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Case No.:

Rebound Effect
Marke/Corrected Direct
Public Counsel
EO-2012-0142

CORRECTED DIRECT TESTIMONY

OF

GEOFF MARKE

Submitted on Behalf of
the Office of the Public Counsel

**UNION ELECTRIC COMPANY D/B/A
AMEREN MISSOURI'S**

Case No. EO-2012-0142

**** Denotes Proprietary Information that has been redacted ****

January 12, 2015

NP

**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) **Case No. EO-2012-0142**
 Allowed by MEEIA.)

AFFIDAVIT OF GEOFF MARKE

STATE OF MISSOURI)
) ss
 COUNTY OF COLE)

Geoff Marke, of lawful age and being first duly sworn, deposes and states:

1. My name is Geoff Marke. I am a Regulatory Economist for the Office of the Public Counsel.
2. Attached hereto and made a part hereof for all purposes is my corrected direct testimony.
3. I hereby swear and affirm that my statements contained in the attached affidavit are true and correct to the best of my knowledge and belief.




 Geoff Marke

Subscribed and sworn to me this 12th day of January 2015.



JERENE A. BUCKMAN
 My Commission Expires
 August 23, 2017
 Cole County
 Commission #13754037



 Jerene A. Buckman
 Notary Public

My commission expires August 23, 2017.

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DIRECT TESTIMONY
OF
GEOFF MARKE
UNION ELECTRIC COMPANY
d/b/a Ameren Missouri
CASE NO. EO-2012-0142

1 **I. INTRODUCTION AND EXPLANATION OF CHANGES TO THE**
2 **RESPONSE TO CHANGE REQUEST**

3 **Q. Please state your name, title and business address.**

4 A. Dr. Geoffrey Marke, Economist, Office of the Public Counsel (OPC or Public Counsel), P.O.
5 Box 2230, Jefferson City, Missouri 65102.

6 **Q. Are you the same Geoff Marke that filed the Response to Change Requests in EO-2012-**
7 **0142?**

8 A. I am.

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

10 A. The purpose of my direct testimony is to adopt and incorporate by reference my previous
11 submitted Response to Change Requests with the amended changes stated below and to
12 provide additional evidence OPC believes is relevant to the question of determining the final
13 EM&V results of Union Electric Company d/b/a Ameren Missouri's ("Ameren Missouri" or
14 "Ameren") PY2013 MEEIA portfolio. Specifically, this testimony will introduce the concept
15 of the rebound effect and why it supports OPC's previous suggestions to the Commission
16 regarding the appropriate net-to-gross (NTG) ratio. Those recommendations include:

- 17 • Adopting Staff's original Change Request that calls for the elimination of
18 market effects and accepting the Auditor's spillover estimates.

- 1 • Rejecting Ameren’s downward adjustment of free ridership.
- 2 • Including a 9% downward adjustment to the NTG ratio for the LightSavers
- 3 Program to account for conservative direct rebound effect estimates.

4 OPC raises the concept of the rebound effect as another factor that should be considered by
5 the Commission when determining the EM&V results for PY2013.

6 This testimony offers that not properly accounting for the rebound effect will overstate actual
7 energy savings attributable to Ameren Missouri PY2013 EM&V. Public Counsel proposes a
8 conservative adjustment to the LightSavers program based on an appropriate mid-range
9 estimate of the direct rebound effect attributable to energy efficient residential lighting.
10 Public Counsel does not propose an additional adjustment for an indirect rebound effect at
11 this time.

12 **Q. What is the purpose of the corrections to your Response to Change Requests?**

13 A. These corrections are made to clarify Public Counsel’s position on Staff’s initial Change
14 Request. As background, when asked to summarize our primary recommendations in the
15 Response to Change Request we stated that the Commission should adopt Staff’s initial
16 change request that calls for the elimination of market effects in the formula used to calculate
17 the LightSavers net-to-gross ratio. We reiterated this position later:

18 **Under our scenario, and as initially proposed by Staff,** Ameren would
19 have achieved 36.44% of their target goal in the first year leaving them only
20 33.56% away from being eligible for a performance incentive with two
21 additional years to reach that (emphasis added, p. 62, 5-8).

22 And at the conclusion, OPC also indicates its support for the weight that should be given to
23 the independent auditor’s results which were included in Staff’s recommendation that OPC
24 supports:

1 Furthermore, the black box agreement does not address EM&V
2 considerations moving forward and in this case undermines the process
3 currently in place by minimizing the evaluation and results of the
4 Commission's independent auditor (p. 65, 1-4).

5 This position is consistent with Staff's primary recommendation to adopt the
6 Auditor's estimates without market effects. However, as indicated earlier, OPC has
7 made changes to portions of its Response that discuss the spillover estimates. OPC
8 previously stated that the differences between the Evaluator's and Auditor's
9 estimates were not pronounced, that OPC did not have a strong position on adopting
10 one or the other, and OPC suggested generally that the Cadmus/ADM spillover
11 estimates should be used to calculate the NTG. These statements, now corrected for
12 consistency and described below, had initially used the general term "spillover"
13 when the more specific term, "nonparticipant spillover," would have been more
14 accurate. It is the nonparticipant spillover estimates for the overall portfolio where
15 the differences are not pronounced, and therefore it is necessary for OPC to clarify
16 its position that the Auditor's estimates should be used for both participant and the
17 Evaluator's for nonparticipant spillover NTG ratios. Absent these changes to
18 differentiate between participant and non-participant spillover, it is unclear which
19 spillover estimate Public Counsel recommends the Commission adopt.

20 Applying the corrections, Public Counsel's Corrected Response to Change Requests,
21 attached as an Appendix, reflects the position that Staff's initial Change Request
22 adopting the Auditor's results that excludes market effects should be adopted, as
23 articulated throughout the rest of the Response.

1 **Q. Please state the corrections you have made to your Response to Change Requests¹ as**
2 **initially filed.**

3 A. There are four textual changes in my Response to Change Requests. Attached hereto as an
4 Appendix and incorporated by reference is a Corrected Response to Change Requests. Those
5 corrections are as follows:

6 1.) Page 7, lines 16-18 now states:

- 7 • Cadmus and the Auditor disagree on participant spillover estimates for
8 only one program. In the LightSavers program the Auditor estimated
9 participant spillover to be 7.5% and Cadmus estimated it to be 28%.

10 2.) Page 45, lines 19-21 now states:

- 11 • Public Counsel believes the Commission should accept the Auditor's
12 estimates for participant and the Evaluator's non-participant spillover
13 estimate.

14 3.) Page 59, line 2 now states:

- 15 • Accept Auditor reports without market effects.

16 4.) Page 64, lines 10-12 now states:

- 17 • Additionally, the Auditor's recommended participant and the Evaluator's
18 nonparticipant spillover estimates should be utilized to calculate the overall
19 net-to-gross ratio for the portfolio.

20 **Q. Please state Public Counsel's position on Staff's initial Change Requests.**

21 As stated on page 11, lines 22-24 of the Response to Change Requests, the Commission
22 should adopt Staff's initial change request which calls for the elimination of market effects in
23 the formula used to calculate the LightSavers net-to-gross ratio. This includes adoption of the

¹ Case No. ER-2012-0142 (Doc. No. 203).

1 independent Auditor's recommended participant spillover and nonparticipant spillover
2 estimates.

3 **Q. Do you have any additional testimony besides the corrections in the original draft?**

4 A. Yes. I will provide further testimony on the rebound effect.

5 **II. THE REBOUND EFFECT**

6 **Q Does this new testimony on the rebound effect change the Office of Public Counsel's**
7 **position on the PY2013 EM&V results and net-to-gross calculation?**

8 A. Yes, it does. Public Counsel recommends that the Commission resolve Ameren Missouri's
9 disputed PY2013 EM&V results by adjusting Staff's initial change request to include a
10 conservative downward 9% adjustment for the direct rebound effect to the LightSavers
11 program's net-to-gross ratio. Because the Lightsaver's program is the largest component of
12 the PY2013 Ameren Missouri MEEIA program, this adjustment will impact the overall
13 results as illustrated in table 1 below. Table 1 includes the five portfolio estimates to date as
14 well as OPC's proposed adjustment. This results in a 6.3% reduction in the overall NTG
15 ratio from our original suggestion to the Commission.

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Table 1: The five portfolio estimates to date & Public Counsel’s proposed estimate

Source (EO-2012-0142)	NTG	MWh Saving ²	Difference	% 3yr-goal 793,100 MWh
Ameren ³	116.1%	397,499	-	50.1%
Cadmus ⁴	114.5%	390,039	7,460	49.2%
Black box ⁵	107.4%	369,500	27,999	46.5%
Auditor 2 ⁶	93.3%	322,296	75,203	40.6%
Auditor 1 ⁷	89.7%	310,041	87,458	39.1%
OPC	83.4%	288,989	108,510	36.44%

Table 2 provides a breakdown of MWh estimates specifically for the LightSavers program with a reference to the Commission-approved savings target in order to illustrate how greatly the savings exceeded targets under all filed estimates.

Table 2: Comparison of LightSavers Net Savings Ex Post Estimates to Approved PSC Target

Program	PSC Approved Target	Net Savings Ex Post: Cadmus ⁸	Net Savings Ex Post: Auditor 2	Net Savings Ex Post: Auditor 1	Net Savings Ex Post: OPC
LightSavers MWh savings	121,258	279,127	214,814	196,470	177,638
% of Target Achieved	100%	230%	177%	162%	146.5%

Q. What is the Rebound Effect?

A. A rebound effect involves increases in energy use that are paradoxically caused by increased energy efficiency. The result is a reduction of expected overall energy savings. The rebound effect runs counter to an assumption of energy efficiency programs that a given percent gain

² 1.0 NTG = 346,519 MWh

³ Application for Approval of Change Request (Ameren Missouri-Investor), 7/3/14.

⁴ Revised Evaluation, Measurement and Verification (EM&V) Reports, 6/12/14.

⁵ Non-Unanimous Stipulation and Agreement Settling the Program Year 2013 Change Request, 9/19/14.

⁶ Final EM&V Auditor Report and Supporting Documentation, 8/27/14 with market effects.

⁷ Final EM&V Auditor Report and Supporting Documentation, 8/27/14 without market effects.

⁸ Ameren Missouri agrees with the Cadmus estimates for LightSavers. Ameren Missouri had proposed additional energy savings for the rest of their portfolio which is why they are included in table 1.

1 in efficiency is assumed to lead simply and directly to an equivalent and equal percent
2 reduction in total energy use. In reality, the economy and consumer behavior is anything but
3 direct, linear, or simple.

4 To explain the rebound effect, I will offer two examples which include the direct rebound
5 effect and the indirect rebound effect:⁹

6 Direct Rebound Effect:

7 This represents a change in patterns of usage after an energy efficient product is installed.
8 When energy use is more efficient, consumers may actually increase some of their energy-
9 using activities. For example, we can reduce lighting energy consumption in our houses by
10 up to 75% by installing more efficient light bulbs if usage remains constant. However, as the
11 lighting service has effectively become cheaper, one may decide to leave the lights on for a
12 longer period of time. This will result in having less energy savings than what was
13 anticipated.¹⁰

14 Indirect Rebound Effect:

15 In general, when customers use less power, they will have lower electrical bills. This gives
16 consumers more money to spend on other things, and many of those other things may require
17 energy to produce or use.¹¹

18 **Q. Has the rebound effect been raised in any other previous testimony in this case?**

19 A. Yes. The rebound effect was discussed in the initial Ameren Missouri MEEIA application in
20 2012 in the rebuttal testimony of Staff witness of Dr. Hojang Kang.¹² It was further discussed

⁹ Time constrained readers can watch the abstract video from research conducted by the Scott Institute for Energy Innovation of Carnegie Mellon University at: <https://www.youtube.com/watch?v=1MIsNp4sSms>. The corresponding academic paper can be found at: http://iopscience.iop.org/1748-9326/9/7/074010/pdf/1748-9326_9_7_074010.pdf

¹⁰ Michaels, R.J. (2012) Energy Efficiency and Climate Policy: The Rebound Dilemma. *Institute for Energy Research*. http://instituteforenergyresearch.org/wp-content/uploads/2012/07/NJI_IER_MichaelsStudy_WEB_20120706_v5.pdf

¹¹ Ibid.

1 in the surrebuttal testimony of Staff witness Michael Stahlman¹³ and Ameren Missouri
2 witness Rick Voytas.¹⁴ Incidentally, there was considerably more testimony from
3 stakeholders regarding the concept of the rebound effect than there was regarding market
4 effects at that time.

5 **Q. Was there any attempt to calculate the rebound effect by either the evaluators**
6 **(Cadmus/ADM) or the state auditor (Johnson Consulting)?**

7 A. No. There was no attempt to calculate the rebound effect in determining the net energy
8 savings for Ameren Missouri's MEEIA PY2013.

9 **Q. Is there any empirical research that has attempted to calculate the rebound effect?**

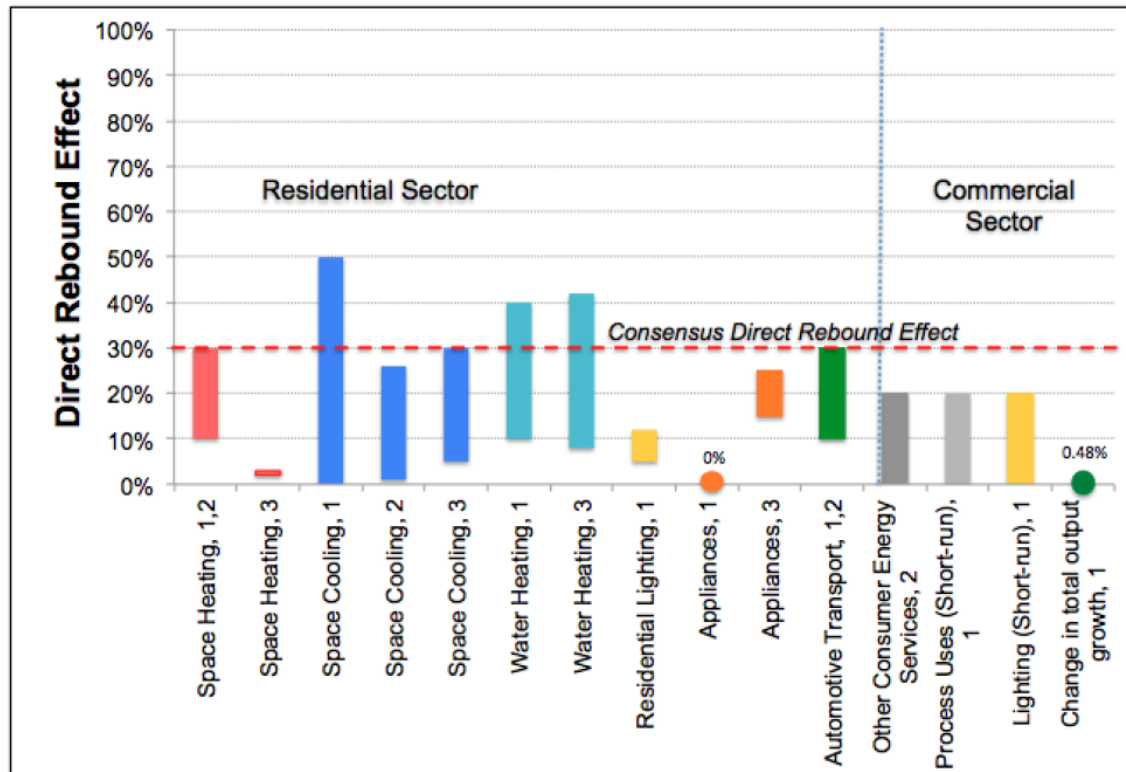
10
11 A. Yes. As listed in Attachment GM-1 (as well as referenced throughout this testimony), there is
12 an extensive amount of empirical research substantiating the existence of a rebound effect
13 associated with energy efficiency investments. Within those studies, there is no argument that
14 the rebound effect occurs. However, there is debate about how large the rebound effects are
15 likely to be in any given context. Table 3 presents a sample of empirical studies looking at
16 the direct rebound effect on various energy efficiency measures. Residential lighting, for
17 example, has a direct rebound effect and corresponding reduction in realized energy savings
18 estimated to be in the range of 5-12%. Accordingly, I applied a 9% direct rebound effect to
19 the LightSavers program as a conservative mid-point to come up with an appropriate direct
20 rebound effect adjustment in this case.

12 Case No. ER-2012-0142 (Doc. No. 51)

13 Case No. ER-2012-0142 (Doc. No. 78)

14 Case No. ER-2012-0142 (Doc. No. 81)

1 Table 3: Empirical results of direct rebound effect and energy efficient measures¹⁵



Direct rebound effect estimates by sector and end-use. Sources: (1) Greening et al., 2000; (2) Sorrell et al., 2009; (3) Parti and Parti (1980), with appliances defined as freezers, dryers, and electric ranges.

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3
4

¹⁵ Ines-Azevedo (2011) Energy Efficiency and the Rebound Effect. *Center for Climate and Energy Decision Making*. Slide 23. <http://cedmcenter.org/wp-content/uploads/2013/01/Ines-Azevedo.pdf> sources include:
 A. Greening, L. et al. (2000). Energy efficiency and consumption—the rebound effect—a survey. *Energy Policy*, 28 (6), 389-401. <http://www.sciencedirect.com/science/article/pii/S0301421500000215>;
 B. Sorrell, S. et al.(2009) Empirical estimates of the direct rebound effect: a review. *Energy Policy* 37: 1356-71., <http://www.sciencedirect.com/science/article/pii/S0301421508007131> ;
 C. Parti and Parti (1980) The total and appliance-specific conditional demand for electricity in the household sector. *The Bell Journal of Economics*. 309-321. <http://sedc-coalition.eu/wp-content/uploads/2011/07/Parti-The-Total-and-Appliance-Specific-Conditional-Demand-.pdf>

1 **Q. Please speak more to how you decided a 9% rebound effect would be appropriate for**
2 **the LightSavers program.**

3 **A.** I applied a 9% direct rebound effect to the LightSavers program as a conservative mid-point
4 from the range developed from the Greening et al. (2000) residential lighting study
5 referenced above. This estimate is supported from the two most conservative estimates I was
6 able to locate regarding the rebound effect on residential programs. These include a 2013
7 article in *Nature* by Gillingham et al. that states:

8 Because people respond more strongly to price than to efficiency cues when
9 deciding how much energy to use, these numbers are overestimates. **The**
10 **direct rebound effect for efficiency alone should be nearer the low end**
11 **of this range, or around 5-10%.** Money saved through efficiency can also
12 be spent on another product, such as a new phone, causing an ‘indirect’
13 rebound effect if extra energy is needed to manufacture and use the
14 additional item. **Assessments of household spending indicate that 5-15%**
15 **of energy-efficiency savings are displaced in this way** (emphasis added).¹⁶

16 The second is from a white paper from The American Council for an Energy-Efficient
17 Economy (ACEEE) “The Rebound Effect: Large or Small?” which concludes with the
18 following statement:

19 There are both direct and indirect rebound effects, but these tend to be
20 modest. Direct rebound effects are generally 10% or less. Indirect rebound
21 effects are less well understood but the best available estimate is somewhere
22 at about 11%. . . . **Overall, even if total rebound is about 20%, then 80%**
23 **of the savings from energy efficiency programs and policies register in**
24 **terms of reduced energy use.** And the 20% rebound contributes to

¹⁶ Gillingham, K. et al. (2013) The rebound effect is over-played. *Nature*, 493: 475-476.
<http://www.ourenergypolicy.org/wp-content/uploads/2013/12/rebound.pdf>

1 increased consumer amenities and a larger economy. These savings are not
2 “lost” but are put to other generally beneficial uses (emphasis added).¹⁷

3 **Q. Have any government and/or research institutions recognized the rebound effect with**
4 **energy efficiency?**

5 Yes. Most recently, the International Risk Governance Council (IRGC) in conjunction with
6 Carnegie Mellon University’s Center for Climate and Energy Decision Making (CEDM)
7 convened a series of workshops¹⁸ to produce a report in which the concluding chapter, *Policy*
8 *Implications*, states:

9 **The evidence to date from econometric studies that generally use price**
10 **elasticity, income elasticity and elasticity of substitution suggests that**
11 **direct and indirect rebound effects in developed economies are**
12 **moderate and that investments in energy efficiency can save between**
13 **70 and 85 percent of the anticipated energy reduction, while allowing**
14 **households to enjoy the benefits of higher consumption.** Such moderate
15 rebound effects would imply that energy efficiency policies such as utility
16 energy efficiency programmes, appliance and vehicle efficiency standards,
17 energy efficiency resource standards, and rebates and tax credits for
18 energy efficiency **all will produce energy savings, although not as**
19 **much as an engineering analysis would suggest.** However, rebound
20 assessments should be incorporated in the development of these energy

¹⁷ Nadel, S. (2012) The Rebound Effect: Large or Small?. *ACEEE*. <http://www.aceee.org/files/pdf/white-paper/rebound-large-and-small.pdf>

¹⁸ The participants in the workshop included ideologically diverse experts from around the world who were asked to submit short think pieces regarding energy efficiency and the rebound effect. These documents can be found and downloaded at <http://cedmcenter.org/energy-efficiency-and-the-rebound-effect-presentations/> and at <http://cedmcenter.org/energy-efficiency-and-the-rebound-effect-stuttgart-presentations/>.

1 efficiency policy instruments, so that realistic forecasts of their cost and
2 effectiveness can be made (emphasis added).¹⁹

3 In addition to the IRCG report, the Intergovernmental Panel on Climate Change (IPCC)²⁰
4 recognized the importance in accounting for the rebound effect in their report, *Climate*
5 *Change 2014: Mitigation of Climate Change*. The rebound effect is discussed in both,
6 Chapter 3: *Social, Economic and Ethical Concepts and Methods*²¹ and in Chapter 5: *Drivers,*
7 *Trends and Mitigation*.²² In the latter chapter, the rebound effect section concludes with the
8 following statement:

9 **In conclusion, rebound effects cannot be ignored, but at the same time**
10 **do not make energy efficiency measures completely redundant.** By
11 considering the size of the rebound effect, a more-realistic calculation of
12 energy-efficiency measures can be achieved providing a clearer
13 understanding of their contribution to climate policy. Particular attention is
14 required where efficiency savings are made with no change in the unit cost
15 of energy (emphasis added).

16 In the United States, rebound effects associated with energy efficiency increases are utilized
17 by the U.S. Energy Information Administration (EIA) in their National Energy Modeling
18 System (NEMS) which “projects the production, imports, conversion, consumption, and
19 prices of energy, subject to assumptions on macroeconomic and financial factors, world
20 energy markets, resource availability and costs, behavioral and technological choice criteria,

¹⁹ International Risk Governance Council (2013) The Rebound Effect: Implications of Consumer Behaviour for Robust Energy Policies http://www.irgc.org/wp-content/uploads/2013/04/IRGC_ReboundEffect-FINAL.pdf

²⁰ Established by the United Nations and World Meteorological Organization (WMO) in 1988, the IPCC includes thousands of scientists from around the globe who contribute voluntarily. According to their website: “Because of its scientific and intergovernmental nature, the IPCC embodies a unique opportunity to provide rigorous and balanced scientific information to decision makers. By endorsing the IPCC reports, governments acknowledge the authority of their scientific content. The work of the organization is therefore policy-relevant and yet policy-neutral, never policy-perspective.” <http://www.ipcc.ch/organization/organization.shtml>

²¹ http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter3.pdf

²² http://report.mitigation2014.org/drafts/final-draft-postplenary/ipcc_wg3_ar5_final-draft_postplenary_chapter5.pdf

1 cost and performance characteristics of energy technologies, and demographics.”²³ In the
2 NEMS Overview describing the Energy Consumption Submodule, rebound effects are
3 specifically identified:

4 Once the required equipment choices have been made the total shock and
5 efficiency of equipment for a particular end use are determined. Energy
6 consumption by fuel can be calculated from the amount of service demand
7 satisfied by each technology and the corresponding efficiency of the
8 technology. At this stage, adjustments to energy consumption are also made.
9 These include adjustments for changes in real energy prices (short-run price
10 elasticity effects), **adjustments in utilization rates caused by efficiency**
11 **increases (efficiency rebound effects)**, and changes for weather relative to
12 the CBECS survey year (emphasis added).²⁴

13 From these examples it is clear that energy savings estimates from energy efficiency
14 programs should be reduced to accurately account for the presence of a rebound effect. In
15 further support, I have also included Attachment GM-1 which is a bibliography of 31 papers
16 either produced by reputable institutions or included in peer-reviewed academic journals that
17 discuss the importance of accounting for the rebound effect.

18 **Q. Has the Uniform Methods Projects specifically addressed rebound effects in**
19 **residential lighting programs?**

20 A. Yes. The rebound effect, as related to residential lighting, is mentioned in the February 2014
21 version of Chapter 6: *Residential Lighting Evaluation Protocol*, as follows:
22

²³ <http://www.eia.gov/oiaf/aeo/overview/>

²⁴ DOE-EIA (2009) The National Energy Modeling System: An Overview 2009.
[http://www.eia.gov/oiaf/aeo/overview/pdf/0581\(2009\).pdf](http://www.eia.gov/oiaf/aeo/overview/pdf/0581(2009).pdf)

1 **4:10 Snapback/Rebound or Conservation Effect**

2 “Snapback” or “rebound” refers to changes in use patterns that occur after
3 the installation of an energy-efficient product and result in reducing the
4 overall measure savings. For example, when residential lighting customers
5 use a CFL for more hours per day than they used the replaced
6 incandescent bulb, this constitutes snapback. This behavior change may
7 be due to factors such as the cost savings per unit of time from the CFL or
8 a concern that turning CFLs on and off shortens their effective life
9 (although it is unlikely most consumers are aware of this effect on bulb
10 life). Some customers, however, might have lower hours of use after
11 installing a CFL, perhaps due to a corresponding desire to reduce energy
12 consumption or dissatisfaction with the quality of the light.

13
14 Due to the nature of residential lighting programs, it is not typically
15 possible to conduct metering both before and after installation of energy-
16 efficient lighting. **However, a recent lighting study in the Northeast**
17 **found that the hours of use were greater for sockets with efficient**
18 **bulbs compared to all sockets in the house (NMR Group 2014).** The
19 difference was believed to be either due to: 1.) differential socket selection
20 (households selecting higher-use locations for their high-efficiency light
21 bulbs); 2) Shifting usage (households install an efficient bulb in a socket
22 and then begin to use that socket in lieu of sockets containing inefficient
23 bulbs); and 3) snapback. However, this evaluation did not collect any data
24 to determine which of these three theories is correct, or the proportion of
25 the difference between efficient and inefficient HOU [hours-of-use] that is
26 attributable to each type of behavior. **Therefore, the Residential**

1 **Lighting Protocol recommends researching for snapback/rebound**
2 **effects in future HOU estimates** (emphasis added).²⁵

3 I contacted the NMR group to gain a better understating of what their study concluded. The
4 NMR group performed onsite visits of 848 homes with over 5,730 loggers (time tracking
5 mechanism for the light bulb) between December 2012 and March 2013. The study included
6 residential locations throughout Connecticut, Massachusetts, New York and Rhode Island.
7 In section 3.4.3 of their report, titled: *HOU by Saturation of Efficient Bulbs* the following
8 conclusion is made:

9 In other words, **the patterns of HOU for efficient and inefficient bulbs**
10 **appear to mirror each other, except that the efficient HOU are always a**
11 **bit higher.** This suggests that, for some reason, efficient bulbs simply have
12 a universally higher level of usage than inefficient bulbs across the overall
13 region (emphasis added).²⁶

14 The results of the NMR study as well as the recommendations made by the Uniformed
15 Methods Project suggest that a greater emphasis should be placed on EM&V efforts
16 regarding capturing direct rebound effect estimates moving forward in ratepayer-sponsored
17 energy efficiency programs.

18 **Q. Was a lighting hour-of-use (HOU) study performed by Cadmus in their evaluation of**
19 **the LightSavers program and included in the 2013 results?**

20 A. No. The results for PY2013 utilize the HOU estimates that were conducted in Ameren
21 Missouri's service territory in 2010. An HOU study was performed, but the results will not
22 be available until 2014. Moreover, it is unclear whether or not the study examined HOU

²⁵ Dimetrosky, S. et al. (2014) Chapter 6: Residential Lighting Evaluation Protocol. National Renewable Energy Laboratory. http://www.nrel.gov/extranet/ump/pdfs/20140514_ump_res_lighting_draft.pdf

²⁶ NMR Group, Inc. (2014) Northeast Residential Lighting Hours-of-Use Study. <https://www.nyserda.ny.gov/-/media/Files/Publications/PPSER/Program-Evaluation/2014ContractorReports/2014-EMEP-Northeast-Residential-Lighting.pdf>

1 times for inefficient bulbs as a comparison similar to what the NMR group did as referenced
2 above.

3 **Q. Would you summarize Public Counsel's comments regarding the rebound effect.**

4 A. The rebound effect is another consideration to take into account when measuring energy
5 savings. Nationally and internationally recognized energy and climate institutions have
6 recognized the phenomenon and the need to study it more carefully so that energy efficiency
7 gains are not overstated.

8 The presence of a rebound effect should not detract from the value of promoting energy
9 efficiency as a least-cost resource moving forward. Clearly, energy savings are occurring,
10 but it is important that those savings are not overstated, especially when Ameren Missouri is
11 rewarded with additional financial compensation for estimated energy savings achieved.

12 Public Counsel presents the rebound effect as an additional consideration for the Commission
13 in determining the appropriate EM&V results. OPC incorporates its Corrected Response to
14 Change Request and recommends the Commission:

- 15 • Adopt Staff's original Change Request that calls for the elimination of market
16 effects and accepting the Auditor's spillover estimates
- 17 • Reject Ameren's downward adjustment of free ridership
- 18 • Include a 9% downward adjustment to the NTG ratio for the LightSavers
19 Program to account for conservative direct rebound effect estimates.

20 In the Response to Change Requests, Public Counsel discussed at length why factoring in
21 market effects for Ameren Missouri's PY2013 is inappropriate in the Response to Change
22 Request. This direct testimony introduced another factor, the rebound effect, which should be
23 accounted for to accurately estimate energy savings attributable to ratepayer funded
24 programs. As illustrated in table 1 above, Public Counsel suggests the Commission adjust

1 the LightSavers program by the 9% rebound effect resulting in an annual estimated energy
2 savings of 288,989MWh for PY2013.

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

4 A. Yes, it does.

5

6

Energy Efficiency and the Rebound Effect: Background Readings¹

An empirical general equilibrium analysis of the factors that govern the extent of energy rebound effects in the UK economy

Economic and Social Research Council

<http://www.esrc.ac.uk/my-esrc/grants/RES-061-25-0010/read>

Consumption and the Rebound Effect: An Industrial Ecology Perspective

Edgar G. Hertwich

Massachusetts Institute of Technology and Yale University

<http://onlinelibrary.wiley.com/doi/10.1162/1088198054084635/pdf>

Defining the rebound effect

Peter H. G. Berkhout, Jos C. Muskens, and Jan W. Velthuis

University of Amsterdam

<http://www.sciencedirect.com/science/article/pii/S0301421500000227>

Do increases in energy efficiency improve environmental quality and sustainability?

Nick Hanley, Peter G. McGregor, J. Kim Swales, and Karen Turner

Universities of Stirling, Strathclyde, and Glasgow

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Li-min Hsueh, Jennifer Gerner

Chung-Hua Institution for Economic Research and Department of Consumer Economics and Housing

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Energy efficiency and consumption — the rebound effect — a survey

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International Resources Group, Oak Ridge National Laboratory, and International Energy Agency

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Karen Turner and Nick Hanley
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Energy efficiency: rebounding to a sound analytical perspective

John A. “Skip” Laitner
EPA Office of Atmospheric Programs

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Fuel conserving (and using) production functions

Harry D. Saunders
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Harry D. Saunders
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Incorporating macroeconomic feedback into an energy systems model using an IO approach: Evaluating the rebound effect in the Korean electricity system

Mark Howells, Kiho Jeong, Lucille Langlois, Man Ki Lee, Kee-Yung Nam and Hans Holger Rogner

Planning and Economic Studies Section, School of Economics and Trade, and Korea Atomic Energy Research Institute

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Steve Sorrell

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Negative rebound and disinvestment effects in response to an improvement in energy efficiency in the UK economy

Karen Turner

University of Strathclyde Glasgow

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John A. "Skip" Laitner and Karen Ehrhardt-Martinez

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Sam Anson and Karen Turner

Scottish Government and University of Strathclyde

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Ana-Isabel Guerra and Ferran Sancho
Universitat Autònoma de Barcelona

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Technological progress and sustainable development: what about the rebound effect?

Mathias Binswanger

University of St. Gallen

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The impact of increased efficiency in the industrial use of energy: A computable general equilibrium analysis for the United Kingdom

Grant Allan, Nick Hanley, Peter McGregor, Kim Swales, and Karen Turner
University of Strathclyde, University of Stirling, and University of Glasgow

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The macro-economic rebound effect and the UK economy

Terry Barker, Paul Ekins, and Tim Foxon

University of Cambridge and Policy Studies Institute

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The rebound effect: Microeconomic definitions, limitations and extensions

Steve Sorrell and John Dimitropoulos

University of Sussex

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The Rebound Effect: Some Questions Answered

Maggie Koerth-Bakera, Karen Turnerb, Janine De Fenccec, Cathy Xin Cuic
University of Strathclyde

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RESPONSE TO CHANGE REQUESTS

OF

GEOFF MARKE

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

CASE NO. EO-2012-0142

1 **I. INTRODUCTION AND QUALIFICATIONS**

2 **Q. Please state your name, title and business address.**

3 A. Dr. Geoffrey Marke, Economist, Office of the Public Counsel (OPC or Public Counsel), P.O.
4 Box 2230, Jefferson City, Missouri 65102.

5 **Q. Please describe your education and employment background.**

6 A. I received a Bachelor of Arts Degree in English from The Citadel, a Masters of Arts Degree
7 in English from The University of Missouri, St. Louis, and a Doctorate of Philosophy in
8 Public Policy Analysis from Saint Louis University (SLU). At SLU, I served as a graduate
9 assistant where I taught undergraduate and graduate course work in urban policy and public
10 finance. I also conducted mixed-method research in transportation policy, economic
11 development and emergency management.

12 I have been in my present position with OPC since April of 2014 where I have been
13 responsible for economic analysis and policy research in electric and gas utility operations.
14 Prior to joining OPC, I was employed by the Missouri Public Service Commission as a
15 Utility Policy Analyst II in the Energy Resource Analysis Section, Energy Unit, Utility
16 Operations Department, Regulatory Review Division. My primary duties in that role
17 involved reviewing, analyzing and writing recommendations concerning electric integrated
18 resource planning, renewable energy standards, and demand-side management programs for
19 all of the investor-owned electric utilities in Missouri. I have also been employed by the

1 Missouri Department of Natural Resources (later transferred to the Department of Economic
2 Development), Energy Division where I served as a Planner III and functioned as the lead
3 policy analyst on electric cases. I have worked in the private sector, most notably serving as
4 the Lead Researcher for Funston Advisory based out of Detroit, Michigan. My experience
5 with Funston involved a variety of specialized consulting engagements with both private and
6 public entities; additionally, I have provided analysis on independent compliance audits.

7 **Q. Have you testified previously before the Missouri Public Service Commission?**

8 A. Yes, prior to this case I submitted written testimony in EO-2014-0189, GR-2014-0086 and
9 GR-2014-0152.

10 **Q. Have you been a member of, or participate in, any work groups, committees, or other**
11 **groups that have addressed electric utility regulation and policy issues?**

12 A. Yes. I am currently a member of the National Association of State Consumer Advocates
13 (NASUCA) Distributed Energy Resources Committee which shares information and
14 establishes policies regarding energy efficiency, renewable generation, and distributed
15 generation, and considers best practices for the development of cost-effective programs that
16 promote fairness and value for all consumers. I am also a member of NASUCA's Electricity
17 Committee that discusses current issues affecting residential electric consumers.
18 Additionally, I have been an active participant in all of the approved Missouri investor-
19 owned electric utility (IOU) energy efficiency programs.

20 **II. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS**

21 **Q. Please outline the recent events leading up to this filing.**

22 A. In 2012, Union Electric Company d/b/a Ameren Missouri ("Ameren Missouri") and the
23 parties to this case submitted to the Commission for approval a Unanimous Stipulation and

1 Agreement ("Stipulation") related to the Company's implementation of MEEIA.¹ The
2 Commission issued an order approving the Stipulation on August 1, 2012 and as amended on
3 December 19, 2012. The Stipulation contained provisions related to the evaluation,
4 measurement and verification ("EM&V") of energy efficiency measures undertaken by
5 Ameren Missouri, including procedures whereby a party may request changes to the Final
6 EM&V Report for each year. Further, the Stipulation requires Ameren Missouri to complete
7 Evaluation, Measurement and Verification Reports ("EM&V Report") on its MEEIA
8 Programs and file final EM&V Reports after the end of each MEEIA Program year.² In
9 pertinent part, the report provides as follows:

10 Any stakeholder group participant who wants a change to the impact
11 evaluation portion of a Final EM&V Report will have 21 days from the
12 issuance of the Final EM&V Report to file a request with the Commission to
13 make such a change ("Change Request"). Any stakeholder group participant
14 filing a Change Request will set forth all reasons and provide support for the
15 requested change in its initial Change Request filing. Responses to a Change
16 Request may be filed by any stakeholder group participant and are due 21
17 days after the Change Request is filed. The response should set forth all
18 reasons and provide support for opposing or agreeing with the Change
19 Request. Within two business days after the deadline for filing a Change
20 Request (if a Change Request is filed), the Signatories agree that the
21 stakeholder group participants will hold a conference call/meeting to agree
22 upon a proposed procedural schedule that results in any evidentiary hearing
23 that is necessary to resolve the Change Request to be completed within 60
24 days of the filing of the Change Request, and which will recommend to the
25 Commission that the Commission issue its Report and Order resolving the

¹ MEEIA is the Missouri Energy Efficiency Investment Act of 2009, § 393.1075, RSMo. 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.

² File No. EO-2012-0142, Unanimous Stipulation And Agreement Resolving Ameren Missouri's MEEIA Filing, pp. 15-19.

1 Change Request within 30 days after the conclusion of such a hearing. The
2 Signatories anticipate a hearing with live testimony may be required to
3 resolve a Change Request, but if a hearing is not required, they agree to
4 cooperate in good faith to obtain Commission resolution of a Change Request
5 as soon as possible. The Signatories will be parties to a Change Request
6 resolution proceeding without the necessity of applying to intervene. The
7 procedural schedule for such a Change Request proceeding will provide that
8 data request objections must be lodged within 7 days and responses will be
9 due within 10 days (notifications that additional time is required to respond
10 will also be due within 7 days) (Stipulation, p. 16-17).

11 Ameren Missouri hired The Cadmus Group, Inc. (“Cadmus”) to prepare an EM&V Report
12 for each of its residential MEEIA Programs, and ADM Associates, Inc., (“ADM”) to prepare
13 an EM&V Report for its commercial and industrial MEEIA Programs. Ameren Missouri has
14 now completed the first year of energy efficiency measures, and the third party evaluators,
15 Cadmus and ADM, have completed EM&V activities culminating in the filing of the Reports
16 as revised on June 12, 2014 (Collectively referred to as "EM&V Reports" or “Reports”).

17 In accordance with Commission Rule 4 CSR 240-20.093(7), the Commission issued a
18 Request For Proposals and subsequently hired Johnson Consulting Group, LLC, (“Johnson
19 Consulting” or “Auditor”), as its “...independent contractor to audit and report on the work
20 of each utility’s independent EM&V contractor.” On July 2, 2014, the Commission’s
21 Auditor filed its EM&V Auditor Final Report and Appendix A: Auditor Market Effects Sales
22 Analysis. Johnson Consulting Group later filed its updated third Final EM&V Auditor Report
23 and Supporting Documentation on August 27, 2014.

24 Accurate EM&V results are important because all Signatories to the Stipulation are bound by
25 the impact evaluation portion of the final EM&V Reports, as they may be modified by the
26 Commission’s resolution of any Change Request. The accuracy of the impact evaluation in

1 each final EM&V Report is significant because it determines the level of performance
2 incentive Ameren Missouri will receive for its implementation of each MEEIA Program.
3 Ameren Missouri will begin to bill its customers for the awarded incentive amounts
4 following the three year cycle of MEEIA Programs.

5 The Stipulation also requires any stakeholder group that wants a change to the impact
6 evaluation portion of a final EM&V Report to file a request before the Commission within 21
7 days of the filing of a final EM&V Report in this matter.

8 On July 3, 2014, the Staff filed *Staff's Change Request For Adjustment To Ameren*
9 *Missouri's Report of 2013 Annual Energy Savings And Net Benefits From MEEIA Programs*.
10 Also on July 3, 2014, Ameren Missouri filed an *Application For Approval of Change*
11 *Request* seeking to make certain changes to the EM&V reports that were filed by the
12 Company's third party evaluators, Cadmus and ADM.

13 On July 7, 2014, the Staff of the Missouri Public Service Commission ("Staff"), Public
14 Counsel, and the Missouri Department of Economic Development-Division of Energy
15 ("Division of Energy") filed the *Joint Proposed Procedural Schedule For Change Request*.

16 On July 17, 2014, the Commission issued its *Order Establishing Procedural Schedule to*
17 *Consider Change Requests* to set the matter of the program year 2013 change requests for
18 Commission determination.

19 Then, on July 30, 2014, Ameren Missouri joined Staff, Public Counsel, and the Division of
20 Energy in the *Motion to Modify Procedural Schedule*. On the motion of Ameren Missouri
21 and Staff, the Commission issued its *Order Staying Procedural Schedule* on August 20,
22 2014, to allow the parties additional time to conduct settlement discussions.

23 On September 19, 2014, Ameren Missouri and Staff filed a *Non-Unanimous Stipulation and*
24 *Agreement Settling the Program Year 2013 Change Requests*. Public Counsel objected and
25 requested an evidentiary hearing.

1 In compliance with the Commission's *Order Directing The Parties To File A Proposed*
2 *Procedural Schedule*, Public Counsel proposed the same procedural schedule that had been
3 agreed to by the parties and ordered by the Commission on two occasions. Ameren Missouri
4 and Staff would not agree to adopt the same procedural schedule and filed a competing
5 procedural schedule on October 1, 2014.

6 On October 3, 2014, the Commission issued its *Order Establishing Partial Procedural*
7 *Schedule to Consider Change Requests*. That procedural schedule established a date for
8 stakeholder response to any change request filed.

9 It is pursuant to that Order and the 2012 Stipulation that the Office of Public Counsel now
10 offers these comments in response to the change requests for the purpose of determining the
11 2013 incremental annual energy and demand savings and net benefits calculation for Ameren
12 Missouri's MEEIA programs.

13 **Q. Please provide a brief glossary of commonly used terms with a working example.**

14 There are several terms that are utilized throughout this testimony that are related to the
15 EM&V of energy efficiency programs. For purposes of this testimony I will use the
16 following terms and concepts including:

17 **The Net-to-Gross (NTG) ratio:**

18 This is a ratio used to determine the actual energy savings attributable to a particular
19 program, as distinct from energy savings that would occur naturally (in the absence of the
20 program).

- 21 • The gross estimate amount is represented as 1.0. The net amount can be
22 higher or lower
- 23 • A net-to-gross above 1.0 suggests that the program produced additional
24 benefits beyond the savings from the actual rebated measure.

- A net-to-gross below 1.0 suggests that the program overstated the benefits associated with the savings from the actual rebated measure.

Free Rider (or free ridership):

This term describes a customer who would have taken the recommended action on their own, even if a program did not exist.

- Free ridership estimates lower the net-to-gross ratio (1.0 – free ridership).
- Cadmus/ADM and the Auditor agree on the free ridership estimates.
- Ameren believes these estimates are overstated.

Spillover:

This term describes that some customers will be influenced by a program and will take a recommended action, but will never claim an incentive.

- Spillover estimates raise the net-to-gross ratio (1.0 + spillover).
- The Cadmus (residential program) evaluation broke spillover into subsets, non-participant spillover and participant spillover.
- The ADM (business program) evaluation only utilized participant spillover.
- Cadmus/ADM and the Auditor disagree on the spillover estimates, but the differences between the two are not pronounced.

Participant spillover example: An Ameren Missouri ratepayer buys an Ameren Missouri rebated CFL, becomes more energy efficiency conscious as a result of the purchase and then decides to buy an energy efficient TV (that is not rebated by Ameren).

Non-participant spillover example: An Ameren Missouri ratepayer sees an Ameren Missouri energy efficiency commercial on TV and as a result of that commercial decides to buy an energy efficient TV (that is not rebated by Ameren Missouri).

1 **Market Effects:**

2 This describes a change in the structure of a market that is casually related to the utility's
3 programs.

- 4 • Market effects estimates raise the net-to-gross ratio (1.0 + market effects).
- 5 • The Cadmus (residential program) evaluation factored in market effects for
6 one program—LightSavers.
- 7 • The ADM (business program) did not utilize market effects.
- 8 • The Auditor included two final estimates in their evaluation:
 - 9 ▪ One with a different calculation for market effects in the LightSavers
10 program.
 - 11 ▪ One without any factor for market effects in the LightSavers program.
- 12 • OPC and Staff (in their initial change request) reject the use of market effects
13 in both Cadmus and the Auditor's version.

14
15 **Upstream Lighting Program**

16 A program designed to provide instant rebates on lighting at the point of purchase. Utilities
17 work with retailers and distributors to “buy down” the original cost of an efficient light bulb.
18 Light bulbs are then placed on store shelves at a reduced price to entice energy efficient sales.

- 19 • A customer goes into a Lowe's and buys a \$3.00 CFL for \$1.00. The price
20 has been subsidized prior to this purchase by Ameren Missouri ratepayers.

21
22 **The Net-to-Gross Ratios Being Used:**

Basic formula:	$NTG = 1.0 - \text{free ridership} + \text{spillover}$
Cadmus:	$NTG = 1.0 - \text{free ridership} + \text{participant} + \text{nonparticipant}$
Cadmus (LightSavers):	$NTG = 1.0 - \text{free ridership} + \text{participant} + \text{nonparticipant} + \text{market effects}$
ADM:	$NTG = 1.0 - \text{free ridership} + \text{participant}$

- 1 • The calculation of net-to-gross is different in many States. States vary
2 considerably over the appropriate factors of net-to-gross with some states
3 only including free ridership and other States not even attempting to calculate
4 net savings.
- 5 • Net savings are generally used when a performance incentive is at stake
6 and/or if stakeholders want to know what actually occurred for program
7 design purposes moving forward.
- 8 • In Missouri we calculate both gross and net savings. Gross savings for
9 purposes of the lost revenue mechanism and net savings for purposes of the
10 performance incentive.

11 **Q. Please provide an overview of the specific topics you will be discussing including what is**
12 **agreed on and what is potentially at stake.**

13 A. The OPC and other stakeholders are in general agreement on a number of issues. All parties
14 believe that Ameren Missouri performed well in PY2013. Every estimate of the annual net
15 shared benefits and MWh savings for the program year before the commission in this filing
16 reflects Ameren Missouri outperforming their 2013 target goal, and shows Ameren Missouri
17 is well on its way to achieving the maximum performance incentive available to them.

18 Ameren Missouri's energy efficiency savings are largely a result of one program—
19 LightSavers, which is mostly a result of one measure—a rebate for the standard compact
20 fluorescent light bulb (CFL).

21 The number of CFLs that were sold in PY2013 is not being contested. Due to the unanimous
22 stipulation and agreement entered into by parties in 2012, Ameren Missouri will receive the
23 estimated gross savings attributed to each bulb (over 4 million CFLs) through their lost
24 recovery mechanism.

1 What is contested is the impact and evaluation attributed to not just the CFL but to the
2 LightSavers program (i.e., marketing, trade ally/vendor/customer awareness). This is also
3 known as the estimated net savings by which the utility performance incentive amount is
4 determined.

5 Ameren Missouri, and their EM&V evaluator Cadmus, argue that through Ameren
6 Missouri's efforts, the LightSavers program transformed the lighting market in their service
7 territory. They argue that the rebated CFL had an overall effect of inducing additional energy
8 efficient actions, and that these actions collectively changed the market for how retail stores
9 and vendors operate their business and how customers approach energy efficiency.

10 Public Counsel agrees many CFLs were sold. However, a lot of those CFLs would have been
11 purchased regardless of the program. Ameren Missouri and Cadmus are overstating the
12 benefits that they are claiming are a result of these discounted CFLs. My testimony will
13 provide evidence that the market effects Ameren Missouri and Cadmus are claiming are
14 really a result of creative and aggressive evaluations and more accurately attributable to
15 outside forces (federal legislation) and separate actors (naturally occurring market forces).

16 At the end of the testimony I also address an additional issue—the net shared benefit
17 calculation. This estimate is miscalculated and overstates the net shared benefits because it
18 does not accurately reflect the cost of incentives as addressed in 4 CSR 240-20.093(1)(C).

19 OPC believes that there are a number of issues at stake as a result of this filing including:

- 20 • As much as \$4,110,991 in excess performance incentives being
21 awarded to Ameren for PY2013.
- 22 • A likely similar excess award for PY2014 and PY2015.
- 23 • A non-binding, but nonetheless precedent setting case facilitating
24 similar outcomes for ratepayers from other Missouri electric IOUs
25 under Commission approved MEEIA plans.

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Q. What is the purpose of your testimony?

A. The purpose of this testimony is to address:

- The original change request filed by Ameren Missouri that reduces free ridership estimates.
- The direct testimony of Ameren Missouri employee Rick Voytas filed in support of that change.
- The original change request filed by the Public Service Commission Staff (Staff) that proposes to eliminate market effects.
- The non-unanimous stipulation and agreement entered into by Staff and Ameren Missouri which proposes a “black box” calculation of the energy savings and net shared benefits amount.
- The appropriate method to calculate the net shared benefits under Commission rules 4 CSR 240-20.093(1)(C).

Q. Please summarize your primary recommendations.

A. The OPC recommends that the Commission reject Ameren Missouri’s proposed downward adjustment of free ridership scores because they are unreasonable and result in an overestimation of net shared benefits. The Commission should adopt Staff’s initial change request that calls for the elimination of market effects in the formula used to calculate the LightSavers net-to-gross ratio. Additionally, the net shared benefits amount has been inaccurately calculated per 4 CSR 240-20.093(1)(C). An accurate and reasonable amount reflecting the utility’s performance incentive should be deducted from the calculation of the net shared benefits, as it is ultimately a cost that ratepayers will have to pay.

1 **II. RESPONSE TO AMEREN MISSOURI'S CHANGE REQUEST FOR**
2 **ADJUSTMENTS IN FREE RIDERSHIP**

3 **Q. What is Ameren Missouri's change request asking for?**

4 A. Ameren Missouri argues that the free ridership scores are overstated in the evaluators'
5 (Cadmus for residential and ADM for business) EM&V reports and that the overall portfolio
6 savings should be increased by 5,512,606 kWh. This would result in a total of 395,996,803
7 kWh (or 395,996 MWh) of energy savings for PY2013.

8 **Q. On what basis does Ameren Missouri support their change request?**

9 A. Ameren Missouri witness, Rick Voytas, argues that estimates of free ridership by both
10 Cadmus and ADM are overstated due to the reliance on standardized self-reporting surveys
11 to estimate net-to-gross ratios. Mr. Voytas contends that self-reporting surveys are subject to
12 bias which has the direct effect of overstating free ridership and, thus, understating the overall
13 impact of Ameren Missouri's MEEIA portfolio. Mr. Voytas proposes a readjustment based
14 on a proprietary market research paper by the market research firm YouGov.

15 **Q. How do you respond?**

16 A. I agree with Mr. Voytas that self-reporting bias is an issue inherent in survey design.
17 However, there is insufficient supporting evidence of self-reporting bias in the evaluators'
18 work to warrant a collective downward adjustment in free ridership scores. Moreover, as I
19 discuss in this testimony, the evaluators' estimates of free ridership are conservative in their
20 final net-to-gross calculation. No additional adjustment to free ridership is necessary.

21 **Q. Please explain.**

22 A. There are a number of reasons why it would be inappropriate to make any downward
23 adjustment to free ridership estimates including:

1 **The Program evaluators' anticipated and addressed self-reporting bias.**

2 As the Company is well aware and has acknowledged in the testimony of Mr. Voytas, the
3 evaluators are recognized industry leaders and fully aware of the threat of self-reporting bias
4 inherent in self-reporting surveys and have taken steps to mitigate this problem. Cadmus, in
5 particular, has written publicly about the need to account for this type of bias in their article,
6 *The Trouble with Freeriders*.³ In fact, Mr. Voytas praises Cadmus for their knowledge on
7 the subject in his direct testimony, stating:

8 Cadmus wrote the most comprehensive, thoughtful, and analytic explanation
9 of the two issues that I have read on the subject. **There should be no**
10 **question that Cadmus understands beyond a shadow of a doubt the**
11 **issues underlying the high free ridership bias resulting from the use of**
12 **customer self-reporting surveys** (p. 11, 9-12) (emphasis added).

13 This is high praise for an evaluation team (that includes one of the authors of the referenced
14 article) he subsequently criticizes. Cadmus and ADM collectively represent many years of
15 EM&V analysis, were personally selected by Ameren based on their credentials, and are well
16 aware of proper survey designs to mitigate various bias results. It also should be noted that
17 the evaluators relied on additional data points in calculating a program's net-to-gross ratios
18 (e.g., time-of-use studies, on-site inspections, surveys with program administrators and trade
19 allies, etc...).

20 **Self-reporting by contractors and trade allies also suffers from the potential of self-**
21 **reporting bias.**

22 Mr. Voytas suggests that instead of focusing on the customers who purchased the rebated
23 product, greater emphasis should be placed on trade allies and contractor feedback.
24 According to Mr. Voytas,

³ Haeri, H. & Khawaja S.M. (2012) *The Trouble with Freeriders*. Public Utilities Fortnightly
<http://www.cadmusgroup.com/wp-content/uploads/2012/11/Haeri-Khawaja-PUF-TroublewithFreeriders.pdf>

1 Contractors or trade allies, who know when sales volumes change
2 meaningfully from year-to-year, saw a definite correlation between increased
3 efficient air conditioner sales and the Ameren MO CoolSavers program and
4 associated customer financial incentives in 2013. This is proof positive that
5 the CoolSavers customer self-reporting surveys yield estimates of free
6 ridership that were biased in the high direction (p. 13, 26 – 30).

7 The problem with this approach is that trade allies and contractors more so than any group
8 outside the utility itself, risk offering a biased response regarding the impact of rebates on a
9 customer's purchasing decision. Why? Because they stand to gain financially from it.
10 Whereas the customer's answer might vary if the questionnaire is not properly designed, the
11 contractor may be more inclined to positively affirm a program that generates more business.
12 This is not to suggest that trade allies and vendors should not be utilized in the EM&V
13 process. But instead that their collective responses are better utilized in program design, not
14 program impact.

15 What is perplexing about Mr. Voytas' assertion is that Cadmus did adjust free ridership
16 scores based on trade ally and vendor responses. In fact, he cites an excerpt from the Cadmus
17 ApplianceSavers Evaluation in his testimony:

18 When asked what percentage of their customers decided to replace this year,
19 the contractor typically responded that about one-third to two-thirds replaced
20 their system this year due to the incentive when they otherwise would have
21 deferred replacement. As these responses do not agree with the participants'
22 self-reported responses (about 60% claimed they planned to replace this year,
23 even without the incentive), **we adjusted free ridership scores. If a**
24 **participant claimed an intention to install this year, but also said their**
25 **contractor had an important influence on the decision to install the new**

1 **system, we applied a decrement to the free ridership score; so the results**
2 **would more closely align** (qtd in Voytas p. 13, 9 – 20) (emphasis added).

3 It is unclear what more Mr. Voytas is asking for in this case. If he believes that the customer
4 surveys should be eliminated entirely in favor of feedback from trade allies and vendors, I
5 disagree. If he is in favor of weighting customer responses downward and trade ally's
6 surveys upward, I disagree to this as well, because it would be inappropriate given the
7 potential for a financial motivation to infect the calculation of the net-to-gross ratio.

8 **The free ridership estimates are already conservative.**

9 There will always be light bulbs that will need to be replaced and energy efficient HVAC's
10 will continue to be sold regardless of whether or not the local utility company gives out a
11 rebate. Some consumers will be more likely to partake in energy efficient upgrades
12 regardless of the cost. Ratepayers should not subsidize actions that would have occurred
13 naturally, let alone reward utilities for these naturally-occurring actions.

14 Unlike spillover, which has been broken down into three subsets in these evaluations
15 (participant, nonparticipant, and market effects), free ridership classification has not been
16 further refined by the evaluators. A review of the most recent edition of the National
17 Renewable Energy Laboratory (NREL) Uniformed Method Projects⁴ does provide
18 descriptions of subsets of free ridership including:

19 **Total free riders:** Participants who would have completely replicated the program
20 measure(s) or practices on their own and at the same time in the absence of the program.

21 **Partial free riders:** Participants who would have partially replicated the program measure(s)
22 or practice(s) by implementing a lesser quantity or lower efficiency level.

⁴ Under the Department of Energy, the Uniformed Methods Project is an attempt to develop a framework and a set of protocols for determining the energy savings from specific energy efficiency measures and programs.

1 **Deferred free riders:** Participants who would have completely or partially replicated the
2 program measure(s) or practice(s) at the time after the program timeframe.⁵

3 What we count and how we classify items matters. The evaluators elected to use the most
4 conservative classification of free ridership. Had *partial* or *deferred* free ridership been
5 counted, the final results would be greater. Of course this did not happen, nor should it in
6 Missouri because this is the sort of differentiating that only leads to a point of diminishing
7 returns for ratepayers. However, it is important to note and account for the fact that the
8 upstream lighting program in particular is subject to a special form of free ridership known as
9 “leakage.”

10 According to the Arkansas Technical Resource Manual:

11 Cross-territory sales, or “leakage,” occur when program-incented efficient
12 products are installed outside of the funding utility’s service territory. When
13 this occurs, the energy and demand savings from the incentivized product are
14 not being realized within the territory that paid for, and is claiming savings
15 for, the unit. Upstream programs are particularly vulnerable to leakage as the
16 rebate recipient is unknown and sales not restricted based on utility.⁶

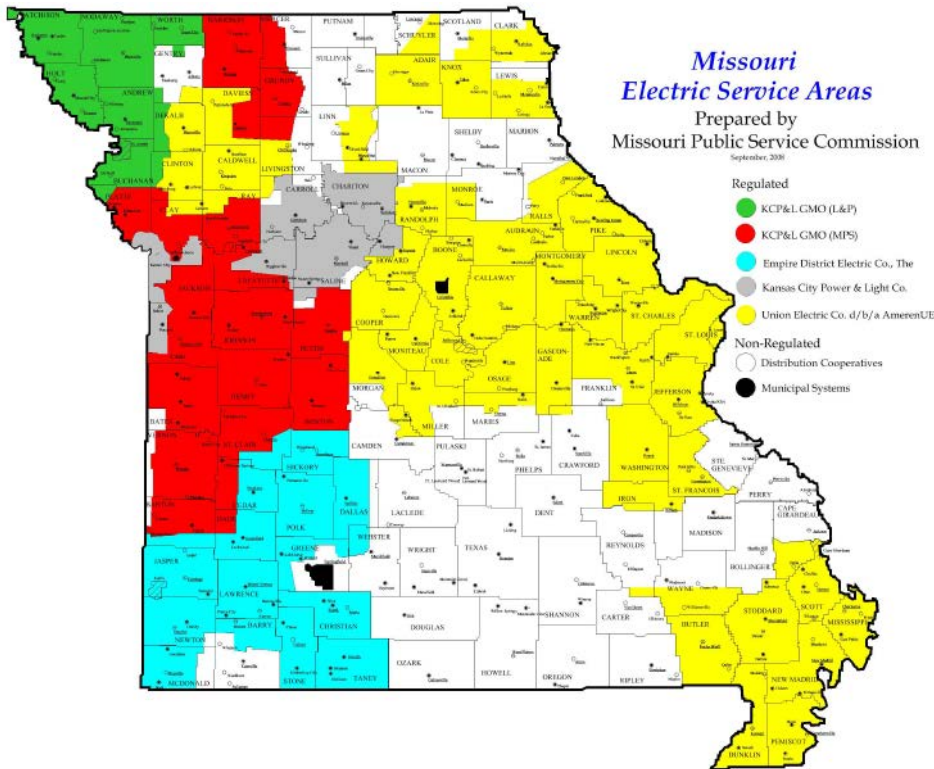
17 Leakage Example: A Co-Op utility ratepayer goes into a Wal-Mart and buys an Ameren
18 Missouri rebated CFL. Ameren ratepayers have subsidized the purchase but have not
19 received the direct benefits.

20 This can be a huge problem. For example, recently Arkansas experienced a contested case
21 where the Southwestern Electric Power Company’s (SWEPCO, an Arkansas electric IOU)

⁵ Violette, D. & Rathburn, P. (2014) Chapter 17: Estimating Net Savings: Common Practices. National Renewable Energy Laboratory. <http://www.nrel.gov/docs/fy14osti/62678.pdf>

⁶ APSC Docket 10-100-R-Doc. 110 filed 8/30/2013 <http://www.apscservices.info/EEInfo/TRM.pdf>

1 EM&V leakage results were estimated to account for 55.75% of their overall sales.⁷ Leakage
2 can be a significant problem in states where rebates are not uniform across utilities. In
3 Ameren Missouri's case, leakage can present a problem because their service territory
4 borders with multiple co-ops, municipal utilities and other investor-owned utilities that do not
5 participate in a similar program. A look at the Missouri electric utility service area map
6 provided on the Missouri Public Service Commission's website illustrates the vast potential
7 for leakage inherent in Ameren's LightSavers program. Ameren Missouri's service territory
8 represents the yellow sections on the state (or light grey if testimony is not in color).⁸



9

⁷ APSC Docket 07-082-TF: In the matter of the application of Southwestern Electric Power Company's initial energy efficiency program plan and energy efficiency cost rate rider. http://www.apscservices.info/pdf/07/07-082-tf_303_1.pdf

⁸Missouri Public Service Commission (2014) Map of Missouri Electric Service Areas. <http://psc.mo.gov/CMSInternetData/Electric/Missouri%20Electric%20Service%20Area%20Map-9-18-08.pdf>

1 The Cadmus evaluation does in fact attempt to account for leakage at the ex-post level by
2 estimating that 3.3% of all upstream markdown bulbs were purchased by non-Ameren
3 customers in 2013. According to Cadmus, leakage rates decreased from 8.7% to 3.3% since
4 the 2010 study. Cadmus attributed this drop in leakage to a change in Ameren's retail partner
5 vendor APT, who only allowed national chain retailers (Wal-Mart, Home Depot, Lowe's) to
6 participate with stores in locations in a zip code with 70% or more of the meters belonging to
7 Ameren. As a result Cadmus came up with the following estimates as seen in Table 1:

8 Table 1: Cadmus Estimates of "leakage" in Ameren Missouri PY2013

Ameren light bulbs sold to Ameren ratepayers	4,028,717 (96.7%)
Ameren light bulbs sold to non-Ameren ratepayers	137,484 (3.3%)
	4,166,201 total bulbs

9
10 Based upon the aforementioned, 3.3% is a very conservative leakage estimate. To be sure,
11 other utilities operating with similar patchwork service territories have seen leakage rates at
12 much higher levels, as described above for SWEPCO operating in Arkansas.

13 **Q. Your testimony has primarily centered on Ameren Missouri's response to residential**
14 **free ridership estimates. Does Ameren provide any response to estimates of free**
15 **ridership on the business side?**

16 A. Yes. The business evaluation was conducted by a different evaluation team, ADM. Mr.
17 Voytas is critical of ADM's approach in his testimony and suggests that they incorporated a
18 minimalist approach in estimating free ridership. His main concern stems from the fact that
19 they did not attempt to survey the business program trade allies. He also suggests that ADM
20 could have reviewed customer maintenance records to see if there were any patterns of
21 upgrading equipment to more efficient standards.

1 **Q. Would reviewing business records help inform EM&V estimates?**

2 A. More data points are always a good thing, but even reviewing customer maintenance records
3 is not going to give a clear picture of the motivation behind a customer's decision.
4 Additionally, it is unclear how the evaluators would gain access to such information—which
5 would likely be proprietary.

6 **Q. Are you troubled that ADM didn't interview business trade allies?**

7 A. No. I understand why Mr. Voytas would want trade ally feedback to be included in the
8 calculation of free ridership, but as expressed above, all of the potential disadvantages of self-
9 reporting surveys are only exaggerated when the questions are posed to an entity that has a
10 financial stake in the outcome.

11 **Q. Did ADM differ in any other meaningful way from the residential evaluator, Cadmus?**

12 A. They did not include market effects or nonparticipant spillover in their calculation. In that
13 sense, the ADM calculation is similar to the basic NTG calculation I described earlier:

14
$$\text{NTG} = 1.0 - \text{free ridership} + \text{spillover}.$$

15 **Q. How is Ameren Missouri proposing to adjust the free ridership scores?**

16 A. Mr. Voytas cites work utilized in the 2013 Ameren Missouri potential study from Dr. David
17 Lineweber as well as the proprietary research conducted by Dr. Lineweber's team in 2010
18 from YouGov, a market research firm. From Mr. Voytas' testimony:

19 Q. Please provide the adjustment factors and the rationale for using them
20 from Dr. Lineweber's work.

21 A. Essentially, the primary adjustment for those residential respondents who
22 rate a given program as a "10" (extremely likely to participate") and who also

1 are rated as “high” on EE information/familiarity, then realistically, about
2 56% of those will ultimately sign up for the program (p. 24, 7-12).

3 This means that if a surveyed respondent said they would have without question bought the
4 energy efficient item regardless of the Ameren Missouri rebate, admitted free riders, we
5 should still only treat their answer as a partial free rider (56% in the most extreme case for
6 residential respondents) and produce a downward adjustment on free rider numbers
7 accordingly.

8 **Q. Did Ameren apply downward adjustment across the board based on the YouGov data?**

9 A. No. Commenting on how it would apply to the ADM surveys, Mr. Voytas states:

10 We placed a higher priority on simplicity of approach rather than accuracy of
11 the adjustment. We choose to use the highest possible free ridership
12 adjustment factor from the table developed by David Lineweber. A more
13 accurate but formulaically challenging approach would have been to apply the
14 full gamut of adjustment factors ranging from 0% to 83% depending on the
15 specific responses of individual customers to each free ridership survey
16 question.

17 But what Mr. Voytas says is inconsistent with the numbers that he produces to quantify free
18 ridership. For example here is a breakdown of his suggested changes:

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Table 2: Ameren’s Free Ridership Adjustments (Adapted from Voytas p. 27-28)

Program Name	Original Free Ridership by Cadmus/ADM	Adjusted Free Ridership by Ameren	Difference
ApplianceSavers	39%	22%	17% decrease
CommunitySavers	4%	2%	2% decrease
ConstructionSavers	72%	72%	No change
CoolSavers	25%	14%	11% decrease
LightSavers	21% ⁹	20%	No change
PerformanceSavers	17%	7%	10% decrease
RebateSavers	13%	8%	5% decrease
Business Custom	7.88%	6.54	1.34% decrease
Business Standard	4.79%	3.98%	.81% decrease
Business New Construction	6.00%	4.98%	1.02% decrease
Business Retro	33.00%	27.39%	5.61% decrease

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As you can see above, some program free ridership scores did not change at all. Others changed considerably. There are no examples of free ridership scores being raised.

5

Q. Is this the first time Ameren Missouri has utilized this method?

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A. **

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⁹ Mr. Voytas cites the wrong free ridership ratio in his testimony. 24% is what Cadmus and the auditor agreed to for the upstream portion of the LightSavers program. The SMD portion of the LightSavers program had a net-to-gross of 1.0. The weighted free ridership of both the upstream and SMD program was agreed on to be 21%.

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¹¹ **

Q. Please comment on what you received in response to your data requests.

A. I received a copy of a white paper authored by three individuals, none of whom were named David Lineweber. I also received a copy of the 2013 Ameren Missouri Market Potential Study and a copy of an email request made by Mr. Voytas in response to a data request made by stakeholders in December regarding its application to the market potential study.

¹⁰ OPC data request 2001 sent July 11, 2014

¹¹ OPC data request 2002 sent July 11, 2014

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Q. Please comment on the white paper study.

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Q. Do you have any comments regarding the omission of Dr. Lineweber from the white paper that was referenced?

1 A. Although I found it peculiar that he hadn't actually authored the study he was being credited
2 for, I understand that he was likely functioning in the role of a consultant and speaking to the
3 proprietary market data obtained by his company. Interested in what work he has authored, I
4 searched Google for "David Lineweber," "YouGov," and "pdf," which produced the
5 following white papers:

- 6 • Few residential customers want dynamic pricing¹²
- 7 • Residential customers say "we've done enough."¹³
- 8 • Not much trust in utility oversight¹⁴
- 9 • Why simply "educating" customers about energy efficiency is not
10 likely to change behavior¹⁵
- 11 • Do rebates move customer purchases?¹⁶

12 The common theme in all of the articles is that consumers are not interested in energy
13 efficiency. The last article "Do rebates move customer purchases?" in particular caught my
14 attention because of subject matter of this filing. I found the following statement in the
15 summary and implication sections of that article:

16 Our research shows that among the quarter of US utility bill-paying
17 households that say they have received a rebate for purchasing/installing an
18 EE appliance or measure, the largest proportion (42%) say that the rebate had
19 no effect on their choice. . . . Most rebates appear to be going to customers
20 who would have purchased the more efficient option without the rebate. (p.
21 3).

¹² http://cdn.yougov.com/cumulus_uploads/document/mklaz9yt3u/Few-Residential-Customers-Want-Dynamic-Prices-Yet.pdf

¹³ http://cdn.yougov.com/cumulus_uploads/document/p5fs55efvs/Residential-Customers-Say-Weve-Done-Enough.pdf

¹⁴ http://cdn.yougov.com/cumulus_uploads/document/4tdhc727fy/Not-Much-Trust-in-Utility-Oversight.pdf

¹⁵ http://cdn.yougov.com/cumulus_uploads/document/zc6hlgett5/Why-Simply-Educating-Customers-is-Not-Likely.pdf

¹⁶ http://cdn.yougov.com/cumulus_uploads/document/b9uycc2apo/Do-Rebates-Move-Customer-Purchases.pdf

1 Though subject to the same bias concerns raised previously, it is curious that Ameren
2 Missouri's authoritative source reaches this conclusion. Based upon this proprietary data
3 from Dr. David Lineweber, one could conclude that 42% of Ameren Missouri's energy
4 efficiency program participants are free riders and that we should adjust our net-to-gross ratio
5 to reflect that.

6 White papers, grey papers, and documents created to generate and attract business from
7 perspective clients should be held with a degree of skepticism, and should rarely (if ever) be
8 used as a substitute for primary data. That said, it appears as though Ameren Missouri is
9 trying to have it both ways.

10 **Q. What do you mean by both ways?**

11 A. Ameren Missouri is utilizing an opaque proprietary market research study and generalizing
12 the information therein creating both smaller target goals for their potential study and higher
13 gains for their EM&V reports. Again, I can think of no situation where it would be
14 appropriate to utilize unsubstantiated secondary data to alter primary data collected from not
15 one but now three sources¹⁷ at the cost of millions of dollars in program costs (related to the
16 potential study and now the EM&V reports) and potential millions of dollars in performance
17 incentive award amounts.

18 **Q. Earlier in testimony you stated that Ameren Missouri adjustments would yield 395,996**
19 **MWh in overall claimed savings. What would that number be in relation to their**
20 **original PY2013 target goal?**

21 A. It would be 165% of their original target (240,397 MWh for PY2013).

¹⁷ That would be data collected by EnerNoc for the market potential study, and data collected by Cadmus and ADM for the EM&V reports.

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Q. What would that number be in relation to their three-year MEEIA target goal?

A. It would include 49.9% of their combined three-year goal that was filed (793,100 MWh).¹⁸

Q. Will Ameren start collecting a performance incentive if they meet the 793,100 MWh goal by the end of 2015?

A. Yes. Ameren Missouri can receive a performance incentive at 70% of its target. Specifically, that incentive (at the 70% mark) would be 4.60% of the net shared benefits. The percentage increases incrementally 10% from that threshold up to 130% of its target at which point Ameren Missouri would then receive 6.19% of the net shared benefits. This can be seen in Table 3 below.

¹⁸ It should be noted that the final target goal will be subject to change depending on adjustments for opt-out customers from the business side. At the moment, Ameren has assumed that there would be more opt-out customers than what has actually occurred to date. However, there are still two additional years where those assumed opt-out projections could be realized or be potentially greater. If more customers opt-out than what was anticipated than the overall target goal would be smaller.

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Table 3: Performance Incentive¹⁹

Percent of % MWh Target	3-Year Total (\$MM)	Percent of Net Benefits ²⁰
<70	\$0.00	0.00%
70	\$12.00	4.60%
80	\$14.25	4.78%
90	\$16.50	4.92%
100	\$18.75	5.03%
110	\$22.50	5.49%
120	\$26.25	5.87%
130	\$30.00	6.19%
<130	\$30.00	6.19%

3

Q. Is the performance incentive capped at 130%?

4

A. The percent of the net shared benefits is capped at 6.19% after 130% of its target is reached.

5

But there is no cap for the overall amount of net shared benefits the utility can receive

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towards performance incentives. For example, Ameren Missouri could reach 165% of its

¹⁹ From appendix B to attachment A in unanimous stipulation and agreement resolving Ameren Missouri's MEEIA filing and approving stipulation and agreement between Ameren Missouri and Laclede Gas 8/1/2012 EO-2012-0142

²⁰ Includes income taxes (i.e., results in revenue requirements without adding income taxes). Dollar figures shown in the above table are for initial design purposes only. The performance incentive awarded will be based on net benefits. The percentages are interpolated linearly between the performance levels.

1 targeted three-year goal and then it would recover 6.19% of every dollar of net shared
2 benefits as its performance incentive.

3 **Q. You've explained that there is no cap for Ameren Missouri's performance incentive,
4 but is there any penalty if they don't meet certain targets?**

5 **A.** No. There is no penalty imposed on the utility. The performance incentive is one of three
6 streams from which money is collected through the MEEIA process to ensure the utility is
7 made whole. The other two are program costs and the lost revenue mechanism.

8 **Q. Please summarize your main points regarding this section.**

9 **A.**

Ameren Missouri's request:

- Free ridership is overstated and should be adjusted downward

Ameren Missouri's rationale:

- Filed evaluations suffer from self-reporting bias
- Should rely on trade allies and vendors as opposed to customers for purchase intent
- Readjust the calculation based on YouGov proprietary market research data

Public Counsel's comment:

- Free ridership estimates should remain what both the evaluator and auditor agreed to

Public Counsel's rationale:

- Evaluators are trained professionals aware of how to design, administer, and evaluate surveys
- Trade allies and vendors are more likely to produce bias due to potential conflict of interest
- Free ridership estimates are already conservative
 - Not broken into subsets like spillover
 - Very small leakage rates reported
- YouGov adjustment has no foundation
 - Opaque, 5-page, non-peer reviewed paper from 2010 without context should not be used as a substitute or used to modify primary data collected on Ameren ratepayer behavior
 - Adjustments made to free ridership estimates are not clear

1 **Q. What is your conclusion regarding Ameren Missouri's free ridership change request?**

2 A. There is overwhelming evidence to suggest that adjusting free ridership scores downward is
3 unwarranted. I recommend that commission rely on the independent evaluators' and auditor's
4 conclusion regarding this estimate.

5 **III. RESPONSE TO AMEREN MISSOURI'S STATEMENT REGARDING**
6 **MARKET EFFECTS**

7 **Q. What is Ameren Missouri's change request statement regarding market effects?**

8 A. Ameren Missouri requests that the Commission recognize and approve market effects for the
9 LightSavers program.

10 **Q. Does Ameren Missouri provide any support of what constitutes market effects?**

11 A. Yes. Ameren Missouri provides overly broad definitions and a list of examples to define
12 market effects or market transformation including:

- 13 • Ameren Missouri's efforts leading to new appliance efficiency standards
14 and/or building codes
- 15 • Increased levels of awareness of energy efficient technologies among
16 customers and suppliers
- 17 • Increased availability of efficient technologies through retail channels
- 18 • Reduced prices of efficient models
- 19 • Build-out of efficient model lines
- 20 • Ultimately, the increased market share for efficient goods, services, and
21 design practices (Voytas 30, 4 – 16).

22

23

1 **Q. Please respond.**

2 A. Using Ameren Missouri's standard, there is no way to meaningfully isolate Ameren's
3 influence on market effects. All of these examples listed, with the exception of building
4 codes, describe what every energy efficiency program does by default. To illustrate this, look
5 at Ameren's CoolSavers program which gives a rebate for HVACs. Under the examples
6 above, one could make an argument that the HVAC program should be rewarded market
7 effects because

- 8 • Energy efficient HVAC systems prices were reduced through a ratepayer
9 rebates
- 10 • There was associated advertising for the program which presumably led to
11 some level of education for ratepayers
- 12 • The program was promoted to retailers that formerly did not have the rebate
13 option
- 14 • Any acceptance of the energy efficient HVAC would be building out less
15 efficient HVACs saturated in the market
- 16 • New HVAC standards will come on line in the future, but by simply offering
17 the program it would be encouraging acceptance towards that standard.

18 Ameren Missouri's standard for assessing the presence of market effects is simply not
19 meaningful; it offers no way to draw distinctions. Under this standard, if you have a program
20 then there are market effects. To give Ameren Missouri an additional boost in energy savings
21 for simply having the program is equivalent of giving a student a diploma for simply showing
22 up to school.

23 **Q. Can market effects decrease the net-to-gross ratio?**

24 A. I have never seen an example of market effects utilized for that purpose. Conceptually, I
25 have a difficult time understanding how that could work. In a response to Staff's question

1 regarding market effect calculations in DR-0057, Mr. Voytas states that “Market effects can
2 result in either an increase or decrease in the estimation of net-to-gross.” The basis for this
3 statement seems to stem from an excerpt he quoted in his testimony from the SEE “Energy
4 Efficiency Program Impact Evaluation Guide” which states:

5 Market Evaluations: a very broad category of activities that document aspects
6 of the marketplace with respect to energy efficiency. One particular type is a
7 market effects evaluation, which characterizes changes in the structure or
8 functioning of a market or the behavior of market participants that resulted
9 from one or more program efforts. Market effects evaluations can include
10 projections of impacts that a market could have on future energy efficiency
11 efforts. If the evaluator’s goal is to assess the cost-effectiveness for
12 stakeholders or regulators, excluding the measurement of market effects could
13 result in underestimating **(or possibly overestimating)** a program’s overall
14 benefits or cost-effectiveness (emphasis added).

15 The “or possibly overestimating” excerpt above that is in parenthesis seems to be the basis
16 for Mr. Voytas claiming that market effects could be adjusted to negatively impact the net-to-
17 gross. In practice, this would be difficult to prove. Under such a scenario, consumers would
18 make energy inefficient choices as a direct result of Ameren’s energy efficiency efforts.

19 **Q. Were there any programs that failed to live up to their expectations?**

20 A. Of course. Many of the programs had difficulty gaining significant traction during the first
21 year. This is not unusual.

22 **Q. Did any of those programs utilize a downward projection of market effects in their
23 calculation?**

24 A. No. There was only one program that utilized market effects, the LightSavers program, and it
25 was used in an upward projection.

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Q. Does Mr. Voytas address how market effects differ from spillover?

A. No. He is less clear on their differences. In his original testimony filed for the Ameren MEEIA application in 2012, Mr. Voytas focused on defining free ridership and spillover with a passing reference to market effects. In the latest direct testimony filed in response to the change request, he focuses his testimony on defining free ridership and market effects with a passing reference to spillover.

Q. How does the Uniformed Methods Project define spillover?

The Uniformed Methods Project breaks down spillover into participant (with four subtypes) and nonparticipant spillover. I will provide the definition and restate my own example to illustrate it.

Participant spillover: This represents the additional energy savings that are achieved when a program participant—as a result of the program’s influence—installs EE measures or practices outside the efficiency program after having participated.²¹

Example: An Ameren Missouri ratepayer buys an Ameren Missouri rebated CFL, becomes more energy efficiency conscious as a result of the purchase and then decides to buy an energy efficient TV (that is not rebated by Ameren).

Nonparticipant spillover: This represents the additional energy savings that are achieved when a nonparticipant implements EE measures or practices as a result of the program’s influence (for example, through exposure to the program) but is not accounted for in program savings.²²

²¹ Violette, D. & Rathburn, P. (2014) Chapter 17: Estimating Net Savings: Common Practices. National Renewable Energy Laboratory. <http://www.nrel.gov/docs/fy14osti/62678.pdf>

²² Ibid.

1 Example: An Ameren Missouri ratepayer sees an Ameren Missouri energy efficiency
2 commercial on TV and as a result of that commercial decides to buy an energy efficient TV
3 (that is not rebated by Ameren Missouri).

4 **Q. What does the Uniformed Methods Project say about market effects?**

5 **A.** The Uniformed Methods Project gives two paragraphs on the subject as follows:

6 Market effects refer to “a change in the structure of a market or the behavior
7 of participants in a market that is reflective of an increase in the adoption of
8 energy efficiency products, services, or practices and is causally related to
9 market intervention(s)” (Eto et al. 1996). For example, programs can
10 influence design professionals, vendors, and the market (through product
11 availability, practices, and prices), as well as influence product or practice
12 acceptance and customer expectations. All these influences may induce
13 consumers to adopt EE measures or actions (Sebold et al. 2001).

14 Some experts suggest that market effects can be “best viewed as spillover
15 savings that reflect significant program-induced changes in the structure or
16 functioning of energy efficiency markets.” Prahl et al. (2013) also suggest that
17 market transformation is a subset of market effects (as the substantive and
18 long-lasting effects). This view implies that market effects are a subset of
19 spillover. **Although spillover and market effects are related, the methods**
20 **used to quantify these two factors generally differ.** Therefore, this chapter
21 addresses them separately (emphasis added).²³

22 What we have here are two terms, spillover and market effects, that are similar but calculated
23 differently. Within those two paragraphs there is also a footnote that sheds some additional
24 insight on this issue:

²³ Ibid.

1 When assessing EE polices in a broad context, it should be acknowledged that
2 some participants identified as free riders in a current program might not have
3 the opportunity to adopt the EE measure or service were it not for the effects
4 on the market from previous EE program efforts. These efforts may have
5 contributed to that measure or service being available to customers in the
6 current year. **The importance of this issue to evaluation depends on the**
7 **parameters of the evaluation.** Most evaluations focus on set time periods
8 spanning 1-3 years. Factors that are included are based on the incremental
9 actions taken as a result of the EE program year being evaluated and the
10 current state of the EE market. **Actions taken that resulted from EE efforts**
11 **in preceding years represent sunk costs and are not incremental to the**
12 **current program being evaluated.** However, this may be an important
13 consideration in a broader policy assessment examining the overall trend in
14 the adoption of EE measures and services across a longer time period.
15 Market effects of previous years' programs may not have been fully
16 accounted for, and this can be a consideration in the broader policy context.
17 **However, for assessing the impacts of a given EE program for a given**
18 **year, these effects from past programs are not generally considered.** This
19 is discussed in more detail in Section 3.3. (emphasis added).²⁴

20 An Ameren MEEIA program implemented in 2013 should be evaluated as an incremental
21 investment. That is, a program implemented in 2013 should be evaluated against what is
22 attributable to that investment only—all impacts from prior years' programs are essentially
23 sunk costs and should not be considered. This is what parties agreed to in 2012 in the
24 Unanimous Stipulation and Agreement filed as a result of Ameren's MEEIA application and
25 stated on page 4 and 5 of the document (5.b.ii).

²⁴ Ibid.

1 NSB Relating to the Performance Incentive. After the conclusion of the
2 three-year Plan period, using final Evaluation, Measurement and Verification
3 (“EM&V”) results (with EM&V to be performed after each of the program
4 years 1,2, and 3), Ameren Missouri will be allowed to recover the
5 performance incentive, which is the percentage of NSB as described on
6 Appendix B attached hereto and incorporated herein by this reference (the
7 “Performance Incentive Award”). The cumulative net megawatt-hours
8 (“MWh”) determined through EM&V to have been saved as a result of the
9 MEEIA Programs will be used to determine the amount of Ameren
10 Missouri’s Performance Incentive Award, with the cumulative net MWh
11 performance achievement level (expressed as a percentage) being equal to
12 cumulative net MWh savings determined through EM&V divided by Ameren
13 Missouri’s total targeted 793,100 MWh (which is the cumulative annual net
14 MWh savings in the third year of the three-year Plan period). The targeted
15 net energy savings caused by actual opt-out. **Actual net energy savings for**
16 **each program year will be determined through the EM&V, including full**
17 **retrospective application of net-to-gross ratios at the program level using**
18 **EM&V results from each of the three program years, with the sum of the**
19 **three years’ actual net energy savings to be used to determine the**
20 **amount of the Performance Incentive Award.** Recovery of the
21 Performance Incentive Award is addressed in paragraph 6.c. (emphasis
22 added).²⁵

23 The parameters of the evaluation are clearly set to be the three-year period of 2013-2015 in
24 the Unanimous Stipulation and Agreement entered into by parties in 2012. Any actions
25 taken that resulted from energy efficiency efforts in preceding years represent sunk costs and

²⁵ Unanimous stipulation and agreement resolving Ameren Missouri’s MEEIA filing and approving stipulation and agreement between Ameren Missouri and Laclede Gas, filed on 8/1/2012, File No. EO-2012-0142.

1 are not incremental to the current program being evaluated. Because of these parameters,
2 market effects qualify as double counting of spillover in this evaluation, and thus, overstating
3 the actual energy savings obtained.

4 **Q. Have any other states recognized the use of market effects, nonparticipant spillover and**
5 **participant spillover simultaneously in their determination of the net-to-gross ratio?**

6 A. Not to my knowledge, and not under similar regulatory and incentive structures as Missouri.

7 **Q. What do you mean by similar regulatory and incentive structures?**

8 A. Table 4 is copied from a March 2014 Issue brief from the Edison Foundation: Institute for
9 Electric Innovation titled, “*Summary of Electric Utility Customer-Funded Energy Efficiency*
10 *Savings, Expenditures, and Budgets.*” It outlines 52 regulatory frameworks for electric
11 efficiency programs sorted by annual state electric efficiency budgets.

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1 Table 4: Regulatory Framework and 2013 Electric Efficiency Budgets (Sorted by Budget)

Table 7: Regulatory Framework and 2013 Electric Efficiency Budgets (Sorted by Budget)

Rank	State/Region	2013 Electric Efficiency Budgets	Fixed Cost Recovery		Performance Incentive	Energy Efficiency Resource Standard
			Decoupling	Lost Revenue Mechanism		
1	CA	\$1,503,323,248	Yes		Yes	Yes
2	NY	\$610,887,944	Yes		Yes	Yes
3	FL	\$509,045,607				Yes
4	MA	\$475,642,766	Yes		Yes	Yes
5	NJ	\$407,323,844				
6	PA	\$247,530,848				Yes
7	OH	\$223,662,799	Yes	Yes	Yes	Yes
8	IL	\$221,260,111				Yes
9	TX	\$221,228,986				Yes
10	WA	\$199,043,798	Yes			Yes
11	*NW	\$169,381,147	Yes	Yes	Pending	Yes
12	AZ	\$164,334,468		Yes	Yes	Yes
13	MI	\$154,801,089			Yes	Yes
14	IN	\$147,919,951		Yes	Yes	Yes
15	IA	\$133,175,420				Yes
16	OR	\$121,323,558	Yes			Yes
17	NC	\$117,378,033		Yes	Yes	Yes
18	MN	\$116,161,625			Yes	Yes
19	MD	\$104,249,593	Yes			Yes
20	CT	\$87,605,782	Yes		Yes	
21	CO	\$85,452,078		Yes	Yes	Yes
22	WI	\$79,939,703	Yes		Yes	Yes
23	AR	\$72,724,333		Yes	Yes	Yes
24	OK	\$72,642,696		Yes	Yes	
25	GA	\$71,542,543		Yes	Yes	
26	RI	\$67,599,587	Yes		Yes	Yes
27	TN	\$59,312,520				
28	KY	\$54,615,523		Yes	Yes	
29	NV	\$51,910,000		Yes		Yes
30	→ MO	\$50,699,065		Yes	Yes	
31	UT	\$44,331,931				Voluntary
32	VT	\$42,764,449	Yes		Yes	Yes
33	AL	\$34,798,146		Yes	Yes	
34	SC	\$33,668,980		Yes	Yes	
35	HI	\$33,483,031	Yes		Yes	Yes
36	NM	\$32,881,071		Yes	Yes	Yes
37	ID	\$30,772,991	Yes			
38	ME	\$20,541,187				Yes
39	NH	\$17,355,360			Yes	
40	NE	\$15,075,866				
41	KS	\$14,751,941		Yes		
42	DC	\$13,956,057	Yes		Yes	
43	MT	\$10,585,871		Yes	Pending	
44	MS	\$10,052,594		Pending	Pending	
45	WV	\$9,867,727			Pending	
46	WY	\$4,855,345		Yes		
47	LA	\$3,650,000		Yes	Yes	
48	SD	\$1,824,209		Yes	Yes	
49	ND	\$940,432				
50	VA	\$868,786		Pending		Voluntary
51	AK	—				
52	DE	—	Pending			Pending

2

1 This table shows us a number of different things in terms of the level of energy efficiency
2 being conducted in the United States. It also illustrates why comparison between states are
3 extremely difficult. The budgets, history and regulatory structures are contextually sensitive.

4 The last four columns on the table break down differences in regulatory structures for a given
5 state/region's energy efficiency program. The first two represent the fixed cost recovery—
6 how the utility is made whole—for promoting a practice that would otherwise be detrimental
7 to their traditional business model. Options for fixed cost recovery include either decoupling
8 or a lost revenue mechanism. In Missouri, we have a lost revenue mechanism.

9 Additionally, some states have a performance incentive and some states have energy
10 efficiency resource standards (EERS) that they have to meet. In Missouri, MEEIA allows
11 utilities the opportunity to earn a performance incentive, but no utility is mandated to produce
12 an energy efficiency program. There are no EERS to meet in Missouri.

13 **Q. What states would be appropriate to compare Missouri with?**

14 A. Table 5 highlights the states that have similar energy efficiency regulatory structures as
15 Missouri. I view these states that share similar regulatory and incentive structures as the most
16 relevant for an accurate and fair comparison.

1

Table 5: States with similar regulatory and incentive structures to Missouri

Rank	State	2013 Electric Efficiency Budget	Decoupling	Lost Revenue Mechanism	Performance Incentive	Energy Efficiency Resource Standards (EERS)
Oklahoma	24	\$72,642,696	No	Yes	Yes	No
Georgia	25	\$71,542,543	No	Yes	Yes	No
Kentucky	28	\$54,615,523	No	Yes	Yes	No
Missouri	30	\$50,699,065	No	Yes	Yes	No
Alabama	33	\$34,798,146	No	Yes	Yes	No
South Carolina	34	\$33,668,980	No	Yes	Yes	No
Louisiana	47	\$3,650,000	No	Yes	Yes	No
South Dakota	48	\$1,824,209	No	Yes	Yes	No

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1 Regarding the last two tables, it may help to keep this school grading analogy in mind. Most
2 secondary education schools in the U.S. operate under a 4.0 grading scale where:

A	4.0
B+	3.5
B	3.0
C+	2.5
C	2.0
D+	1.5
D	1.0
F	0.0

6 All things being equal, a 4.0 student is judged to be better than a 3.0 student. However,
7 things are ever rarely equal. This is especially true when comparing students across different
8 schools. An honor student at one school might only be an average student at another school.
9 Context and the evaluation criteria under which the grades are administered matters. This is
10 why universities rely so heavily on standardized tests for admittance. In the world of energy
11 efficiency EM&V, there is no SAT or ACT to standardize the comparison. At best, you need
12 to look at states that share similar regulatory structures for an accurate, relevant comparison.

13 **Q. Have any of these similar states utilized market effects in their EM&V calculation?**

14 A. I could find no examples of any EM&V reports in the aforementioned states that had market
15 effects as part of their net-to-gross calculation. All of the EM&V reports evaluated savings
16 against what was attributable to the investment made in the period under its evaluation.

17 **Q. What key differences exist between states that have utilized market effects in their**
18 **EM&V calculations and states like Missouri that have not used market effects?**

1 A. The one common characteristic exhibited by states that have attempted to utilize market
2 effects in their net-to-gross calculations is that they have mandated energy efficiency
3 resource standards (EERS) to meet. It is understood that states with EERS's in place have
4 agreed to creative and aggressive reporting requirements which allow them credit for much
5 larger savings as a result of their programs efforts.

6 **Q. Can you cite any source that shares your opinion that states with EERS's have agreed**
7 **to creative and aggressive reporting requirements?**

8 A. Yes. Ameren Missouri shares my sentiment. As filed in EW-2012-0065 and stated as a
9 Response to the National Resource Defense Council's comments regarding the opportunities
10 for Missouri to build on clean energy successes to meet new federal carbon standards, the
11 following statement and reply is made:

12 NRDC Perspective No. 4: MEEIA set soft targets which, if met, would result
13 in a cumulative reduction in load of 18% for the major investor owned
14 utilities by 2030.

15 [Ameren Missouri] Reply: NRDC states that leading states already today are
16 meeting the aggressive EERS annual load reduction targets. The fact of the
17 matter is that leading states with EERS in place have agreed to creative and
18 aggressive approaches to report that they have met aggressive annual load
19 reduction goals. . . . Creative and aggressive reporting includes the following:

- 20 **a. Report gross rather than net savings for energy efficiency programs**
21 **b. Take credit for achieving legislated building codes and appliance**
22 **efficiency standards**
23 c. Take credit for customer self-directed energy savings
24 d. Apply a multiplier to energy efficiency savings if demand response
25 programs are also enacted

- 1 e. Take credit for utility infrastructure energy efficiency improvements
- 2 f. Take credit for combined heat and power energy savings as energy
3 efficiency
- 4 g. Allow a portion of renewable energy to count towards meeting energy
5 efficiency mandates
- 6 h. Use alternative cost effectiveness test and avoided cost constructs to allow
7 more energy efficiency measures to be cost effective
- 8 i. **Take credit for prior years (prior to EERS standards effective dates)**
9 **energy efficiency savings.**

10 If Missouri is willing to allow, and the EPA is willing to accept, creative and
11 aggressive reporting approaches similar to those states where EERS is the
12 energy efficiency operating model, Missouri may have a more realistic
13 possibility of achieving the 2030 cumulative load reduction targets set by the
14 EPA. **That being said, the use of creative reporting of annual customer**
15 **load reductions attributable to utility energy efficiency programs will**
16 **overstate the actual benefits received by customers directly attributable**
17 **to utility sponsored energy efficiency program costs** (emphasis added).²⁶

18 Ameren is critical of NRDC's assertion of obtainable energy efficiency targets based on what
19 they feel is not an "apples-to-apples" comparison. Ameren Missouri claims that reaching
20 such high targets is impractical and distorts the actual savings that are attainable. Ameren
21 Missouri makes a point of this by including its three-year MEEIA targets in an earlier
22 response:

23
24

²⁶ File No. EW-2012-0065, *Ameren Missouri's Reply to Certain Stakeholder Responses*, filed on 9/16/2014, pp. 13-15.

1 Table 6: Ameren MEEIA Target Goals

	2013	2014	2015	Total
Energy Efficiency Savings (MWh)	240,397	255,445	297,260	793,102

2
3 **Q. Is Ameren taking credit for these items in this case?**

4 A. Yes. The savings Ameren Missouri is claiming they achieved based on their first-year
5 evaluation would suggest that either the NRDC is correct in their assertion, or that Ameren
6 Missouri is attempting to utilize aggressive and creative reporting.

7 Table 7: What Ameren is claiming happened here

	2013	2014	2015	Total
Energy Efficiency Savings (MWh)	397,499			397,499

8
9 For example, Ameren Missouri is taking credit for prior year's energy efficiency savings by
10 including the quantification of creative and aggressive reporting in the form of market effects
11 which overstate the actual benefits received by ratepayers and is directly attributable to
12 Ameren's MEEIA PY2013 program costs (see bullet point i. above from Ameren response).

13 Additionally, Ameren Missouri seeks to benefit from the timing of federally-mandated
14 efficiency standards resulting from the Energy Independence and Security Act of 2007,
15 which collectively raised the energy efficiency standard for light bulbs (see bullet point b.
16 above from Ameren response). This point will be discussed later in my testimony.

17 The Commission also should take note that the first example listed under creative and
18 aggressive reporting includes the reporting of gross estimates rather than net estimates for
19 energy savings. This is because under almost all EM&V scenarios the net estimates will be
20 smaller than the gross estimates. However, in this case, the net estimates Ameren is claiming
21 are larger.

1 The use of creative and aggressive evaluations to quantify savings forces ratepayers to bear
2 the additional financial penalty of rewarding Ameren an incentive in excess of a million
3 dollars, millions more for future program year evaluations, and likely a precedent that will be
4 cited by other Missouri electric IOUs in their future MEEIA recovery.

5 **Q. Please summarize your main points regarding this section.**

6 A.

Ameren Missouri's request:

- The Commission should recognize market effects from the Cadmus study

Ameren Missouri's rationale:

- Calculating market effects is a recognized practice
- They are real and Ameren Missouri's program produced them

Public Counsel's comment:

- Market Effects did not occur in PY2013 for the LightSavers program and should not be included in the final calculations

Public Counsel's rationale:

- Market effects are loosely defined and can be applied arbitrarily
- Market effects have not been applied to evaluations with states with Missouri's regulatory and incentive structure
 - There are no energy efficiency resource standards in Missouri
- Market effect studies represent previous years program efforts and are not incremental to the current program year under evaluation
 - Market effects and spillover represent double-counting in PY2013
 - 2012 Unanimous Stipulation and Agreement clearly intends for evaluation to consist of a three-year program range (2013 – 2015)
- Market Effects represent creative and aggressive reporting that overstate the benefits received by customers directly attributable to program costs

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1 **IV. RESPONSE TO STAFF'S CHANGE REQUEST FOR THE**
2 **EXCLUSION OF MARKET EFFECTS**

3 **Q. What is Staff's Change Request asking for?**

4 A. Staff's Change Request recommends that the Commission reject the adjustment for market
5 effects in the calculation of net-to-gross. Staff specifically presents three recommendations:

- 6 • Accept the Auditor Report with no market effects, but if not, then
- 7 • Accept the Cadmus & ADM Reports with no market effects, and
- 8 • Direct future evaluations to exclude market effects for PY2014 and
9 PY2015

10 **Q. On what basis does Staff base their Change request?**

11 A. Staff's change request centers primarily on two factors.

- 12 • That there are no accepted best practices for the calculation of market
13 effects
- 14 • That Cadmus is utilizing data prior to PY2013 to quantify market
15 effects when the 2012 Stipulation and Agreement clearly states the
16 evaluation should be confined to the single program year.

17 Staff also states how they formally notified Ameren Missouri about their concerns when it
18 came to their attention that Cadmus was attempting to calculate market effects in their
19 evaluation over a year before the final results were presented.

20 **Q. Please respond to Staff's Change Request.**

21 A. The OPC agrees with Staff that market effects should not be included for the LightSavers
22 program and should not be applied to the final estimate of the net-to-gross ratio for PY2013.
23 There are no accepted best practices for the quantification of market effects. Moreover, the

1 quantification of market effects is attempting to take credit for benefits that occurred prior to
2 the program year evaluation and are not directly attributable to the program itself. Public
3 Counsel does not have a strong opinion on whether or not the Commission should accept the
4 Auditor Report or the Cadmus/ADM Report. Final results from both are very close after
5 market effects are eliminated from the formula. However, the Cadmus/ADM calculation of
6 spillover balances out the report's conservative estimates of free ridership, and so, may be the
7 superior document.

8 To be sure, market effects can happen. They just did not happen here in one year nor can they
9 be reasonably attributed to Ameren Missouri's actions independent of the factors explained
10 in this testimony. The quantification of market effects is contextually sensitive and requires a
11 collective effort in design, coordination and execution from stakeholders prior to
12 implementation.

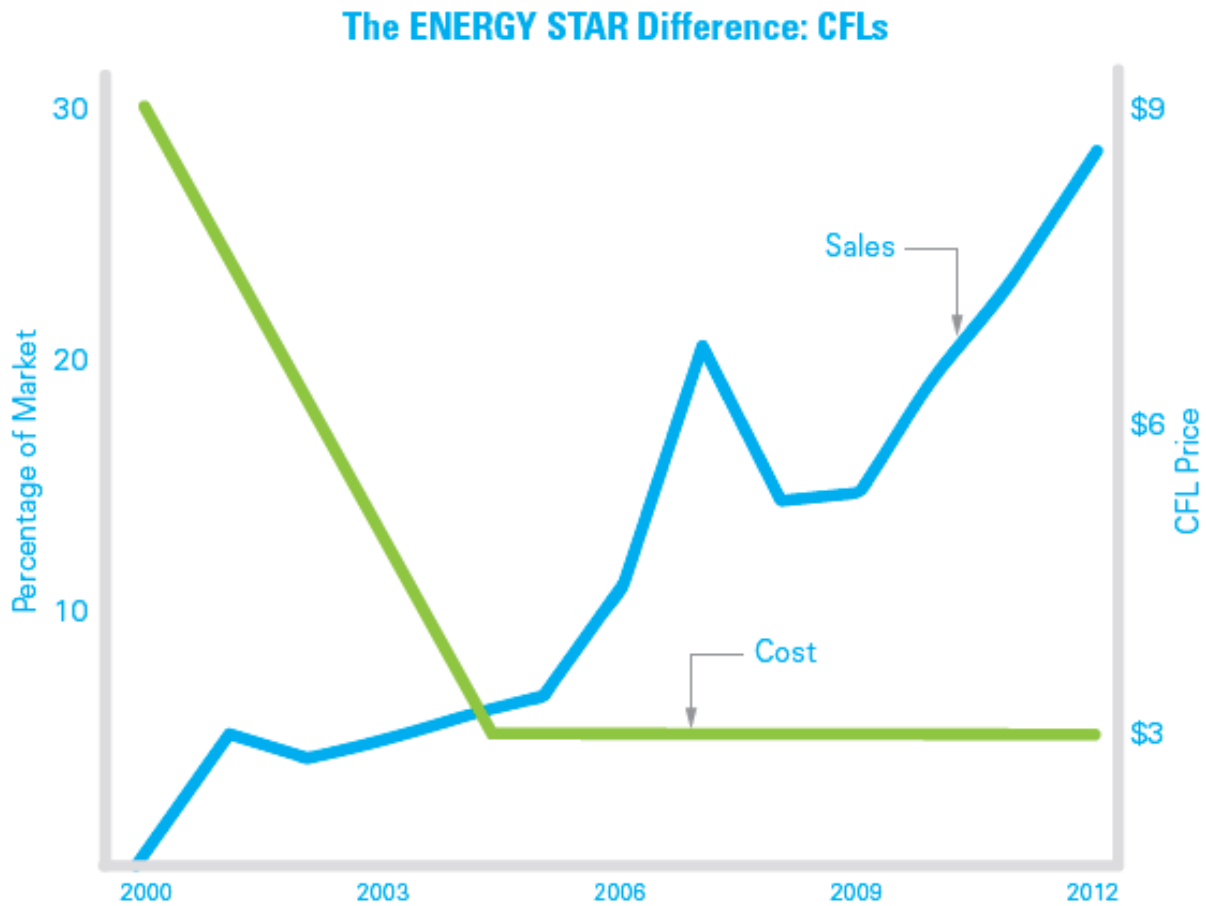
13 **Q. Is there additional evidence to support Staff's assertion that the inclusion of market**
14 **effects in the net-to-gross calculation is unwarranted?**

15 A. Yes. I will provide additional examples to illustrate that market and regulatory forces
16 influenced efficient lighting uptake in Ameren Missouri's territory, and which make it
17 unreasonable for Ameren Missouri to claim or receive additional credit for market
18 transformation in PY2013. I also will provide sales information released by Home Depot
19 which illustrates realistically what would have occurred absent Ameren Missouri's upstream
20 lighting program in PY2013.

21 **Q. Please provide your additional examples that contradict Ameren's market effect**
22 **assertion.**

23 A. **Wal-Mart's influence on the retail market**

1 Naturally-occurring adoption of CFLs has been on the rise since 2006. This can be seen in
2 the growth of CFL market penetration despite the consistent \$3.00 cost per bulb in the line
3 graph provided by ENERGYSTAR below.



In the years after CFLs were added to the ENERGY STAR program, an increase in sales led to economies of scale that lowered product costs and brought the purchase price down dramatically. Lower prices and improved performance led to the first peak in sales in 2007, when media attention around the danger of global warming was high. That same year, Walmart sold 100 million CFLs. Today, ENERGY STAR qualified CFLs represent about a quarter of all U.S. light bulb shipments.

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5 There are several important things to notice about this line graph. First, is the upward
6 trajectory of CFL sales occurring into 2012 despite the flat price of \$3.00 for CFL bulbs over

²⁷ ENERGYSTAR (2012) Product Retrospective: Residential Lighting
http://www.energystar.gov/ia/products/downloads/Residential_Lighting_Highlights.pdf

1 the previous six-years. The second is the initial large spike in sales that occurred between
2 2006-2007.

3 That spike (and the continued increase) in nationwide sales of CFLs is largely the result of
4 actions taken by retail giant Wal-Mart. In 2006, Wal-Mart publicly pledged to move 100
5 million CFLs in a year.

6 This pledge literally changed the lighting market. An increase in sales of a 100 million CFLs
7 represented an increase of approximately 50 percent of CFL sales from the previous year.²⁸ It
8 also had enormous implication for the lighting manufacturers. Because CFLs last up to eight
9 years, giant light bulb manufacturers would sell far fewer bulbs moving forward. The
10 announcement was met with resistance, but ultimately was accepted because of Wal-Mart's
11 retail position.

12 "When Wal-Mart sets its mind to something with a narrow objective like that,
13 they are going to make it happen," said Jim Jubb, vice president for consumer
14 product sales at Sylvania.²⁹

15 On Oct 2, 2007, Wal-Mart announced it had surpassed its goal three months early and in a
16 press released it outlined its efforts towards that goal including:

- 17 • Introduce a private CFL at Wal-Mart under the Great Value brand that
18 retails at four bulbs for the cost of three regularly priced brand name
19 CFLs;
- 20 • Offer online orders at both www.walmart.com and
21 www.samsclub.com, and put an online savings calculator on the
22 Sam's Club Web site;

²⁸ Barbaro, M. (2007) Wal-Mart puts some muscle behind power-sipping bulbs. *New York Times*.

http://www.nytimes.com/2007/01/02/business/02bulb.html?pagewanted=all&_r=0

²⁹ Ibid.

- 1 • Increase shelf space, offer more selection and move bulbs to eye level
2 for easiest access;
- 3 • Increase interactive displays in select Wal-Mart stores to allow
4 customers to compare qualities and styles, and demonstrate the
5 potential savings associated with each type of CFL;
- 6 • Work with manufacturers to lower the mercury content of the CFLs
7 sold at Wal-Mart stores and Sam's Clubs, making them safer and
8 more efficient; and
- 9 • Partner with Yahoo!, Lawrence Bender, the Department of Energy's
10 ENERGY STAR program, Environmental Defense and hundreds of
11 others on the 18Seconds movement to promote energy efficiency.³⁰

12 Wal-Mart's CFL pledge and continued commitment to energy efficient lighting was
13 instrumental in changing the lighting market across America. Within two years (Sept. 8,
14 2010), the last major General Electric factory making ordinary incandescent light bulbs in the
15 United States closed in Winchester, Virginia.³¹

16 Wal-Mart's market-changing strategies, illustrated in the bullet points above, would be
17 copied and implemented by utility upstream lighting programs across the country over the
18 next eight years. Seven years after Wal-Mart laid the blueprint, Ameren Missouri would
19 follow suit and then proceed to cite many of the same actions as justification for the inclusion
20 of market effects in Ameren Missouri's net-to-gross calculation.

³⁰ Wal-Mart (2007) Wal-Mart surpasses goal to sell 100 million compact fluorescent light bulbs three months early
<http://news.walmart.com/news-archive/2007/10/02/wal-mart-surpasses-goal-to-sell-100-million-compact-fluorescent-light-bulbs-three-months-early>

³¹ Whoriskey, P. (2010). Light bulb factory closes, End of era for U.S. means more jobs overseas. Washington Post.
<http://www.washingtonpost.com/wp-dyn/content/article/2010/09/07/AR2010090706933.html>

1 If a goal of an upstream lighting program is to transform a market, it would appear as though
2 that job had at least in part already been done by other actors, namely Wal-Mart, in the eight
3 years preceding PY2013. Accordingly, adoption of energy efficient lighting has been
4 naturally occurring for years due to actions taken by other actors years ago.

5 Coincidentally, in 2013, Wal-Mart began promoting the next stage of efficient, safe lighting—
6 LEDs. In October, Wal-Mart introduced 26 Great Value LED light bulbs that would sell for
7 less than \$10.00 (60 watt retailed at \$8.88) in all U.S. stores.³² LEDs provide a little more
8 energy savings than CFLs annually, but they last much longer (twice as long lifespan), and
9 do not contain any hazardous materials if broken (CFLs contain very small amounts of
10 mercury).

11 Although the delta in energy savings between LEDs and CFLs is much smaller than between
12 standard incandescent lighting and CFLs, the continued promotion of CFLs in Ameren's
13 service territory may have the unintended consequence of slowing the adoption rate of the
14 more efficient LEDs.

15 **California and Previous Utility-Sponsored Energy Efficiency Programs**

16 Between 2006 and 2008 the three largest utilities in the state of California³³ implemented an
17 upstream lighting program that ultimately included moving 112,692,637 total energy
18 efficient light bulbs. Of that total number, approximately 96 million light bulbs represented
19 standard CFLs.³⁴ Following an attempt to measure the impact of one of the largest single
20 energy efficiency programs ever implemented, the Energy Division of the California Public
21 Utilities Commission (CPUC) released its evaluation of the three-year program period in
22 2010. The goal of the evaluation was to estimate how much electricity was saved and how

³² WalMart (2013) Walmart launches Great Value LED lightbulbs for less than \$10 in all U.S. stores.
<http://news.walmart.com/walmart-launches-great-value-led-lightbulbs-for-less-than-10-in-all-us-stores>

³³ Pacific Gas and Electric, Southern California Edison, and San Diego Gas and Electric respectively.

³⁴ KEMA, Cadmus (2010) Final Evaluation Report: Upstream Lighting Program Volume 1.
http://www.calmac.org/publications/FinalUpstreamLightingEvaluationReport_Vol1_CALMAC_3.pdf

1 much peak demand was reduced through the programs. The study was also an attempt by
2 CPUC to estimate how much of the savings would have happened in the absence of the
3 program, in other words, a measurement of the net-to-gross ratio. The conclusion resulting
4 from the study states:

5 The conjoint study showed price is important to consumers, particularly as
6 they choose between different types of CFLs. **However, it is not clear price**
7 **is as important to consumers when choosing between a CFL and an**
8 **incandescent bulb, as long as consumers fully understand the overall**
9 **costs and benefits of choosing a CFL over an incandescent bulb and have**
10 **the desired CFL readily available.** The concurrent focus groups concluded
11 certain consumers reject CFLs or all fixtures due to non-price considerations,
12 such as light color, fit, and mercury concerns. For these consumers,
13 decreasing prices are not likely to cause increased purchases of CFLs.

14 As noted above, the limitations of the study led The Team to not use the
15 findings in the final NTG estimation for Upstream CFLs. These results may
16 be helpful for future program design and evaluation, as they do indicate that
17 with proper information regarding cost vs. payback consumers are likely to
18 choose a CFL, even at higher price points (emphasis added).³⁵

19 The study recommended a net-to-gross ratio for the three-year period of 0.54.

20 The results of this study were highly contentious and directly led to a renewed interest
21 within the EM&V community to investigate quantifying concepts like market effects. In fact,
22 the Cadmus article referenced in Mr. Voytas' testimony (and referred to earlier in this
23 testimony) *The Trouble with Free Riders* is largely a response to the CPUC conclusions.

³⁵ KEMA, Cadmus (2010) Final Evaluation Report: Upstream Lighting Program Volume 2.
http://www.calmac.org/publications/finalupstreamlightingevaluationreport_vol2_calmac.pdf

1 As an outcome of the program, as well as ensuing state legislation on efficient lighting,³⁶
2 California modified their upstream lighting program to place an increased emphasis on
3 specialty CFLs and LEDs through their Advanced Consumer Lighting programs in 2009.³⁷
4 That is, in 2009, California already was cognizant of the fact that efficient lighting needed to
5 move beyond standard CFLs.

6 **The Energy Independence and Security Act of 2007 (EISA)**

7 Another factor offsetting the impact that Ameren Missouri had on the lighting market in
8 PY2013 is the effect of the EISA. At its heart, EISA was intended to change the market.
9 Among the stated goals:

10 To move the United States toward greater energy independence and security,
11 to increase the production of clean renewable fuels, to protect consumers, to
12 increase the efficiency of products, buildings, and vehicles, to promote
13 research on and deploy greenhouse gas capture and storage options, and to
14 improve the energy performance of the Federal Government, and for other
15 purposes.³⁸

16 One of EISA's most prominent initiatives included setting minimum efficiency standards for
17 general service light bulbs (incandescent, halogens, CFLs, LEDs) which included the
18 following phase-in ranges and dates as seen in Table 8:

³⁶ Huffman Bill (AB 1109): Signed on Oct. 12, 2007. The bill required reductions in energy usage for lighting, encouraged more efficient lighting technologies, reduced hazardous waste in lighting and increased recycling opportunities. http://www.cawrecycles.org/issues/current_legislation/ab1109_07

³⁷ California Public Utilities Commission (2009) Market Transformation Opportunities. http://webcache.googleusercontent.com/search?q=cache:PFiElRGiqu0J:www.cpuc.ca.gov/NR/ronlyres/E30E2C04-2465-4841-8051-078FB4DF8640/0/MarketTransformationOpportunities_PerspectivesonStatewideLightingMarketTransformationProg ra.ppt+&cd=1&hl=en&ct=clnk&gl=us

³⁸ Energy Independence and Security Act of 2007. US Government Printing Office. <http://www.gpo.gov/fdsys/search/pagedetails.action?granuleId=&packageId=BILLS-110hr6enr>

1 Table 8: EISA Phase-In Standards³⁹

Today's Bulb (2007)	After the Standard	Standard Effective Date
100 watt	72 watts	January 1, 2012
75 watt	53 watts	January 1, 2013
60 watt	43 watts	January 1, 2014
40 watt	29 watts	January 1, 2014

2
3 The long phase-in periods gave vendors and manufacturers four-to-seven years to sell off
4 their remaining inventory of standard incandescence light bulbs.

5 The EISA's standards ultimately were not enforced due to a last-minute rider passed in the
6 U.S. House in 2011. But according to lighting industry leaders, the long phase-in effectively
7 made this a non-issue:

8 "The industry has moved on," said Larry Lauck a spokesman for the American
9 Lighting Association. Lauck said U.S. light bulb manufacturers have already
10 "retooled" their production lines to build more efficient bulbs, he said.

11 Joseph Higbee, a spokesman for the National Electrical Manufacturers
12 Association, which represents 95 percent of U.S. light bulb manufacturers, said
13 even if the Department of Energy does not have the funding to enforce the

³⁹ Adapted from ENERGYSTAR (2007) Energy Independence and Security Act of 2007 (EISA) Frequently Asked Questions. http://www.energystar.gov/ia/products/lighting/cfls/downloads/EISA_Backgrounder_FINAL_4-11_EPA.pdf

1 energy efficiency standards, manufacturers are not going to retro-fit their
2 assembly lines to produce the traditional, less-efficient bulbs.⁴⁰

3 Today you can still buy an incandescent light bulb at your local Lowe's, but it is likely going
4 to be replaced on the shelf with a CFL or LED thereafter as purchased inventory of
5 inefficient incandescent inventory decreases.⁴¹

6 As the EISA standards began to be phased in, state regulatory commissions began adjusting
7 net-to-gross ratios for standard CFLs to more accurately reflect the change in the baseline.
8 For example, in Missouri the CFL net-to-gross ratios were adjusted for KCPL's most recent
9 approved MEEIA portfolio which allowed the company to claim gross savings of 0.90 in
10 2014 and then 0.75 in 2015 for each CFL sold. Prior to this, all CFLs would have received a
11 1.0 gross savings amount.

12 However, unlike KCPL, Ameren Missouri will continue to receive the gross savings amount
13 of 1.0 for CFLs in PY2014 and PY2015, as those numbers were agreed to by parties in 2012.

14 The rationale behind the decrease in gross savings reflects the concern that ratepayers should
15 not subsidize a light bulb that is increasingly the only option on the market.

16 Federal standards that pushed manufacturers, vendors and customers to adopt the more
17 efficient standards contributed greatly to the promotion of the CFL market in PY2013 and in
18 the ensuing years leading up to the Cadmus evaluation. The impact of EISA standards on the
19 light bulb market cannot be understated, as it clearly represents a government-driven market
20 effects program.

⁴⁰ Bingham, A. (2011) Congress defunds ban on incandescent light bulbs but doesn't quite save them. ABC News. <http://abcnews.go.com/blogs/politics/2011/12/congress-defunds-ban-on-incandescent-light-bulbs-but-doesnt-quite-save-them/>

⁴¹ Johnson, A.M. (2013) Hey! Who turned out the lights? Incandescent bulb ban just one of new year's new laws. NBC News: U.S. News. <http://usnews.nbcnews.com/news/2013/12/30/22114574-hey-who-turned-out-the-lights-incandescent-bulb-ban-just-one-of-new-years-new-laws?lite>

1 **Ameren Illinois’ upstream lighting rebate program**

2 Cadmus’s LightSavers report gives four “other metrics” to justify the increase for market
3 effects:

- 4 • Customer familiarity with CFLs is increasing
- 5 • Customer purchase rates are increasing
- 6 • Retail store program participation has increased
- 7 • Retail stocking of non-discounted CFLs and LEDs has increased⁴²

8 As explained earlier, Cadmus is claiming that their LightSavers metrics showed an increase
9 in 2013 from its study in 2010. However, Staff’s Report goes to great lengths to describe
10 what happened between the two studies prior to the MEEIA PY2013 that would have
11 contributed to these factors. There is, though, an additional reason to explain the increase in
12 CFL usage and familiarity from 2010 to 2013 beyond any of those mentioned to date—
13 Ameren Illinois’ upstream lighting program.

14 In PY2012, the fourth year of their lighting program, Ameren Illinois moved 4,379,576
15 energy efficient light bulbs, with approximately 94% representing standard CFLs sold
16 through the upstream program.⁴³ One year later (2013) Ameren Illinois’ program moved
17 2,821,350 light bulbs in their fifth program year.⁴⁴ Ameren Missouri, by comparison, began
18 the first year of their approved MEEIA portfolio and their LightSavers program in 2013 and
19 moved 4,166,201 energy efficient light bulbs. A quick review of the two year’s programs and
20 respective program net-to-gross ratios can be seen below in Table 9.

⁴² Cadmus (2013) Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013 page 54

⁴³ Opinion Dynamics Corporation (2012) Impact and Process Evaluation of Ameren Illinois Company’s Residential Lighting Program (PY4).

http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPY4/AIC_PY4_Residential_Lighting_Program_Final_Report.pdf

⁴⁴ Opinion Dynamics Corporation (2014) Impact and Process Evaluation of Ameren Illinois Company’s Residential Lighting Program (PY5).

http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPY5/AIC_PY5_Residential_Lighting_Report_FINAL_2013-01-22.pdf

1 Table 9: Ameren Illinois and Ameren Missouri Comparison

	PY 2012	PY 2013
Ameren Illinois	4,379,576 bulbs	2,821,350 bulbs
- Net-to-gross ratio	0.83 NTG	0.47 NTG
Ameren Missouri	No program	4,166,201 bulbs
- Net-to-gross ratio		1.25 NTG

2 Given the geographic proximity between Ameren Illinois and Missouri, it is reasonable to
3 conclude that many of the market effects that are being claimed by Cadmus as a result of
4 comparing data from 2010 to 2013 are actually market effects that should be attributed to
5 Ameren Illinois.

6 Over 4 million CFLs were moved in southern Illinois in 2012 when there was no program in
7 Missouri. It seems plausible to conclude that customer awareness on the Missouri side was at
8 least in part raised by Ameren Illinois' previous four-year effort. This is especially true given
9 the large population overlap in the greater St. Louis area which consists of 8 Illinois counties
10 and 9 Missouri counties sharing mass media outlets.⁴⁵

11 **Home Depot and Kansas City**

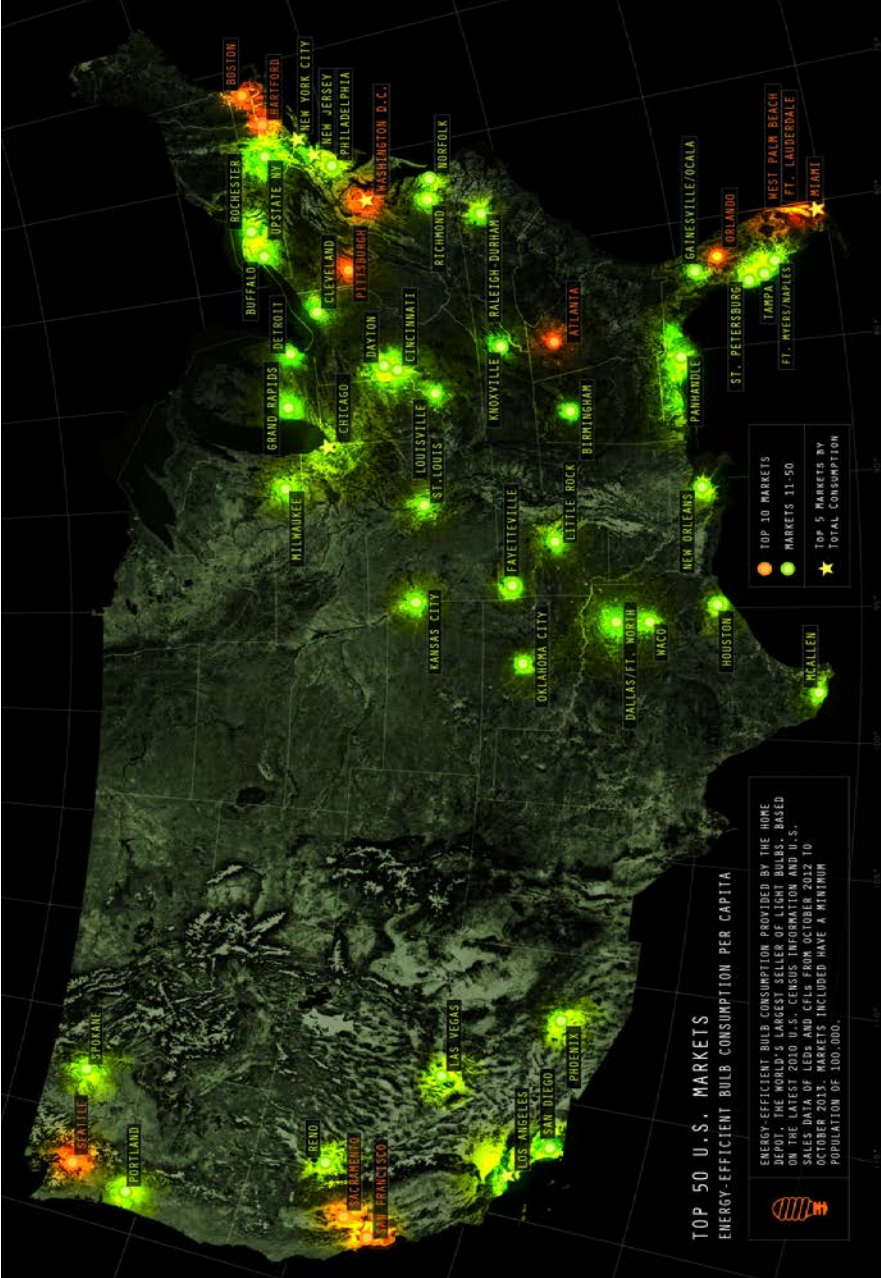
12 It is interesting to note that Home Depot issued a press release in the winter of 2013 to show
13 the top 50 U.S. markets for energy efficient light bulbs based on consumption per capita from
14 October 2012 to October 2013.⁴⁶ According to their data during this time, 27 of the top 50
15 markets offered lighting rebates. Two of those cities happen to be in Missouri. St. Louis,
16 which benefits from both Ameren Missouri and Illinois having upstream lighting programs,
17 is highlighted on the map. On the surface this would seem to indicate the program's success.
18 However, when compared to Kansas City, Ameren Missouri's success is called into question.

⁴⁵ Greater St. Louis. http://en.wikipedia.org/wiki/Greater_St._Louis

⁴⁶ Fehrenbacher, K. (2013) Check out this map for which cities are buying LEDs & CFLs
<https://gigaom.com/2013/12/10/check-out-this-map-for-which-cities-are-buying-the-most-leds-cfls/>

1 There was no upstream lighting program during that period in the Kansas City area on either
2 the Missouri or Kansas side, and yet Kansas City adopted CFLs and LEDs with apparent
3 vigor. The map below provides yet another piece of evidence to suggest that Ameren
4 Missouri overstates the actual benefits the LightSavers program has produced.

**Top 50 U.S. Markets for Energy Efficient Lighting:
Home Depot Sales Data Oct 2012 –Oct 2013**



1 **Q. Please summarize your main points regarding this section.**

2 A.

Staff's request:

- Accept Auditor report without market effects, but if not, then
- Accept the Cadmus/ADM reports without market effects and
- Direct future evaluations to exclude market effects for PY2014 & PY2015

Staff's rationale:

- There are no accepted best practices for calculating market effects
- Evaluation should focus on benefits realized for activity in PY2013 not previous sunk costs for past EE programs or naturally occurring uptake

Public Counsel's comment:

- Support Staff's assertion to exclude market effects
- Accept Cadmus/ADM reports without market effects
- Future evaluations can contain market effects but parameters need to be addressed prior to evaluation

Public Counsel's rationale:

- Wal-Mart's influence on the retail market
 - Moved market in 2007 and impacted manufacturers
 - 2013 released market transformation LEDs (CFL market moved)
- California and previous utility-sponsored energy efficiency programs
 - 3-year program results in NTG of 0.53 between 2006 – 2008
- Energy Independence and Security Act of 2007
 - Moved manufactures to no longer make incandescent in U.S.
 - EE programs adjust gross estimates downward for CFLs to account for standards—seen in KCPL-MOs most recent MEEIA application
- Ameren Illinois's upstream lighting program
 - Close proximity and shared media suggest Illinois warrants credit for market effects on Missouri in 2012 when there was no program in place
- Home Depot and Kansas City
 - KC reaches top 50 status without an upstream rebate program in their territory in 2013
- Home energy audit marketed to potential home buyers
 - Provides a working example of a program design and market where over a period of time additional quantification of benefits for market effects would be justified

V. RESPONSE TO THE AMEREN MISSOURI AND STAFF NON-UNANIMOUS STIPULATION AND AGREEMENT

Q. What are the terms of Ameren Missouri and Staff’s non-unanimous stipulation and agreement?

A. The parties settled on a “black box” calculation where the annual energy savings would be 369,500 MWh and the net benefits amount at \$129,925,000.

Q. Please provide some context for those numbers. How do they differ from what was filed in each parties change request?

A. Table 10 provides a breakdown of the five net-to-gross ratios that have been submitted to date in this case for Ameren’s PY2013.

Table 10: The five filed estimates to date

Source (EO-2012-0142)	NTG	MWh Saving	Difference	% 3yr-goal 793,100 MWh	Net benefits
Ameren ⁴⁷	116.1%	397,499	-	50%	\$141,010,520
Cadmus ⁴⁸	114.5%	390,039	7,460	49%	\$138,486,221
Black box ⁴⁹	107.4%	369,500	27,999	46.5%	\$129,925,000
Auditor 2 ⁵⁰	93.3%	322,296	75,203	40.6%	\$113,272,046
Auditor 1 ⁵¹	89.7%	310,041	87,458	39%	\$109,602,961

For reference purposes, I have also provided the original targets as submitted in Ameren Missouri’s approved MEEIA application and seen in Table 11.

⁴⁷ Application for Approval of Change Request (Ameren Missouri-Investor), 7/3/14.

⁴⁸ Revised Evaluation, Measurement and Verification (EM&V) Reports, 6/12/14.

⁴⁹ Non-Unanimous Stipulation and Agreement Settling the Program Year 2013 Change Request, 9/19/14.

⁵⁰ Final EM&V Auditor Report and Supporting Documentation, 8/27/14 with market effects.

⁵¹ Final EM&V Auditor Report and Supporting Documentation, 8/27/14 without market effects.

1 Table 11: Ameren Missouri's MEEIA Targets

	2013	2014	2015	Total
Energy Efficiency Savings (MWh)	240,397	255,445	297,260	793,102

2
3 As you can see from table 10:

- 4 • Ameren Missouri decreased their net-to-gross ratio by 8.7% and decreased
5 their net shared benefits amount \$11,085,520.
- 6 • Staff increased their net-to-gross ratio by 17.7% (no market effects and
7 represented as Auditor 1) and increased their net shared benefits amount
8 \$20,322,039.

9 Additionally, the black box stipulation and agreement recognizes the use of market effects for
10 future program years, which would suggest that PY2014 will receive similar treatments for
11 the upstream lighting program.

12 Public Counsel believes the performance amount attributable to the black box non-
13 unanimous stipulation and agreement for PY2013 would be calculated as follows:

14
$$\text{Joint position annual net benefit} = \$129,925,000$$

15
$$\$129,925,000 \times 3 = \$389,775,000$$

16
$$6.19\% \text{ of } \$389,775,000 = \$24,127,073 \text{ or } \underline{\$8,042,357 \text{ annual average}}$$

17 That would be the performance incentive amount under the black box agreement and would
18 assume that Ameren Missouri would reach their 130% target. This assumption is reasonable
19 based on the fact that Ameren Missouri would already be at 46.5% their three-year target in
20 their first year if the black box stipulation was agreed on. The numbers in the "black box"
21 stipulation can be supported only if market effects are included in the agreement.

1 For numerous reasons stated above, Public Counsel believes that market effects within this
2 context overstate the benefits accrued to ratepayers. Coming to a black box determination at
3 some level slightly less than what Ameren has proposed does absolutely nothing to address
4 the exaggeration of these benefits for this evaluation and for future program years.
5 Additionally, the black box agreement does not address EM&V considerations moving
6 forward and undermines the process currently in place by minimizing the evaluation and
7 results of the Commission's independent auditor.

8 Ameren Missouri actually performed well during PY2013. Its results need no exaggeration,
9 inflation or embellishment. This is illustrated by the results of both the evaluator and auditor
10 reports minus the inclusion of market effects. Under our scenario, and as initially proposed
11 by Staff, Ameren would have achieved 36.44% of their target goal in the first year leaving
12 them only 33.56% away from being eligible for a performance incentive with two additional
13 years to reach that.

14 **VI. STATEMENT REGARDING THE CALCULATION OF NET SHARED**
15 **BENEFITS**

16 **Q. What is your concern about the calculation of the net shared benefits?**

17 A. The net shared benefits should not be calculated without an offsetting adjustment to reflect
18 the performance incentive amount. Presently, that amount is not being calculated and is
19 overstating the benefits attributable to the programs.

20 **Q. Please explain.**

21 A. The Total Resource Cost test is the preferred test in Missouri for the evaluation of the net
22 shared benefits produced by energy efficiency programs. The Missouri Energy Efficiency
23 Investment Act §393.1075.4 RSMo., states:

1 The commission shall permit electric corporations to implement commission-
2 approved demand-side programs pursuant to this section with a goal of
3 achieving all cost-effective demand-side savings. Recovery for such
4 programs shall not be permitted unless the programs are approved by the
5 commission, result in energy or demand savings and are beneficial to all
6 customers in the customer class in which the programs are proposed,
7 regardless of whether the programs are utilized by all customers. **The**
8 **commission shall consider the total resource cost test a preferred cost-**
9 **effectiveness test.** Programs targeted to low-income customers or general
10 education campaigns do not need to meet a cost-effectiveness test, so long as
11 the commission determines that the program or campaign is in the public
12 interest. Nothing herein shall preclude the approval of demand-side programs
13 that do not meet the test if the costs of the program above the level
14 determined to be cost-effective are funded by customers participating in the
15 program or through a tax or other governmental credits or incentives
16 specifically designed for that purpose (emphasis added).

17 The definition for net shared benefits in 4 CSR 240-20.093(1)(C) states:

18 Annual net shared benefits means the utility's avoided costs measured and
19 documented through evaluation, measurement, and verification (EM&V)
20 reports for approved demand-side programs less the sum of the programs'
21 costs including design, administration, delivery, end-use measures,
22 **incentives**, EM&V, utility market potential studies, and technical resource
23 manual on an annual basis (emphasis added).

24 The OPC recommendation to utilize the TRC is consistent with the MEEIA statute to deduct
25 incentives from the net shared benefits calculation and is consistent with Chapter 20 rules. It
26 also properly accounts for the very real costs that ratepayers will have to bear as a result of the

1 utilities performance incentive. To exclude it would overstate the net shared benefits
2 attributable to the energy efficiency program.

Public Counsel's Statement:

- Net shared benefits have not been properly calculated

Public Counsel's rationale:

- TRC test is preferred test and should be utilized for determining the annual net shared benefits
- "Incentives" should be deducted from the net shared benefits
 - This amount represents real costs borne by ratepayers

3
4 **VII. CONCLUSION**

5 **Q. Could you please summarize Public Counsel's comments regarding the Change**
6 **Requests?**

7 A. The OPC recommends that the Commission reject Ameren Missouri's proposed downward
8 adjustment of free ridership scores because they are unreasonable and result in an
9 overestimation of net shared benefits.

10 The Commission should adopt Staff's Change Request that calls for the elimination of
11 market effects in the formula used to calculate the LightSavers net-to-gross ratio.
12 Additionally, the Cadmus/ADM nonparticipant spillover estimates and the Auditor's
13 participant spillover estimates should be utilized to calculate the overall net-to-gross ratio for
14 the portfolio.

15 Public Counsel also recommends that the Commission order a recalculation of the the net
16 shared benefits amount to reflect MEEIA statute §393.1075.4 RSMo. and the net shared
17 benefits definition stated in 4 CSR 240-20.093(1)(C). An accurate and reasonable amount

1 reflecting the utility's performance incentive should be deducted from the calculation of the
2 net shared benefits, as it is ultimately a cost that ratepayers will have to pay.

3 Public Counsel does not believe that the black box settlement offer entered into by Ameren
4 Missouri and Staff addresses the outstanding issues raised in this testimony, overstates
5 realized energy savings and distorts the net shared benefit amount. Furthermore, the black
6 box agreement does not address EM&V considerations moving forward and in this case
7 undermines the process currently in place by minimizing the evaluation and results of the
8 Commission's independent auditor.

9 **Q. Does this conclude your testimony?**

10 **A.** Yes, it does.

11