BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as Allowed by MEEIA.	))))	**File No. EO-2012-0142**

STAFF'S CHANGE REQUEST FOR ADJUSTMENT TO AMEREN MISSOURI'S REPORT OF 2013 ANNUAL ENERGY SAVINGS AND NET BENEFITS FROM MEEIA PROGRAMS

COMES NOW 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 July 5, 2012, 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 Resolving Ameren Missouri's MEEIA Filing* ("*Stipulation*"). The Commission approved the *Stipulation* by Order on August 1, 2012.

2. In part, the *Stipulation* provided for Ameren Missouri's implementation of 11 Demand-Side Management Programs pursuant to the Missouri Energy Efficiency Investment Act ("MEEIA Programs"). The *Stipulation* requires Ameren Missouri to complete 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] Ameren Missouri hired The Cadmus Group, Inc. ("Cadmus") to prepare

[1] File No. EO-2012-0142, *Unanimous Stipulation And Agreement Resolving Ameren Missouri's MEEIA Filing*, pp. 15-19.

an EM&V Report for each of its residential MEEIA Programs, and ADM Associates, Inc., ("ADM") to prepare an EM&V Report for its commercial and industrial MEEIA Programs.

3. In accordance with Commission Rule 4 CSR 240-20.093(7), the Commission issued a Request For Proposals and subsequently hired Johnson Consulting Group, LLC, ("Johnson Consulting" or "Auditor"), as its "…independent contractor to audit and report on the work of each utility's independent EM&V contractor." On July 2, 2014, the Commission's Auditor filed its *EM&V Auditor Final Report and Appendix A: Auditor Market Effects Sales Analysis*.

4. The *Stipulation* also 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 in this matter ("Change Request"). Staff identified several errors and inconsistencies of data in the EM&V Reports filed on both May 15, 2014, and May 28, 2014. After working with Staff to correct the data issues, Cadmus and ADM corrected and finalized the EM&V Reports that were filed by Ameren Missouri on June 12, 2014. As such, Staff's Change Request filing complies with the *Stipulation*.

IMPORTANCE OF EM&V RESULTS

5. All Signatories to the *Stipulation* are bound by the impact evaluation portion of the final EM&V Reports, as they may be modified by the Commission's resolution of any Change Request. The accuracy of the impact evaluation in each final EM&V Report is significant because it determines the level of performance incentive Ameren Missouri will receive for its implementation of each MEEIA Program.

Ameren Missouri will begin to bill its customers for the awarded incentive amounts following the three year cycle of MEEIA Programs.

6. As described in the *Memorandum* attached hereto as Appendix A and incorporated fully herein, Ameren Missouri's evaluator, Cadmus, has wrongly included market effects in its determination of net to gross ("NTG") ratios used to calculate the 2013 incremental annual energy and demand savings and net benefits of Ameren Missouri's LightSavers program. This deliberate error ignores industry best practices and inflates Ameren Missouri's performance incentive award that will be paid by ratepayers by up to $1.4 million for 2013. The amount of inflation of the incentive award amount will grow should Ameren Missouri's evaluator continue to include market effects in its 2014 and 2015 evaluations of MEEIA Programs.

7. Staff recommends the Commission accept Johnson Consulting's final EM&V Report with one exception. To investigate Cadmus' value of market effects on NTG, the Commission's Auditor conducted its own study with lighting sales data from Missouri retailers for the period 2009 through 2013. By doing so, the Commission's Auditor was able to determine a NTG including market effects for comparison to Cadmus' NTG, along with a NTG that excludes market effects. For the LightSavers program, Staff recommends the Commission accept Johnson Consulting's NTG for the LightSavers program that excludes market effects, and order an adjustment to any performance incentive award under the *Stipulation* to exclude any recovery by Ameren Missouri for market effects, not only for 2013, but also the years 2014 and 2015 covered by the *Stipulation*.

8. 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 and direct its Evaluator to remove all market effects from the 2013 incremental annual energy and demand savings and net benefits calculation. 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 final EM&V Report, with the NTG for the LightSavers program excluding market effects, and order an adjustment to any performance incentive award under the *Stipulation* to exclude any recovery by Ameren Missouri for market effects, not only for 2013, but also the years 2014 and 2015 covered by the *Stipulation*.

Respectfully submitted,

/s/ Jennifer Hernandez
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CERTIFICATE OF SERVICE

I do hereby certify that a true and correct copy of the foregoing document has been emailed this 3rd day of July, 2014 to all parties of record in this proceeding.

/s/ Jennifer Hernandez

M E M O R A N D U M

TO: Missouri Public Service Commission Official Case File
Case No. EO-2012-0142
Union Electric Company d/b/a Ameren Missouri

FROM: John Rogers, Utility Regulatory Manager

/s/ Natelle Dietrich 07/03/2014
Tariff, Safety, Economic & Engineering Analysis Department / Date

/s/ Jennifer Hernandez 07/03/2014
Staff Counsel's Office / Date

SUBJECT: Change Request Concerning Incremental Annual Energy Savings and Net Benefits Resulting from the Evaluation, Measurement and Verification Reports for Ameren Missouri's 2013 MEEIA Programs

DATE: July 3, 2014

I. Purpose

The purpose of this memorandum is a "Change Request"[1] for the Missouri Public Service Commission's ("Commission") determination of the 2013 incremental annual energy savings and net benefits amounts resulting from the evaluation, measurement and verification ("EM&V") of Union Electric Company's d/b/a Ameren Missouri ("Ameren Missouri") Missouri Energy Efficiency Investment Act of 2009[2] ("MEEIA") energy efficiency programs.

The Change Request will:

1. Summarize Ameren Missouri's experience with demand-side programs during the period of February 2009 – September 2011 ("Cycle One") and during November 2011 through September 2012 ("Bridge Period");
2. Summarize Ameren Missouri's *2013 – 2015 Energy Efficiency Program Plan* ("Plan")[3] approved by the Commission including the Plan's eleven (11) energy efficiency programs ("MEEIA Programs") and the Plan's demand-side programs investment mechanism ("DSIM") and summarize results of Ameren Missouri's MEEIA Programs delivered in program year 2013 ("PY2013");

[1] Change Request process is documented in paragraph 11.a.iv. of the *Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing* in Case No. EO-2012-0142.
[2] MEEIA is the Missouri Energy Efficiency Investment Act of 2009, § 393.1075, RSMo, Supp. 2012. 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 have an effective date of May 30, 2011.
[3] See *Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing* approved by the Commission on August 1, 2012, in Case No. EO-2012-0142.

3. Identify Ameren Missouri's independent EM&V contractors ("Evaluators") and the Commission's EM&V Auditor ("Auditor") and describe the roles and responsibilities of the Evaluators and the Auditor;
4. Provide background and context for the Plan's EM&V process[4] for Ameren Missouri's MEEIA Programs delivered in PY2013;
5. Describe the components of the net-to-gross ("NTG") ratios produced by the Evaluators and Auditor to determine program and portfolio incremental and cumulative annual energy and demand savings and net benefits;
6. Illustrate how Evaluator and Auditor NTG ratios for the PY2013 LightSavers program can impact the incremental and cumulative annual energy and demand savings, annual net benefits and any DSIM performance incentive award amount earned by Ameren Missouri following completion of the 3-year Plan;
7. Provide an EM&V industry perspective on market effects;
8. Discuss Ameren Missouri's rationale for using gross savings for the Plan's annual energy and demand savings for purposes of its recovery of estimated lost margin revenues and for establishing its cumulative annual energy and demand savings targets;
9. Discuss Ameren Missouri's rationale and strategy for performing EM&V as a part of its Plan; and
10. Provide Staff's recommendations for this Change Request.

II. Staff Recommendations

Staff recommends that the Commission:

1. Accept – with one exception - the EM&V Auditor's PY2013 Final Report ("Auditor Report") for the Commission's determination of PY2013 annual energy savings and net benefits, because the Auditor Report includes refinements to the Evaluators' Reports, which more correctly reflect EM&V industry best practices. The market effects adjustment is the exception to Staff's recommendation, and Staff recommends the Commission exclude the Auditor's market effects adjustment to the NTG ratio for the

[4] Commission Rules 4 CSR 240-3.163(7), 4 CSR 240-20.093(7) and 4 CSR 240-22.070(8) include requirements for performance and auditing of MEEIA demand-side programs' EM&V. Further, paragraph 11 of the Stipulation includes additional activities and schedules for drafting, reviewing, discussing, finalizing and requesting changes to the EM&V final reports.

LightSavers program, since the Auditor's methodology is not yet recognized as an established EM&V industry best practice;

2. Should the Commission not accept the Auditor Report, Staff recommends the Commission reject the Evaluator's market effects adjustment to the NTG ratio for the LightSavers program, since the evaluator's methodology is not yet recognized as an established EM&V industry best practice; and
3. Finally, Staff recommends the Commission order Ameren Missouri to direct the Evaluators to exclude market effects adjustments from their determination of NTG ratios used to calculate incremental annual energy and demand savings and net benefits during their EM&V activities and reports for Plan years 2014 and 2015.[5]

III. History of Ameren Missouri's energy efficiency and MEEIA programs

A. Cycle One and Bridge Period Programs

In February 2009, Ameren Missouri began implementing its Cycle One energy efficiency programs (four business energy efficiency programs and five residential energy efficiency programs) contained in Ameren Missouri's then-adopted preferred resource plan which was filed on February 5, 2008, in Case No. EO-2007-0409. Ameren Missouri terminated its Cycle One energy efficiency programs on September 30, 2011. Ameren Missouri also had one voluntary demand response program (Rider L Peak Power Rebate) which was effective from July 9, 2009 to December 31, 2011. Rider L was utilized during the summer of 2009 but was not utilized during the summer of 2010 or during the summer of 2011. The energy and demand impacts and the overall delivery processes of Ameren Missouri's demand-side programs were evaluated, measured and verified by third-party contractors chosen and paid for by Ameren Missouri. Ameren Missouri's Cycle One EM&V reports for all of its demand-side programs were provided to the Ameren Missouri's demand-side stakeholders in May 2012. Ameren Missouri's Cycle One programs were successful as illustrated by Addendum 1, which shows that Cycle One spending was $67.9 million ($28.9 million less than the budget of $96.8 million) while Cycle One cumulative annual energy savings were 554,158 MWh (124,723 MWh greater than the

[5] Staff does not oppose the study of market effects to inform future demand-side market potential studies and to inform and improve future demand-side programs' designs.

planned 429,435 MWh). While Cycle One programs delivered benefits to Ameren Missouri's customers, the testimony of Warren Wood asserts that Cycle One programs resulted in significant harm to Ameren Missouri shareholders due to the regulatory demand-side programs' cost recovery mechanism in effect at that time:[6]

> "Our success in implementing energy efficiency meant that the Company sold less electricity, which damaged the Company because a majority of the fixed costs it has incurred in order to provide safe and reliable service to customers (power plants, environmental controls, poles, substations, etc.) are recovered through a volumetric (usage) charge which was designed assuming a certain level of kilowatt-hour (kWh) sales. When the Company's own energy efficiency program efforts suppressed the level of electricity sales, it deprived the Company of its ability to recover a substantial amount of the fixed costs it incurred to provide safe and reliable service. Through 2011, those losses have approximated $26.4 million and are expected to grow to $60 million by the end of 2014 even without further investment in energy efficiency."[7]

To continue to offer some energy efficiency programs for customers and to maintain business relationships with program implementers and retail partners while limiting its lost margin revenues due to demand-side programs, Ameren Missouri began offering two (2) business Bridge Period programs on November 24, 2011 and three (3) residential Bridge Period programs on December 18, 2011. The approved tariff sheets of all the Bridge Period programs included a date for termination on September 30, 2012, as Ameren Missouri wanted to focus its efforts on preparing to implement its MEEIA Plan energy efficiency programs on January 2, 2013. Addendum 2 summarizes the results of the Bridge Period programs which cost $7.0 million and achieved deemed[8] annual energy savings[9] of 27,833 MWh.

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[6] In Case No. ER-2010-0036, as a result of the First Nonunanimous Stipulation and Agreement, the balance of the regulatory asset for prudently incurred programs' costs was included in rate base and an annual amortization based on six years was included in expense. In File No. ER-2011-0028, the Commission approved the continued use of the regulatory asset cost recovery mechanism it had approved in File No. ER-2010-0036.

[7] Page ii of the Prologue to the *2013 – 2015 Energy Efficiency Program Plan* filed on January 20, 2012 in Case No. EO-2012-0142.

[8] http://www1.eere.energy.gov/seeaction/pdfs/emv_ee_program_impact_guide.pdf defines deemed savings values as stipulations based on historical and verified data (in some cases using the results of prior M&V studies). Similarly, *deemed savings calculations* are standardized algorithms. Both deemed savings values and deemed savings calculations should only be used with well-defined energy efficiency measures that have documented and consistent savings values. This approach determines gross savings values or net savings values, if net-to-gross ratios are included in the deemed savings values or calculations.

[9] Ameren Missouri's Bridge Period programs were limited by a goal of achieving a maximum 30,000 MWh of annual energy savings.

B. 2013 – 2015 Energy Efficiency Program Plan

On July 5, 2012, Ameren Missouri and the parties to Case No. EO-2012-0142 filed (or did not object to) a Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing ("Stipulation"). On August 1, 2012, the Commission issued its *Order Approving Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing*, approving eleven (11) energy efficiency programs[10] for implementation beginning January 2, 2013 and ending December 31, 2015. Table 1 and Table 2 contain the planned and actual energy efficiency programs' spending and incremental annual deemed energy savings for Cycle One, Bridge Period and MEEIA Plan. Although Ameren Missouri struggled to implement its Cycle One programs in 2009, Cycle One was very successful overall. During PY2013, the MEEIA Programs' spending was $34.4 million ($2.3 million and 6 percent less than the planned spending of $36.7 million) while incremental annual deemed[11] energy savings totaled 337,368 MWh (86,641 MWh and 35 percent greater than the planned incremental annual deemed energy savings of 250,727 MWh).

Table 1

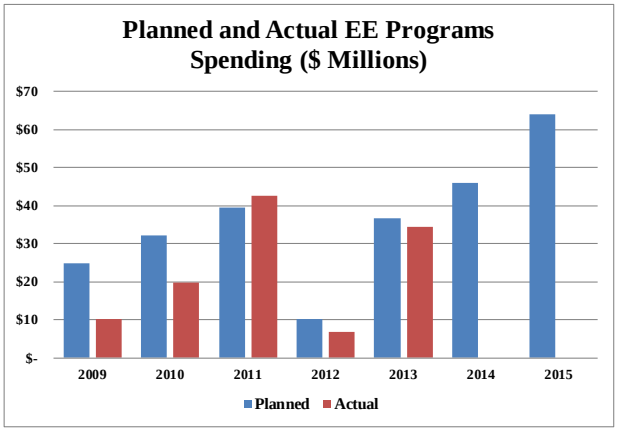
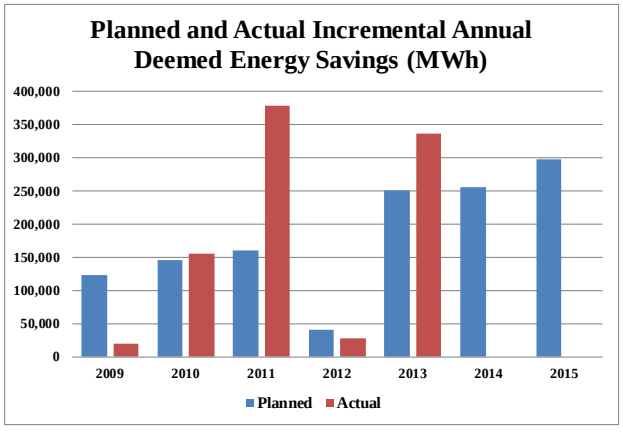


Table 2



The Commission's August 1, 2012 Order also approved implementation of a DSIM which allowed $80 million annual revenue requirement in Ameren Missouri's then-current general rate

[10] Business energy efficiency programs' tariff sheets are on Union Electric Company MO.P.S.C. Schedule 5, Sheet Nos. 225 through 234, and residential energy efficiency programs' tariff sheets are on Union Electric Company MO.P.S.C. Schedule 5, Sheet Nos. 236 through 246.

[11] Deemed annual energy and demand savings for each energy efficiency measure are contained in Ameren Missouri's technical resource manual ("TRM"), work papers and models used to estimate the Commission-approved cumulative annual energy and demand savings targets of 793,102 MWh and 174.4 MW, respectively, based upon the 1,434,353 MWh annual energy sales for the opt-out customers specified in Table 2.11 of the Plan.

case (Case No. ER-2012-0166) for recovery. Of that $80 million, recovery of $50 million is for annual demand-side programs' costs and recovery of $30 million is for the annual estimated lost margin revenue due to the demand-side programs. The DSIM also allows Ameren Missouri to earn a future performance incentive award based on after-the-fact verified cumulative annual energy savings[12] and net benefits[13] as a result of demand-side programs' EM&V by an independent third party evaluator.

On February 28, 2014, Ameren Missouri filed its PY2013 MEEIA annual report in File No. EO-2014-0142. The PY2013 annual report includes a summary of the 2013 DSIM for program cost recovery and for the through-put disincentive ("TD-NSB Share") on its fourth page. Addendum 10 provides details on Ameren Missouri's DSIM Rider, which includes definitions for the terms used in the following summary.

[12] See Addendum 3 definition of EM&V impact analysis in 4 CSR 240-22.070(8)(B).
[13] 4 CSR 240-20.093(1)(C): Annual net shared benefits means the utility's avoided costs measured and documented through evaluation, measurement, and verification (EM&V) reports for approved demand-side programs less the sum of the programs' costs including design, administration, delivery, end-use measures, incentives, EM&V, utility market potential studies, and technical resource manual on an annual basis.

DSM Advisory Group Annual Report: Portfolio DSIM Performance Measures	Utility: Ameren Missouri Report Date: 02/28/14 Period: 01/02/13 - 12/31/13 Portfolio Start Date: 01/02/2013

DSM Programs' Costs	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	1ST YTD TOTAL
Billed Programs' Costs	$ 10,373,264	$ 11,062,034	$ 13,668,014	$ 11,654,966	$ 46,758,278
Actual Programs' Costs	$ 5,116,574	$ 8,066,821	$ 10,009,598	$ 11,239,409	$ 34,432,402
Variance	$ 5,256,690	$ 2,995,213	$ 3,658,416	$ 415,557	$ 12,325,876
Interest for DSM Programs' Cost Recovery	$ (5,875)	$ 1,209	$ (10,009)	$ (11,424)	$ (26,098)

Net Benefits	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	1ST YTD TOTAL
Planned Net Benefits (1)	$ 9,288,164.47	$ 24,775,914.09	$ 30,619,371.61	$ 36,513,170.24	$ 101,196,620.40
Deemed Net Benefits (2)	$ 7,139,266	$ 27,497,465	$ 41,392,295	$ 64,981,495	$ 141,010,520
Variance of Planned v. Actual Net Shared Benefits	$ 2,148,899	$ (2,721,551)	$ (10,772,924)	$ (28,468,324)	$ (39,813,900)

Planned Company TD-NSB Share	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	1ST YTD TOTAL
100% of Planned Company TD-NSB Share (3)	$ 2,446,895	$ 6,527,021	$ 8,066,435	$ 9,619,110	$ 26,659,461
Actual Company TD-NSB Share Disinentive (4)	$ 1,880,784	$ 7,243,993	$ 10,904,478	$ 17,118,868	$ 37,148,122
Variance	$ 566,111	$ (716,971)	$ (2,838,043)	$ (7,499,758)	$ (10,488,662)

90% of Planned Company TD-NSB Share	1ST QUARTER	2ND QUARTER	3RD QUARTER	4TH QUARTER	1ST YTD TOTAL
Billed @ 90% of Planned Company TD-NSB Share	$ 6,275,019	$ 6,471,335	$ 8,127,766	$ 6,856,543	$ 27,730,662
Actual Company TD-NSB Share Disinentive (4)	$ 1,880,784	$ 7,243,993	$ 10,904,478	$ 17,118,868	$ 37,148,122
Variance	$ 4,394,235	$ (772,658)	$ (2,776,712)	$ (10,262,325)	$ (9,417,460)
Interest for Company TD-NSB Share Recovery	$ (58,317)	$ (82,765)	$ (42,810)	$ 92,431	$ (91,461)

(1) Present value of Net Benefits in the Plan (and DSMore Model) approved by the Commission in Case No. EO-2012-0142.

(2) Present value of Net Benefits derived from using the DSM Model in Note (1) which is re-run to account for (i) the actual number of energy efficiency measures (by type) installed in each month up to that point; (ii) the actual program costs in each month incurred up to that point; and (3) for C&I custom measures for which the TRM does not provide a deemed value, savings determined according to the protocol provided for at pages 85 to 98 of the TRM.

(3) 26.34% of the pre-tax planned Net Benefit calculated using an assumed combined marginal federal/state tax rate of 38.39%.

(4) 26.34% of the pre-tax Net Benefits in Note (2) calculated using an assumed combined marginal federal/state tax rate of 38.39%.

IV. Programs' Evaluations

A. EM&V Evaluators and Auditor

In accordance with 4 CSR 240-20.093(7),[14] Ameren Missouri hired two "independent contractors to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs": 1) The Cadmus Group, Inc. ("Cadmus") to perform EM&V for its MEEIA Plan residential programs, and 2) ADM Associates, Inc. ("ADM") to perform EM&V for its MEEIA Plan commercial and industrial

[14] 4 CSR 240-20.093(7) Evaluation, Measurement, and Verification (EM&V) of the Process and Impact of Demand-Side Programs. Each electric utility shall hire an independent contractor to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs. The commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

("C&I") programs. Cadmus and ADM also performed EM&V for Ameren Missouri's residential and C&I energy efficiency programs, respectively, for Cycle One and Bridge Period.

In accordance with 4 CSR 240-20.093(7), the Commission hired the Auditor, Johnson Consulting Group, LLC, as its "…independent contractor to audit and report on the work of each utility's independent EM&V contractor."

B. PY2013 EM&V Process

Commission Rules 4 CSR 240-3.163(7), 4 CSR 240-20.093(7) and 4 CSR 240-22.070(8) include requirements for performance and auditing of MEEIA demand-side programs' EM&V. Further, paragraph 11 of the Stipulation includes additional activities and schedules for drafting, reviewing, discussing, finalizing and requesting changes to the EM&V final reports. Copies of Commission Rules 4 CSR 240-3.163(7), 4 CSR 240-20.093(7) and 4 CSR 240-22.070(8) and paragraphs 11 EM&V and 14 Stakeholder Meetings of the Stipulation are included in Addendum 3. Addendum 4 is the current schedule for the PY2013 EM&V process.[15]

The Plan's Section 3.11 Evaluation, Measurement and Verification is included as Addendum 5.

On June 12, Ameren Missouri filed its Evaluators' revised EM&V reports and on July 2, 2014, the Auditor filed its *FINAL Annual Report on Evaluation, Measurement &*

[15] On March 18 - 19, 2013, Ameren Missouri held a stakeholder meeting at Ameren Corporation's headquarters to review all of Ameren Missouri's draft EM&V plans. The meeting was attended by over 40 persons each day including Ameren Missouri stakeholders, Evaluators and the Auditor team. On April 15, 2013, Ameren Missouri held a meeting at its St. Charles Operations Center to discuss the written comments received from stakeholders and the Auditor concerning all draft EM&V plans.

In compliance with the schedule on Addendum 4, Cadmus and ADM draft EM&V reports were circulated to stakeholders and the Auditor on February 14, 2014. Stakeholder and Auditor comments concerning the Cadmus and ADM draft EM&V reports were reviewed during stakeholder meetings on March 11 – 12, 2014 and on April 15, 2014, a stakeholder conference call was held to review comments on the Cadmus and ADM draft EM&V reports and the draft Auditor Report.

On May 15, 2014, in compliance with the schedule on Addendum 4, Ameren Missouri filed eight (8) EM&V Reports produced by Cadmus for its MEEIA residential programs and one (1) EM&V Report produced by ADM for its MEEIA commercial and industrial ("C&I") programs. On May 28, 2014, revisions were filed to all eight (8) of the Cadmus final EM&V Reports. On May 30, 2014, revisions were filed to the ADM final EM&V Report. On June 12, 2014, revisions were filed to all eight (8) of the Cadmus final EM&V Reports and to the ADM final EM&V Report. All of revisions were made following Staff's requests to: 1) allocate all indirect program plan costs to individual programs prior to calculation of program-level cost effectiveness tests and net benefits, and 2) use of program level costs and benefits from the utility cost test when calculating each program's net benefits.

Verification Findings for Ameren Missouri Program Year 2013 ("Auditor Report") in Case No. EO-2012-0142.

C. Net-to-Gross[16] ("NTG" Ratios of Cadmus and Auditor for the LightSavers Program)

The Stipulation states,

> Actual net energy savings for each program year will be determined through the EM&V, including full retrospective application of net-to-gross ("NTG") ratios at the program level using EM&V results from each of the three program years, with the sum of the three years' actual net energy savings to be used to determine the amount of the Performance Incentive Award.[17]

The Cadmus *Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013* ("Evaluator LightSavers Report") was filed in Case No. EO-2012-0142 on May 27, 2014. To estimate LightSavers' PY13 NTG ratio, the Cadmus team used the following formula:

> *NTG = 1.0 – Free Ridership + Nonparticipant Lighting Spillover + Nonparticipant Non-lighting Spillover + Market Effects*

For the LightSavers upstream markdown and coupon distribution channels, the Cadmus team estimated an overall savings-weighted NTG of 125%, based on the following:

- Free ridership (24%): the percentage of products that would have been purchased without the retailer discounts or coupons.
- Nonparticipant Lighting Spillover or "like" Spillover (28%): the additional non-discounted light bulbs purchased as a result of the program.
- Nonparticipant Non-lighting Spillover or "unlike Spillover" (1%): the non-lighting energy-efficiency actions induced by the program.
- Market Effects (20%): structural market or behavior changes caused by program activity that result in additional purchases of non-discounted bulbs.

The Evaluator LightSavers Report includes the following discussion of net impact for the LightSavers program beginning on page 3:

> **Net Impacts**
> Using demand elasticity modeling, the Cadmus team estimated free ridership separately for the upstream markdown channel and the coupon channel for three LightSavers bulb types: standard CFLs, specialty CFLs, and LEDs. Demand elasticity modeling uses an econometric model to estimate the impact of program incentives, promotional events, and product placements on observed lighting sales, based on actual program sales data.

[17] Beginning at the bottom of page 4 and ending at the top of page 5 of the Stipulation.

As shown in Table 1, LEDs experienced extremely limited free ridership (1%), while higher free ridership rates occurred for standard CFLs (23%) and specialty CFLs (24%). Overall, the program exhibited a savings-weighted free ridership rate of 24%, as standard CFLs constituted 91.5% of total savings.

Table 1. Upstream Free Ridership by Bulb Type

Bulb Type	Free Ridership	Percentage of Savings
Standard CFLs	23%	91.5%
Specialty CFLs	24%	7.2%
LEDs	1%	0.4%
Total	**24%**	**100%**

The Report also states:

As shown in Table 2 the PY13 LightSavers program realized 230% of its targeted energy savings as approved by the Public Service Commission (PSC), and 577% of its targeted demand savings based on actual PY13 participation. As reported in this table *ex ante* gross savings are annualized savings calculated by applying tracked program activity to TRM savings values. *Ex post* gross savings are those calculated and presented by the evaluators (and already include installation rate adjustments). *Ex post* net savings is the *ex post* gross savings multiplied by the NTG ratio, accounting for free ridership, spillover, and market effects. The high number of upstream CFLs installed in non-residential locations greatly increased the demand savings generated by the program (as these bulbs are used more frequently during peak hours).

Table 2. LightSavers Savings Comparisons

Metric	MPSC-Approved Target[1]	*Ex Ante* Gross Savings Utility Reported[2]	*Ex Post* Gross Savings Determined by EM&V[3]	*Ex Post* Net Savings Determined by EM&V[4]	Percent of Goal Achieved[5]
Energy (MWh)	121,258	198,735	227,132	279,127	230%
Demand (kW)	3,647	7,909	17,111	21,028	577%

[1] https://www.ameren.com/sites/AUE/Rates/Documents/UECSheet191EEResidential.pdf
[2] Calculated by applying tracked program activity to TRM savings values.
[3] Calculated by applying tracked program activity to Cadmus' evaluated savings values.
[4] Calculated by multiplying Cadmus' evaluated gross savings and NTG ratio, which accounts for free ridership, participant spillover, nonparticipant spillover, and market effects.
[5] Compares MPSC Approved Target and *Ex Post* Net Savings Determined by EM&V.

The Auditor Report filed in Case No. EO-2012-0142 on July 2, 2014, includes the following conclusions and recommendations on page 7 of Appendix A: Analysis of LightSavers Spillover and Market Effects Annual Allocation to FINAL Annual Report on Evaluation, Measurement & Verification Findings for Ameren Missouri Program Year 2013:

> **Conclusions and Recommendations**
>
> The EM&V Auditor believes any impacts due to potential spillover and market effects need to incorporate the sales pattern of non-program bulbs, not just program bulbs. The sales data analysis provides strong evidence that sales of CFLs and LEDs were extremely high in 2012, despite the lack of program activity. This could be due to a "momentum effect" of prior program activity. In fact, were it not for the momentum effect, it would suggest that the naturally occurring adoption is significantly higher than suggested in the report. In other words, sales of CFLs and LEDs were still 75 percent of what they were in 2011; if some of these sales were not due to the momentum effect, it would suggest that naturally occurring adoption (free ridership) could even be in the 75 percent range.
>
> Reallocating the percentage to match the non-program sales effectively drops the percentage of spillover and market effects that is attributable to the 2013 program, when more than on half of the total sales for these retailers were already in the program.
>
> *Ultimately, the EM&V Auditor believes that the sales data used and presented here, along with the supplemental data provided by Cadmus, represents the best and most comprehensive data currently available. Any calculation of spillover and market effects should be relocated in this manner. Making this adjustment, the proportion of spillover and market effects attributable to the 2013 program drops to 18.8 percent, a downward revision from the 26.3 percent as presented in the LightSavers report. This then drops the NTG with spillover to 87 percent, and with spillover and market effects to 94 percent.*
>
> [Emphasis added.]

D. Impact of LightSavers EM&V on Ameren Missouri's Performance Incentive Award

Staff performed an analysis of the impact due to different PY2013 LightSavers NTG ratios (resulting from spillover and market effects differences in the Evaluator's PY2013 LightSavers Report and in the Auditor's PY2013 Report) upon the Ameren Missouri 3-year performance incentive award amount. This analysis is in Table 3 and Table 4 and illustrates that the impact due to different PY2013 LightSavers NTG ratios can have a 1-year impact of as much as $1.4 million on the Ameren Missouri 3-year performance incentive award.

Table 3

Performance Incentive Award Impact Due to NTG Ratios for the LightSavers Program for PY2013 Assuming Final 3-Year Percent of MWh Target is 100% For Cadmus With Market Effects

	NTG	Ex Post Gross Savings Determined by EM&V (MWh)	Ex Post Net Savings Determined by EM&V (MWh)	Reduction from Cadmus With Market Effects (MWh)	Reduction of MWh as Percent of 793,102 MWH Target	LightSavers PY2013 Net Shared Benefits (Dollars)	Percent of EM&V Net Shared Benefits	LightSavers PY2013 Impact on Performance Incentive Award Amount (Dollars)	Reduction in Performance Incentive Award Amount for Only PY2013 Impact (Dollars)
Cadmus With Market Effects	1.25	227,132	283,915	0	0.00%	$ 72,971,575	5.03%	$ 3,670,470	$ -
Cadmus Without Market Effects	1.05	227,132	238,489	45,426	5.73%	$ 61,296,123	4.97%	$ 3,044,576	$ 625,895
Auditor With Market Effects	0.94	227,132	213,504	70,411	8.88%	$ 54,874,624	4.93%	$ 2,706,605	$ 963,866
Auditor Without Market Effects	0.87	227,132	197,605	86,310	10.88%	$ 50,788,216	4.91%	$ 2,492,505	$ 1,177,966

Table 4

Performance Incentive Award Impact Due to NTG Ratios for the LightSavers Program for PY2013 Assuming Final 3-Year Percent of MWh Target is 145% For Cadmus With Market Effects

	NTG	Ex Post Gross Savings Determined by EM&V (MWh)	Ex Post Net Savings Determined by EM&V (MWh)	Reduction from Cadmus With Market Effects (MWh)	Reduction of MWh as Percent of 793,102 MWH Target	LightSavers PY2013 Net Shared Benefits (Dollars)	Percent of EM&V Net Shared Benefits	LightSavers PY2013 Impact on Performance Incentive Award Amount (Dollars)	Reduction in Performance Incentive Award Amount for Only PY2013 Impact (Dollars)
Cadmus With Market Effects	1.25	227,132	283,915	0	0.00%	$ 72,971,575	6.19%	$ 4,516,940	$ -
Cadmus Without Market Effects	1.05	227,132	238,489	45,426	5.73%	$ 61,296,123	6.19%	$ 3,794,230	$ 722,710
Auditor With Market Effects	0.94	227,132	213,504	70,411	8.88%	$ 54,874,624	6.19%	$ 3,396,739	$ 1,120,201
Auditor Without Market Effects	0.87	227,132	197,605	86,310	10.88%	$ 50,788,216	6.19%	$ 3,143,791	$ 1,373,150

It is important to note the following points related to the above analysis:

1. The LightSavers net benefits amount of $72,971,575 represents 53.4% of the PY2013 Plan net benefits of $136,554,103 as illustrated on Addendum 6; and
2. The Stipulation's Section 5.b.ii., NSB Relating to the Performance Incentive, requires that "After the conclusion of the three-year Plan period, using final Evaluation, Measurement and Verification ("EM&V") results (with EM&V to be performed after each of the program years 1, 2 and 3), … Actual net energy savings for each program year will be determined through the EM&V, including full retrospective application of

net-to-gross ratios at the program level using EM&V results from each of the three program years, with sum of the three years' actual net energy savings to be used to determine the amount of the Performance Incentive Award." Therefore, the Commission's 2014 decision concerning the issue of the PY2013 NTG ratio for the LightSavers program or any other program is final and binding toward determination of the Performance Incentive Award. Also, this provision in the Stipulation prevents an Evaluator from performing an impact evaluation of market effects over a period of multiple years.

V. No Industry Best Practices for Market Effects

A. Staff's Historical Perspective on Market Effects

As the Staff's analysis demonstrates, market effects play a key role in the calculation of the NTG ratio and ultimately the determination of the Performance Incentive Award. Staff expressed its concerns related to market effects to Ameren Missouri on various occasions. Addendum 9 is a May 21, 2013 letter from Natelle Dietrich, Director-Tariff, Safety, Economic and Engineering Analysis to Rick Voytas, Director, Energy Efficiency and Demand Response for Ameren Missouri. In the letter, Ms. Dietrich describes the communications that occurred once Staff became aware of Cadmus' proposal to include energy savings for market effects from the Cross-Cutting Study.[18] Ms. Dietrich indicated that Staff does not support the use of the Cross-Cutting Study planned activities for the express purpose of adjusting NTG and annual energy savings, but supports activities and the associated budget necessary to better understand market effects in general. By the May 21, 2013 letter, Ms. Dietrich put Ameren Missouri on notice that Staff was reserving its right to challenge any market effects adjustments to the NTG ratio and annual energy savings of Ameren Missouri's residential energy efficiency programs should Cadmus proceed with its proposed plans.

B. EM&V Industry Perspective on Market Effects

For a perspective on market effect evaluations, Staff provides **Appendix B: Other Evaluation Categories and Approaches** from *Energy Efficiency Program Impact Evaluation*

[18] The Cadmus *Evaluation Plan: Cross-Cutting Activities (PY5–PY7)* is the plan which supplements the evaluation activities detailed in the seven program-specific residential evaluation tasks. Specifically, this plan discusses the methods Cadmus will use estimate spillover and market effects generated by select programs and program-related efforts.

Guide Evaluation, Measurement, and Verification Working Group dated December 2012 produced by the State & Local Energy Efficiency Action Network http://www1.eere.energy.gov/seeaction/pdfs/emv_ee_program_impact_guide.pdf

(See Addendum 7)

Appendix B.1.2 Market Effects Evaluations follows:

The goal of market effects evaluations is to characterize and quantify the effects of a program on supplier promotion and customer adoption of the targeted energy efficiency measures, regardless of whether those suppliers and customers participated in the program. Effects that cannot be captured by program records are particularly important for certain kinds of initiatives, including "upstream" promotions of mass-market goods, such as light bulbs and consumer electronics as well as training programs aimed at inducing engineers and contractors to adopt energy efficiency design and specification practices. Studies have shown that even straightforward equipment rebate programs may have effects "outside the program" by exposing contractors and large customers to the benefits of efficient technologies. This in turn leads to increased specification of efficient technologies on projects that do not receive program support. *In some cases, market effects evaluation results can be combined with impact evaluation findings to estimate program-induced energy savings that were not tracked by the program itself.*

Other market studies include potential studies (see sidebar) and market baseline studies. Potential studies investigate how much savings may be available through various measures and baseline studies look at indicators of market development before the program intervention.

Market effects studies are usually associated with programs that have a specific market transformation focus. There are many definitions of market transformation, although it is often considered the ultimate goal of publicly and consumer-funded energy efficiency programs. In this guide, *the definition of market transformation is: a reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects that is likely to last after the intervention has been withdrawn, reduced, or changed.*

Market effects evaluations often involve a significant undertaking, because they require collection and analysis of data from a wide range of market actors, as well as analysis of those data against a background developed out of secondary sources. Market effects are sometimes called the ultimate test of a program's success, answering the question: "Will energy efficiency (best) practices continue in the marketplace, even after the current program ends?" The difference between a market change and a market effect is attribution: the ability to trace back a change in the market to a specific program or group of programs. The following is a definition of market effects from a well-referenced 1996 study:

Market effect: a change in the structure of a market or the behavior of market participants that is reflective of an increase in the adoption of energy-efficient products, services, or practices and is causally related to market intervention(s) (e.g., programs). Examples of market effects include increased levels of awareness of energy-efficient technologies among customers and suppliers, increased availability of efficient technologies through retail channels, reduced prices for efficient models, build-out of efficient model lines, and—the end goal—increased market share for efficient goods, services, and design practices.

Another form of market study (although not formally an "evaluation") is called a potential study. Potential studies are conducted before a program is implemented in order to assess market baselines and future savings potentials for different efficiency technologies, strategies, or approaches in different customer markets. These studies can also assess customer needs and barriers to adoption of energy efficiency, as well as how best to address these barriers through program design. Potential studies indicate what can be expected in terms of savings from a program. Potential is often defined in terms of technical potential (what is technically feasible given commercially available products and services), and economic potential (which is the level of savings that can be achieved assuming a certain level of participant and/or societal cost effectiveness is required). Findings also help managers identify the program's key markets and clients and how to best serve the intended customers.

Structuring a market effects evaluation entails consideration of several levels or stages, with the ultimate goal generally understood to be the increased adoption of energy efficiency goods and services in the general market leading to energy savings. Energy savings are the ultimate goal of programs seeking to cause market effects (i.e., the intended long-term outcome). The following list suggests a hierarchy of precursors to that goal:

Early Acceptance: proliferation of models and manufacturers, purchase by frontrunners and enthusiasts

Take-off Phase: customer awareness, visibility on shelves and in inventories, perceptible levels of market share in the supply channels

Maturity: all major competitors offer energy efficient models; codes and standards include energy efficient models

Energy Savings: energy savings attributable to the program are associated with acceleration of these developments.

In general, the achievement of goals at each of the higher levels of the hierarchy requires accomplishments at the lower levels. As a result, tracking goals at each stage not only provides feedback on performance with respect to that goal itself, but also provides evidence that effects at the next-higher levels can be attributed to the program.

> Goals will typically be set and tracked for different time frames and for different purposes. *While energy savings are the ultimate market effects goal, in most cases, savings cannot be measured meaningfully without several years of information; even then, they will usually not have the same level of accuracy as impact evaluations of direct resource acquisition savings. To credit measure adoption and associated savings to a program, it must be shown that the increased energy efficiency adoption, the longer-term market effects, and the participant effects have all occurred essentially in the manner and in the order specified by the program theory. And this, for most programs, takes a number of years to reach this point.*
>
> [Emphasis added.]

C. Plan's Cumulative Annual Energy and Demand Savings, Performance Incentive Targets

Addendum 8 is the Plan's Section 3.4 Gross vs. Net Saving and includes the following:

1. "The issue of using either gross kWh or net kWh savings as the appropriate metric to assess whether the Company has met its annual load reduction targets is a question of attribution. In other words, how many energy efficiency measures were installed as a result of the utility program versus how many would have been installed absent the program? The ratio of net program savings to gross program savings is the NTG ratio. The discussion below supports Ameren Missouri's proposal to use gross savings/reductions as the metric for tracking utility and customer progress toward the Ameren Missouri energy efficiency goals and for the calculation of the TRC and for all applicable performance incentives."[19]
2. "There is a third potential adjustment for "market effects." Market effects impacts can be measured by evaluating and estimating the impacts of any changes the program causes to the way markets operate. … Although the impact of market effects can be significant, measurement of market effects becomes both a significant and costly measurement and evaluation challenge."[20]
3. "The issue of attribution – who or what organization should receive credit for changing customer energy consumption behaviors – is at best complicated and unclear. A good example is the influence of the more than $200 million from the [American] Reinvestment and Recovery Act (ARRA) allocated to Missouri and administered by the Missouri Department of Natural Resource (DNR) for energy efficiency initiatives from 2010 through 2012. Many of the energy efficiency initiatives administered by DNR overlap with the Ameren Missouri DSM portfolio of customer programs. Which program had the most impact on moving customers to take energy efficiency actions? Of course, in addition to the ARRA, there are a variety of other state, local, and even retail initiatives that encourage customers to be more conscious of energy consumption."[21]

[19] Page 55 lines17 – 25 of the Plan (Addendum 8).
[20] Page 56 lines 15 – 22 of the Plan (Addendum 8).
[21] Page 57 line15 through page 58 line 4 of the Plan (Addendum 8).

4. Table 3.9 includes the NTG ratios for Ameren Missouri's Cycle One programs and indicates that all NTG ratios are below 1.0. Further, only one NTG ratio included the impact due to market effects and that is the residential Lighting & Appliance program.

As a result of its review of the Plan's Section 3.4 Gross vs. Net Savings, Staff concludes it is very difficult and costly to quantify the impacts (energy and demand savings) from market effects. The assumed gross savings for the Plan's TD-NSB Share provides Ameren Missouri with some lost revenue recovery for any impact of market effects. Further, the cumulative energy and demand savings targets for the Plan would appear to include some amount of market effects.

D. Plan's Strategy for Performing EM&V Using Industry Best Practices

Addendum 5 is the Plan's Section 3.11 Evaluation, Measurement and Verification and includes the following:

1. "The success of an EMV program is highly dependent on the evaluator's ability to properly design and implement both the qualitative and quantitative aspects of evaluation. EMV is often described as "part art" and "part science" and the evaluator needs to be objective and skillful in interpreting the data. Evaluator knowledge and experience can also be drawn upon for program design and process improvement during the implementation cycle. Additionally, for evaluation results to be credible, the process should be transparent and follow an evaluation plan that conforms to industry best practices."[22]
2. "Through the first two annual evaluation report presentations, the process has worked well: all Business Program Evaluation Reports were accepted with little comment and no concern by Stakeholders. … The only concern that has been raised is with the calculation of the NTG ratio for the lighting portion of the Lighting & Appliance Program. This concern was due to an innovative model being used to calculate NTG which included both free ridership and spillover."[23]

VI. Conclusion

Staff agrees that it is important to employ experienced and skilled EM&V evaluators who employ a transparent process which conforms to industry best practice.[24] Staff remains very concerned that there is currently no acknowledged industry best practice EM&V methodology

[22] Page 105 lines 4 – 11 of the Plan (Addendum 8).
[23] Page 105 line 35 through page 106 line4 of the Plan (Addendum 8)
[24] From Wikipedia: A best practice is a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark. In addition, a "best" practice can evolve to become better as improvements are discovered. Best practice is considered by some as a business buzzword, used to describe the process of developing and following a standard way of doing things that multiple organizations can use.

for objectively quantifying market effects from energy efficiency programs.[25] For this reason, Staff is opposed to including any market effects adjustment to the EM&V NTG ratios for the Plan and, therefore, recommends the Commission reject both the adjustments proposed by the Evaluator's Report and the Auditor's Report, and accept the Auditor's report for NTG values without market effects.

[25] Concerns related to market effects from the Cycle One Lighting & Appliance program were raised and brought to Ameren Missouri's attention in File No. ET-2009-0404, and in the surrebuttal testimony of John A. Rogers in Case No. ER-2011-0028 at page 16 line 8 through page 21 line 20.

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's Filing to Implement Regulatory Changes Furtherance of Energy Efficiency as Allowed by MEEIA	)))))	File No. EO-2012-0142

AFFIDAVIT OF JOHN A. ROGERS

STATE OF MISSOURI)
) **ss**
COUNTY OF COLE)

John A. Rogers, employee of the Staff of the Missouri Public Service Commission, being of lawful age and after being duly sworn, states that he has participated in the preparation of the accompanying Staff Recommendation, in memorandum form, and the facts therein are true and correct to the best of his knowledge and belief.

John A Rogers
John A. Rogers

Subscribed and sworn to before me this 3rd day of July, 2014.

SUSAN L. SUNDERMEYER
Notary Public - Notary Seal
State of Missouri
Commissioned for Callaway County
My Commission Expires: October 03, 2014
Commission Number: 10942086

Susan L Sundermeyer
Notary Public

Ameren Missouri Demand-Side Resources Performance Summary Report

Date of Report: **December 31, 2011**

Year 1: Feb. 11, 2009 to Sept. 30, 2009 (BUSINESS) and Apr. 24, 2009 to Sept. 30, 2009 (RESIDENTIAL) **Year 2**: Oct. 1, 2009 to Sept. 30, 2010 **Year 3**: Oct. 1, 2010 to Sept. 30, 2011

Implementation Date			Cumulative MWh			Cumulative MW			Cumulative Program Costs ($000)			Cost Effectiveness	
			Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	TRC	UCT
IRP	ENERGY STAR Homes Program	IRP	0	0	154	0.0	0.0	0.1	$ -	$ 129	$ 304	1.00	1.18
Expected		Actual	0	0	0	0.0	0.0	0.0	$ -	$ -	$ -		
Actual		Variance	0	0	(154)	0	0	(0)	$ -	$ (129)	$ (304)	(1.00)	(1.18)
IRP	Home Energy Performance	IRP	3,480	8,195	14,463	0.5	1.2	2.0	$ 762	$ 1,820	$ 3,262	2.39	3.19
Expected		Actual	0	0	0	0.0	0.0	0.0	$ 371	$ 371	$ 371		
Actual		Variance	(3,480)	(8,195)	(14,463)	(1)	(1)	(2)	$ (391)	$ (1,449)	$ (2,891)	(2.39)	(3.19)
IRP	Res. DR-CPP w/ Smart Thermostat	IRP	0	0	159	0.0	0.0	1.8	$ -	$ -	$ 506	1.37	1.30
Expected		Actual	0	0	0	0.0	0.0	0.0	$ 300	$ 300	$ 300		
Actual		Variance	0	0	(159)	0	0	(2)	$ 300	$ 300	$ (206)	(1.37)	(1.30)
IRP	Res. DR - Direct Load Control	IRP	495	1,013	1,554	5.5	11.3	17.3	$ 1,144	$ 2,458	$ 3,955	1.93	1.78
Expected		Actual	0	0	0	0.0	0.0	0.0	$ -	$ -	$ -		
Actual		Variance	(495)	(1,013)	(1,554)	(6)	(11)	(17)	$ (1,144)	$ (2,458)	$ (3,955)	(1.93)	(1.78)
IRP	HVAC CheckMe!	IRP	0	7,368	17,086	0.0	1.5	3.5	$ 520	$ 3,275	$ 7,273	1.55	1.92
Expected		Actual	0	415	7,658	0.0	0.1	2.2	$ 622	$ 943	$ 4,166		
Actual	7/28/10	Variance	0	(6,953)	(9,428)	0	(1)	(1)	$ 102	$ (2,332)	$ (3,107)	(1.55)	(1.92)
IRP	Res Lighting & Appliance	IRP	28,749	65,928	112,670	2.4	5.6	9.6	$ 3,075	$ 7,151	$ 12,403	2.29	3.99
Expected		Actual	3,838	76,222	169,924	0.3	12.8	21.2	$ 2,424	$ 7,823	$ 12,786		
Actual	5/22/09	Variance	(24,911)	10,294	57,254	(2)	7	12	$ (651)	$ 672	$ 383	(2.29)	(3.99)
IRP	Social Marketing Distribution	IRP											
Expected		Actual	0	5,789	31,701	0.0	0.9	3.2	$ -	$ 192	$ 861		
Actual	6/7/10	Variance	0	5,789	31,701	0	1	3	$ -	$ 192	$ 861	0.00	0.00
IRP	Res. Low Income	IRP	4,581	9,162	13,742	0.3	0.5	0.8	$ 2,954	$ 5,982	$ 9,085	0.88	1.00
Expected		Actual	0	4,626	14,030	0.0	0.5	1.5	$ 1,348	$ 3,820	$ 9,934		
Actual	7/30/09	Variance	(4,581)	(4,536)	288	(0)	0	1	$ (1,606)	$ (2,161)	$ 849	(0.88)	(1.00)
IRP	Res. Multi-Family	IRP	10,012	24,136	34,026	1.8	4.3	6.2	$ 656	$ 1,685	$ 3,047	2.63	3.26
Expected	(included in Low Income)	Actual	0	0	0	0.0	0.0	0.0	$ -	$ -	$ -		
Actual	7/30/09	Variance	(10,012)	(24,136)	(34,026)	(2)	(4)	(6)	$ (656)	$ (1,685)	$ (3,047)	(2.63)	(3.26)
IRP	Appliance Recycling	IRP	0	0	0	0.0	0.0	0.0	$ -	$ -	$ -	1.71	2.13
Expected		Actual	0	646	8,989	0.0	0.1	1.3	$ -	$ 109	$ 1,359		
Actual	7/28/10	Variance	0	646	8,989	0	0	1	$ -	$ 109	$ 1,359	(1.71)	(2.13)
	Total Residential Portfolio	**IRP**	**47,317**	**115,802**	**193,854**	**10.5**	**24.4**	**41.3**	**$ 9,111**	**$ 22,500**	**$ 39,834**		
		Actual	**3,838**	**87,698**	**232,302**	**0.3**	**14.4**	**29.5**	**$ 5,064**	**$ 13,558**	**$ 29,777**		
		Variance	(43,479)	(28,104)	38,448	(10)	(10)	(12)	$ (4,046)	$ (8,941)	$ (10,058)		
IRP	C&I Custom*	IRP	27,099	54,198	81,297	3.5	7.0	10.6	$ 4,203	$ 8,510	$ 12,925	2.23	2.94
Expected		Actual	5,018	56,642	186,439	1.0	10.1	30.7	$ 1,882	$ 8,159	$ 18,431		
Actual	2/11/09	Variance	(22,081)	2,444	105,142	(2.5)	3.1	20.1	$ (2,321)	$ (351)	$ 5,505	(2.23)	(2.94)
IRP	C&I Prescriptive*	IRP	32,470	68,985	109,738	4.8	10.5	16.6	$ 4,871	$ 11,327	$ 19,647	1.89	2.44
Expected		Actual	10,466	24,515	44,549	1.9	3.8	7.5	$ 1,524	$ 3,007	$ 5,048		
Actual	2/11/09	Variance	(22,004)	(44,470)	(65,189)	(2.9)	(6.7)	(9.1)	$ (3,346)	$ (8,320)	$ (14,599)	(1.89)	(2.44)
IRP	C&I Retro-Commissioning*	IRP	11,573	24,007	37,357	1.4	2.8	4.4	$ 562	$ 1,182	$ 1,863	3.17	6.78
Expected		Actual	0	1,249	51,401	0.0	0.2	2.0	$ 74	$ 314	$ 2,212		
Actual	6/25/09	Variance	(11,573)	(22,758)	14,044	(1.4)	(2.6)	(2.4)	$ (489)	$ (868)	$ 349	(3.17)	(6.78)
IRP	Commercial Demand Credit	IRP	760	760	760	38.0	38.0	38.0	$ 410	$ 830	$ 1,261	1.56	1.08
Expected		Actual	156	156	156	7.5	7.5	7.5	$ 40	$ 40	$ 40		
Actual	7/9/09	Variance	(604)	(604)	(604)	(30.5)	(30.5)	(30.5)	$ (370)	$ (790)	$ (1,221)	(1.56)	(1.08)
IRP	Commercial DR - CPP w/ Smart Therm.	IRP	0	0	178	0.0	0.0	2.0	$ -	$ -	$ 488	1.60	1.51
Expected		Actual	0	0	0	0.0	0.0	0.0	$ -	$ -	$ -		
Actual		Variance	0	0	(178)	0.0	0.0	(2.0)	$ -	$ -	$ (488)	(1.60)	(1.51)
IRP	Commercial New Construction*	IRP	817	1,634	2,451	0.3	0.5	0.8	$ 666	$ 1,348	$ 2,047	1.14	1.35
Expected		Actual	0	4,769	39,311	0.0	0.9	8.1	$ 95	$ 841	$ 4,612		
Actual	5/3/09	Variance	(817)	3,135	36,860	(0.3)	0.4	7.3	$ (571)	$ (507)	$ 2,565	(1.14)	(1.35)
IRP	Industrial Interruptible Tariff	IRP	3,800	3,800	3,800	47.5	47.5	47.5	$ 1,999	$ 4,047	$ 6,147	1.59	0.36
Expected		Actual	0	0	0	0.0	0.0	0.0	$ -	$ -	$ -		
Actual		Variance	(3,800)	(3,800)	(3,800)	(47.5)	(47.5)	(47.5)	$ (1,999)	$ (4,047)	$ (6,147)	(1.59)	(0.36)
	Total C&I Portfolio	**IRP**	**76,519**	**153,384**	**235,581**	**96**	**106**	**120**	**$ 12,710**	**$ 27,245**	**$ 44,379**		
		Actual	**15,640**	**87,331**	**321,856**	**10**	**22**	**56**	**$ 3,615**	**$ 12,361**	**$ 30,343**		
		Variance	(60,879)	(66,053)	86,275	(85)	(84)	(64)	$ (9,096)	$ (14,884)	$ (14,036)		

* Program Year Ended, Result Include Projects Being Closed Out

Education Program	**IRP**						$ 500	$ 1,200	$ 2,100			
	Actual											
	Variance						$ (500)	$ (1,200)	$ (2,100)			
Information Program	**IRP**						$ 500	$ 1,200	$ 2,100			
	Actual						$ 484	$ 1,116	$ 1,804			
	Variance						$ (16)	$ (84)	$ (296)			
Total Education and Information Programs	**IRP**						**$ 1,000**	**$ 2,400**	**$ 4,200**			
	Actual						**$ 484**	**$ 1,116**	**$ 1,804**			
	Variance						$ (516)	$ (1,284)	$ (2,396)			
Total Portfolio (Without Indirect Costs)	**IRP**	**123,836**	**269,186**	**429,435**	**106**	**131**	**161**	**$ 22,821**	**$ 52,144**	**$ 88,414**	**1.71**	**2.04**
	Actual	**19,478**	**175,029**	**554,158**	**11**	**37**	**85**	**$ 9,163**	**$ 27,035**	**$ 61,924**		
	Variance	(104,358)	(94,157)	124,723	(95)	(94)	(76)	$ (13,658)	$ (25,110)	$ (26,490)		
Portfolio Administration - Contractor	**IRP**							$ -	$ -	$ -		
	Actual							$ -	$ -	$ -		
	Variance							$ -	$ -	$ -		
Portfolio Administration - Ameren Missouri	**IRP**							$ 1,100	$ 2,500	$ 4,200		
	Actual							$ 736	$ 1,717	$ 2,699		
	Variance							$ (364)	$ (783)	$ (1,501)		
EM&V - Contractor	**IRP**							$ 1,100	$ 2,500	$ 4,200		
	Actual							$ 304	$ 1,351	$ 3,264		
	Variance							$ (796)	$ (1,149)	$ (936)		
Total Portfolio Indirect Costs	**IRP**							**$ 2,200**	**$ 5,000**	**$ 8,400**		
	Actual							**$ 1,040**	**$ 3,068**	**$ 5,963**		
	Variance							$ (1,160)	$ (1,932)	$ (2,437)		
Total AmerenUE DSM Portfolio	**IRP**	**123,836**	**269,186**	**429,435**	**106**	**131**	**161**	**$ 25,021**	**$ 57,144**	**$ 96,814**	**1.71**	**2.04**
	Actual	**19,478**	**175,029**	**554,158**	**11**	**37**	**85**	**$ 10,203**	**$ 30,103**	**$ 67,886**		
	Variance	**(104,358)**	**(94,157)**	**124,723**	**(95)**	**(94)**	**(76)**	**$ (14,818)**	**$ (27,042)**	**$ (28,927)**		

PY1 and PY2 results are as calculated by evaluators.

Low Income Weatherization * Data begins 8/1/2010	**2010 ***	**2011**
	159	**471**

	2010 *	**2011**
CAA Spend	**$ 523.56**	**$ 1,497.49**
Ameren Missouri Contribution	**$ 1,200.00**	**$ 1,200.00**

Ameren Missouri Bridge Energy Efficiency Summary Report

Date of Report: **December 31, 2012**

		Cumulative MWh	Cumulative MW	Cumulative Program Costs ($000)	TRC
Res Lighting		9,912	0.9	$ 1,437	1.48
Res. Multi-Family Income Qualified		2,563	0.3	$ 1,994	0.88
Refrigerator Recycling		2,105	0.3	$ 402	3.32
	Goal	15,000			
Total Residential Portfolio	Actual	**14,580**	**1.5**	**$ 3,832**	
	Variance	420			
C&I Custom Incentive		12,838	2.4	$ 1,234	1.61
C&I Standard Incentive		415	0.0	$ 7	1.72
	Goal	15,000			
Total C&I Portfolio	Actual	**13,253**	**2.4**	**$ 1,241**	
	Variance	1,747			
Education, Information, and EM&V				**$ 926**	
Total Portfolio (Without Indirect Costs)		**27,833**	**3.9**	**$ 6,000**	
Portfolio Administration - Ameren Missouri				**$ 981**	
Total AmerenUE DSM Portfolio		**27,833**	**4**	**$ 6,981**	

	Homes	Expenditures
Low Income Weatherization	**277**	**$1,090**

Addendum 2

4 CSR 240-3.163(7) EM&V reports shall document, include analysis, and present any applicable recommendations for at least the following, and all models and spreadsheets shall be provided as executable versions in native format with all formulas intact:

(A) Process evaluation and recommendations, if any; and

(B) Impact evaluation—

1. The lifetime and annual gross and net demand savings and energy savings achieved under each program, and the techniques used to estimate annual demand savings and energy savings; and

2. A demonstration of the cost-effectiveness of the program, to include at a minimum the TRC of each program.

A. If a program is determined not to be cost-effective, the electric utility shall identify the causes why and present appropriate program modifications, if any, to make the program cost-effective. If there are no modifications to make the program cost-effective, the utility shall describe how it intends to end the program and how it intends to achieve the energy and demand savings initially estimated for the discontinued program.

B. The fact that a program proves not to be cost-effective is not by itself sufficient grounds for disallowing cost recovery.

4 CSR 240-20.093(7) Evaluation, Measurement, and Verification (EM&V) of the Process and Impact of Demand-Side Programs. Each electric utility shall hire an independent contractor to perform and report EM&V of each commission-approved demand-side program in accordance with 4 CSR 240-20.094 Demand-Side Programs. The commission shall hire an independent contractor to audit and report on the work of each utility's independent EM&V contractor.

(A) Each utility's EM&V budget shall not exceed five percent (5%) of the utility's total budget for all approved demand-side program costs.

(B) The cost of the commission's EM&V contractor shall—

1. Not be a part of the utility's budget for demand-side programs; and

2. Be included in the Missouri Public Service Commission Assessment for each utility.

(C) EM&V draft reports from the utility's contractor for each approved demand-side program shall be delivered simultaneously to the utility and to parties of the case in which the demand-side program was approved.

(D) EM&V final reports from the utility's contractor of each approved demand-side program shall—

1. Be completed by the EM&V contractor on a schedule approved by the commission at the time of demand-side program approval in accordance with 4 CSR 240-20.094(3); and

2. Be filed with the commission and delivered simultaneously to the utility and the parties of the case in which the demand-side program was approved.

(E) Electric utility's EM&V contractors shall use, if available, a commission-approved statewide technical resource manual when performing EM&V work.

4 CSR 240-22.070(8) Evaluation of Demand-Side Programs and Demand–Side Rates. The utility shall describe and document its evaluation plans for all demand-side programs and demand-side rates that are included in the preferred resource plan selected pursuant to 4 CSR 240-22.070(1). Evaluation plans required by this section are for planning purposes and are separate and distinct from the evaluation, measurement, and verification reports required by 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7); nonetheless, the evaluation plan should, in addition to the requirements of this section, include the proposed evaluation schedule and the proposed approach to achieving the evaluation goals pursuant to 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7). The evaluation plans for each program and rate shall be developed before the program or rate is implemented and shall be filed when the utility files for approval of demand-side programs or demand-side program plans with the tariff application for the program or rate as described in 4 CSR 240-20.094(3). The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates, and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis.

(A) Process Evaluation. Each demand-side program and demand-side rate that is part of the utility's preferred resource plan shall be subjected to an ongoing evaluation process which addresses at least the following questions about program design.

1. What are the primary market imperfections that are common to the target market segment?

2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?

3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

4. Are the communication channels and delivery mechanisms appropriate for the target market segment?

5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

(B) Impact Evaluation. The utility shall develop methods of estimating the actual load impacts of each demand-side program and demand-side rate included in the utility's preferred resource plan to a reasonable degree of accuracy.

1. Impact evaluation methods. At a minimum, comparisons of one (1) or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:

A. Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other intertemporal differences; and

B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.

2. The utility shall develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination:

A. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or

B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.

(C) The utility shall develop protocols to collect data regarding demand-side program and demand-side rate market potential, participation rates, utility costs, participant costs, and total costs.

Paragraphs 11 and 14 of the Stipulation and Agreement in File No. EO-2012-0142 - Ameren Missouri MEEIA:

11. EM&V.

a. Approximately five percent of the three-year MEEIA Programs' costs budget will be spent for EM&V. Ameren Missouri will consider input from the stakeholder group, as described in paragraph 14, in its determination of how best to allocate and utilize the EM&V budget.

b. The following process will be used for EM&V reports:

i. 45 days after the end of each program year, the EM&V contractor will circulate a draft EM&V report to all stakeholders participating in the stakeholder group and the Commission's Independent EM&V Auditor ("Auditor"). This provision does not affect the requirement in the MEEIA rules for the EM&V contractors to provide copies of draft EM&V reports to stakeholders participating in the stakeholder group at the same time that draft reports are provided to Ameren Missouri.

ii. 60 days after circulation of the draft EM&V report, the Auditor and each stakeholder group participant will provide any comments and recommendations for report changes to the EM&V contractor and to all other stakeholder group participants and the Auditor. The Signatories recognize there is a benefit to providing comments as early as possible, as providing comments and recommendations earlier to the EM&V contractor will allow for more time for the incorporation of comments and changes into the Final Report.

iii. Prior to issuing the Final EM&V Report, the EM&V contractor will host at least one meeting with the Auditor and the stakeholder group participants to discuss the comments and recommendations for report changes. The EM&V contractor will determine what comments and/or changes are incorporated into the Final EM&V Report. 30 days after the deadline for comments and recommendations for report changes, the Final EM&V report will be provided to all stakeholder group participants by the EM&V contractor.

iv. Any stakeholder group participant who wants a change to the impact evaluation portion of a Final EM&V Report will have 21 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 21 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 two 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 60 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 30 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. The Signatories will be parties to a Change Request resolution proceeding without the necessity of applying to intervene. The procedural schedule for such a Change Request proceeding will provide that data request objections must be lodged within 7 days and responses will be due within 10 days (notifications that additional time is required to respond will also be due within 7 days).

v. All Signatories will be bound by the impact evaluation portion of the Final EM&V Report, as it may be modified by the Commission's resolution of issues related to the impact evaluation portion of the Final EM&V Report.

14. <u>Stakeholder Meetings</u>. Ameren Missouri will continue meeting at least quarterly with its stakeholder group which shall consult with and advise Ameren Missouri on at least the topics the stakeholder group currently addresses, with Ameren Missouri providing at least information of the nature it currently provides. The stakeholder group will consist of the Signatories who choose to participate and their invitees. The stakeholder group will: (a) receive program updates from Ameren Missouri and EM&V updates and report presentations from Ameren Missouri's evaluators; (b) consult with and advise Ameren Missouri on the possible expansion of energy efficiency and demand response programs, and the design of such programs (possibly including co-delivery of programs with gas/water utilities); and (c) consult with and advise Ameren Missouri on issues related to EM&V (including Ameren Missouri's proposed EM&V Requests for Proposals, the scope of work for future EM&V projects, and issues relating to net-to-gross ratios that may be used in future MEEIA plans), and the TRM. Ameren Missouri will circulate a draft agenda for each stakeholder group meeting approximately one week prior to the scheduled meeting date. Any stakeholder group member can suggest items for the agenda for a stakeholder group meeting. A suggested agenda item will be included on the agenda for a stakeholder group meeting so long as a majority of the Signatories voting on inclusion of the suggested item believe it is appropriate to do so. This stakeholder group fulfills the requirements of 4 CSR 240-20.094(8)(A) regarding a utility specific collaborative. The Signatories agree to support efforts to develop a statewide TRM as set forth in 4 CSR 240- 20.094 (8)(B). If a statewide TRM is approved by the Commission prior to the end of Ameren Missouri's initial three-year MEEIA programs, the Signatories agree that Ameren Missouri's TRM will continue to be used for the Plan.

Stipulation and Agreement in File No. EO-2012-0142 - Ameren Missouri MEEIA

Stipulation Paragraph	Process Steps	Program Year Days	Cumulative Days	PY 2013 Date	
11.b.i.	Draft EM&V Report Circulated to Stakeholders	45	45	2/14/14	
11.b.ii.	Comments and Recommendations on Draft EM&V Report (1)	60	105	4/15/14	
11.b.iii.	Meeting to Discuss Comments Prior to Final Draft EM&V Report	0	105	4/15/14	
11.b.iii.	Final EM&V Report Issued (2)	30	135	6/12/14	Thurs.
11.b.iv.	File a Change Request	21	156	7/3/14	Thurs.
11.b.iv.	Conference Call on Procedural Schedule (working days)	2	158	7/8/14	Tues.
11.b.iv.	File Responses to Change Request	19	177	7/24/14	Thurs.
11.b.iv.	Evidentiary Hearing Completed Not Later Than	39	216	9/1/14	Mon.
11.b.iv.	Commission Report and Order Not Later Than	30	246	10/1/14	Wed.

(1) There was an additional meeting on March 11 and 12, 2014 to review initial comments.
(2) Staff's *Notice Regarding Change Request* filed on May 30, 2014 provided for additional time for final EM&V reports to be issued. Since the final EM&V reports were issued on June 12, 2014, there were 58 days (and not 30 days) between the April 15, 2014 meeting to discuss comments prior to final draft EM&V reports and the final EM&V reports being issued.

- Target advertisements are occasionally utilized to reach certain customers or increase awareness of specific programs.
- The Trade Ally eNewsletter and the Trade Ally banquet endorse healthy communication.

Establishing Contractor Teams for MEEIA

The three year MEEIA Implementation cycle is anticipated to begin approximately January 1, 2013. To start this cycle of the DSM Implementation, a number of tasks need to be completed.

- The Ameren Missouri request of program approval
- A contractor team needs to be selected, which consists of the following tasks (anticipated to take 6 – 7 months):
  a. Prepare and Issue RFP – 6 weeks
  b. Receive bids from contractors on the work for the three year cycle of the Ameren Missouri MEEIA filing, hold Question and Answer sessions, complete the review and assessment process for all of the bids on the work,– 6 weeks
- Select the contractor team that will implement the second three year cycle of the Ameren Missouri DSM MEEIA plan, prepare Statement of Work document(s) for the contractor team(s), iron out contract details (will involve receiving approval of the Corporate Project Oversight Committee and the Strategic Sourcing groups), establish teams, and ramp up – 3 to 4 months.

3.11 Evaluation Measurement and Verification (EMV)

The EMV Process

When running any program, people will often want the answer to these basic questions: "Does the program work as expected? And how can it be improved?" These questions are answered by EMV.

A robust EMV program is often comprised of two parts: an Impact Evaluation and a Process Evaluation. The Impact Evaluation answers whether the program works by taking a systematic assessment of the relevant data relating to the operational outcomes of a program and comparing them to a set of explicit or implicit standards. In the context of Energy Efficiency, Impact Evaluation compares the actual kWh saved to the savings goal to see whether the goal was achieved. The Process Evaluation answers how the program can be improved through careful examination of program implementation by reviewing existing procedures and interviewing program participants and program staff. This review attempts to determine whether procedures are being followed, and how well these procedures are working.

In theory, Impact Evaluation is purely quantitative and Process Evaluation is highly qualitative. However, the reality is that there are overlapping elements of each in these evaluations. Thus, effective EMV programs often cover both Impact and Process in one report. The success of an EMV program is highly dependent on the evaluator's ability to properly design and implement both the qualitative and quantitative aspects of evaluation. EMV is often described as "part art, part science" and the evaluator needs to be objective and skillful in interpreting the data. Evaluator knowledge and experience can also be drawn upon for program design and process improvement during the implementation cycle. Additionally, for evaluation results to be credible, the process should be transparent and follow an evaluation plan that conforms to industry best practices.

Recognizing the importance of EMV, Ameren Missouri subscribes to the independent third party contractor model to provide an objective assessment of the performance of the energy efficiency portfolio.

Existing EMV Model at Ameren Missouri

Ameren Missouri currently has separate independent third-party evaluators under contract for the evaluation of the Residential and Business portfolios. The Cadmus Group, Inc. evaluates Residential activities while ADM Associates, Inc. evaluates the Business portfolio. Both of these evaluators are reputable, national firms with strong track records as leaders in the industry. The evaluations they perform are in accordance with EMV best practices and International Performance Measurement and Verification Protocols.

The evaluators will submit process and impact evaluations three to six months after the completion of each program year, and will provide a final report six months after the completion of the third and final program year, summarizing the 3 year implementation period. Reported program savings have been adjusted based on these evaluation reports. In addition, the evaluators submit monthly progress reports and participate in weekly conference calls with the Ameren Missouri Evaluation Team. These scheduled updates allow the Evaluation Team to continuously monitor and manage EMV activities and assist the Implementation Team in identifying areas that could potentially affect program performance. Updates on the progress of evaluation activities are shared with Stakeholders during quarterly update meetings. The annual evaluation reports are sent to Stakeholders, followed by formal presentations of evaluation results by the respective evaluators to Stakeholders, where questions and concerns are addressed.

Through the first two annual evaluation report presentations, the process has worked well: all Business Program Evaluation Reports were accepted with little comment and no concern by Stakeholders. There have also been no concerns regarding the Residential Multi Family Income Qualified Program and the Appliance Recycling

Program. The only concern that has been raised is with the calculation of the NTG ratio for the lighting portion of the Lighting & Appliance Program. This concern was due to an innovative model being used to calculate NTG which included both free ridership and spillover. This model was part of a large study for 10 utilities throughout the United States. Due to Stakeholder questions, additional discussions were held with Stakeholders and all related data and SAS code information was provided to Stakeholders to alleviate any concerns. This ambiguity is another reason why assuming net savings equal gross savings is rational and will ultimately reduce confusion between the parties involved in Ameren Missouri's energy efficiency programs.

A major objective of evaluation is to quantify the savings attributable to an energy efficiency program as opposed to other factors such as weather or behavioral shifts within markets. Evaluators compare savings to baseline estimates to determine the effects of individual measures and entire programs. Impact evaluations quantify the effects of the programs. A second type of evaluation known as process evaluation analyzes program design and implementation strategies through program documentation review, interviews with key stakeholders, and customer surveys.

Evaluations for PY3 and a final report on the three year program cycle are not yet complete. However, Ameren Missouri will have spent over $3 million on program evaluation from 2008 through 2012. This does not include the evaluation cost of the bridge program which would add an additional $500,000. This budget has allowed programs to be evaluated at better than a 10% precision level at 90% confidence for business programs, and a 20% precision level at 80% confidence for residential programs.

Common Aspects of Impact Evaluations

One of the most important aspects of evaluation is the measurement of savings achieved, or impact evaluation results. Ameren Missouri has developed, in coordination with the evaluation contractor, the necessary methods to estimate load impacts of the energy efficiency programs offered by the Company. An integral part of this calculation methodology has been the NTG ratio which is a factor that represents the relative size of net program load impact to the gross program load impact. The NTG factor is applied to gross program savings to determine the program's net impact. For MEEIA, however, this NTG factor will be removed, marking a significant change from the existing EMV model.

Process Evaluations

Ameren Missouri has collaborated with its evaluators to identify appropriate process evaluation goals, procedures, and practices. These evaluations focus more on program

design and delivery, market segments, and other societal factors that affect the program's performance.

Process evaluations have used program implementer/contractor interviews, retailer surveys, participant surveys and review of program materials to inform the process evaluation. Stakeholder and retailer interviews provide details on program design, staffing levels, training, implementation, marketing to retailers, retailer satisfaction, marketing to consumers, products, payments and invoicing, communications, tracking and market feedback. Program data reviews provide further information on program design and implementation processes. Participant surveys include questions about how the participant learned about the program, how the process operated, decision-making criteria, and overall program satisfaction.

Program Improvements Based on Previous Evaluations

Evaluations of previous energy efficiency programs have allowed Ameren Missouri to make improvements to programs. These improvements have included:

- The removal of high leakage stores from the Lighting Program
- Removal of appliance measures that were not cost effective or for which the market had already been transformed
- Making programmable thermostats optional in the Multi-family Income Qualified Program due to building manager concerns
- Adjustments to measure savings values
- The information learned from evaluators, including measure savings values and incremental cost information, was used in the development of the TRM. By the time the TRM is finalized, all Ameren Missouri energy efficiency programs will have been evaluated at least once, with the three largest programs, Business Custom, Business Standard, and Residential Lighting & Appliance, being evaluated three times. The results from each year have been similar, such as the Business Custom and Standard NTG ratio based only on free-ridership being identical each year.

Changes to EMV for MEEIA

Ameren Missouri is submitting a TRM with this filing. This will greatly impact the evaluation needs. The TRM will contain deemed savings values for measures. In PY1 and PY2, the evaluator's primary role in the impact evaluation will be to verify the installation of measures; taking instrumented readings of energy consumption will not be a part of the process. This verified number of measures will be multiplied by the deemed savings values to determine the program savings. At the end of third year of implementation cycle, the evaluator will be expected to complete a full impact evaluation of all programs. This will include any necessary measurement to determine adjusted savings values for each measure. One of the lessons learned in previous evaluations is

that not every evaluation activity needs to occur every year. In the recent evaluations, Cadmus specifically suggested not repeating many of the tasks in PY3 that were completed in PY2 due to the high likelihood of identical results. For example, lighting loggers for residential customers only need to be installed for one year as it is unlikely that the results would vary from year to year. Other activities, such as onsite metering for Business Custom projects, will be installed on a sampling of customers throughout the three year program cycle.

The most significant change to the EMV process will be assuming net savings equal gross savings, as mentioned in Section 3.4. This will produce a more understandable and simpler EMV process and also provide more portfolio dollars to use on customer incentives, implementation, and portfolio design expenses.

Results from recent evaluations show that ex ante and ex post savings values have been very similar:

Table 3.25 Residential Savings Comparison

Program	Ex ante Savings	Ex post Savings	Difference
Lighting & Appliance	68,658	75,548	10.0%
Multifamily Income Qualified	5,201	4,626	-11.1%
Refrigerator Recycling	551	646	17.2%
Residential Total	**74,410**	**80,820**	**8.61%**

The table above does not include HVAC CheckMe! because it did not undergo an impact evaluation after PY2 due to limited activity.

For the Business Programs, we have even smaller differences.

Table 3.26 Commercial Savings Comparisons

Program	Ex ante Savings	Ex post Savings	Difference
Custom	52,347	51,624	-1.4%
Standard	12,893	14,049	9.0%
New Construction	4,809	4,769	-0.8%
Retro-Commissioning	1,558	1,249	-19.8%
Business Total	**71,607**	**71,691**	**0.1%**

The results from the impact evaluation of the proposed programs will be used to update the TRM for the next three-year cycle if a statewide TRM has not been developed, but will not be used to recalculate verified savings retroactively. Table 3.27 shows the evaluation activities that are anticipated to be completed after PY2 for the Residential impact evaluation.

Table 3.27 EMV Activities

	Site visits	Metering	Engineering Estimate/ Analysis	Participant Surveys
Lighting	✓	✓	✓	✓
Energy Efficient Products			✓	✓
HVAC	✓	✓	✓	✓
Refrigerator Recycling			✓	✓
Home Energy Performance			✓	✓
Energy Star ® New Homes			✓	✓
Low Income	✓	✓	✓	✓
Custom	✓	✓	✓	✓
Standard	✓			✓
New Construction	✓	✓	✓	✓
Retro-Commissioning	✓	✓	✓	✓

In addition to the above, the Low Income program evaluation will include an analysis of the impact of the program on customer bill payment including bad debt, arrearages, and disconnections.

Process evaluations will be conducted for all programs all three years. Participant, trade ally, and stakeholder surveys are anticipated to be completed for every program, every year for the process evaluation.

Some of these activities occur at or near the end of a program year, such as process evaluation surveys. However, other activities such as site visits and metering occur throughout the year. For example, metering on air conditioning units needs to be in place during the cooling season and cannot wait until the end of the program year.

Ameren Missouri continues to require the independent third party evaluators to meet current best practice standards. The program evaluations have and will continue to follow International Performance Measurement and Verification Protocols.

Final evaluation plans will not be developed until after an evaluator is hired. Consequently, evaluation activities may change from those listed in the above tables depending upon the evaluator's recommendation.

The evaluations will include at least the following elements:

- Process evaluations and recommendations for improvement
- Impact evaluations including lifetime and annual gross and net demand savings and energy savings and a calculation of the cost effectiveness.

As is required by the Commission's MEEIA regulations, Ameren Missouri will require its evaluators to provide the Stakeholders with a copy of draft and the final EMV report at the same time as they are provided to Ameren Missouri.

As a result of the TRM and the reduced scope of the impact evaluation, the evaluation budget has been reduced. The evaluation budget for the previous three year portfolio was 5% of the program budget. For this three-year portfolio, the annual evaluation budgets will be 2%, 2%, and 5% respectively, which are at or below the 5% budget limits.

Another consideration in the evaluation involves the provision in the Commission's MEEIA regulations requiring the Commission to hire an independent contractor to audit and report on the EMV activities of the electric utilities and their evaluation contractors. The Company's evaluation contractors will be expected to fully cooperate with the Commission's auditor. Ameren Missouri's plan includes allowances for these additional tasks in its anticipated evaluation budget. In order for the Company to adequately prepare its RFP for EMV services it is important to understand specific scope of work associated with the Commission's auditor. In order to facilitate a smooth process, Ameren Missouri recommends the Commission adopt the following scope of work and schedule.

- Issue RFP for auditor services within 30 days after MEEIA approval
- Auditor should review and agree to evaluation plans in the 1st quarter of 2013
- Auditor should review final annual evaluation reports
- Auditor should submit draft and final reports to all parties in the case simultaneously. The draft report should be available 15 days after the final report of the utility EMV contractor and the final reports should be available 45 days after the final report of the utility EMV contractor.

The following schedule is an estimate of the evaluation activity timeline. All dates are subject to change based upon the timing associated with the approval of the proposed plan.

Table 3.28 EMV Schedule

Task	Due Date
Issue Evaluation RFP	8/1/2012
Hire Evaluation Contractor(s)	10/1/2012
Create Evaluation Plan	1/1/2013
PY1 Process Evaluation Draft Report	3/30/2014
PY1 Process Evaluation Final Report	4/30/2014
Evaluation Audit Report	6/15/2014
PY2 Evaluation Draft Report	3/30/2015
PY2 Evaluation Final Report	4/30/2015
Evaluation Audit Report	6/15/2015
PY3 Evaluation Draft Report	3/30/2016
PY3 Evaluation Final Report	4/30/2016
Evaluation Audit Report	6/15/2016

Staff's 6/12/2014 Summary of Annual Energy Savings and Net Benefits for 2013 EM&V Reports

Annual Energy Savings				Net Benefits					
Summary Rpt Table 1 MWh	Program Rpt Table MWh	Cadmus Program Rpt Table	Residential Program	Cacmus Table	Benefits	Costs	Net Benefits	Table 3	UTC
5,170	5,170	4	Appliance	12	$ 2,708,615	$ 1,173,022	$ 1,535,593	$ 1,535,592	2.31
5,890	5,890	3	Community	17	$ 3,643,840	$ 3,972,571	$ (328,731)	$ (328,731)	0.92
67	67	3	Construction	22	$ 74,483	$ 411,591	$ (337,108)	$ (337,108)	0.18
23,941	23,941	3	Cool	27	$ 23,642,704	$ 5,961,160	$ 17,681,544	$ 17,681,544	3.97
279,127	279,127	4	Lighting	32	$ 83,573,603	$ 10,602,028	$ 72,971,575	$ 72,971,575	7.88
285	285	4	Performance	37	$ 126,124	$ 187,188	$ (61,064)	$ (61,064)	0.67
7,795	7,795	3	Rebate	42	$ 3,214,342	$ 1,528,581	$ 1,685,761	$ 1,685,761	2.10
322,275	322,275		**Total Residential**		$ 116,983,711	$ 23,836,141	$ 93,147,570	$ 93,147,569	4.91

Table 1-2 MWh	Program Rpt MWh	ADM Program Rpt Table	Business Program	ADM Table	Benefits	Costs	Net Benefits	UTC
43,876	43,876	4-6	Custom	I-9	$ 37,288,077	$ 7,275,593	$ 30,012,484	5.13
23,899	23,899	4-7	Standard	I-13	$ 16,435,224	$ 2,629,836	$ 13,805,388	6.25
204	204	4-8	New Construction	I-17	$ 171,546	$ 368,188	$ (196,642)	0.47
224	224	4-9	Retro-Comm.	I-21	$ 107,948	$ 322,645	$ (214,697)	0.33
68,203	68,203		**Total Business**	Above	$ 54,002,795	$ 10,596,262	$ 43,406,533	5.10
			Total Business	I-5	$ 54,002,794	$ 10,596,262	$ 43,406,532	5.10
	390,478		**Total Portfolio Through EM&V**		**$170,986,506**	**$ 34,432,403**	**$136,554,103**	4.97
	337,368		2013 Annual Report With NTG = 1.0		$ 175,442,922	$ 34,432,402	$ 141,010,520	
	111,351		**Total Portfolio Less Lighting Through EM&V**		**87,412,903**	**23,830,375**	**$ 63,582,528**	3.67

John Rogers
June 12, 2014

Lighting Portion of Total Net Benefits **53.4%**

Appendix B: Other Evaluation Categories and Approaches

This appendix provides a brief introduction to process and market effects evaluations, cost-effectiveness analysis, and impact evaluations using "top-down" approaches. The material in this appendix is intended to supplement the other sections of the guide, which are focused on "bottom-up" impact evaluations.

B.1 PROCESS, MARKET EFFECTS, AND COST-EFFECTIVENESS EVALUATIONS

The following subsections introduce three non-impact types of evaluations: process, market, and cost-effectiveness. However, because cost-effectiveness analyses rely on the documentation of program impacts, these analyses are often considered a component of impact evaluations, and program cost-effectiveness indicators are thus often included in impact evaluation reports. Table B.1 compares these three evaluation types, plus impact evaluations.

B.1.1 Process Evaluations

The goal of process evaluations is to produce better and more cost-effective programs. Process evaluations meet this goal by assessing the processes a program undergoes during implementation, documenting program goals and objectives from a variety of perspectives, and describing program strengths and weaknesses so that success is highlighted and improvements can be made in a timely manner. Thus, process evaluations examine the efficiency and effectiveness of program implementation procedures and systems. Typical process evaluation results involve recommendations for changing a program's structure, implementation approaches, and goals.

These evaluations usually consist of asking questions of those involved in the program, analyzing their answers, and comparing results to established best practices. Whereas it is typically required that an independent third-party evaluator is involved in conducting

TABLE B.1: Program Evaluation Types

EVALUATION TYPE	DESCRIPTION	EXAMPLES USES
Impact Evaluation	Quantifies direct and indirect changes associated with the subject program(s)	Determines the amount of energy and demand saved
Process Evaluation	Indicates how the procedures associated with program design and implementation are performing from both the administrator's and the participants' perspectives	Identifies how program designs and processes can be improved
Market Effects Evaluation	Analyzes how the overall supply chain and market for energy efficiency products have been affected by the program	Characterizes changes that have occurred in efficiency markets and whether they are attributable to and sustainable with or without the program
Cost-Effectiveness Evaluation	Quantifies the costs of program implementation and compares them with program benefits	Determines whether an energy efficiency program is a cost-effective investment compared with other programs and energy supply resources

impact evaluations, for process evaluations, jurisdictions might recommend (but not require) them to be conducted by independent third-party evaluators; however, the use of third-party process evaluators is a best practice. Use of a trusted party for process evaluation is important for successful process evaluation so that the evaluator can gather the necessary data and provide feedback in a manner that is productive (e.g., not considered threatening by the recipient of the feedback).

Process evaluations are particularly valuable in the following situations:

- Benefits are higher/lower than expected and/or are being achieved more quickly/slowly than expected.
- There is limited program participation or stakeholders are slow to begin participating.
- The program is a greater success than anticipated.
- The program has a slow start-up.
- Participants are reporting problems.
- The program appears not to be cost effective.
- The program is built around a new concept that could be replicable for other populations, technologies, etc.

As part of a process evaluation, a logic model may be developed for the program (or possibly a set of logic models for a complete portfolio of programs). A program's theory and logic model serve as a roadmap to guide the systematic approach of a process evaluation. A program logic model is a visual representation of the program's theory that illustrates a set of interrelated program activities that combine to produce a variety of outputs that lead to key outcomes (see sidebar in Chapter 7 on Theory-Based Evaluation: A Guiding Principle for MT Evaluation). Logic models can be linked to performance indicators that provide ongoing feedback to program managers. The models usually flow top to bottom and are often organized according to five basic categories:

- **Program inputs:** financial, staffing, and infrastructure resources that support the activity
- **Program activities:** overarching activities that describe what the program is doing (e.g., marketing and rebate processing)
- **Outputs:** metrics resulting from the activities, and that tend to be measurable "bean counting" results (e.g., provide outreach events at five community fairs)
- **Short- to intermediate-term outcomes:** expected outcomes resulting from program activities, with goals attached to those outcomes when possible. (e.g., target energy savings and recruitment into the program)
- **Long-term outcomes and goals:** ideal, sustainable outcomes resulting from program activities (e.g., "all eligible customers participate in the program" and "increase customer awareness of program offerings").

These logic model categories indicate the intended and expected results of activities. Expected short-, medium-, and long-term outcomes tend to define program goals at a high level and also specify market effects (i.e., expected program outcomes). In this manner, process evaluation is part of a continuum linking impact and market effects evaluations.

TABLE B.2: Elements of Typical Process Evaluations

Program Design • The program mission • Assessment of program logic • Use of new practices or best practices	**Program Implementation** • Quality control • Operational practice—how the program is implemented • Program targeting, marketing, and outreach efforts • Program timing
Program Administration • Program oversight • Program staffing • Management and staff training • Program information and reporting	**Participant Response** • Participant interaction and satisfaction • Market and government allies interaction and satisfaction

The primary mechanism of process evaluations is data collection (e.g., surveys, questionnaires, and interviews) from administrators, designers, participants (e.g., facility operators, business owners, renters, or homeowners), implementation staff (including contractors, subcontractors, and field staff), trade allies (e.g., mechanical contractors, architects, and engineers) and key policymakers. Other elements of a process evaluation can include workflow and productivity measurements; reviews, assessments, and testing of records, databases, program-related materials, and tools; and collection and analysis of relevant data from third-party sources (e.g., equipment vendors or retailers). Process evaluations can be operated continuously, perhaps as part of a continuous improvement effort, or at intervals (e.g., as a new program is being implemented, whenever there are major changes in a program, in response to issues noted in first set of bullets above, and/or just every two to three years).

Table B.2 lists examples of program elements typically assessed during a process evaluation.

B.1.2 Market Effects Evaluations

The goal of market effects evaluations is to characterize and quantify the effects of a program on supplier promotion and customer adoption of the targeted energy efficiency measures, regardless of whether those suppliers and customers participated in the program. Effects that cannot be captured by program records are particularly important for certain kinds of initiatives, including "upstream" promotions of mass-market goods, such as light bulbs and consumer electronics as well as training programs aimed at inducing engineers and contractors to adopt energy efficiency design and specification practices. Studies have shown that even straightforward equipment rebate programs may have effects "outside the program" by exposing contractors and large customers to the benefits of efficient technologies. This in turn leads to increased specification of efficient technologies on projects that do not receive program support. In some cases, market effects evaluation results can be combined with impact evaluation findings to estimate program-induced energy savings that were not tracked by the program itself.

Other market studies include potential studies (see sidebar) and market baseline studies. Potential studies investigate how much saving may be available through various measures and baseline studies look at indicators of market development before the program intervention.

Market effects studies are usually associated with programs that have a specific market transformation focus. There are many definitions of market transformation, although it is often considered the ultimate goal of publicly and consumer-funded energy efficiency programs. In this guide, the definition of *market transformation* is: a reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects, that is likely to last after the intervention has been withdrawn, reduced, or changed.

Market effects evaluations often involve a significant undertaking, because they require collection and analysis of data from a wide range of market actors, as well as analysis of those data against a background developed out of secondary sources. Market effects are sometimes called the ultimate test of a program's success, answering the question: "Will energy efficiency (best) practices continue in the marketplace, even after the current program ends?" The difference between a market change and a market effect is attribution: the ability to trace back a change in the market to a specific program or group of programs. The following is a definition of market effects from a well-referenced 1996 study:[105]

> **Market effect:** a change in the structure of a market or the behavior of market participants that is reflective of an increase in the adoption of energy-efficient products, services, or practices and is causally related to market intervention(s) (e.g., programs). Examples of market effects include increased levels of awareness of energy-efficient technologies among customers and suppliers, increased availability of efficient technologies through retail channels, reduced prices for efficient models, build-out of efficient model lines, and—the end goal—increased market share for efficient goods, services, and design practices.

POTENTIAL STUDIES

Another form of market study (although not formally an "evaluation") is called a potential study. Potential studies are conducted before a program is implemented in order to assess market baselines and future savings potentials for different efficiency technologies, strategies, or approaches in different customer markets. These studies can also assess customer needs and barriers to adoption of energy efficiency, as well as how best to address these barriers through program design. Potential studies indicate what can be expected in terms of savings from a program. Potential is often defined in terms of technical potential (what is technically feasible given commercially available products and services), and economic potential (which is the level of savings that can be achieved assuming a certain level of participant and/or societal cost effectiveness is required). Findings also help managers identify the program's key markets and clients and how to best serve the intended customers.

Examples of the questions that a market effects evaluation might answer are as follows:

- **Are the entities that undertook energy efficiency projects undertaking additional projects or incorporating additional technologies in their facilities that were not directly induced by the program?** This might indicate that facility operators have become convinced of the value of, for example, high-efficiency motors, and are installing them on their own.
- Are entities that did not undertake projects now adopting **concepts and technologies that were encouraged by the program?** This might indicate that the program convinced other facility operators of the advantages of the energy efficiency concepts.
- **Are manufacturers, distributors, retailers, vendors, and others involved in the supply chain of energy efficiency products (and services) changing their product offerings—for example, how are they marketing them, pricing them, stocking them?** The answers can indicate how the supply chain is adapting to changes in supply of and demand for efficiency products.

Structuring a market effects evaluation entails consideration of several levels or stages, with the ultimate goal generally understood to be the increased adoption of energy efficiency goods and services in the general market leading to energy savings. Energy savings are the ultimate goal of programs seeking to cause market effects (i.e., the intended long-term outcome). The following list suggests a hierarchy of precursors to that goal:

- **Early Acceptance:** proliferation of models and manufacturers, purchase by frontrunners and enthusiasts
- **Take-off Phase:** customer awareness, visibility on shelves and in inventories, perceptible levels of market share in the supply channels
- **Maturity:** all major competitors offer energy efficient models; codes and standards include energy efficient models
- **Energy Savings:** energy savings attributable to the program are associated with acceleration of these developments.

In general, the achievement of goals at each of the higher levels of the hierarchy requires accomplishments at the lower levels. As a result, tracking goals at each stage not only provides feedback on performance with respect to that goal itself, but also provides evidence that effects at the next-higher levels can be attributed to the program.

Goals will typically be set and tracked for different time frames and for different purposes. While energy savings are the ultimate market effects goal, in most cases, savings cannot be measured meaningfully without several years of information; even then, they will usually not have the same level of accuracy as impact evaluations of direct resource acquisition savings. To credit measure adoption and associated savings to a program, it must be shown that the increased energy efficiency adoption, the longer-term market effects, and the participant effects have all occurred essentially in the manner and in the order specified by the program theory. And this, for most programs, takes a number of years to reach this point.

In 2009, a comprehensive white paper study on market transformation and market effects was prepared.[106] Table B.3, from a presentation by the principle author of this white paper, indicates approaches for assessing market effects, including attribution.

As can be deduced from the above discussion and Table B.3, the market effects evaluation can easily overlap with the spillover analyses conducted as part of an impact evaluation. In fact, many of the techniques used to quantify market effects can be applied in estimating spillover savings.

B.1.3 Cost-Effectiveness Analyses[107, 108]

Cost-effectiveness (sometime called benefit-cost) evaluations compare program benefits and costs, showing the relationship between the value of a program's benefits and the costs incurred to achieve those benefits. The findings help judge whether to retain, revise, or eliminate program elements and provide feedback on whether efficiency is an effective investment, compared with energy supply options. Cost-effectiveness evaluation is also often a key component of the evaluation process for programs using public or utility customer funds.

In 1983, California's *Standard Practice for Cost-Benefit Analysis of Conservation and Load Management Programs* manual (SPM) developed five cost-effectiveness tests for evaluating energy efficiency programs. These approaches, with minor updates, continue to be used today and are the principal approaches used for evaluating energy efficiency programs across the United States.[109]

The five tests vary in terms of (1) perspectives (project participants, ratepayers, utilities, or society), (2) their applicability to different program types, (3) the cost and benefit elements included in the calculation, (4) the methods by which the cost and benefit elements are computed, and (5) the uses of the results. Most regulated utility energy efficiency programs use one or more versions of these tests, sometimes with variations unique to the requirements of a particular regulatory commission. Definitions of these tests (paraphrased from the SPM) are as follows on page 144:

- **Total Resource Cost (TRC) Test.** The TRC test measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including

TABLE B.3: Approaches for Assessing Market Effects, Including Attribution

BASIC SOURCE/RELATIVE ADVANTAGES	LIMITATIONS
SURVEYS OF CUSTOMER PURCHASES • Can be deployed quickly, relatively inexpensively, and repeatedly over extended time frames • Can be deployed in program and non-program areas • Generally produces reliable data on number of purchases/adoptions	• Limited accuracy on key details: exact number, timing, efficiency rating of purchases • Non-response bias a problem, particularly in early stages of market development • Difficult to validate results in absence of some comparison to sales or program volumes
SURVEYS OF SUPPLY-SIDE ACTORS • Taps into close knowledge of local markets • Respondents sufficiently knowledgeable to provide accurate information on product features	• Difficult to build measures of sales volume—may need to be content with estimates of market share • In many jurisdictions, population available to be sampled is small • Difficult to validate results in absence of some comparison to sales or program volumes
SHIPMENT AND SALES DATA • Conceptually, the most accurate and detailed measure of adoption: quantity, efficiency, timing	• Requires negotiated cooperation of manufacturers and retailers; risk of dropouts • Difficult to obtain coverage of all sectors, time periods, and regions (and may be costly) • Quality control is difficult
CUSTOMER-REPORTED FREE RIDERSHIP AND SPILLOVER • Can be deployed quickly, relatively inexpensively, and repeatedly over extended time frames • Can probe adoption process and decisions • Consistent with current Performance Earnings Basis (PEB) methods now in force in California	• For non-participants, requires that customers be aware of the program and able to judge its impact on adoption decisions
CROSS-SECTIONAL METHODS • Closest to conventional social science research methods; intuitively satisfying • Data provide insight into exogenous factors, working of market beyond program boundary	• Increasingly difficult to find non-program areas • Difficult to verify comparability of non-program areas • Appears to be effective only in time-limited periods • Logistically demanding and time consuming
EXPERT JUDGING • Focuses insights from experienced market participants and observers • Results can be expressed in terms of net adoptions • In some cases, can be deployed fairly rapidly	• Not a statistical estimation process • Difficult to identify and account for factors affecting individual judgments

Source: Rosenberg, M. (June 2010) "Market Effects and Market Transformation: Their Role in Program Design and Evaluation." EPA EM&V Webinar. www.emvwebinar.org.

both the participants' and the utility's costs. It combines the perspectives of participants and non-participants, which is why it is also often called an "all ratepayers" perspective. The TRC ratio equals the benefits of the program, in terms of value of energy and demand saved, divided by the net costs. The ratio is usually calculated on a lifecycle basis, considering savings and costs that accrue over the lifetime of installed energy efficiency equipment or systems. This is a commonly applied cost-effectiveness test.

- **Program Administrator Cost Test (PACT).** The PACT measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator (often a utility, though it can be any organization), excluding any net costs incurred by the participant. The benefits are the same as the TRC benefits (energy and demand savings value). The PACT is also a commonly applied test.
- **Participant Cost Test (PCT).** The PCT assesses cost effectiveness from the participating consumer's perspective by calculating the quantifiable benefits and costs to the consumer of participating in a program. Because many consumers do not base their decision to participate entirely on quantifiable criteria, this test is not necessarily a complete measure of all the benefits and costs a participant perceives.
- **Societal Cost Test (SCT).** The SCT, a modified version of the TRC, adopts a societal rather than a utility service area perspective. The primary difference between the societal and TRC tests is that, to calculate lifecycle costs and benefits, the societal test accounts for externalities (e.g., environmental benefits), excludes tax credit benefits, and uses a (often lower) societal discount rate.
- **Ratepayer Impact Measure (RIM) Test.** The RIM test only applies to utility programs. It examines the potential impact that the energy efficiency program has on rates overall. The net benefits are the avoided cost of energy (same as PACT). The net costs include the overhead and incentive costs (same as PACT) but also include utility lost revenues from customer bill savings. Historically, reliance on the RIM test has limited energy efficiency investment, as it is the most restrictive of the five cost-effectiveness tests.

The basic structure of each cost-effectiveness test involves a calculation of the total benefits and the total costs in dollar terms from a certain vantage point to determine whether or not the overall benefits exceed the costs. A test is positive if the benefit-to-cost ratio is greater than one, and negative if it is less than one—with, of course, proper consideration of uncertainties in the inputs used in the calculation. Results are reported either in net present value (NPV) dollars (method by difference) or as a ratio (i.e., benefits/costs). Table B.4 outlines the basic approach underlying cost-effectiveness tests.

Each of the tests provides a different kind of information about the impacts of energy efficiency programs from different vantage points in the energy system. On its own, each test provides a single stakeholder perspective. Together, multiple tests provide a comprehensive approach to answering key questions: "Is the program effective overall?" "Is it balanced?" "Are some costs or incentives too high or too low?" "What is the effect on rates?" "What adjustments are needed to improve the alignment?"

Overall, the results of all five cost-effectiveness tests provide a more complete picture than the use of any one test alone. The TRC and SCT cost tests help to answer whether energy efficiency is cost-effective overall. The PCT, PACT, and RIM help to answer whether the selection of measures and design of the program is balanced from participant, utility, and non-participant perspectives, respectively. Looking at the cost-effectiveness tests together helps to characterize the attributes of a program or measure to enable decision making, to determine whether some measures or programs are too costly, whether some costs or incentives are too high or too low, and what adjustments need to be made to improve distribution of costs and benefits among stakeholders. The scope of the benefit and cost components included in each test is summarized in Table B.5 and Table B.6.

The broad categories of costs and benefits included in each cost-effectiveness test are consistent across all regions of the country and applications. However, the specific components included in each test may vary across different regions, market structures, and utility types. For example, transmission and distribution investment may be considered deferrable through energy efficiency in some areas and not in others. Likewise, the TRC and SCT may consider just natural gas or electricity resource savings in some cases, but also include co-benefits of other savings streams (such as water and fuel oil) in others.

Also, for the SCT, how the "non-monetized benefits" in Tables B.5 and B.6 are determined is an evolving area. In particular, benefits that in the past could not be monetized (e.g., air quality impacts) now can be assigned monetary values and, in fact, need to be assigned such values in order to be used in cost-effectiveness equations. Also, non-energy benefits, which in the past might have been ignored, are being shown to have significant value. These include economic development and employment benefits as more money is spent on local services and products because of the efficiency investments.

TABLE B.4: The Five Principal Cost-Effectiveness Tests Used in Energy Efficiency

TEST	ACRONYM	KEY QUESTION ANSWERED	SUMMARY OF APPROACH
Participant cost test	PCT	Will the participants benefit over the measure life?	Comparison of costs and benefits of the customer installing the measure
Program administrator cost test	PACT	Will utility bills increase?	Comparison of program administrator costs to supply-side resource costs
Ratepayer impact measure	RIM	Will utility rates increase?	Comparison of administrator costs and utility bill reductions to supply-side resource costs
Total resource cost test	TRC	Will the total costs of energy in the utility service territory decrease?	Comparison of program administrator and customer costs to utility resource savings
Societal cost test	SCT	Is the utility, state, or nation better off as a whole?	Comparison of society's costs of energy efficiency to resource savings and non-cash costs and benefits

California Public Utilities Commission (CPUC). (2001). California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF.

National Action Plan for Energy Efficiency. (2008). Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers. Prepared by Energy and Environmental Economics, Inc. (E3) and Regulatory Assistance Project (RAP). www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf.

TABLE B.5: Description of Benefits and Costs Included in Each Cost-Effectiveness Test

TEST	BENEFITS	COSTS
PCT	*Benefits and costs from the perspective of the customer installing the measure*	
	• Incentive payments • Bill savings • Applicable tax credits or incentives	• Incremental equipment costs • Incremental installation costs
PACT	*Perspective of utility, government agency, or third party implementing the program*	
	• Energy-related costs avoided by the utility • Capacity-related costs avoided by the utility, including generation, transmission, and distribution	• Program overhead cost • Utility/program administrator incentive costs • Utility/program administrator installation costs
RIM	Impact of efficiency measure on non-participating ratepayers overall	
	• Energy-related costs avoided by the utility • Capacity-related costs avoided by the utility, including generation, transmission, and distribution	• Program overhead cost • Utility/program administrator incentive costs • Utility/program administrator installation costs • Lost revenue due to reduced energy bills
TRC	*Benefits and costs from the perspective of all utility customers (participants and non-participants) in the utility service territory*	
	• Energy-related costs avoided by the utility • Capacity-related costs avoided by the utility, including generation, transmission, and distribution • Additional resource savings (i.e., gas and water if utility is electric) • Monetized environmental and non-energy benefits (see Section 4.9) • Applicable tax credits (see Section 6.4)	• Program overhead costs • Program installation costs • Incremental measure costs (weather paid by the customer or utility)
SCT	Benefits and costs to all the utility service territory, state, or nation as a whole	
	• Energy-related costs avoided by the utility • Capacity-related costs avoided by the utility, including generation, transmission, and distribution • Additional resource savings (i.e., gas and water if utility is electric) • Non-monetized benefits (and costs) such as cleaner air or health impacts	• Program overhead costs • Program installation costs • Incremental measure costs (weather paid by the customer or utility)

California Public Utilities Commission (CPUC). (2001). California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF.

National Action Plan for Energy Efficiency. (2008). Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers. Prepared by Energy and Environmental Economics, Inc. (E3) and Regulatory Assistance Project (RAP). www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf.

TABLE B.6: Summary of Benefits and Costs Included in Each Cost-Effectiveness Test

COMPONENT	PCT	PACT	RIM	TRC	SCT
Energy and capacity-related avoided costs		Benefit	Benefit	Benefit	Benefit
Additional resource savings				Benefit	Benefit
Non-monetized benefits					Benefit
Incremental equipment and installation costs	Cost			Cost	
Program overhead costs		Cost	Cost	Cost	Cost
Incentive payments	Benefit	Cost	Cost		
Bill savings	Benefit		Cost		

California Public Utilities Commission (CPUC). (2001). California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects. www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF.

National Action Plan for Energy Efficiency. (2008). Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers. Prepared by Energy and Environmental Economics, Inc. (E3) and Regulatory Assistance Project (RAP). www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf.

B.2 TOP-DOWN IMPACT EVALUATION

Top-down impact evaluation refers to methods that rely on aggregate energy consumption data or per-unit energy consumption indices (e.g., energy consumption per-unit of output or per capita) defined by sector, utility service territory, state, region, or country as the starting point for determining energy savings. Top-down evaluation focuses on the bottom line—reductions in energy use (and/or demand) for a state, region, or utility service territory. This gives top-down evaluation a direct link to (1) demand forecasting and resource planning, and (2) emissions accounting and forecasting, as used for greenhouse gas mitigation goals.

Figure B.1 compares the top-down with the bottom-up impact evaluation approaches that are discussed in the body of this guide. At present, virtually all energy efficiency program evaluations conducted in the United States rely on bottom-up approaches.

Top-down approaches start from aggregate data, such as state-level data for energy consumption, and then attempt to correlate any changes in energy consumption with measures of energy efficiency actions, such as expenditures or savings, using macro-economic models. The main advantages of top-down evaluation methods over bottom-up methods are their potentially lower evaluation costs due to relatively modest data requirements and the potential for directly estimating net program savings at the sector, state, regional, and national levels. The primary potential drawbacks of top-down evaluation are the difficulty in attributing energy consumption changes to specific energy efficiency policies and/or particular programs and actions.

A metric that can be considered the output of top-down evaluation is gross market savings. These are the energy savings resulting from energy efficiency programs, codes and standards, and naturally occurring adoption, and which have a long-lasting savings effect. Such gross market savings sometimes do not include temporary reductions in energy use from changes in weather, income, energy prices, and other structural economic changes, such as in industry composition. Figure B.2 shows a graphical illustration of the concept behind estimating gross market savings.[110]

During the last two decades, many energy efficiency practitioners and policymakers have expressed growing interest in the use of top-down methods for documenting the system-wide impacts and gross market savings of energy efficiency initiatives. Interest in top-down methods has grown from policymakers' and evaluation researchers' concerns that bottom-up evaluations have not properly accounted for effects of free ridership, spillover, and energy efficiency measure interactions—particularly in large program portfolios and in situations where energy consumer funds are used, such as in

utility-sponsored efficiency programs. Top-down evaluations should also be less expensive to implement than bottom-up evaluations. Thus, research on top-down evaluation has been directed largely toward estimation of energy consumer-funded energy efficiency program savings, both the gross market energy savings and the portion attributable to the programs being evaluated.

Top-down energy efficiency evaluation methods are generally less developed than bottom-up methods in the energy efficiency field. However, at time of the publication of this guide, two macro-consumption (top-down) pilot studies are under way. Sponsored by the California Public Utilities Commission (CPUC), these studies are attempts to test the effectiveness and reliability of different top-down evaluation approaches and to determine whether they can be applied consistently to project market gross savings and to attribute savings to utility-sponsored energy efficiency investments. The results of these pilots can be found at the CALMAC website (www.calmac.org) and the CPUC website (www.cpuc.ca.gov/PUC/energy/Energy+Efficiency).

FIGURE B.1: Comparison of bottom-up versus top-down evaluation

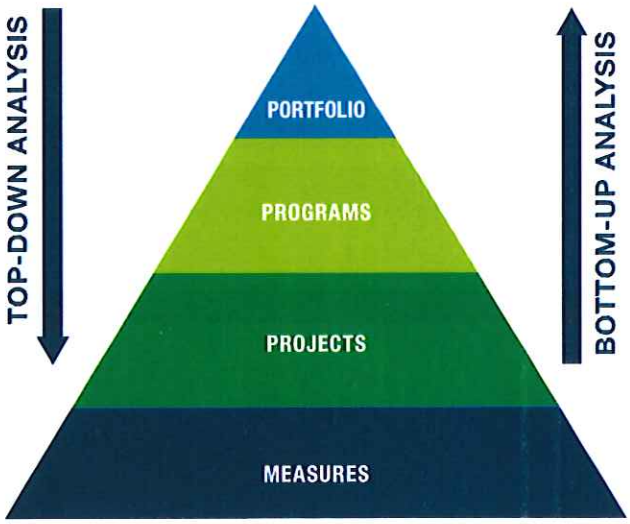
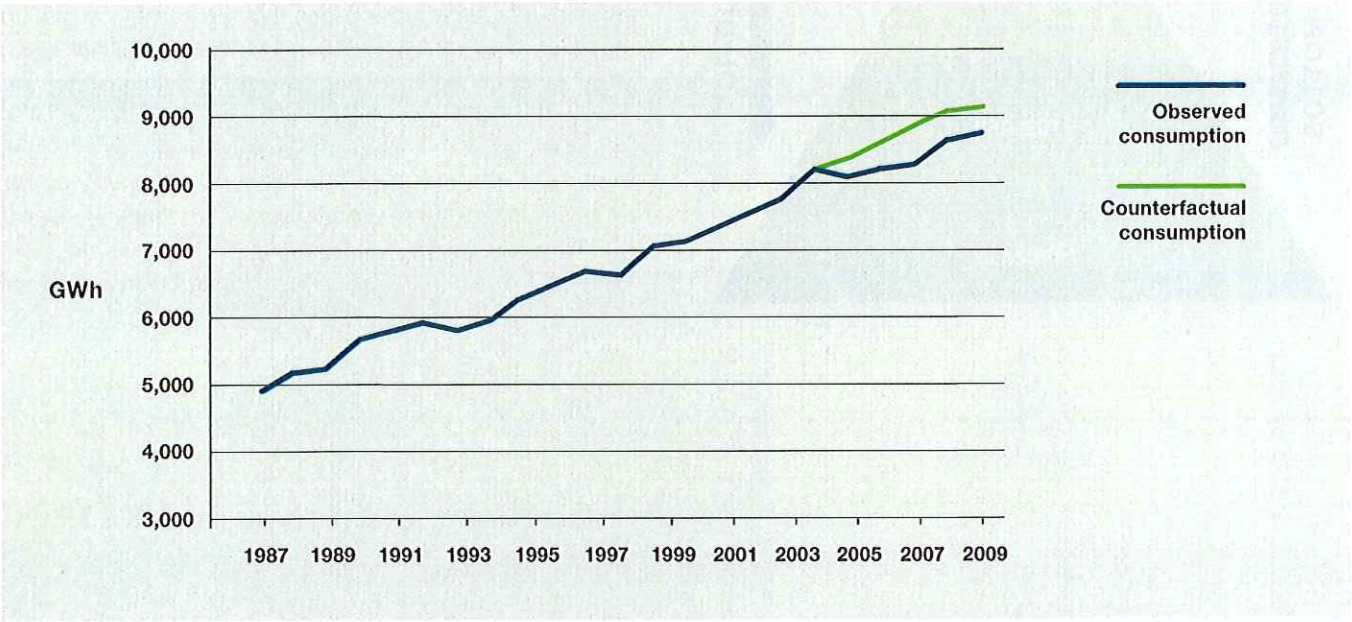


FIGURE B.2: Graphical illustration of estimation of market gross savings



Source: Stewart, J.; Haeri, M.H. (July 2011). Critical Review and Recommendations on Top-Down Evaluation. White paper. The Cadmus Group, Inc. Prepared for the California Public Utilities Commission (CPUC).

Appendix B: Notes

[105] Eto, J.; Prahl, R.; Schegel, J. (1996). *A Scoping Study on Energy-Efficiency Market Transformation by California Utility DSM Programs.* Lawrence Berkeley National Laboratory. http://eetd.lbl.gov/ea/ems/reports/39058.pdf.

[106] Rosenberg, M.; Hoefgen, L. (March 2009). *Market Effects and Market Transformation: Their Role in Energy Efficiency Program Design and Evaluation*. Prepared for California Institute for Energy and Environment (CIEE) by KEMA, Inc.; Nexus Market Research. http://uc-ciee.org/downloads/mrkt_effts_wp.pdf.

[107] Much of this subsection is taken (in some cases word for word) from the National Action Plan for Energy Efficiency. (2008). *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*. Prepared by Energy and Environmental Economics, Inc. (E3) and Regulatory Assistance Project (RAP). www.epa.gov/cleanenergy/documents/suca/cost-effectiveness.pdf.

[108] Another recent summary report of cost-effectiveness tests is: Woolf, T.; Malone, E.; Takahashi, K.; Steinhurst, W. (July 23, 2012). *Best Practices in Energy Efficiency Program Screening: How to Ensure that the Value of Energy Efficiency is Properly Accounted For. Synapse Energy Economics, Inc.* Prepared for National Home Performance Council. www.synapse-energy.com/Downloads/SynapseReport.2012-07.NHPC.EE-Program-Screening.12-040.pdf.

[109] California Public Utilities Commission (CPUC). (2001). *California Standard Practice Manual: Economic Analysis of Demand-Side Programs and Projects*. www.energy.ca.gov/greenbuilding/documents/background/07-J_CPUC_STANDARD_PRACTICE_MANUAL.PDF. See also www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V for the 2007 SPM Clarification Memo.

[110] Stewart, J.; Haeri, M.H. (July 2011). *Critical Review and Recommendations on Top-Down Evaluation.* White paper. The Cadmus Group, Inc. Prepared for the California Public Utilities Commission (CPUC).

providing more incentives to customers to purchase and install more energy efficient equipment.

There is also a multiplier effect associated with minimizing the inevitable controversies associated with how best to estimate the load reductions associated with measures, programs, and portfolios – that would likely occur in a retrospective review of the reported energy and demand savings. DSM impacts are well informed estimates of energy savings. Estimates are a function of multiple factors including: baseline measure savings, efficient measure savings, effective useful lives of measures, free ridership, participant spillover, non-participant spillover, rebound effects, survey design and implementation, and interactive factors. Since there is a significant amount of subjectivity involved in the calculation of each factor, every stakeholder or EMV expert could testify to a different estimate of load impacts attributable to measures, programs and portfolios. It is a burden to the Commission to determine the most technically appropriate assumptions, processes, and methodologies to estimate energy efficiency savings.

3.4 Gross vs. Net Savings

The issue of using either gross kWh or net kWh savings as the appropriate metric to assess whether the Company has met its annual load reduction targets is a question of attribution. In other words, how many energy efficiency measures were installed as a result of the utility program versus how many would have been installed absent the program? The ratio of net program savings to gross program savings is the NTG ratio.

The discussion below supports Ameren Missouri's proposal to use gross savings/reductions as the metric for tracking utility and customer progress toward the Ameren Missouri energy efficiency goals and for the calculation of the TRC and for all applicable performance incentives.

The expense of obtaining high quality analysis on subjective assessments of estimating NTG should be considered. Ameren Missouri believes the money could be better spent on program design, implementation, and customer incentives. This portfolio has been designed to provide more benefits to the customers and use the additional EMV dollars to better implement the programs.

Definitions

"Free ridership" and "spillover" are two adjustments to gross savings utilized to determine net savings. The first adjustment, estimating free ridership, subtracts from gross savings the actions of participants unaffected by the program. That is, participants are considered free riders if they would have taken the same energy saving action at the same time, in the same quantity, and at the same level of efficiency regardless of the program's existence.

The second adjustment, for spillover, adds energy savings from high-efficiency actions taken outside the program to gross impacts attributable to the program. These additional energy savings result from greater customer knowledge and awareness of energy efficiency options directly attributable to program availability but are not actually achieved through implementation of a program measure. Furthermore, spillover can occur within both participant and nonparticipant groups. For example, participants may be inspired to adopt high-efficiency measures beyond those available within a program. Nonparticipants can gain knowledge and awareness of energy efficient options due to program availability and apply that knowledge and awareness to implement high efficiency actions. These actions would not have occurred without the program's existence even though the savings are gained outside the program structure. The fact is that for most customer energy efficiency programs within a Company's service territory, the number of nonparticipants is greater than the number of participants. Thus, the potential exists for large spillover impacts within the nonparticipant population.

There is a third potential adjustment for "market effects." Market effect impacts can be measured by evaluating and estimating the impacts of any changes the program causes to the way markets operate. As a result of programs, manufacturers may change the efficiency of their products, or retailers and wholesalers may change the composition of their inventories to reflect the demand for more efficient goods created through a program or group of programs. Although the impact of market effects can be significant, measurement of market effects becomes both a significant and costly measurement and evaluation challenge.

There is substantial evidence of both free ridership and spillover with Ameren Missouri's energy efficiency programs. Table 3.9 summarizes the conclusions drawn in its EMV reports in relation to these issues.

Table 3.9 Free Ridership and Spillover Existence In Ameren Missouri Programs

Program	Net-to-Gross Ratio	Free ridership Identified	Free ridership Quantified	Spillover Identified	Spillover Quantified	Market Effects
Residential Lighting & Appliance	0.96[1]	✔	0.42*	✔	-	Appliance rebates encouraging other efficient behavior
Residential Appliance Recycling	0.64**	✔	0.36**	✔	-	Slow market transformation in first year
Residential HVAC#	N/A	N/A	N/A	N/A	N/A	N/A
Residential Multifamily Low Income	0.91	✔	0.09	✔	-	N/A
C&I Standard	0.90	✔	0.11	✔	0.054***	Contractors altering product mix and operations to more efficient practices##
C&I Custom	0.86	✔	0.14	✔	0.11***	Contractors altering product mix and operations to more efficient practices##
C&I Retro-Commissioning	0.83	✔	0.17	✔	0****	
C&I New Construction	0.95	✔	0.05	✔	0*****	Encouraging customers with less efficient building codes to install more efficient equipment###

* - Free ridership only for appliances; page 44 "Ameren Missouri Lighting and Appliance Evaluation PY 2" March 2011
** - calculated using a weighted average of freezer and refrigerator installations; Ameren Missouri Refrigerator Recycling Program Evaluation March 2011
*** - taken from page 3-8 "Evaluation of Business Energy Efficiency Program Custom and Standard Incentives" March 2011
**** - taken from page 3-7; "Evaluation of Business Energy Efficiency Program Retro-Commissioning Incentives" March 2011
***** - taken from page 3-7; "Evaluation of Business Energy Efficiency Program New Construction Incentives" March 2011
# - No impact evaluation was completed due to lack of program data
##- taken from page 5-2 "Evaluation of Business Energy Efficiency Program Custom and Standard Incentives" March 2011
- taken from page 5-1 "Evaluation of Business Energy Efficiency Program New Construction Incentives" March 2011
1 – Includes spillover

Net-To-Gross Estimation

Attribution

The issue of attribution - who or what organization should receive credit for changing customer energy consumption behaviors - is at best complicated and unclear. A good example is the influence of the more than $200 million from the Ameren Reinvestment and Recovery Act (ARRA) allocated to Missouri and administered by the Missouri Department of Natural Resources (DNR) for energy efficiency initiatives from 2010 through 2012. Many of the energy efficiency initiatives administered by DNR overlap

with the Ameren Missouri DSM portfolio of customer programs. Which program had the most impact on moving customers to take energy efficiency actions? Of course, in addition to the ARRA, there are a variety of other state, local, and even retail initiatives that encourage customers to be more conscious of energy consumption.

The combination of the "negative" of free ridership and the "positive" of spillover are computed as the NTG ratio and are applied to gross savings to provide an estimate of attributable net savings for a program.

The measurement of spillover involves different issues than the measurement of free ridership. Free ridership assessments come from the pool of identified program participants. The effects from spillover are not realized from the participating projects. Identifying who to contact to explore the issue of spillover and associated indirect effects is daunting. For this reason alone, many states only consider free ridership in the calculation of NTG. This analytic asymmetry undervalues energy efficiency savings by incorporating only subtractions, such as free riders, from gross savings and ignoring potential additions, such as spillover.

Precision and Accuracy

It is rare for the NTG in EMV impact analyses to report any confidence ranges or even to discuss uncertainty associated with its estimation. It is as if the estimation of NTG is more of an art than a science and thus precision and accuracy cannot be determined. The potential for error and uncertainty associated with these measurements is significant. Difficulties include: (1) identifying an accurate baseline; (2) identifying and implementing a control group; (3) relying on self-reporting surveys; and (4) determining correction factors for self-reporting biases.

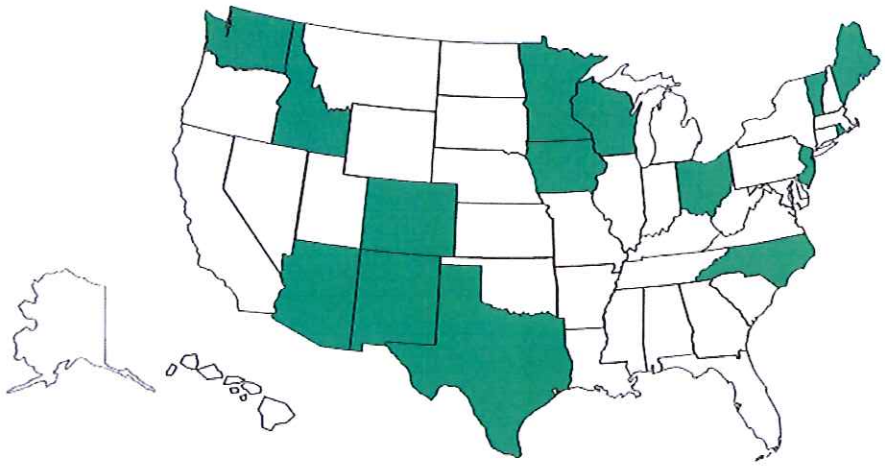
The MEEIA rules do not address the specifics, including preferred methodologies, to address the components of net demand and energy savings – free ridership, spillover, and market effects.

Gross vs. Net Savings – A National Perspective

The decision to include free ridership impacts without including spillover impacts is inherently an asymmetrical, and thus biased, view. The National Association of Regulatory Commissioners' Regulating DSM Evaluation Manual states that, "...as of 1994 virtually no regulators were requiring the measurement of spillover effect, yet...most encourage or require Free Ridership assessments, resulting in potentially lopsided analyses, which could undervalue the benefits of utility DSM programs."

There are approximately 15 states that currently base energy savings from utility sponsored energy efficiency programs on estimates of gross savings. A map of the U.S. depicting states that use gross savings is shown below in Figure 3.6.

Figure 3.6 States Using Gross Savings[3]



Key findings of prior national studies on net vs. gross estimates of energy efficiency load reductions include:

- Many states have assumed free ridership and spillover offset one another. A recent study conducted for the Nevada Power Company and Sierra Pacific Power Collaborative found 15 states (69%) have rejected the concept of free ridership in estimating net saving and thus rely on gross savings.
- Estimating free ridership and spillover is difficult, with no consensus on an approach for how best to estimate these values. There are inherent biases with both the self-report and statistical approaches, and the selection of one approach over another can give significantly different results.
- A study of best practice programs[10] found over two-thirds of all identified programs had a NTG value of approximately 1.0. Nearly half of the studies (49%) either assumed or calculated a net-to-gross value of 1.0, and 68% of the studies had NTG values between 0.9 and 1.0. In most cases, net-to-gross values, when used by a program, were only based on free ridership values; so an even higher percentage of programs would have a net-to-gross ratio of approximately 1.0 if spillover was examined.
- Assuming a NTG ratio of 1.0 may provide conservative estimates. Research indicates some programs, particularly for lighting, routinely achieve net-to-gross ratios of well over 1.0 when spillover is examined. Assuming a NTG of 1.0, therefore, is likely a conservative estimate, underestimating true program impacts for some measures.

[10] "Assessment of Energy and Capacity Savings Potential in Iowa" Prepared by Quantec. February 15, 2008

Furthermore, Ameren Missouri makes efforts to design effective programs that minimize free ridership by:

- Reviewing studies that indicate certain measures are achieving high market shares and thus high free ridership rates. For example, ENERGY STAR clothes washers continue to gain market share throughout the country, and results from other state studies indicate high free ridership and a NTG ratio of less than 1.0.
- Carefully setting incentive levels to minimize free ridership. As programs mature and market share for efficiency measures increase, program administrators may be inclined to reduce incentive levels. Paradoxically, however, as incentives *drop,* free ridership *increases.* This occurs because lower incentives are less likely to motivate participants who would not have installed a measure in the incentive's absence (i.e., a low incentive is not enough to motivate a customer to do what he or she was not already planning). Incentive levels should thus be carefully reviewed and set to make sure to motivate a substantial number of participants to install an efficiency measure they would likely not have installed in a program's absence.

3.5 Implementation Flexibility

Although Ameren Missouri's MEEIA implementation plan (Plan) represents the most current knowledge to design programs to meet program objectives, inevitably some programs will work better than expected while some will not work as well as expected. Risk is also influenced by time. Risk increases as the implementation plan horizon expands. The longer the horizon, the more the economy and markets can change from what was assumed during the program design process. A key element of program risk management is the flexibility to shift resources within the programs/portfolio and to modify the programs/portfolio composition and risk as the market responds to Ameren Missouri programs. Specifically, Ameren Missouri proposes the following:

- The flexibility to reallocate funds among program elements with the Residential and Business portfolios is critical to ensure Ameren Missouri's ability to meet its annual load reduction goals. This flexibility requires the ability to write tariff provisions that give utilities the flexibility to change program elements that do not require Commission approval. Otherwise, the time delays to re-file tariffs and receive Commission approval may preclude Ameren Missouri's ability to respond to the markets in a timely manner thereby wasting time and resources which result in lost opportunities to achieve load reductions between tariff filings. Investor owned utilities in states that the ACEEE rank highly in ACEEE's annual state energy efficiency scorecard and who require tariffs for utilities that sponsor energy efficiency programs generally have tariffs that model flexibility. Table 3.10 shows a sampling of those tariffs:

Missouri Public Service Commission

POST OFFICE BOX 360
JEFFERSON CITY, MISSOURI 65102
573-751-3234
573-751-1847 (Fax Number)
http://www.psc.mo.gov

May 21, 2013

Richard A. Voytas
Director, Energy Efficiency and Demand Response
Ameren Services
1901 Chouteau Ave - MC 1400
St Louis, MO 63103

Dear Mr. Voytas:

The Staff of the Missouri Public Service Commission first became aware of the planned Cross-Cutting Activities proposed by The Cadmus Group on March 11, 2013. The Activities, and related concerns, were discussed at the March 18-19, 2013 and April 15, 2013 Ameren Missouri stakeholder meetings. While I was not able to make the March meetings, I participated by phone for the April 15 meeting, and met with you, Greg Lovett and John Rogers on May 9, 2013.

Staff has carefully considered the Cross-Cutting Activities evaluation plan, other related information and the resources you provided on May 9. This letter is to inform you that I have discussed this review with Staff and considered the material you presented and concur with John Rogers' representation that Staff cannot support the use of the planned Cross-Cutting Activities proposed by The Cadmus Group for the expressed purpose of adjusting the net-to-gross ratio and annual energy savings of Ameren Missouri's residential energy efficiency programs as part of the evaluation, measurement and verification (EM&V) for the Company's *2013-2015 Energy Efficiency Plan.*

This decision is primarily based on the following facts:

1. Lack of discussion in the Company's *2013 – 2015 Energy Efficiency Plan* of any established industry best practices for estimating energy impacts from non-participants due to market effects as required by Rule 4 CSR 240-22.070(8).
2. Including energy savings for market effects from the Cross-Cutting Study, when that impact was not part of the negotiated Demand-Side Programs Investment Mechanism (DSIM).

Studying market effects is a long-term study which should evolve over several program plan cycles and result in data which is most useful in the development of long-term market potential studies. While Staff does not support the use of the planned Cross-Cutting Activities proposed by The Cadmus Group for the express purpose of adjusting the net-to-gross ratio and annual energy savings through EM&V for program years 2013-2015, Staff does support conducting the Cross-Cutting Activities, and supports the associated budget, in an effort to better understand the market effects specifically due to Ameren Missouri's energy efficiency programs for the purpose of enhancing future planning for demand-side programs and conducting future demand-side market potential studies.

Should you choose to use the planned Cross-Cutting Activities proposed by The Cadmus Group to adjust the net-to-gross ratio and annual energy savings of Ameren Missouri's residential energy efficiency programs as part of the Company's *2013-2015 Energy Efficiency Plan*, Staff reserves its right to challenge that adjustment pursuant to Paragraph 11.b. of the Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing in Case No. EO-2012-0142.

Sincerely,

Natelle Dietrich
Director – Tariff, Safety, Economic and Engineering Analysis

cc: John Rogers – Missouri Public Service Commission
Greg Lovett – Ameren Missouri

RIDER EEIC
ENERGY EFFICIENCY INVESTMENT CHARGE
For MEEIA CYCLE 1 Plan

APPLICABILITY

This Rider EEIC - Energy Efficiency Investment Charge(Rider EEIC) is applicable to all kilowatt-hours (kWh) of energy supplied to customers served by Ameren Missouri (Company) under Service Classification Nos. 1(M), 2(M), 3(M), 4(M), 11(M), and 12(M), excluding kWh of energy supplied to "opt-out" customers.

Charges passed through this Rider EEIC reflect the charges approved to be collected from the implementation of the MEEIA Cycle 1 Plan. Those charges include: 1) projected Program Costs, projected Ameren Missouri's TD-NSB Share and Performance Incentive Award (if any) for each Effective Period, 2) Reconciliations, with interest, to true-up for differences between the revenues billed under this Rider EEIC and total actual monthly amounts for: i) Program Costs incurred, ii) Ameren Missouri's TD-NSB Share incurred, and iii)amortization of any Performance Incentive Award ordered by the Missouri Public Service Commission (Commission) and 3)any Ordered Adjustments. Charges under this Rider EEIC shall continue after the anticipated December 31, 2015 end of MEEIA Cycle 1 Plan until such time as the charges described in items 1), 2) and 3) in the immediately preceding sentence have been billed. Charges arising from the MEEIA Cycle 1 Plan that are the subject of this Rider EEIC shall be reflected in one "Energy Efficiency Invest Chg" on customers' bills in combination with any charges arising from a rider that is applicable to post-MEEIA Cycle 1 Plan demand-side management programs approved under the Missouri Energy Efficiency Investment Act.

DEFINITIONS

As used in this Rider EEIC, the following definitions shall apply:

"Ameren Missouri's TD-NSB Share" means 26.34% of the TD-NSB multiplied by the Time-Value Adjustment Factor.

"Effective Period" (EP) means the twelve (12) billing months beginning with the February billing month and ending with the January billing month. Where an additional EEIC filing is made during a calendar year, the Effective Period for such a filing shall begin with the June or October billing month and end with the subsequent January billing month.

"Evaluation Measurement & Verification - Net Shared Benefits" (EM&V-NSB) means the 2013 present value of the lifetime avoided costs (i.e., avoided energy, capacity, transmission and distribution, and probable environmental compliance costs) for the MEEIA Cycle 1 Plan using the EM&V results described in paragraph 11 of the Stipulation less the 2013 present value of Program Costs. Paragraphs 5.b.ii and 6. c. of the Stipulation provide further description of the EM&V-NSB.

"MEEIA Cycle 1 Plan" has the same meaning as the defined term "Plan" provided for in paragraph 4 of the Stipulation, as it may be hereafter amended by Commission-approved amendments to the Stipulation.

"MWH Target" has the meaning provided for in paragraph 5.b.ii and Appendix B of the Stipulation.

"Program Costs" means program expenditures, including such items as program design, administration, delivery, end-use measures and incentive payments, evaluation, measurement and verification, market potential studies and work on the Technical Resource Manual (TRM).

RIDER EEIC
ENERGY EFFICIENCY INVESTMENT CHARGE (Cont'd.)
For MEEIA CYCLE 1 Plan

DEFINITIONS (Cont'd.)

"Performance Incentive Award" means the sum of a two-year annuity (using 6.95% as a discount rate and not discounting the first period) of a percentage of EM&V-NSB as described below and further described in paragraph 5.b.ii and Appendix B of the Stipulation:

Percent of MWH Target	Percent of EM&V-NSB*
<70	0.00%
70	4.60%
80	4.78%
90	4.92%
100	5.03%
110	5.49%
120	5.87%
130	6.19%
>130	6.19%

*Includes income taxes (i.e. results in revenue requirement without adding income taxes). The percentages are interpolated linearly between the performance levels.

"Stipulation" means the Stipulation and Agreement approved by the Commission in its order effective August 11, 2012, as amended by order effective December 29, 2012, in File No. EO-2012-0142, as it may be amended further by subsequent Commission orders.

"Throughput Disincentive - Net Shared Benefits" (TD-NSB)means the 2013 present value of the lifetime avoided costs (i.e., avoided energy, capacity, transmission and distribution, and probable environmental compliance costs) for the MEEIA Cycle 1 Plan using the deemed values in the TRM, less the 2013 present value of Program Costs as further described in paragraphs 5.b.i and 6. b. of the Stipulation.

"Time-Value Adjustment Factor" means the factor used each month to convert Ameren Missouri's TD-NSB Share from a present value into a nominal revenue requirement. The factor is [1.0695 ^ (Calendar Year - 2013)].

RIDER EEIC
ENERGY EFFICIENCY INVESTMENT CHARGE (Cont'd.)
For MEEIA CYCLE 1 Plan

ENERGY EFFICIENCY INVESTMENT RATE (EEIR) DETERMINATION

The EEIR during each applicable EP is a dollar per kWh rate for each Service Classification calculated as follows:

$$EEIR = [NPC + NTD + NPI + NOA]/PE$$

Where:

NPC = Net Program Costs for the applicable EP as defined below,

$$NPC = PPC + PCR$$

PPC = Projected Program Costs is an amount equal to Program Costs projected by the Company to be incurred during the applicable EP.

PCR = Program Costs Reconciliation is equal to the cumulative difference, if any, between the PPC revenues billed resulting from the application of the EEIR and the actual Program Costs incurred through the end of the previous EP (which will reflect projections through the end of the previous EP due to timing of adjustments). Such amounts shall include monthly interest charged at the Company's monthly short-term borrowing rate.

NTD = Net Throughput Disincentive for the applicable EP as defined below,

$$NTD = PTD + TDR$$

PTD = Projected Throughput Disincentive is 90% of Ameren Missouri's TD-NSB Share projected by the Company to be incurred during the applicable EP.

TDR = Throughput Disincentive Reconciliation is equal to the cumulative difference, if any, between the PTD revenues billed resulting from the application of the EEIR and 100% of Ameren Missouri's TD-NSB Share through the end of the previous EP as adjusted for the inputs described in paragraph 6.b. of the Stipulation, (which will reflect projections through the end of the previous EP due to timing of adjustments). Prior to the beginning of the February 2014 billing month, such amounts shall include monthly interest charged at the Company's monthly Allowance for Funds Used During Construction (AFUDC) rate. Beginning with the start of the February 2014 billing month, any cumulative difference and all subsequent amounts shall include monthly interest charged at the Company's monthly short-term borrowing rate.

RIDER EEIC
ENERGY EFFICIENCY INVESTMENT CHARGE (Cont'd.)
For MEEIA CYCLE 1 Plan

EEIR DETERMINATION (Cont'd.)

NPI = Net Performance Incentive for the applicable EP as defined below,

$$NPI = PI + PIR$$

PI = Performance Incentive is equal to the Performance Incentive Award monthly amortization multiplied by the number of billing months in the applicable EP.

The monthly amortization shall be determined by dividing the Performance Incentive Award by the number of available billing months between the first billing month of the first EEIR filing after the determination of the Performance Incentive Award and 24 calendar months following the end of the annual period in which the Performance Incentive Award is determined.

The number of applicable billing months in the EP shall be the number of applicable billing months less the number of months including Performance Incentive Award amortization from previous EPs.

PIR = Performance Incentive Reconciliation is equal to the cumulative difference, if any, between the PI revenues billed resulting from the application of the EEIR and the monthly amortization of the Performance Incentive Award through the end of the previous EP (which will reflect projections through the end of the previous EP due to timing of adjustments). Such amounts shall include monthly interest charged at the Company's monthly short-term borrowing rate.

NOA = Net Ordered Adjustment for the applicable EP as defined below,

$$NOA = OA + OAR$$

OA = Ordered Adjustment is the amount of any adjustment to the EEIC ordered by the Commission as a result of prudence reviews and/or corrections under this Rider EEIC. Such amounts shall include monthly interest at the Company's monthly short-term borrowing rate.

OAR = Ordered Adjustment Reconciliation is equal to the cumulative difference, if any, between the OA revenues billed resulting from the application of the EEIR and the actual OA ordered by the Commission through the end of the previous EP (which will reflect projections through the end of the previous EP due to timing of adjustments). Such amounts shall include monthly interest charged at the Company's monthly short-term borrowing rate.

RIDER EEIC
ENERGY EFFICIENCY INVESTMENT CHARGE (Cont'd.)
For MEEIA CYCLE 1 Plan

EEIR DETERMINATION (Cont'd.)

PE = Projected Energy, in kWh, forecasted to be delivered to the customers to which the Rider EEIC applies during the applicable EP.

The EEIR components and Total EEIR applicable to the individual Service Classifications shall be rounded to the nearest $0.000001.

Allocations of charges for each Service Classification for the MEEIA Cycle 1 Plan will be made in accordance with the Stipulation.

This Rider EEIC shall not be applicable to customers that have satisfied the opt-out provisions contained in Section 393.1075.7, RSMo.

FILING

The Company shall make an EEIC filing each calendar year to be effective for the subsequent calendar year's February billing month. The Company is allowed or may be ordered by the Commission to make one other EEIC filing in each calendar year with such subsequent filing to be effective beginning with either the June or October billing month. Rider EEIC filings shall be made at least sixty (60) days prior to their effective dates.

PRUDENCE REVIEWS

A prudence review shall be conducted no less frequently than at twenty-four (24) month intervals in accordance with 4 CSR 240-20.093(10). Any costs which are determined by the Commission to have been imprudently incurred or incurred in violation of the terms of this Rider EEIC shall be addressed through an adjustment in the next EEIR determination and reflected in factor OA above.

RIDER EEIC
ENERGY EFFICIENCY INVESTMENT CHARGE (Cont'd.)
For MEEIA CYCLE 1 Plan
(Applicable To Determination of EEIR for the Billing Months of February 2014 through January 2015)

EEIR Components and Total EEIR

Service Class	NPC/PE ($/kWh)	NTD/PE ($/kWh)	NPI/PE ($/kWh)	NOA/PE ($/kWh)	Total EEIR ($/kWh)
1(M)-Residential Service	$0.001447	$0.002025	$0.000000	$0.000000	**$0.003472**
2(M)-Small General Service	$0.000920	$0.001035	$0.000000	$0.000000	**$0.001955**
3(M)-Large General Service	$0.000933	$0.001439	$0.000000	$0.000000	**$0.002372**
4(M)-Small Primary Service	$0.000936	$0.001087	$0.000000	$0.000000	**$0.002023**
11(M)-Large Primary Service	$0.000809	$0.000886	$0.000000	$0.000000	**$0.001695**
12(M)-Large Transmission Service	$0.000000	$0.000000	$0.000000	$0.000000	**$0.000000**