustments for all identified measures.

b. A compromise between the Cadmus split of 87% early replacement and 13% replace-on-burnout for the Heating and Cooling program and the split of 14% early replacement and 86% replace-on burnout assumed in the Missouri technical resource manual ("TRM").

10. As the Auditor is the Commission's expert, the Commission may choose to call its expert to testify at a hearing if necessary, should Ameren Missouri not accept Staff's recommendation to adjust the annual net energy savings and re-run the DSMore® model with the revised annual net energy savings amounts to determine the appropriate demand savings. If the Commission does not intend to call its Auditor as a witness, Staff may choose to do so.

WHEREFORE, Staff files this Change Request and recommends the Commission accept its Auditor's PY2017 EM&V final report, but use the Even Allocation methodology to allocate the Auditor's residential portfolio's NPSO annual energy savings to individual residential programs, and re-run the DSMore® model to determine the annual net demand savings.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that true and correct copies of the foregoing were mailed, electronically mailed, or hand-delivered to all counsel of record this 15th day of August, 2018.

/s/ Ron Irving

MEMORANDUM

TO: Missouri Public Service Commission
Official Case File, Case No. EO-2015-0055
Union Electric Company d/b/a Ameren Missouri

FROM: Brad J. Fortson, Regulatory Economist III
Mark Kiesling, Utility Management Analyst III

/s/ John Rogers 8/15/2018 — Energy Resources Department / Date
/s/ Ron Irving 8/15/2018 — Staff Counsel's Office / Date

SUBJECT: Change Request Concerning Incremental Annual Net Energy and Demand Savings Resulting from the Evaluation, Measurement and Verification Reports for Ameren Missouri's Program Year 2017 MEEIA Programs

DATE: August 15, 2018

EXECUTIVE SUMMARY

Staff proposes an impact Change Request[1] to the program year 2017 (PY2017) evaluation, measurement and verification (EM&V) results reported by Union Electric Company d/b/a Ameren Missouri's ("Ameren Missouri") evaluator, Cadmus Group, Inc. ("Cadmus"), based primarily on the PY2017 EM&V Report of the Commission's independent auditor, Evergreen Economics ("Auditor").

As a result of the Auditor's analysis and review of Ameren Missouri's PY2017 energy efficiency programs and the first year net energy and demand savings reported by Cadmus, Staff proposes the following Auditor supported adjustments be made to the final Cadmus EM&V results for PY2017:

1. Set the participant spillover for the Residential Lighting program to zero, which changes the Cadmus Residential Lighting program first year annual energy and demand savings of 22,256 MWh and 3.618 MW, respectively, (highlighted values in Table 1 and Table 4, respectively, of Exhibit A) to Staff's requested Residential Lighting program first year annual energy and demand savings of 12,704 MWh and 2.035 MW, respectively, (highlighted values in Table 3 and Table 5, respectively, of Exhibit A); and

[1] The recommendations listed in the Executive Summary are for adjustments that affect PY2017 incremental annual energy and demand savings. There are other recommendations contained in this Change Request that do not affect PY2017 incremental annual energy and demand savings.

2. Reduce the savings for the Residential Heating and Cooling program by 2 percent to adjust for a consistent value of the effective full load hours (EFLH) when calculating the heating savings for air-source heat pumps (ASHP) and ductless heat pumps. Doing so changes the Cadmus Heating and Cooling program first year annual energy and demand savings of 42,640 MWh and 29,324 MW, respectively, (highlighted values in Table 1 and Table 4, respectively, of Exhibit A) to Staff's requested Heating and Cooling program first year annual energy and demand savings of 41,799 MWh and 28,659 MW, respectively, (highlighted values in Table 3 and Table 5, respectively, of Exhibit A).

Further, Staff recommends that the Auditor and Evaluators reach consensus agreement on the following significant unresolved issues so that Ameren Missouri can rerun the DSMore model and adjust first year net annual energy and demand savings and the cost effectiveness analysis for the Commission's consideration in the Change Request case:

1. A complete list of measures where a mid-life savings adjustment[2] is applicable for PY2017 measures and the mid-life adjustments for all identified measures; and
2. A compromise between the Cadmus split of 87% early replacement and 13% replace-on-burnout for the Heating and Cooling program and the split of 14% early replacement and 86% replace-on-burnout assumed in the Missouri technical resource manual ("Missouri TRM").

BACKGROUND SUMMARY

In 2016, Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") contracted Cadmus Group, Inc. ("Cadmus") and ADM Associates, Inc. ("ADM") (collectively "Evaluators") as its independent contractors to conduct comprehensive impact and process EM&V of Ameren Missouri's Missouri Energy Efficiency Investment Act[3] (MEEIA) Cycle 2 energy efficiency programs. Cadmus conducted evaluations of the residential energy efficiency programs. ADM conducted evaluations of the business energy efficiency programs, or

[2] A partial list of measures where a mid-life savings adjustment is needed is provided on pages 3 and 4 of the Auditor Report. These mid-life adjustments have an impact on: 1) The throughput disincentive (TD), and 2) The earnings opportunity (EO) since the Auditor's identification of the need for mid-life adjustments for the PY2017 may affect whether or not some measures are delivering annual demand savings in 2023.

3 MEEIA is the Missouri Energy Efficiency Investment Act of 2009, § 393.1075, RSMo, Supp. 2016. The Commission MEEIA Rules include 4 CSR 240-3.163, 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094 which all had an effective date of May 30, 2011. On October 30, 2017, 4 CSR 240-20.093 and 4 CSR 240-20.094 were amended, and 4 CSR 240-3.163 and 4 CSR 240-3.164 were rescinded.

BizSavers programs[4], and the CommunitySavers[5,] programs. On May 1, 2017, the Missouri Public Service Commission ("Commission" or "the Commission") contracted with the Auditor to serve in the capacity of its independent contractor to audit and report on the work of each utility's independent contractor(s). [6]

On July 16, 2018, the Evaluators filed their PY2017 EM&V final reports (collectively "Evaluators Reports" and individually "Cadmus Report" or "ADM Report") in this case. On July 24, 2018, the Auditor filed its PY2017 EM&V final report ("Auditor Report").

STAFF'S REVIEW OF AUDITOR AND EVALUATORS REPORTS

Staff has completed its review of the Evaluators Reports and the Auditor Report. As a result of its limited review, Staff finds that, with the exception of the Auditor's recommended mid-life adjustments, ADM and the Auditor are in complete agreement on the annual net energy and demand savings for BizSavers programs and CommunitySavers program for PY2017. Staff agrees with those results. However, the Auditor's PY2017 EM&V final report contains recommended changes to Cadmus's PY2017 annual net energy and demand savings. These recommended changes are summarized in the Auditor's Report Section **1.3.1 Portfolio Level Findings**. With one exception, Staff agrees with the recommended changes summarized in the Auditor's Report Section **1.3.1 Portfolio Level Findings**. The one exception being the methodology used by the Auditor to allocate the residential portfolio total non-participant spillover (NPSO) annual energy and demand savings to individual residential programs. Staff recommends the Even Allocation methodology described in the Cadmus Reports be used to allocate the Auditor's residential portfolio's NPSO annual energy and demand savings to individual residential programs. NPSO and the allocation methodologies will be discussed more in depth in the Allocation Method for NPSO section of this change request.

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[4] BizSavers programs are the commercial and industrial programs offered by Ameren Missouri including: Standard Rebate, Custom Rebate, Retro-Commissioning, New Construction and Small Business Direct Install programs.

[5] CommunitySavers is a residential program which provides financial incentives and services to encourage energy efficiency improvements in income-eligible multifamily properties.

[6] 4 CSR 240-20.093(87). … The commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

Exhibit A includes a summary of the PY2017 EM&V results of Cadmus and the Auditor as well as Staff's recommended PY2017 annual net energy and demand savings for the portion of the Change Request which Staff is able to quantify.

The remainder of this memorandum contains: 1) background information concerning EM&V and the change request process, 2) support for Staff's Change Request, 3) Staff's recommendation for NPSO, 4) Staff's concern and recommendation for the ongoing disagreement between the Evaluators and the Auditor concerning specific best practices for EM&V, and 5) Staff's concern and recommendation for running the DSMore model to determine the incremental annual net energy and demand savings and program cost effectiveness of Ameren Missouri's Cycle 2 energy efficiency programs.

CHANGE REQUEST FOR PROGRAM YEAR 2017 EM&V RESULTS

This memorandum is a "Change Request" for the Commission's determination of the PY2017 incremental annual net energy and demand savings resulting from the EM&V for Ameren Missouri MEEIA energy efficiency programs. PY2017 is the second program year of Ameren Missouri's MEEIA Cycle 2 (including energy efficiency programs, demand-side programs investment mechanism ("DSIM") and Ameren TRM which was initially described[7] in the Non-Unanimous Stipulation and Agreement ("Cycle 2 Stipulation") filed on February 5, 2016 in Case No. EO-2015-0055 and approved by the Commission in its February 10, 2016 *Order Approving Non-Unanimous Stipulation and Agreement.* PY2017 covers the period March 1, 2017 through February 28, 2018, while Cycle 2 covers the period March 1, 2016 through February 28, 2019.

[7] The Cycle 2 Stipulation has been modified through three Commission orders: 1) Commission's July 7, 2017, *Order Approving Stipulation and Agreement* established the process for long-lead energy efficiency projects' implementation and completion, impact measurement and verification, and demand-side programs investment mechanism treatment; 2) Commission's June 6, 2017, *Order Approving Request to Revise Technical Resource Manual* modified measures in the TRM; 3) Commission's April 13, 2017, *Order Approving Non-Unanimous Stipulation and Agreement Regarding Use of R&D Funds and Modification of Measure Incentives.* 1) Addresses appropriate uses for remaining research and development ("R&D") funds, 2) Modifies the Cycle 2 budget, and 3) Modifies the incentives available to customers for adopting certain measures.

The Change Request process for Cycle 2 EM&V is described on page 1 of Exhibit A[8] and includes:

> Any stakeholder group participant which wants a change to the impact evaluation portion of the Final EM&V Report will have twenty one days from the issuance of the Final EM&V Report to file a request with the Commission to make such a change ("Change Request"). Any stakeholder group participant filing a Change Request will set forth all reasons and provide support for the requested change in its initial Change Request filing. Responses to a Change Request may be filed by any stakeholder group participant and are due twenty one days after the Change Request is filed. The response should set forth all reasons and provide support for opposing or agreeing with the Change Request. Within five business days after the deadline for filing a Change Request (if a Change Request is filed) the Signatories agree that the stakeholder group participants will hold a conference call/meeting to agree upon a proposed procedural schedule that results in any evidentiary hearing that is necessary to resolve the Change Request to be completed within sixty days of the filing of the Change Request, and which will recommend to the commission that the Commission issue its Report and Order resolving the Change Request within thirty days after the conclusion of such a hearing. The Signatories anticipate a hearing with live testimony may be required to resolve a Change Request, but if a hearing is not required, they agree to cooperate in good faith to obtain Commission resolution of a Change Request as soon as possible.

Final Commission-approved EM&V for each program year of Cycle 2 is used to: 1) Retrospectively determine Ameren Missouri's Cycle 2 earnings opportunity[9] (EO), 2) Annually update the deemed gross annual energy and demand savings of measures in the Ameren Missouri's TRM, [10] and 3) Retrospectively adjust the throughput disincentive[11] (TD) as a result of portfolio net-to-gross factor (NTGF) for final EM&V for all three years of Cycle 3. The updated deemed gross annual energy and demand savings of measures in the Ameren

[8] Appendix A is a 4-page document which is Appendix C EM&V Plan and Timeline of the Cycle 2 Stipulation.
[9] Union Electric Company, MO.P.S.C. Schedule No. 6, 1st Revised Sheet No. 91.9.
[10] Paragraph 11. a. (iii) of the Cycle 2 Stipulation.
[11] TD = Monthly Savings x Net Margin Revenue x NTGF; where the initial NTGF is 0.85. Upon completion of the three year cycle, the final portfolio NTGF applied for the EO shall be used as the NTGF prospectively starting with the month in which the EO is determined. Union Electric Company, MO.P.S.C. Schedule No. 6, 1st Revised Sheet No. 91.8.

Missouri's TRM are used prospectively to determine the amount of monthly TD Ameren Missouri is allowed to collect from its customers through its Energy Efficiency Investment Charge ("Rider EEIC").[12]

SUPPORT FOR STAFF'S CHANGE REQUEST

Midlife Savings Adjustments

The Auditor stated in the Auditor's Report that mid-life savings adjustments do not appear to have been incorporated into the cost effectiveness analysis, and there are several instances where this will have significant effects on the cost effectiveness calculations. The mid-life changes to baseline energy consumption are caused when the baseline equipment efficiency is expected to revert to code minimum efficiency over the duration of the cost effectiveness analysis, and the energy efficiency measure has a longer effective useful life (EUL) than the equipment it replaces. A partial list of measures where a mid-life savings adjustment is needed is provided on pages 3 and 4 of the Auditor Report. These mid-life adjustments have an impact on 1) the TD, and 2) the EO since the Auditor's identification of the need for mid-life adjustments for the PY2017 may affect whether or not some measures are delivering annual demand savings in 2023. In the Cycle 2 Stipulation it states,

> "Corresponding kW savings for the year 2023 will be determined by applying an end-use category energy to coincident demand factor found in Appendix E to the first year energy savings that are determined by EM&V. Only measures that are expected to deliver energy savings in 2023 and beyond are counted towards the demand goal in the EO included in Appendix A. This means that eligible measures for inclusion in the EO calculations are measures with an expected useful life of eight (8) years or more for measures in 2016, measures with an expected useful life of seven (7) years or more for measures installed in 2017…"

The Auditor could not calculate the effect mid-life savings adjustments will have on annual net energy and demand savings because this would require rerunning the DSMore model, to which the Auditor does not have access.

[12] Union Electric Company, MO.P.S.C. Schedule No. 6, 1st Revised Sheet No. 91.6 – 91.8.

Staff recommends that the Auditor and Cadmus reach consensus agreement on a complete list of measures where a mid-life savings adjustment is needed and the mid-life adjustments for all identified measures so that Ameren Missouri can rerun the DSMore model and apply the mid-life savings adjustments to the applicable PY2017 measures, adjust annual energy and demand savings accordingly, and re-run the cost effectiveness analysis for the Commission's consideration in this Change Request case. Staff further recommends that mid-life savings adjustments be applied, when applicable, in future EM&V.

Heating and Cooling Program

In the PY2016 Auditor's Report, the Auditor discussed the impact on savings due to the high early replacement rates for the Residential Heating and Cooling program. The Auditor also identified areas where the Auditor believed more research was needed. In the PY2017 Cadmus EM&V Report, the early replacement rate is still high (96%, for the initial ex ante savings values) without additional research provided by Cadmus to support these numbers. The Auditor is of the opinion the early replacement rate is very high in comparison with the Missouri TRM[13] recommended an early replacement rate of 14% (or 40% if the central air conditioning unit is a secondary unit in a combined system replacement).[14] The Auditor further states that the high early replacement rate is potentially problematic since the annual savings for early replacement measures are as much as five times higher than replace-on-burnout measures.

The table of savings values in the Ameren Missouri's TRM does not have a column for mid-life adjustments, so the change in savings after the baseline change is not included. The Auditor believes the early replacement savings need to account for the change in baseline from the existing equipment after the early replacement period has ended to avoid a significant overstatement of savings for these measures. In further support that the PY2017 early replacement numbers claimed from the program are too high were the contractor and customer interviews conducted during PY2016 and reported in the PY2016 Evaluator's Report. Of the ten (10) contractors interviewed in PY2016, only seven (7) were familiar with the early replacement criteria used for the program. Of these, only one contractor said he used the correct

[13] https://energy.mo.gov/sites/energy/files/MOTRM2017Volume3.pdf
[14] https://energy.mo.gov/sites/energy/files/MOTRM2017Volume3.pdf, page 120

criterion by measuring for a temperature drop across the coil. Similarly, when customers were asked about their reasons for contacting their contractor about their HVAC systems, responses such as "system stopped working" (33%) and "system had problems" (37%) are more suggestive of replace-on-burnout systems rather than early replacements.[15] Contractors were also interviewed in PY2017, but these questions appear not to have been explored in the latest evaluation.[16] Cadmus attempts to correct for some of these issues in the ex post impact analysis by re-categorizing some of the installations based on responses to survey questions. This attempted correction results in a split of 87% early replacement and 13% replace-on-burnout. The Auditor recommends that these types of adjustments be made during the gross impact analysis rather than as part of the net impact calculations. The Auditor indicates this is a step in the right direction, but it still is much higher than the split assumed in the Ameren Missouri TRM and the split of 14% assumed in the Missouri TRM.

Staff recommends that the Auditor and Cadmus reach consensus agreement on a compromise between the Cadmus split of 87% early replacement and 13% replace-on-burnout for the Heating and Cooling program and the split of 14% early replacement and 86% replace-on-burnout assumed in the Missouri TRM so that Ameren Missouri can rerun the DSMore model and adjust first year net annual energy and demand savings and the cost effectiveness analysis for the Commission's consideration in this Change Request case.

In the PY2016 Auditor Report, the Auditor recommended using a consistent value of the EFLH when calculating the heating savings for ASHP and ductless heat pumps. In the PY2017 Cadmus EM&V Report, it appears this was not incorporated into the savings calculations and the Auditor repeats its recommendation from its PY2016 Auditor Report in the PY2017 Auditor Report.[17] The Auditor estimates that correcting this issue in the savings calculations will decrease savings by approximately 2% for the entire HVAC program. Staff agrees with this recommendation.

[15] EFIS Item No. 521, page 7
[16] EFIS Item No. 521, page 7
[17] Ibid

Non-Participant Spillover

The NPSO for the Residential LED Lighting Program is estimated the same in the PY2017 Cadmus EM&V Report as it was in the PY2016 Cadmus EM&V Report. As was stated in the PY2016 Auditor Report, the Auditor is of the opinion that this method is fundamentally flawed. Specifically, the Auditor believes it is not appropriate to go from asking respondents general questions about program influences and then using this information to calculate very specific market shares. In general, the Auditor believes the spillover survey questions are very complex and are focused on asking how the program is influencing non-program bulb sales. The Auditor goes on to state that the survey assumes that the respondents will have put a significant amount of thought and possibly some research prior to answering the questions. Even with customer knowledge of the lighting markets and their own store sales, the Auditor is of the opinion that it is not reasonable to expect respondents to provide accurate enough information on non-program sales to calculate actual market shares for program influence. To the Auditor's knowledge, there are no other evaluation studies that use this specific method to estimate market shares for NPSO.

The Auditor details a separate issue in the estimate of the total nonparticipant LED bulbs that are credited to the program. Once the program sales bulbs are removed, the entire total of the remaining LEDs is used to calculate the spillover total. The Auditor claims this provides too high of a starting point for calculating program spillover, as some of these non-program sales will be driven primarily by non-program factors. The Auditor provides the example that the possibility of analogous 'free riders' for non-program bulbs should be considered, as at least some (if not all) of the non-program LEDs would have been purchased regardless of the program activity. The Auditor mentions that it is important to note that the retailer interviews would not have addressed this issue, as none of the respondents will have a sense of this free ridership component without doing their own survey research with their customers addressing this very specific topic (i.e., the likely sale of non-program LED bulbs in absence of the program). In other words, there would be no issue of double-counting free ridership by making this adjustment.[18] If the program free ridership is applied to the non-program LED bulb sales,

[18] EFIS Item No. 521, page 11

then the spillover estimate would be reduced by approximately half (46%), according to the Auditor.

According to the Auditor, this estimate of NPSO should be accepted due to the serious problems with the survey methodology. Staff recommends that the Auditor's methodology for calculating spillover in the Residential LED Lighting program be adopted and applied to PY2017 and future program years. See Exhibit A for the impact of this change on individual residential programs.

Allocation Method for NPSO

Cadmus considered three possible approaches for allocating total observed NPSO to individual programs: 1) Even Allocation, 2) "Like" Programs and, 3) Marketing Budget and Program Size. The following is a description of each approach.

> **Even Allocation**: The most straightforward approach allocated NPSO evenly across the residential programs (i.e., made a 20.4% adjustment to each program's NTG). This equaled applying NPSO at the portfolio-level, and, therefore, assumed all programs contributed equally to generating NPSO.
>
> **"Like" Programs:** Another approach allocated NSPO savings to specific programs based on the measure that the nonparticipant installed. Note that this approach is only applicable to like NPSO.
>
> **Marketing Budget and Program Size.** The final allocation approach the team considered—and eventually chose to use—assigned overall NSPO as a function of each program's marketing and program budget (shown in Table 52). This approach remained consistent with the theory that NPSO resulted from the cumulative effects of program-specific marketing and program activity over a period—not necessarily by a single, program-specific marketing effort. In addition, while NPSO most commonly was associated with mass media marketing campaigns, the scale of program activity also counted as a factor. For example, even without a significant marketing campaign, a program's size can drive NPSO through word-of-mouth and in-store program messaging. The team found this approach accurately reflected and attributed NSPO to programs, ensuring those total costs (including marketing) and total benefits (net savings including NPSO) are properly accounted for when assessing overall program cost-effectiveness.

Cadmus allocated NPSO based off marketing budget and program size. Cadmus' methodology allocates 89% of all the estimated NPSO MWh savings to the HVAC program. In Staff opinion, utilizing the marketing budget and program size allocation methodology gives an unfair amount of credit to the HVAC program. Cadmus allocation methodology would suggest that as a result of Ameren marketing and outreach, 89% of the energy savings from a non-participating customer that purchased an energy efficiency measure outside of Ameren Missouri's MEEIA program (i.e. an energy efficient refrigerator or clothes washer) should be credited to Ameren Missouri's HVAC program. Of the four residential programs that NPSO is allocated to, the HVAC program also provides by far the greatest MW reduction per MWh.[19] So essentially, the 89% of the MWh savings from the purchase of the energy efficient refrigerator in the example above are treated identically to the MWh savings from an HVAC unit when calculating the demand reduction for that non-program measure. The Auditor allocated NPSO based on an even allocation. However, the Auditor allocated NPSO evenly across all residential programs by taking the portfolio NPSO savings amount (6,212 MWH), dividing 6,212 MWh by the number of residential programs (4), and allocating the same savings amount (1,553 MWh) to each residential program. Staff interprets the even allocation approach differently. Staff understands this approach to mean an allocation of the portfolio NPSO savings amount evenly across all residential programs based off an even allocation of the portfolio NPSO *percent*. Staff recommends using the Auditor ex-post gross savings and the Auditor NPSO and applying the Auditor NPSO percent (7.7%)[20] evenly across all residential programs for which NPSO is estimated.

STAFF'S CONCERN FOR THE ONGOING DISAGREEMENT BETWEEN THE EVALUATORS AND THE AUDITOR

Staff remains concerned that many of the Auditor's PY2016 recommendations were not addressed in the Evaluator's reports, specifically:

1. **Home Energy Report:** In the PY2016 Auditor Report, the Auditor recommended that the comparison between the treatment

[19] See page 2 of 2 of Appendix E of the Cycle 2 Stipulation.
[20] Auditor ex-post gross savings = 81,145 MWh and Auditor NPSO = 6,212 MWh; 6,212/81,145 = 7.7%

and control groups in the pre-period[21] should include a comparison of participation rates in the other Ameren Missouri energy efficiency programs. The Auditor recommended that this be done beginning with the PY2017. This was not done in the PY2017 Cadmus EM&V Report; and Cadmus did not explain why it was not done. Thus, the Auditor is bringing this issue up again. Staff recommends that the comparison between the treatment and control groups in the pre-period include a comparison of participation rates in the other Ameren Missouri energy efficiency programs in future program years starting in PY2018.

2. **BizSavers Program:** In the PY2016 Auditor Report, the Auditor discussed how the survey question, "Would you have been financially able to install the equipment or measures without the financial incentive from the BizSavers Program?" was scored to estimate the free ridership rate. According to the Auditor, there is a possibility that the scoring for this question may be too restrictive, as customers that answer 'no' are automatically scored as a net participant based solely on their response to that single question and those that respond 'yes' are subjected to a battery of questions designed to provide a more nuanced estimate of free ridership. The Auditor Report includes a recommendation that all customers be scored based on the longer free ridership questions. Staff recommends that all customers be scored based on the longer free ridership questions in future years starting in PY2018.

3. **Residential Free Ridership:** In the PY2016 Auditor Report, the Auditor raised the issue of how the "don't know" survey responses were being used in the residential programs free ridership calculations. The Auditor recommended that there be no changes to the free ridership score based on a "don't know" response, since this answer does not provide any information that can be used to characterize free ridership. In the PY2017 Cadmus EM&V Report, the "don't know" responses are still being used to adjust free ridership, which in the Auditor's opinion, are lowering free ridership estimates. The Auditor recommends that the "don't know" responses be omitted entirely from the free ridership calculations, so that the free ridership scores are calculated based on only respondents that are able to provide a more clear response. However, the Auditor further recommends that if the "don't know" responses are to remain in the free ridership calculation, that the "don't know" response should be given a

reduction value of 0% so that they do not improve the free ridership score. Staff recommends the "don't know" responses be omitted entirely from the free ridership calculation in future program years starting in PY2018.

4. **Residential Lighting Program:** A potential disagreement between Cadmus and the Auditor in future years is the need for the lighting elasticity model to be redone each year**.** In the PY2017 Auditor Report, the Auditor explains that net savings impacts for the residential LED lighting program are calculated using the results of a lighting elasticity model that was estimated as part of the residential LED lighting program in the PY2016 Cadmus EM&V Report. The Auditor recommends that the elasticity model be estimated each year since the lighting program is a significant contributor to overall savings and since this is a relatively simple exercise once the sales data are compiled to calculate savings. The Auditor believes that the current model is misspecified[22] and therefore, needs to be redone in PY2018 and updated for future program years and offers that the Auditor would gladly work with the Evaluators to correct the model for future evaluations. Staff recommends that the elasticity model be redone in future program years starting in PY2018.

STAFF'S CONCERN FOR AMEREN MISSOURI RUNNING THE DSMORE MODEL

Staff recently raised a concern with Ameren Missouri as a result of Ameren Missouri (and not Cadmus and ADM) performing cost-effectiveness analyses using the DSMore model for PY2017. Ameren Missouri responded that this is not a new approach, but rather it was identified as the approach to be followed within the original MEEIA Cycle 2 plan, and was documented within the PY2016 Residential EM&V reports with the following language:

> Ameren Missouri determined the program's cost-effectiveness using DSMore (a financial analysis tool designed to evaluate the costs, benefits, and risks of demand-side management [DSM] programs and services).

In MEEIA Cycle 1, Ameren Missouri paid approximately $95,000 (which does not include PY2015 residential fees because the statement-of-work (SOW) budget cap was reached) for EM&V directed cost-effectiveness analyses that were performed by a third party, Morgan Marketing Partners, for the three-year period.

[22] EFIS Item No. 521, page 9

While Staff appreciates Ameren Missouri's interest in reducing the cost of conducting EM&V, Staff is concerned about the removal of an independent third party from calculating the program level annual net energy and demand savings and cost effectiveness for EM&V. Staff is concerned about a potential conflict of interest arising from the utility performing its own savings calculations for its programs. The utility should not be responsible for determining financial rewards for the programs that it runs. To preserve the independence of Ameren Missouri's EM&V contractors, Staff recommends that in all future MEEIA cycles Ameren Missouri's independent EM&V contractors run the DSMore model to determine incremental annual energy and demand savings and program cost-effectiveness results.

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 Furtherance of Energy Efficiency as allowed by MEEIA	))))	**File No. EO-2015-0055**

AFFIDAVIT OF BRAD J. FORTSON

State of Missouri)
) ss.
County of Cole)

COMES NOW Brad J. Fortson and on his oath declares that he is of sound mind and lawful age; that he contributed to the attached Staff Recommendation; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Brad J. Fortson

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 15th day of August, 2018.

Dianna L. Vaught
NOTARY PUBLIC

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: June 28, 2019
Commission Number: 15207377

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 Furtherance of Energy Efficiency as allowed by MEEIA	))))	**File No. EO-2015-0055**

AFFIDAVIT OF MARK KIESLING

State of Missouri)
) ss.
County of Cole)

COMES NOW Mark Kiesling, and on his oath declares that he is of sound mind and lawful age; that he contributed to the attached Staff Recommendation; and that the same is true and correct according to his best knowledge and belief.

Further the Affiant sayeth not.

Mark Kiesling

JURAT

Subscribed and sworn before me, a duly constituted and authorized Notary Public, in and for the County of Cole, State of Missouri, at my office in Jefferson City, on this 15th day of August, 2018.

NOTARY PUBLIC

DIANNA L. VAUGHT
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: June 28, 2019
Commission Number: 15207377

Table 1: Cadmus Reported Savings (MWh) – Residential Programs

Program	*Ex Post* Gross Savings (MWh/Yr)	Participant Net Savings (MWh/Yr)	NPSO (MWh/Yr)	Total Net Savings (MWH/Yr)	NTG Ratio
Efficient Products	9,956	7,452	214	7,666	77%
Energy Efficiency Kits	5,367	4,983	22	5,004	93%
Heating and Cooling	44,089	37,093	5,547	42,640	97%
Lighting	22,733	21,828	428	22,256	98%

Table 2: Auditor Recommended Savings (MWh) - Residential Programs

Program	*Ex Post* Gross Savings (MWh/Yr)	Participant Net Savings (MWh/Yr)	NPSO (MWh/Yr)	Total Net Savings (MWh/Yr)	NTG Ratio
Efficient Products	9,956	7,452	1,553	9,005	90%
Energy Efficiency Kits	5,367	4,983	1,553	6,536	122%
Heating and Cooling	43,089	37,093	1,553	38,646	90%
Lighting	22,733	12,276	1,553	13,829	61%

Table 3: Staff Change Request Savings (MWh) - Residential Programs

Program	*Ex Post* Gross Savings (MWh/Yr)	Participant Net Savings (MWh/Yr)	NPSO (MWh/Yr)	Total Net Savings (MWh/Yr)	NTG Ratio
Efficient Products	9,956	7,452	214	7,666	77%
Energy Efficiency Kits	5,367	4,983	22	5,005	93%
Heating and Cooling	43,089	36,252	5,547	41,799	97%
Lighting	22,733	12,276	428	12,704	56%

Table 4: Cadmus Savings (MW) - Residential Programs

Program	*Ex Post* Gross Savings (MW)	Net Savings (MW)	NTG Ratio
Heating and Cooling	30.436	29.324	96%
Lighting	3.421	3.618	106%

Table 5: Staff Change Request Savings (MW) - Residential Programs

Program	*Ex Post* Gross Savings (MW)	Net Savings (MW)	NTG Ratio
Heating and Cooling	29.746	28.659	96%
Lighting	3.421	2.035	59%