

Exhibit No.: _____
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Testimony of John Rogers/
Response to Ameren Missouri's
Direct Testimony of Rick Voytas
Witness/Type of Exhibit: Marke/Corrected Rebuttal
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Case No.: EO-2012-0142

CORRECTED REBUTTAL 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

December 31, 2014

**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 rebuttal 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.

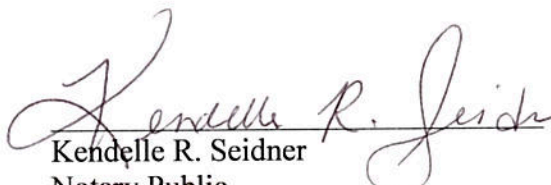


Geoff Marke

Subscribed and sworn to me this 31st day of December 2014.



KENDELLE R. SEIDNER
My Commission Expires
February 4, 2015
Cole County
Commission #11004782



Kendelle R. Seidner
Notary Public

My commission expires February 4, 2015.

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CORRECTED REBUTTAL TESTIMONY

OF

GEOFF MARKE

UNION ELECTRIC COMPANY

d/b/a Ameren Missouri

CASE NO. EO-2012-0142

1 **I. INTRODUCTION**

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. Are you the same Dr. Marke that filed direct testimony in EO-2012-0142?**

6 A. I am.

7 **Q. What is the purpose of your rebuttal testimony?**

8 A. The purpose of this testimony is to respond to the direct testimony of the Missouri Public
9 Service Commission's Staff (Staff) witness John Rogers and the direct testimony of Union
10 Electric Company d/b/a Ameren Missouri ("Ameren Missouri") witness Rick Voytas.

11 **Q. Has Public Counsel's analysis changed since the submitted direct testimony?**

12 A. It has not. Public Counsel continues to recommend the following to the Commission
13 regarding the appropriate net-to-gross (NTG) ratio for Ameren Missouri's PY2013 EM&V
14 results:

- 1 • Adopting Staff's original Change Request which calls for the elimination of market
- 2 effects and accepting the participant spillover estimates of the Commission's auditor
- 3 and the nonparticipant spillover estimates of the Evaluator.
- 4 • Rejecting Ameren Missouri's downward adjustment of free ridership
- 5 • Including a conservative 9% downward adjustment to the NTG ratio for the
- 6 LightSavers Program to account for direct rebound effects.
- 7 • Calculating the net shared benefits through the use of the total resource cost test
- 8 (TRC) and including the utility performance incentive as a direct cost within that
- 9 calculation.

10 **II. Response to Staff's Direct Testimony of John Rogers**

11 **Q. What is your overall response to the direct testimony filed by Staff witness John**

12 **Rogers?**

13 A. Mr. Rogers attempts to explain Staff's rationale for its new position. Mr. Rogers begins by

14 providing some background on the events leading up to the black box settlement discussion.

15 He then provides a list of twenty-four potential outcomes for PY2013 utilizing variations of

16 estimates proposed by either Ameren Missouri, the evaluators, and/or the Commission's

17 auditor. Table 1 includes a table provided in Mr. Rogers testimony of the various outcomes

18 sorted by EM&V net benefits. Staff provides this table in defense of the purported

19 reasonableness of the black box agreement. I provide that table as annotated herein to

20 demonstrate how far Staff moved from their original Change Request position and how little

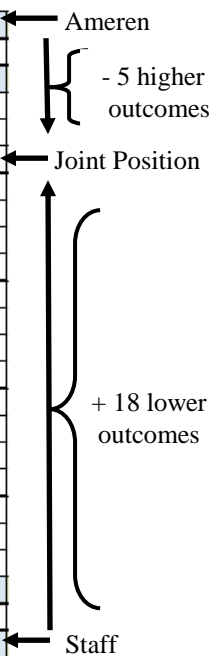
21 Ameren Missouri moved from their original Change Request position.

22

23

1 **Table 1: 24 Scenarios in Ameren Missouri & Staff Settlement Discussions**

Scenarios Sorted by EM&V Net Benefits							
Scenario	Free Rider	PSO	NPSO	Market Effects	EM&V NTG <i>a</i>	EM&V MWh <i>b</i>	EM&V Net Benefits <i>c</i>
7	Voytas	Evaluator	Evaluator	Evaluator	116.1%	397,499	\$ 141,187,752
10	Voytas	Evaluator	Auditor	Evaluator	116.9%	398,063	\$ 138,486,221
1	Evaluator	Evaluator	Evaluator	Evaluator	114.5%	390,039	\$ 136,425,329
4	Evaluator	Evaluator	Auditor	Evaluator	115.4%	390,602	\$ 133,723,798
8	Voytas	Evaluator	Evaluator	Auditor	106.9%	368,906	\$ 132,626,554
9	Voytas	Evaluator	Auditor	Auditor	107.4%	369,469	\$ 129,925,023
19	Voytas	Auditor	Evaluator	Evaluator	103.4%	357,786	\$ 129,297,199
11	Voytas	Evaluator	Evaluator	None	103.1%	356,652	\$ 128,957,469
2	Evaluator	Evaluator	Evaluator	Auditor	104.9%	361,446	\$ 127,864,130
22	Voytas	Auditor	Auditor	Evaluator	103.9%	358,349	\$ 126,595,668
12	Voytas	Evaluator	Auditor	None	103.5%	357,215	\$ 126,255,938
3	Evaluator	Evaluator	Auditor	Auditor	105.8%	362,009	\$ 125,162,600
13	Evaluator	Auditor	Evaluator	Evaluator	101.4%	350,326	\$ 124,534,776
5	Evaluator	Evaluator	Evaluator	None	101.1%	349,191	\$ 124,195,045
16	Evaluator	Auditor	Auditor	Evaluator	102.2%	350,889	\$ 121,833,245
6	Evaluator	Evaluator	Auditor	None	101.8%	349,755	\$ 121,493,515
20	Voytas	Auditor	Evaluator	Auditor	95.0%	329,193	\$ 120,736,001
21	Voytas	Auditor	Auditor	Auditor	95.1%	329,756	\$ 118,034,470
23	Voytas	Auditor	Evaluator	None	91.7%	316,938	\$ 117,066,916
14	Evaluator	Auditor	Evaluator	Auditor	92.8%	321,733	\$ 115,973,577
24	Voytas	Auditor	Auditor	None	91.6%	317,502	\$ 114,365,385
15	Evaluator	Auditor	Auditor	Auditor	93.3%	322,296	\$ 113,272,046
17	Evaluator	Auditor	Evaluator	None	89.4%	309,478	\$ 112,304,492
18	Evaluator	Auditor	Auditor	None	89.7%	310,041	\$ 109,602,961



2
 3 Table 1 demonstrates that the departure from Staff’s original position to the joint settlement
 4 position is much greater than has been characterized in Mr. Rogers testimony. In fact, based
 5 on the potential outcomes shown in Mr. Rogers’ table, Staff leaped over eighteen other
 6 potential scenarios with lower outcomes for MWh savings and net benefits, while Ameren
 7 Missouri only dropped five potential scenarios from their initial position.

8 Staff’s new position is clearly not a reasonable outcome, nor anywhere near the middle of the
 9 potential outcomes. Worse, this new position does nothing to address the many outstanding
 10 issues present in this case, namely, overstated energy savings (EM&V MWh in table 1
 11 above) and incorrect net benefits calculations (EM&V Net Benefits in table 1 above).

1 Regarding the energy savings, Public Counsel asserts the correct result is best arrived at by
2 adopting Staff's original Change Request which calls for the elimination of market effects,
3 accepting the spillover estimates of the Commissions auditor, and including a conservative
4 9% downward adjustment to the net energy savings for the LightSavers Program to reflect
5 direct rebound effects. Under this calculation, and shown in Table 1 of my direct testimony,
6 the results of the PY2013 annual energy savings is a laudable 279,959 MWh.¹

7 Regarding net benefits, the 24 scenarios in Table 1 utilize a utility cost test (UCT), which is a
8 test that minimizes costs and runs counter to the MEEIA statute and Commission rules which
9 emphasize that the TRC is to be the preferred test for this purpose. Each of those net benefit
10 outcomes listed in the 24 scenarios are inflated benefits and will translate into inflated bonus
11 payments. Staff and Ameren Missouri have failed to adequately demonstrate why the
12 Commission should diverge from the test indicated by the statute and the rules. Further, the
13 net benefits amounts from the 24 scenarios also do not include any consideration of the costs
14 ratepayers will bear as a result of the utility performance incentive, which is explicitly
15 defined as a cost in the rules. Consequently, because of these errors, the correct EM&V net
16 benefit amount should be considerably lower than any number depicted in the last column on
17 Table 1.

18 **Q. Will there be a large difference in assumed costs if the TRC is used instead of the UCT**
19 **test?**

20 A. Yes. Table 2 is reprinted from Cadmus's Residential Report Summary and highlighted by the
21 author to emphasis the difference in costs between using the UCT test as opposed to the TRC
22 test.

23

¹ Direct Testimony, Marke, p. 5, lines 12-13.

1 **Table 2: Comparison between the Utility Cost Test and the Total Resource Costs Test for**
 2 **Ameren Missouri’s Residential Programs in PY2013.**

Table 7. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	Costs
Avoided Electric Production	\$101,117,367	
Avoided Electric Capacity	\$9,416,419	
Avoided T&D Electric	\$6,449,924	
Incentives		\$8,036,052
Program overhead costs		\$15,800,088
Total	\$116,983,710	\$23,836,140
UCT Benefit - Cost Ratio	4.91	

Table 8. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	Costs
Avoided Electric Production	\$101,117,367	
Avoided Electric Capacity	\$9,416,419	
Avoided T&D Electric	\$6,449,924	
Participant Costs (Net)		\$16,074,379
Program overhead costs		\$15,800,088
Total	\$116,983,710	\$31,874,467
TRC Benefit - Cost Ratio	3.67	

3
 4 This table illustrates the large difference between the TRC and UCT test when calculating net
 5 benefits. The Commission should take note that there is an approximate \$8 million dollar
 6 gap between the two tests.

7 Additionally, the Commission should note that the example above only reflects the Ameren
 8 Missouri residential programs in the first-year of the MEEIA Cycle. The commercial and
 9 industrial programs costs would need to be adjusted as well.

1 And, as noted earlier, the costs will also be greater after the estimated utility performance
2 incentive is factored in and the Ameren Missouri LightSavers program is properly quantified.
3 These are far from trivial numbers and the issue will only further be exacerbated if left
4 improperly unaddressed.

5 This is important because agreeing to overstated energy savings today will materially impact
6 ratepayer's bills now, overstate actual environmental benefits, and negatively impact future
7 energy efficiency efforts.

8 **Q. Do you have any concluding comments regarding Staff's direct testimony?**

9 A. Staff's changed position represents a large departure from their original position and then
10 selectively chooses what to include as appropriate costs.

11 Accepting Staff's position would effectively make Missouri an outlier within the regulatory
12 world of energy efficiency. This position would only be exacerbated when you factor in that
13 Ameren Missouri would be claiming savings from market effects when:

- 14 • There was no mandated state Energy Efficiency Resource Standard in Missouri.
- 15 • The program has only been in existence for one year before savings were claimed.
- 16 • The time period of the claimed market effects immediately preceded new federal
17 EISA standards.
- 18 • The program was not jointly delivered throughout the state.
- 19 • The program implemented was marketed with a budget of only \$33,146.
- 20 • The program's evaluation rests primarily on data collected six months into a 36
21 month program cycle.

22 The Commission should decline to endorse such a drastic new policy in this case and refrain
23 from making Missouri the outlier in rewarding utilities for taking credit beyond what can be
24 verified by their actions.

1 **III. Response to Ameren Missouri's Direct Testimony of Rick Voytas**

2 **Q. What is your overall response to the direct testimony filed by Ameren witness Rick**
3 **Voytas?**

4 A. Mr. Voytas' testimony misstates the objections I raised in the Response to Change Requests.
5 Unlike Mr. Rogers' direct testimony, instead of affirmatively supporting the Company's
6 position Mr. Voytas spends the majority of his sixty-three pages of direct testimony
7 commenting on Public Counsel's filed Response to Change Requests. Additionally, Mr.
8 Voytas offers testimony, similar to Staff's, about the purported reasonableness of Ameren
9 Missouri's new position. This rebuttal will address each of the issues he raises.

10 **Q. Please provide an outline to your response to Mr. Voytas' testimony.**

11 A. For the same reasons articulated in my response to Mr. Rogers, the new position of Ameren
12 Missouri neither reaches the correct result, nor offers a reasonable resolution of the issues in
13 this case. Additionally, as stated above, Mr. Voytas raises a variety of issues in an attempt to
14 "rebut" the points raised in my Response to Change Requests. Ultimately, what we are
15 attempting to do is quantify the energy savings and net benefits caused by Ameren
16 Missouri's MEEIA programs in 2013. Mr. Voytas' testimony is an attempt to support an
17 increase in the claimed energy savings by including market effects. In this rebuttal I address
18 each point Voytas raises to support market effects in order to demonstrate to the Commission
19 why it should reject these unverifiable and speculative purported "savings."

20 **Q. Please discuss the reasonableness of Ameren Missouri's new position.**

21 A. Ameren Missouri's direct testimony reinforces how little the utility moved from its proposed
22 Change Request. Explaining how the EM&V evaluator's 2013 results differ from what the
23 Staff and the Company agreed to in their stipulation, Mr. Voytas states:

1 *2013 energy efficiency portfolio energy savings were reduced from approximately*
2 *390,000 MWh to 369,000 MWh which is approximately a 5% reduction.*²

3 This is a very small reduction, which is particularly concerning when one considers that
4 Ameren Missouri inflated its MWh savings estimates by including a downward adjustment in
5 free ridership and the addition of market effects in its calculation. The Company has
6 effectively proposed an unreasonable and unsubstantiated “high” energy savings estimate and
7 then used the straw man number it created as leverage to negotiate a new position, one which
8 minimizes the importance of the results of the Commission’s independent auditor and
9 produces a windfall for Ameren.

10 **Q. How should the PY2013 annual energy savings be determined?**

11 A. As articulated in the earlier response to Staff’s comments, the Commission should determine
12 the results of the PY2013 EM&V annual energy savings by: adopting Staff’s original Change
13 Request which calls for the elimination of market effects, accepting the spillover estimates of
14 the Commission’s auditor, and including a 9% downward adjustment to the net energy
15 savings for the LightSavers Program to reflect direct rebound effects. As shown in Table 1
16 from my direct testimony this calculation results in PY2013 annual energy savings
17 attributable to Ameren’s MEEIA programs of 279,959 MWh—a strong outcome in itself.

18 Importantly, determining the energy savings in the manner suggested gives full consideration
19 to the strong work performed by the Commission’s independent auditor and rests the energy
20 savings calculation on a much stronger foundation that would otherwise be the case if the
21 Commission were to accept Ameren Missouri’s largely experimental, highly speculative and
22 very aggressive inclusion of market effects in the energy savings calculation.

² Voytas p. 6, lines 8-9.

1 **Q. Does Ameren Missouri agree that the auditor's report without market effects should be**
2 **the base line for determining the energy savings achieved?**

3 A. No. The Company wants to include savings attributed to market effects. Public Counsel has
4 expressed the reasons market effects should not be included in its Response to Change
5 Request and in its Direct Testimony.

6 **Q. in Mr. Voytas' direct testimony, which responded to Public Counsel's Response to**
7 **Change Request, did he address the reasons why he disagreed with your positions?**

8 A. Yes. He raises multiple objections to the points I articulated regarding the appropriateness of
9 including market effects, objects to the proposed downward adjustment of free ridership and
10 further objects to the proposed recalculation of net shared benefits. Moreover, he raises a
11 policy issue regarding the proposed EPA Clean Power Plan, and potential compliance costs.

12 **Q. Please give an outline of the issues you will discuss.**

13 A. The outline of issues that I respond to include:

- 14 • Other states' treatment of market effects
- 15 • "Best practice" literature on market effects
- 16 • Challenging the EM&V community
- 17 • The Wal-Mart example
- 18 • The Home Depot/Kansas City comparison
- 19 • What can be learned from the California example
- 20 • Ameren Illinois' leakage
- 21 • Impact of EISA standards
- 22 • The 2012 Ameren Missouri MEEIA application
- 23 • NRDC witness Phil Mosenthal's observations

- Free ridership adjustment
- Net shared benefits definition
- Clean Power Plan considerations

Other state’s treatment of market effects

Q. Mr. Voytas lists a number of states that have either accepted claimed savings from market effects or are considering market effects in some form, in order to support his assertion that use of market effects is an industry best practice. Please respond.

A. Mr. Voytas lists five states and one multi-state alliance as proof that market effects happen and are a valid construct for Missouri. Although he did not specifically address the states that I had identified as suitable comparisons to Missouri in my Response to Change Requests, I include them again in Table 3 as a point of comparison with the states Mr. Voytas references in Table 4. Missouri is included in both tables.

Table 3: States Referenced in OPC Response to Change Request

State	Rank	2013 EE 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

1 The states in table 3 represent states that have similar budgets and regulatory structures as
2 Missouri. Not one of these states includes decoupling or has a mandated Energy Efficiency
3 Resource Standard in place. And though these states range from a low-end budget of
4 approximately \$2 million in South Dakota to a high end of \$72 million in Oklahoma, the
5 breadth of this range pales in comparison to the chasm in energy efficiency budgets from the
6 states that Mr. Voytas references throughout his direct testimony table 4 breaks down those
7 states in the same format as table 3.

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1 **Table 4: States Referenced in Mr. Voytas' Direct Testimony**

State	Rank	2013 EE Budget	Decoupling	Lost Revenue Mechanism	Performance Incentive	Energy Efficiency Resource Standards (EERS)
New York (NYSERDA) ³	2	\$610,887,944	Yes	No	No	Yes
Massachusetts (MassSave) ⁴	4	\$475,642,766	Yes	No	No	Yes
Pennsylvania	6	\$247,530,848	No	No	No	Yes
Northwest Energy Alliance ⁵ (multi-state)	11	\$169,381,147	Yes	Yes	Pending	Yes
Arizona	12	\$164,334,468	No	Yes	Yes	Yes
Wisconsin (Focus on Energy) ⁶	22	\$79,939,703	Yes	No	Yes	Yes
Missouri	30	\$50,699,065	No	Yes	Yes	No

2
 3 The difference between the two tables is stark, not only with respect to the overall budgets for
 4 the states but also with respect to their respective regulatory structures (as discussed below)
 5 and implementations. There are several key points of which readers should take note
 6 regarding the states Mr. Voytas referenced:
 7

³ NYSERDA includes Central Hudson Gas & Electric, Con Edison, National Fuel, National Grid, National Grid-Long Island, National Grid New York, NYSEG, Orange and Rockland Utilities, RG&E

⁴ MassSave includes Berkshire Gas, Blackstone Gas, Cape Light Compact, Columbia Gas of Massachusetts, Liberty Utilities, National Grid, NSTAR Electric Gas, Unitil, Western Massachusetts Electric

⁵ NEEA includes the Energy Trust of Oregon, Avista Utilities, Bonneville Power Administration, Chelan County PUD, Clark Public Utilities, Cowlitz PUD, Eugene Water & Electric Board, Idaho Power, Northwestern Energy, Pacific Power, Puget Sound Energy, Seattle City Light, Snohomish County Public Utilities, and Tacoma Power.

⁶ Focus on Energy includes over 100 utilities in a jointly delivered state program.

1 Overall:

- 2 • 6 out of the 6 states listed in Mr. Voytas' table have Energy Efficiency Resource Standards
3 (EERS) in place.⁷
- 4 ○ Missouri does not have EERS mandated targets.
- 5 • 4 out of the 6 states listed in Mr. Voytas' table have decoupling in place.
- 6 ○ Missouri does not have decoupling in place.
- 7 • 4 out of the 6 states listed in Mr. Voytas' table are jointly delivered programs either
8 throughout the state with multiple utilities participating or jointly delivered program through
9 multiple states (see footnotes above for the sheer volume in joint delivery).
- 10 ○ Missouri does not have mandated jointly delivered programs at any level.

11 **Q. Please address how these different states have addressed market effects.**

12 A. Below in bullet form, I highlight relevant issues for the Commission to consider when
13 comparing these states to Missouri. The examples below show that Ameren Missouri
14 attempts to include market effects in an extraordinary manner not replicated in any other
15 state.

16 Pennsylvania and Arizona:

- 17 • Although referenced, Pennsylvania and Arizona:
- 18 ○ Do not give utilities credit for the inclusion of market effects/transformation.
- 19 ○ Arizona utilizes "market effects" as a potential adder to their cost-effective tests—
20 That is, the emphasis there is on the front-end screening, with the efficiency potential
21 studies and applications, and not on the back-end, as is being discussed here (see
22 NEST example on p. 17 of this rebuttal testimony)

⁷ Mr. Voytas also includes the Energy Trust of Oregon in his testimony. This organization is affiliated with the NorthWest Energy Efficiency Alliance and thus not included separately; regardless, Oregon has an EERS standard to meet as well.

- 1 ○ Pennsylvania’s recent interest in market effects is tied to the announcement that their
- 2 seven IOU’s have to achieve a cumulative 2.3% savings for 2014-2016.⁸
- 3 ○ Pennsylvania does not have a utility performance incentive.
- 4 ○ The Missouri Public Service Commission has not directed Missouri electric utilities
- 5 to conduct market effects evaluations or to include market effects as an “adder” for
- 6 the cost-effectiveness of potential “new” measures.

7 Wisconsin:

- 8 • Using a methodology similar to that which was employed in the Ameren Missouri study,
- 9 there Cadmus estimated that market effects accounted for 16% of CFL savings. However, the
- 10 measured market effects savings capture the cumulative impacts occurring between 2008 and
- 11 2013. Thus, the savings attributable to market effects occurring in 2013 would be a fraction
- 12 of that 16%.⁹ Moreover, it is not at all clear that the savings attributed to market effects could
- 13 or should be distributed evenly among the years of the multi-year Cadmus Wisconsin study.
- 14 By the time 2013 hit, there may be nothing to attribute to market effects for the CFL switch.
- 15 • The Wisconsin Public Service Commission (which regulates Focus on Energy) did not
- 16 approve Cadmus’ attempt to quantify market effects for 2013. The Commission merely took
- 17 it under consideration.
- 18 • The final NTG ratio for the 2013 upstream lighting program was 0.81.¹⁰
- 19 • There have been no regulatory decisions using market effects. The 2009 study Mr. Voytas
- 20 references also states that:

21 Market effects (for example, manufacturer sales data), involves a much

22 longer time span and are likely to be measurable until after at least a year of

⁸ ACEEE, State Energy Efficiency Policy Database: Pennsylvania <http://www.aceee.org/sector/state-policy/pennsylvania>

⁹ Cadmus (2014) Focus on Energy: Calendar Year 2013 Evaluation Report Vol. II. Pg. 80
https://focusonenergy.com/sites/default/files/FOC_XC_%20CY%2013%20Evaluation%20Report_Volume%20II.pdf

¹⁰ Ibid, p. 79.

1 program activity. **Market effects that are sizable enough to be translated**
2 **into energy impacts should not typically be expected until at least three**
3 **to five years of program activity** (emphasis added).¹¹

- 4 • Unlike in Missouri, Wisconsin’s Focus on Energy has had a state-wide residential lighting
5 program in place since 2005. They have had an upstream lighting program in place since
6 2008.
- 7 • Wisconsin’s Focus on Energy uses net savings only to determine program cost effectiveness,
8 to inform continuous improvement of program design, and to inform public policy decision
9 making—all front-end efforts. Focus on Energy uses gross energy savings to determine
10 contract goals and incentives for the program administrators—back-end efforts.¹²

11 New York

- 12 • Does not have a performance incentive for the utilities.
- 13 • In New York, market effects and spillover are used interchangeably. From the 2013
14 New York Evaluation Plan Guidance:

15 [Spillover] Refers to the energy savings associated with energy efficient
16 equipment installed by customers who were influenced by an energy
17 efficiency program, but without direct financial or technical assistance from
18 the program. Spillover includes additional actions taken by a program
19 participant as well as actions undertaken by non-participants who have been
20 influenced by the program. **Sometimes spillover is referred to as “free**

¹¹ Public Service Commission of Wisconsin: Focus on Energy Semiannual Report (18-month Contract Period) (2009)
p. 2-17 & 2-18.

https://focusonenergy.com/sites/default/files/semiannualreport18monthcontractperiodfinalrevisedoctober192009_evaluationreport.pdf

¹² Kushaler, M. et al. (2014) Examining the Net Savings Issue: A National Survey of State Policies and Practices in
the Evaluation of Ratepayer-Funded Energy Efficiency Programs. ACEEE. Report Number U1401.

<http://www.aceee.org/sites/default/files/publications/researchreports/u1401.pdf>

1 **drivership” or as “market effects.” These market effects may be current**
2 **or may occur after a program ends.** When market effects occur after a
3 program ends, they are referred to as “momentum” effects or as
4 “postprogram market effects” (emphasis added).¹³

- 5 • Attachment GM-1 includes Appendix F from the 2013 New York Evaluation Plan that goes
6 into detail regarding Program-Level Participant and Nonparticipant Spillover Guidance.
7 This outlines a number of the requirements that need to be met to claim “additional” savings
8 attributed to a program (that does not receive any additional performance incentive) for
9 market transformation studies including:

10 Evaluators can choose to conduct market effects studies which include
11 naturally occurring adoptions, program-rebated adoptions, participant and
12 nonparticipant spillover, other program effects that cannot be reliably
13 attributed to a specific program (e.g., upstream lighting programs and the
14 effects of the portfolio of programs on such things as increases in the
15 allocation of shelving space to efficient measures), **and other non-program**
16 **effects due to such factors as DOE Energy Star [sic], programs funded**
17 **by the American Recovery and Reinvestment Act (ARRA) and the**
18 **gradual non-program induced evolution of the market in terms of**
19 **attitudes, knowledge and behavior regarding energy efficiency.**¹⁴

20 Unlike in New York, the Cadmus evaluation of Ameren Missouri’s LightSavers Program did
21 not address or attribute non-program effects due to outside factors such as ARRA, the DOE

¹³ New York State Department of Public Service and the Evaluation Advisory Group (2013) New York Evaluation Plan Guidance for EEPs Program Administrators. Pg. 5, footnote 3
[http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/766a83dce56eca35852576da006d79a7/\\$FILE/NY_Eval_Guidance_Aug_2013.pdf](http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/766a83dce56eca35852576da006d79a7/$FILE/NY_Eval_Guidance_Aug_2013.pdf)

¹⁴ Ibid, p. xvi.

1 Energy Star program, efforts made by the Missouri Botanical Garden’s EarthWay education
2 team, or other institutional and independent efforts to increase awareness and adoption of
3 energy efficiency.

4 **Q. What does Mr. Voytas say about Massachusetts?**

5 A. Mr. Voytas praises Massachusetts as a model state not only in energy efficiency but in
6 rewarding market effects initiatives. He specifically cites their implementation plan as
7 evidence that market effect estimates are an industry best practice.

8 *The MassSave 2013-2015 implementation plan clearly states how market*
9 *effects are to be included in the cost effectiveness of energy efficiency*
10 *programs as follows:*

11 *“3. Net Benefits and Cost-Effectiveness*

12 *. . . In general, the benefit categories in the TRC test include the value of*
13 *energy savings, gas and electric system benefits, and other measurable*
14 *benefits (for example, participant resource benefits, participant non-*
15 *resource benefits and benefits due to measurable market effects).” [emphasis*
16 *in direct testimony]*

17 *6. Evaluation Budgets*

18 *. . . The valuation and market research budget was based on several factors,*
19 *including historical evaluation costs and an expected higher cost of*
20 *evaluation activities for codes and standards initiatives and the*

1 *quantification of market effects.* *[Empahsis Added]* and in direct
2 testimony].¹⁵

3 **Q. Please respond.**

4 A. The citation titled “Net Benefits and Cost Effectiveness” includes “market effects” as a
5 parenthetical aside. In context, the citation describes how Massachusetts will use market
6 effects as an “adder” when calculating the TRC in order to make programs cost effective that
7 would otherwise not be cost effective—that is to say, eligible to be subsidized. This
8 approach is similar to what Arizona does as described above.

9 To explain what that passage is discussing, consider the \$200+ smart thermostat NEST. A
10 subsidized \$200 smart thermostat is a measure that, by itself, would not likely be cost
11 effective and, therefore, not approved for inclusion in a utility’s efficiency portfolio.

12 However, “adding” on a market effects value may help to justify inclusion of the measure in
13 the portfolio. To do so is a policy decision, one which reflects that the NEST thermostat is
14 perceived as better than a standard smart thermostat, and thus, worth subsidizing for the
15 course of several years to penetrate the market. Convincing customers to buy a \$200 smart
16 thermostat (as opposed to \$25 smart thermostat), and then to actually see the savings result
17 from that measure would require an enormous cost-ineffective marketing and education push
18 by the utility.

19 Important to this case, though, is the fact that an energy efficiency measure like a subsidized
20 CFL does not need an “adder” because:

- 21 ■ it has been on the market since the late 70s,
- 22 ■ it already has significant market penetration,

¹⁵ Voytas, p. 29, lines 1 – 27.

- 1 ▪ it will not need ratepayer subsidized funds in the future (if it needs them
- 2 now),
- 3 ▪ and it is already cost-effective on its own.

4 A residential lighting program focused on CFLs in 2013, as proposed by Ameren, is clearly
5 not what the MassSave implementation plan is referring to when it says market effects can be
6 included as justification for passing the TRC's cost-effective test.

7 Separately, the context of the "evaluation budgets" section cited above also influences the
8 meaning of the quote. That section merely states that future EM&V budget estimates are
9 based on historical budgets which included, among other things, the quantification of market
10 effects. It does not say that market effects are claimed savings. Further, it does not say market
11 effects are a component of the NTG ratio. Finally, it does not even say that market effects
12 evaluations (something separate from market effects as a component of NTG and discussed
13 later) are required.

14 **Q. So has Massachusetts ever claimed savings for market effects in the NTG ratio?**

15 A. Yes, it has. But that history is not as sympathetic to Mr. Voytas' position as he might have
16 the Commission believe. MassSave, a statewide energy efficiency effort, with mandated
17 EERS standards and an annual budget of nearly a half-billion dollars has had arguably the
18 most aggressive residential lighting program in the United States and began in 1998.
19 According to the NMR Group's 2013 literature review of effective market transformation
20 practices, which Mr. Voytas references, the following findings were captured regarding
21 MassSave's residential lighting program:

22 One interviewee involved in multiple programs in the state opined that in
23 Massachusetts, any program with a greater potential for market effects than
24 most others programs would be considered a MT [market transformation]

1 program. At the same time, this interviewee noted that since MT is
2 considered to be a positive program attribute, **program administrators tend**
3 **to frame almost everything as MT, whether it truly is or not.**¹⁶

4 As this interviewee explained, NTG went from 1.15 in 2005 to 2.77 in 2006
5 and 2.15 in 2007, then dropped to precipitously to 0.41 in 2008 and 0.47 in
6 2009-2010. . . . **When asked whether and how the evaluation approach**
7 **changed after 2007, one interviewee noted that since then, there has**
8 **been somewhat more focus on net-to-gross, with a particularly**
9 **ambitious net-to-gross study performed in 2010-2011 using five different**
10 **methods to address concerns about very large savings.** All the
11 interviewees who were asked whether the Massachusetts Program
12 Administrators claim savings from market effects explained that they were
13 able to do so only to the extent that the market effects are embedded in the
14 NTG ratios, and added that this is true for other programs, not just residential
15 lighting. **There is no explicit adjustment for any other market effects.**¹⁷

16 MassSave's state-wide residential program claimed NTG ratios considerably higher than 1.0
17 in 2005, 2006 and 2007. Then, after a closer review, those NTG ratios dropped because of
18 "concerns about very large savings." That is to say, no one believed the results were real. So
19 too, would be the case in Missouri, if Ameren Missouri were to be allowed to include savings
20 "attributable" to market effects.

21 Note that the Massachusetts program occurs at least seven years prior to EISA standards
22 going into effect and prior to Wal-Mart's 100 million CFL push, among other concurrent

¹⁶NMR Group (2013) A Review of Effective Practices for the Planning, Design, Implementation, and Evaluation of
Market Transformation Efforts P. 36

http://www.calmac.org/publications/FINAL_NMR_MT_Practices_Report_20131125.pdf

¹⁷ Ibid, P. 67

1 market intervention strategies (e.g., The American Recovery and Reinvestment Act). In
2 addition to the comments listed, the NMR Group report sheds additional light about the
3 difficulty in quantifying market effects in their *Policies and Other Considerations Affecting*
4 *the Program* section:

5 Regarding the programs that the study reviewed:

6 A third interviewee noted that the program administrators are able to claim
7 non-energy benefits such as maintenance, lighting quality, and lifetime.
8 **This interviewee suspects that the reason NEBs can be claimed**
9 **separately while market effects cannot is that there is no easy way to**
10 **quantify savings from market progress indicators such as consumer**
11 **awareness and acceptance.** The second interviewee was of the opinion that
12 claiming savings from market effects or spillover is particularly challenging
13 in situations where utilities administer energy-efficiency programs, as the
14 short-term need to back up revenue recovery claims does not fit well with
15 the long-term nature of market transformation. This interviewee noted that
16 **there have been no explicit market effects studies for the residential**
17 **lighting program.** To this interviewee’s knowledge, the only separate
18 lighting market effects evaluation performed in the state was for high-bay
19 lighting in commercial and industrial facilities, which resulted in the
20 negotiation of an informal increase in the NTG ratio for the associated
21 program.¹⁸

22 To be clear in what the interviewees are discussing, a non-energy-benefit or “NEB” is an
23 “adder” of some value that is applied to measures to make them more likely to pass a cost-

¹⁸ Ibid p. 72-73.

1 effective screening. An example might include jobs created as a direct result of the promotion
2 of a particular program. The Massachusetts Public Service Commission felt that, for
3 example, the value of lighting quality may be worth an additional numerical addition to a
4 cost-effective calculation, thus, should be given a value above the otherwise stated savings.
5 Market effects would then function as a potential pseudo-NEB where a measure would get an
6 additional adder because of its potential market changing value.

7 This is the kind of market effects adder to which Mr. Voytas refers when he says that market
8 effects are embedded in the NTG:

9 *“program administrators in Massachusetts and New York, claim savings*
10 *from market effects to the extent they are embedded in NTG ratios.”¹⁹*

11 The quote above is taken from the NMR Group report Voytas references, but Mr. Voytas’
12 critique leaves out the next sentence, which states:

13 “There is no explicit adjustment for any other market effects.”²⁰

14 Additionally, NMR report states in a different section:

15 4.8.2 Changing Markets

16 Program administrators should think carefully about where their market is.

17 **They should not duplicate something that was done successfully**
18 **elsewhere, because it may be too late—or too early—for their region’s**
19 **particular market.**—Massachusetts Program Administrators.²¹

¹⁹ Voytas, p. 23, lines 1-2.

²⁰ Ibid p. 61.

²¹ Ibid p. 74.

1 And so, these Massachusetts program administrators echo sentiments expressed in my earlier
2 direct testimony and Response to Change Request that Ameren Missouri's emphasis on
3 CFLs in the LightSavers program occurred too late for our particular market in light of all of
4 the mitigating factors which also influence the adoption of CFL bulbs in the market.

5 **Q. What were the results from the net-to-gross study in 2010-2011 for MassSave's**
6 **residential lighting program that changed their NTG ratio so drastically?**

7 A. When the NMR Group was brought in with Research in Action to conduct a multi-stream
8 analysis of the NTG ratio for their lighting program each of the five independent evaluations
9 resulted in a NTG under 1.0 and none of them higher than 0.47. Table 5 is reprinted from the
10 study included below for reference.

1 **Table 5: Final Results of the Massachusetts ENERGY STAR Lighting Program 2010**
 2 **Annual Report**

FINAL Annual Report: 2010 ENERGY STAR Lighting Program Evaluation

Page III

Table ES-1: Comparison of Estimated NTG Ratios^{*}

Method	Sample Size	All CFLs		Spiral CFLs		Specialty CFLs		HTR	
		NTG	CI	NTG	CI	NTG	CI	NTG	CI
Delphi Panel	19	0.47		0.43		0.60			
Conjoint	300					0.59			
Multistate Modeling	1,495	0.45	0.08 - 0.90						
Revealed Preference	105	0.36	0.29 - 0.43	0.37	0.29 - 0.45	0.31	0.21 - 0.41	0.34 - 0.38	0.25 - 0.45
Supplier Self-Reports	201	0.41		0.39		0.49		0.72	
Willingness to Pay	75 ^a 37 ^b	0.45	0.39 - 0.51	0.49	0.42 - 0.56	0.31	0.22 - 0.40		

^{*} The data did not allow for estimates in the shaded cells. All studies achieved at least a 90/10 level of precision, with the conjoint method achieving 95/5.

^a For spiral CFLs

^b For specialty CFLs

The Team has identified three patterns in the NTG results that may have important implications for the future of the Program. First, each of the NTG ratio methods yielded an estimate falling below one, with most of the ratios falling between 0.3 and 0.5. The conjoint analysis (limited to a subset of specialty CFLs), supplier interview estimates for HTR customers and certain retail channels, and the Delphi panel for specialty CFLs yielded NTG estimates of greater than 0.5. While each method certainly has its limitations, the Team believes that the convergence of results may quell at least some concerns about the validity of individual results; multiple methods led to similar conclusions, suggesting that the results are in the right ballpark of the actual "real world" value. The convergence by no means proves that the results have a high level of validity, as they could all still be biased in the same direction, but the evidence does provide some support for the conclusion that the results are valid.⁵

3

4 **Q. What should readers note from this table?**

5 A. Once Massachusetts decided to examine closely the net savings being claimed by the
 6 utilities, the NTG ratio dropped in more than half. This examination included an evaluation
 7 conducted by a panel of lighting and energy efficiency experts known as a Delphi Panel and
 8 is included as the first method analyzed in the table above.

9 Missouri should not make the same mistakes Massachusetts made prior to 2010. In fact,
 10 given our unique regulatory structure, the timing of the program in question, and the
 11 significantly smaller budget, the impact of including phantom savings from market effects
 12 would arguably be much worse here than in Massachusetts.

13

1 **Q. Please explain?**

2 A. Massachusetts promoted the CFL across their entire state with multiple utilities at a time
3 when the incandescent light bulb, the unquestioned standard, was still being made in the
4 United States (because EISA regulations had not even been crafted). That distinguishing
5 factor merits recognition. Ameren Missouri cannot claim to have endured any of those early
6 mover barriers, and yet it wants to be rewarded as though it did.

7 **Q. What has ACEEE said about net savings estimates and market effects in their review of**
8 **what is taking place in the United States?**


9 ACEEE says that there are no best practices for quantifying or verifying market effects.
10 ACEEE routinely conducts surveys of state policies and practices in energy efficiency
11 evaluations, cost-test screenings, and program best practices. In 2014, it released the results
12 of its nation-wide survey on net savings. I have included the entire section within the survey
13 speaking to market effects and have drawn additional emphasis to sections meriting careful
14 consideration regarding the use of market effects:


15 The Special Case of Market Effects

16 In reviewing the core survey results, **we were somewhat surprised to see**
17 **that a total of 13 states reported that they included market effects in**
18 **their assessment of net savings. Since this seemed incongruous with the**
19 **fact that market effects evaluation is thus far fairly rare,** we decided to
20 follow up with respondents and seek clarification.

21 Here is our preferred definition of “market effects” from the earlier
22 definitions section:

1 A change in the structure of a market or the behavior of
2 participants in a market that is reflect of an increase (or decrease)
3 in the adoption of energy efficient products, services, or practices
4 and is casually related to market interventions (e.g., programs). . . .
5 (SEE Action 2012, p. A-10),

6 In the light of this definition, it appears that **only 2 of those 13 states**
7 **(Massachusetts and Vermont) are in fact actively pursuing the** 
8 **estimation of actual market effects.** One additional state specifically
9 acknowledges the presence of market effects and incorporates a specific
10 “adder” in part to reflect that factor. Three states clarified that they really
11 just consider spillover. The remaining six states acknowledged that they
12 really do not include market effects in their evaluation of energy efficiency
13 program impacts. **Generally, their initial response was due to a**
14 **misunderstanding of what was meant by market effects—some thought**
15 **it just meant adjusting savings for changes in baseline standards—or in**
16 **some cases it was just an error in the initial response.**

17 These results confirm that thus far, **the actual estimation of market effects**
18 **in the official quantification of energy efficiency program impacts by** 
19 **states is extremely rare.** While market effects is a hot topic in the
20 professional evaluation community, it has thus far had a very limited
21 practical impact in actual state regulation of ratepayer-funded energy
22 efficiency programs.²²

²² Kushaler, M. et al. (2014) Examining the Net Savings Issue: A National Survey of State Policies and Practices in the Evaluation of Ratepayer-Funded Energy Efficiency Programs. ACEEE. Report Number U1401. <http://www.aceee.org/sites/default/files/publications/researchreports/u1401.pdf>

1 And later:

2 Opinions of the Experts

3 Finally, we asked the experts which states they thought were leading on the
4 important emerging issue of market effects. Here we did find some
5 commonality. Several mentioned Massachusetts as a leading state. Several
6 also mentioned New York as noteworthy for its work on developing
7 spillover guidance (NYSPDS 2012). Several complimented California for its
8 work in conducting research studies on market effects, albeit not necessarily
9 for how it has operationally handled the issue thus far. Similarly, Wisconsin
10 was noted for having done some good research, but not for any actual
11 regulatory decisions using market effects. Finally, two additional states
12 (Indiana and Hawaii) were praised for their conceptual approach to
13 examining the issue.

14 **Overall, however, the experts could not point to any state as having an**
15 **ideal approach at this point. The issue of quantifying and crediting**
16 **market effects is simply too new to the field** (emphasis added).



17 Missouri stakeholders have been expressing these concerns for almost a year now after it
18 came to light that Ameren would insist on moving forward with crediting market effects for a
19 program that is, at best, seven years too late in making a meaningful market effect impact on
20 the Ameren Missouri service territory.

21 There are no established best practices for quantifying market effects, and so they should not
22 be included as achieved energy savings for Ameren Missouri.

1 The approach Cadmus utilized for Ameren Missouri’s LightSavers program, although similar
2 to what they attempted in Wisconsin during part of this same period (Wisconsin’s NTG ratio
3 did not include nonparticipant spillover as an input) is still a new and an unrecognized
4 approach by any regulatory body in the country. Wisconsin, for their part, did not recognize it
5 and nor should Missouri.

6 Approving Ameren Missouri’s suggested approach would allow Ameren Missouri to claim
7 savings from unquantifiable and unverifiable market effects and reward the utility with
8 ratepayer funds for achieving non-existent phantom results.

9 **“Best practice” literature on market effects**

10 **Q. Mr. Voytas lists a number of publications and/or institutions and asserts that they**
11 **endorse market effects as a legitimate component to the NTG ratio. Please respond.**

12 A. Because the energy savings achieved by the company increases the amount of money that the
13 Company charges to customers through its MEEIA rider, it is essential that the savings
14 credited to Ameren’s MEEIA program be accurate. A closer examination of these
15 publications cited by Voytas shows that, as a general matter, the publications do no support
16 his claims that market effects are an industry-wide best practice. Further, in specific, the
17 publications do not support the inclusion of market effects for Ameren Missouri’s MEEIA
18 program year 2013. In total, Mr. Voytas references five different publications to support his
19 claims: 1) National Home Performance Council, 2) Lawrence Berkeley National Laboratory,
20 3) California Institute for Energy and the Environment (CIEE), 4) The National Action Plan
21 for Energy Efficiency (NAPEE), and 5) State Energy Efficiency Action Network.

22 **Q. What does the report for the National Home Performance Council (NHPC) say about**
23 **market effects?**

1 A. The report says nothing about the validity and necessity of estimating market effects as part
2 of a balanced approach to estimating NTG for energy efficiency programs. The term “market
3 effects” is used one time in the 78-page document, and that reference, located within the
4 subsection *Market Transformation Program*, is merely quoting another report. It does,
5 however, go into greater detail describing the rebound effect:

6 Market Transformation Program: “An energy efficiency program strategy
7 that leads to a reduction in a market barriers resulting from a market
8 intervention as evidenced by market effects that last after the intervention
9 has been withdrawn, reduced or changed.” (NEEP 2009, p. 22).

10 **There is also another factor called “rebound” effect that influences the**
11 **net energy savings.** The rebound effect describes an effect where consumers
12 increase the level of energy service due to lower cost of energy usage
13 resulting from more energy efficient measures. Our study will focus on free-
14 rider and spillover and will not discuss the rebound effect in our study for two
15 reasons. First, the literature on this topic indicates that the rebound effect from
16 energy efficiency programs is minimal (Synapse 2011a; Nadel 2011;
17 Ehrhardt-Martinez and Latineer 2010). Second, historically free-rider and
18 spillover effects have been the major focus on net savings (emphasis added).²³

19 All references for “market transformation” are used in the context of a screening
20 process (front-end) to ensure that a given measure would be cost-effective that
21 otherwise would not.

²³ Woolf et al. (2012) Best Practices in Energy Efficiency Program Screening. National Home Performance Council.
P. 45. http://www.nhpci.org/images/NHPC_Synapse-EE-Screening_final.pdf

1 The document cited by Mr. Voytas fails to substantiate his claims on market effects
2 and does not provide any evidence justifying the inclusion of market effects in the
3 PY2013 energy savings for Ameren Missouri.

4 **Q. What does the report from the Lawrence Berkley National Laboratory (LBNL) say**
5 **about market effects?**

6 A. This survey of state EM&V practices uses the term market effects and spillover
7 interchangeably. There is no recommendation for a state commission to utilize any given
8 input over another in the NTG ratio, as the study is a review, not a prescriptive report. It does
9 include a working “net savings” definition that includes market effects, however, this
10 definition also includes a host of other potential inputs that are not traditionally included:

11 Net savings – The total change in energy consumption and demand that is
12 attributable to an EE program or efficiency standard. **This change may**
13 **include implicitly or explicitly**, the effects of free-drivers, free-riders, state
14 or federal energy efficiency standards, change in the level of energy service
15 and natural change effects, spillover and **market effects** (emphasis added).²⁴

16 If one were to apply this working definition, the LightSavers program also should have also
17 factored in the upcoming federal energy efficiency standards in the net savings ratio. Of
18 course, Ameren Missouri suggests nothing of the sort. Rather than showing that inclusion of
19 market effects in the NTG is a best practice, the Berkley report undercuts the claim.

²⁴ Messenger, M. et al. (2010). Review of Evaluation, Measurement and Verification Approaches Used to Estimate the Load Impacts and Effectiveness of Energy Efficiency Programs. *Berkeley National Laboratory*. P. 18.
<http://emp.lbl.gov/publications/review-evaluation-measurement-and-verification-approaches-used-estimate-load-impacts-an>

1 **Q. What does the report from the California Institute for Energy and the Environment**
2 **(CIEE) say about market effects?**²⁵

3 A. This 2009 paper discussed and advocated for the inclusion of market effects. However, this
4 report was prepared for and submitted to the California Public Utilities Commission
5 following the Commission’s finding that market effects did not take place in the 2006-2008
6 California IOU upstream lighting programs. Importantly, as of 2014, the California Public
7 Utilities Commission has not changed its opinion rejecting the inclusion of market effects in
8 the NTG ratio. This limited, unpersuasive paper should have no bearing on whether the
9 Missouri Public Service Commission should endorse the use of market effects for Ameren
10 Missouri’s PY2013 MEEIA portfolio.

11 **Q. Voytas cites the 2007 National Action Plan for Energy Efficiency (NAPEE) as**
12 **supporting market effects. What does the report say about market effects?**

13 A. This report discusses traditional evaluation studies conducted in the EM&V community,
14 which include process and impact evaluations. The report introduces a third kind of
15 evaluation study, the market effects study as a type of study that may be appropriate for long-
16 term interventions. In describing the new kind of evaluation, the report states that the results
17 of market effect studies can only be included if proven, “after the intervention has been
18 withdrawn, reduced, or changed.”²⁶ According to this definition market effects cannot apply
19 to the intervention here—Ameren Missouri’s LightSavers program—because LightSavers is
20 only in its first year and is still active. Again, this report fails to support Ameren’s assertions.

²⁵ Rosenberg, et al. (2009) Market Effects and Market Transformation: Their Role in Energy Efficiency Program Design and Evaluation. CIEE http://uc-ciee.org/downloads/mrkt_effts_wp.pdf

²⁶ EPA (2007) Model Energy Efficiency Program Impact Evaluation Guide. NAPEE. http://www.epa.gov/cleanenergy/documents/suca/evaluation_guide.pdf

1 **Q. Voytas cites the 2012 State Energy Efficiency (SEE) Action Network Impact Evaluation**
2 **Guides as supporting market effects? What does the evaluation guide say about**
3 **market effects?**

4 A. Similar to the NAPEE report that preceded this document, market effects are largely
5 referenced as “market effects studies” and differ from “impact” or “process” EM&V studies.
6 The SEE report does include a long working definition of “net energy savings,” singling out
7 free ridership and spillover before making a brief mention of market effects.

8 **Net energy savings:** the change in energy consumption and/or demand that
9 is attributable to a particular energy efficiency program. Estimating net
10 energy savings typically involves assessing free ridership and spillover,
11 although this guide discusses additional considerations. In the efficiency
12 industry, *free ridership* refers to the portion of energy savings that
13 participants would have achieved in the absence of the program through their
14 own initiatives and expenditures (i.e., the participant would have undertaken
15 the energy-saving activity anyway). *Spillover* refers to the program-induced
16 adoption of measures by nonparticipants and participants who did not claim
17 financial or technical assistance for additional installations of measures
18 supported by the program. For instance, a participant undertakes additional
19 energy efficiency measures due to positive experience with the program, or a
20 nonparticipant undertakes such measures based on observing a program
21 participant’s results. **Net savings estimates also sometimes include**
22 **consideration of market effects**²⁷(emphasis added).

²⁷ SEE Action (2012) Energy Efficiency Program Impact Evaluation Guide.
https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf

1 The aforementioned passing reference to market effects only says that these are
2 sometimes considered within estimated net savings. This passing reference to the
3 possibility that market effects are sometimes considered does not then require that
4 Missouri must, or even should, do so here, particularly when confronted with the
5 paucity of evidence that any other comparable jurisdiction does so, or that those few
6 jurisdictions who attempt to do so, do so at all accurately.

7 **Challenging the EM&V Community**

8 **Q. Mr. Voytas asserts that you are challenging the energy efficiency EM&V community by**
9 **questioning the inclusion of market effects into the NTG ratio. Please respond.**

10 A. In reality, it is Ameren Missouri's position that is unsupported and runs counter to the
11 widespread practices of the EM&V community. Voytas' assertion repeated throughout his
12 direct testimony is an attempt to frame Public Counsel's position on market effects as being
13 inconsistent with best practices, and as somehow holding a minority perspective that runs
14 counter to what is being practiced in every other state. For example, Mr. Voytas states:

15 *From his testimony we can recognize that Mr. Marke challenges the industry*
16 *and its experts on fundamental means by which we address and*
17 *quantification of the components of NTG or EM&V calculations [sic].*
18 *Inasmuch as Mr. Marke's testimony represents a departure from accepted*
19 *best practice and a challenge to principles of general acceptance in the field,*
20 *his testimony should be rejected.*²⁸

21 But it is clear from the evidence supported throughout this rebuttal that if any consensus
22 about market effects exists in the EM&V and regulatory community, it tends towards

²⁸ Voytas p. 32, lines 3-7.

1 exclusion of market effects. According to the supporting documentation offered throughout
2 Public Counsel's Response to Change Requests and this rebuttal testimony, the attempted
3 quantification of market effects as a component of NTG in EM&V calculations is a departure
4 from accepted practice. My view does not represent a minority opinion on this subject, as is
5 evident from the conclusion drawn by ACEEE from their earlier referenced Net Savings
6 Survey that stated:

7 **These results confirm that thus far, the actual estimation of market**
8 **effects in the official quantification of energy efficiency program**
9 **impacts by states is extremely rare.**

10 **While market effects is a hot topic in the professional evaluation**
11 **community, it has thus far had a very limited practical impact in actual**
12 **state regulation of ratepayer-funded energy efficiency programs.**

13 (emphasis added).²⁹

14 And,

15 **Overall, however, the experts could not point to any state as having an ideal**
16 **approach at this point. The issue of quantifying and crediting market effects is**
17 **simply too new to the field** (emphasis added).³⁰

18 **Q. Mr. Voytas also implies that you asserted you are more qualified than the evaluator**
19 **and auditor on matters of market effects. Please respond.**

20 **A. Mr. Voytas does attempt to frame this as an issue of Public Counsel vs. the consultants.**

²⁹ Kushaler, M. et al. (2014) Examining the Net Savings Issue: A National Survey of State Policies and Practices in the Evaluation of Ratepayer-Funded Energy Efficiency Programs. ACEEE. Report Number U1401. p. 15
<http://www.aceee.org/sites/default/files/publications/researchreports/u1401.pdf>

³⁰ Ibid, p. 16.

1 To clarify, OPC has never challenged the “expertise” of the evaluator and auditor on these
2 topics, only the results they reach. Furthermore, I did not propose a new estimation of market
3 effects. I proposed that market effects be eliminated from the NTG ratio, as their
4 quantification was never appropriate within this context.

5 Moreover, OPC is not the only stakeholder that has taken issue with either the auditor or with
6 Cadmus on their final results. Both Staff and Ameren Missouri have separately challenged
7 various results in these studies. Ameren Missouri challenges the results of Cadmus, ADM
8 and the Commission’s independent auditor with respect to their findings on free ridership.
9 However, both Cadmus and the independent auditor’s finding on free ridership have been
10 accepted in multiple EM&V processes by other state commissions. OPC has utilized the free
11 ridership estimates calculated by Cadmus and supported by Mr. Dimetrosky’s section of the
12 Auditor’s report.

13 The difference between Mr. Voytas’ approach to those issues and mine is that to my
14 knowledge, neither Cadmus nor the Auditor have had any calculation of market effects
15 approved by a state commission whether there was a financial incentive involved for a utility
16 or not.

17 **Q. Mr. Voytas asserts that market effects are an accepted input into the NTG ratio. Please**
18 **respond.**

19 A. Market effects are not required to be an input in the NTG ratio nor can it be said they
20 are necessarily an accepted input. In his direct, Mr. Voytas makes the following
21 assessment of what is the basic NTG equation.

22 *Q. Mr. Marke states on Page 9, Line 1 of his testimony that the inclusion of*
23 *non-participant spillover and market effects in the computation of the NTG*

1 *ratio is a Cadmus equation and not the basic NTG equation. Is there any*
2 *truth to Mr. Marke's statement?*

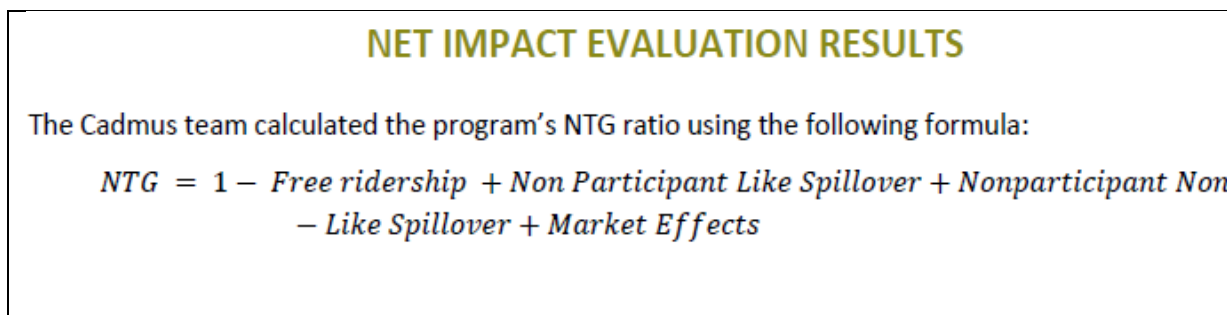
3 *A. No, there is not. Cadmus has not invented or re-created any new*
4 *definition of NTG. The SEE Action Network has a compendium of best*
5 *practices and SEE defines NTG exactly as Cadmus does for Cadmus' 2013*
6 *EM&V work.*³¹

7 Page 9, line 1 of my Response to Change request simply lists the inputs that were utilized by
8 each of the different consultant's reports. There was no declarative statement on my part.

9 I disagree with Mr. Voytas' assertion that Cadmus' inclusion of non-participant spillover
10 (actually non-participant "like" spillover and non-participant "non-like" spillover) and
11 market effects is consistent with the basic NTG equation. His claim conflicts with multiple
12 NTG equations listed within the EM&V reports.

13 Reprinted and included in Figure 1 is the LightSavers NTG ratio utilized by Cadmus and
14 included in their 2013 Evaluation.

15 **Figure 1: LightSavers NTG ratio utilized by Cadmus:**³²



³¹ Votas p. 20, lines 12-18.

³² Cadmus (2014) Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013 p. 48.

1 If figure 1 is the basic NTG equation, as asserted by Ameren Missouri, then what are the
2 other 10 different NTG equations listed in the EM&V reports which did not include market
3 effects or “like” and “non-like” nonparticipant spillover?³³

4 I can find no examples throughout all of my research where a NTG estimate was used in the
5 manner that Cadmus is attempting to use with the LightSavers program. To the best of my
6 knowledge, this is a newly-created ratio and has not been approved by any state commission.

7 Regarding the basic NTG ratio, Mr. Voytas is incorrect if he believes “the basic ratio” is the
8 one Cadmus is utilizing above. However, two of the papers he references in his direct
9 testimony do correctly address the issue of “the basic NTG ratio.”

10 3.2.7.1 Traditional Approach: Program-Level Net Savings

11 Of the five methods discussed in the previous section, self-reported
12 counterfactual analysis, with its focus on free-ridership and spillover, is the
13 only one that necessarily calculates a NTG ratio at the program level.
14 However, it continues to be the most common approach by far. **The**
15 **traditional formula for calculating a net-to-gross (NTG) ratio at the**
16 **program level is as follows:**

$$17 \quad \underline{\mathbf{NTG = 1 - FR + SO}} \text{ (emphasis added)}^{34 35}$$

18 And in this excerpt from the 2010 NMR Massachusetts ENERGYSTAR Lighting Program
19 Evaluation:

20 **Net-to-Gross Estimates**

³³ There were 11 programs in Ameren Missouri’s PY2013.

³⁴ p. 30.

³⁵ FR = free ridership, SO = spillover

1 The rapidly changing CFL market challenges the ability of traditional net-to-
2 gross (NTG) methods to provide reliable and valid estimates of CFL
3 program NTG ratios, and **no single methodology stands out as the latest**
4 **best practice NTG estimation.** [footnote comments are included next]

5 **It is unlikely that any single method will ever be a “best practice” for**
6 **CFL (or other) NTG ratio estimation.** Data availability, program design,
7 target population, and budget, among other factors must be taken into
8 account when deciding which NTG approach to use in net savings estimation
9 (emphasis added).³⁶

10 The attempt to define the “basic NTG equation” as one that includes market effects is
11 unsupported.

12 **The Wal-Mart example**

13 **Q. Please summarize and then respond to Mr. Voytas’ criticism of your inclusion of Wal-**
14 **Mart’s efforts to promote CFLs as a contributing factor to market transformation.**

15
16 **A.** Mr. Voytas disputes my suggestion that Ameren Missouri is claiming savings in part based
17 on efforts made by Wal-Mart which occurred prior to Ameren Missouri’s LightSavers
18 program. He specifically states:

19
20 *As a threshold point, Mr. Marke’s argument presents an existential*
21 *challenge to energy efficiency efforts brought about by state law and*
22 *advanced by State Commissions, including this Commission through MEEIA*

³⁶ NMR Group (2011) Massachusetts ENERGYSTAR Lighting Program: 2010 Annual Report Volume 1 Final p. II
<https://www.efis.psc.mo.gov/mpsc/commoncomponents/viewdocument.asp?DocId=935690223>

1 *programs implemented in Missouri. If a Walmart press release can foretell*
2 *massive energy savings across the region, then there is little need for a utility*
3 *energy efficiency residential lighting program, and Ameren Missouri, as well*
4 *as scores of other utilities across the country, could have simply referred*
5 *their customers to Walmart.*³⁷
6

7 My earlier proposition that Wal-Mart deserves some attribution for CFL market adoption
8 separate and before Ameren Missouri's LightSavers program does not require a
9 Kierkegaardian leap of faith. Nor does it suggest, as Mr. Voytas would have you believe, that
10 there is no need for a utility energy efficiency residential lighting program. And importantly,
11 nothing I suggest is so dramatic as to "present an existential challenge" to Missouri's energy
12 efficiency regulatory regime.

13
14 To be clear, Public Counsel is not suggesting that the CFL net-to-gross should be 0.0. Many
15 CFLs clearly were sold, but to suggest that Ameren Missouri's ability to move light bulbs
16 exceeds that of Wal-Mart's a company with annual revenues comparable to the GDP of a
17 large national economy like Nigeria, strains credulity. Ameren Missouri does not sell light
18 bulbs, Wal-Mart does. Wal-Mart is world known for its marketing, pricing, inventory
19 management and other market moving practices. Ameren Missouri simply does not compare
20 and cannot take credit for market movement attributable at least in part to the behemoth that
21 is Wal-Mart.

22
23 The efforts of Wal-Mart (explained in my Response to Change Request) and the general
24 adoption of CFLs nationwide over the past three decades (not to mention EISA standards

³⁷ Voytas p. 34, lines 3-9.

1 going into effect) is exactly why utilities across the country have not been able, or even
2 attempted, to claim NTG ratios over 1.0 for CFL programs in at least seven years.

3 Later, Mr. Voytas casually dismisses Wal-Mart selling 100 million CFLs in 2006-2007 as
4 having no impact on the lighting market. Mr. Voytas states:

5
6 *The fact is that this nationwide one-time, one-year pledge, made in 2006,*
7 *had no impact on the lighting market.*³⁸

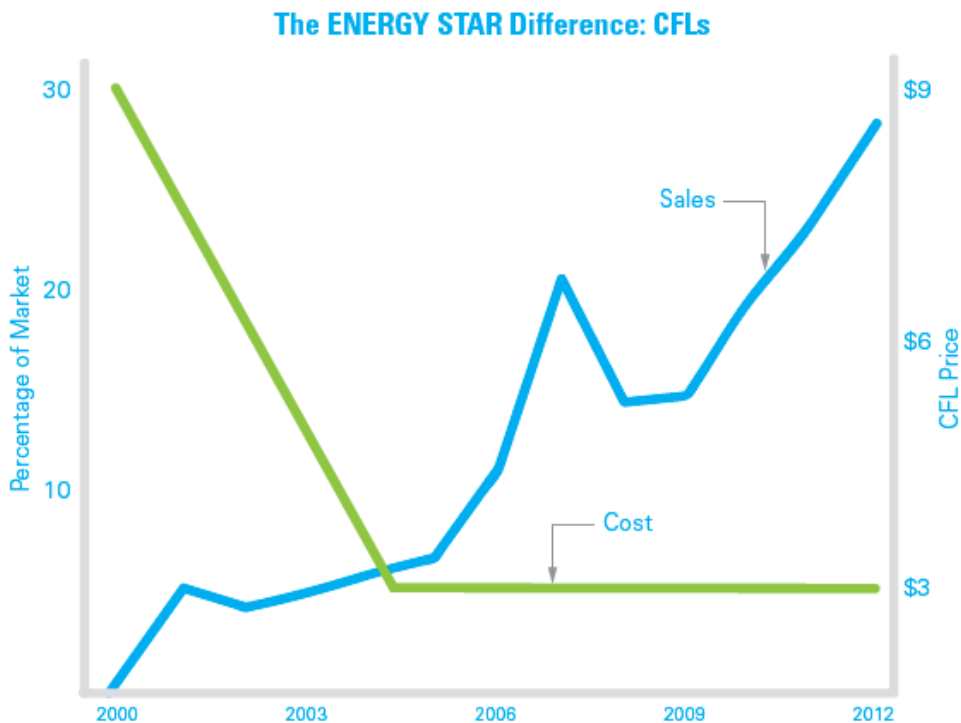
8 Consider, for a moment, this statement as it compares to Ameren Missouri's argument that
9 their program changed the market. Mr. Voytas seems to be suggesting that while the
10 approximate 4 million CFLs sold in Ameren Missouri's service territory in PY2013 had an
11 impact on the lighting market, Wal-Mart selling 100 million CFLs (seven years earlier) had
12 no impact? If Mr. Voytas is suggesting that the impact Wal-Mart had in transforming the
13 CFL market cannot be measured, then it stands to reason that neither can Ameren's.

14
15 To be sure, the EPA's ENERGYSTAR, at the very least, believes that Wal-Mart had an
16 impact on the lighting market as seen and annotated in figure 2.

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³⁸ Voytas p. 34, lines 12-13.

1 **Figure 2: CFL market growth and price stability**



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.



2
3

4 **The Home Depot/Kansas City comparison**

5 **Q. Please summarize and then respond to Mr. Voytas' criticism of your Home Depot**
6 **energy efficient lighting sales heat map for 2013.**

7 **A.** Mr. Voytas presents three objections to the inclusion of the Home Depot data. The first is that
8 the Kansas City area may be more saturated with stores, with higher volume of sales, and a
9 more densely populated area than Ameren's service territory which is heavily weighted to the
10 St. Louis metropolitan area.

1 *The Kansas City area may be heavily saturated with a large number of*
2 *Home Depot locations that are also high volume. Combine that with a*
3 *population base that is not as dense and it would tend to have a significantly*
4 *higher per capita rating. The inclusion of this heat map is most likely due to*
5 *the high volume store concentration and the population base of using*
6 *Kansas City only, instead of Kansas City metro area, which has 2.34M*
7 *people in it. Kansas City would have dropped out of the Top 50 if the metro*
8 *area had been used.*³⁹

9 **Q. Please respond.**

10 A. The first response would appear to be a valid concern, the Home Depot heat map sacrifices
11 detail for what it gains in simplicity. The map does not provide any details regarding the
12 geographic parameters placed on the metro areas within the study. Perhaps Kansas City does
13 have an inordinate number of Home Depot locations, and thus, the results are skewed.
14 However, the claim that the area of Kansas City evaluated is less densely populated than the
15 Ameren service territory in St. Louis is not testable because it is not clear from the document
16 the size of the area used to create the heat map.

17 In order to examine the concerns raised by Mr. Voytas, I first retrieved store location
18 information from Home Depot for St. Louis and Kansas City at a 100 mile radius. But
19 because the 2013 heat map does not go into detail about the parameters of the geographic
20 area that was investigated, I also compared both metro areas for all available stores within
21 several mileage radius options as is seen in table 6. The St. Louis area has a number of stores
22 equal to or greater than Kansas City at all tested radius points. Unless the St. Louis metro

³⁹ Voytas page 37, lines 6-7.

1 area has seen a large increase in new stores in 2014,⁴⁰ it would seem as though Kansas City
2 does not represent a uniquely saturated Home Depot area. As an appropriate comparison to
3 St. Louis then, the heat map tends to show that the changes in the CFL market would have
4 occurred even absent Ameren's program.

5
6 **Table 6: Comparison of saturated Home Depot Stores⁴¹**

	St. Louis, MO.	Kansas City, MO.
100 miles	24 stores	19 stores
50 miles	22 stores	17 stores
20 miles	14 stores	13 stores
10 miles	3 stores	3 stores
5 miles	1 store	1 store

7
8 This addresses the saturation of Home Depot stores, but it still leaves population
9 density as a potential concern. Here, Mr. Voytas' objection may be valid if St. Louis
10 City as opposed to St. Louis City and County or the St. Louis metropolitan region
11 were the parameters chosen.

12 **Q. What is Mr. Voytas' next criticism?**

13 A. Mr. Voytas argues that the sales data cannot be taken seriously because it fails to include the
14 three largest metro areas in the United States. According to Voytas:

15 *But more surprising is what cities were left off the per capita list:*

⁴⁰ In the past six months there has been one new store in North Dakota which opened in June of 2014.

<http://www.homedepot.com/webapp/wcs/stores/servlet/StoreFinderRecentStores?langId=-1>

⁴¹ <http://www.homedepot.com/StoreFinder/index.jsp>

1 *Chicago, IL*

2 *Los Angeles, CA*

3 *New York City, NY*

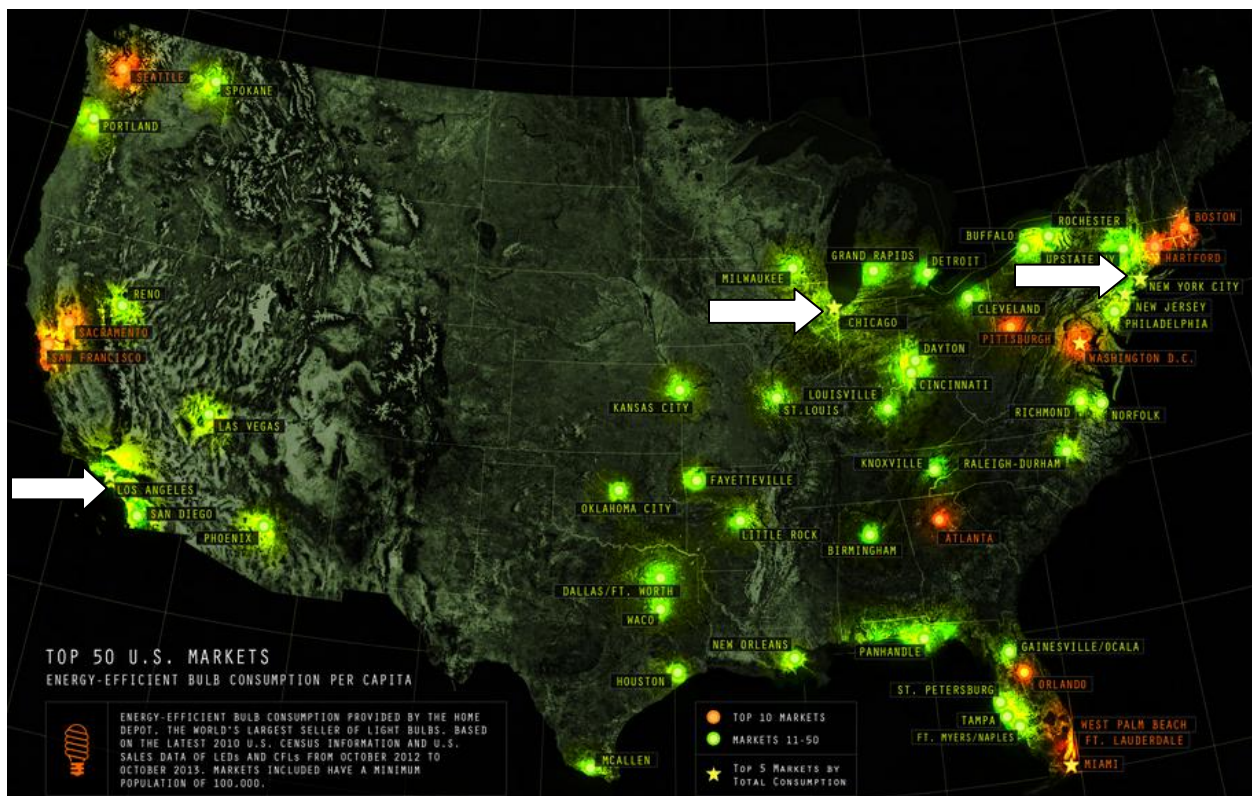
4 *In fact, New York didn't even make it into the top 50. Are we to assume that*
5 *energy efficiency programming, marketing, and promotion are complete*
6 *failures in these markets compared to Kansas City?⁴²*

7 **Q. Please respond.**

8 A. Mr. Voytas is incorrect; all three metro areas are included in the Top 50. Figure 3 includes
9 the Home Depot Top 50 U.S. Markets for energy efficient light bulb consumption per capita
10 in 2013. New York, Chicago, and Los Angeles are all included in the Top 50 cities.
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⁴² Voytas, page 37, lines 15-22.

1 **Figure 3: Top 50 U.S. Markets Energy-Efficient Bulb Consumption Per Capita (Home**
2 **Depot 2013 sales data)**



3
4
5 **Q. What are Mr. Voytas' concluding views regarding the inclusion of the Home Depot**
6 **sales data?**

7 **A.** Mr. Voytas believes that the 2013 lighting sales data for Home Depot does not contribute
8 anything meaningful to the market effects discussion as it pertains to Ameren Missouri's
9 service territory in PY2013.

1 | **Q. Please respond.**

2 | A. While the map has its limitations, it does give readers a rough idea of a suitable control
3 | group. Neither KCPL, GMO nor KCPL Kansas offered an upstream lighting program in
4 | 2013. Both Ameren Missouri and Ameren Illinois did. Yet, Kansas City, at least within the
5 | limitations of Home Depot efficient lighting sales, managed to be one of the top 50 metro
6 | areas in the country.

7 |
8 | As explained throughout this testimony, as well as in my previous submissions, there are no
9 | best practices in determining market effects for EM&V purposes. This research area is a
10 | work-in-progress; evaluators have used different types of quantitative and qualitative data in
11 | their attempt to investigate whether market effects occurred. For example, the Commission's
12 | independent auditor utilized proprietary sales data that showed efficient lighting sales for
13 | Ameren Missouri's service territory in 2012. Ameren Missouri did not have a lighting
14 | program that year. However, according to that data, and illustrated in Staff's original Change
15 | Request, Ameren Missouri ratepayers were still buying CFLs when there was no program.
16 | Cadmus had no such sales data to draw from. Instead Cadmus used an estimate based on its
17 | 2010 socket saturation study. Both studies were able to produce some type of result, but each
18 | is of limited value.

19 |
20 | These estimates represent a "best effort" to quantify something that is largely qualitative in
21 | nature. There are no perfect studies. However, some are better than others. In attempting to
22 | quantify the data in any study, use of a control group will serve to determine how the test
23 | group of customers would have behaved absent the program.

24 |
25 |
26 |

1 **Q. Should the Cadmus study have utilized a control group?**

2 A. It certainly would have strengthened Ameren Missouri's argument if Cadmus could have
3 provided that level of proof.

4 **Q. Has Cadmus ever conducted a market effects evaluation that utilized a control group?**

5 A. Yes. The most notable example includes their evaluation of the 2006-2008 upstream lighting
6 program in California. In that evaluation Cadmus used Georgia, Kansas and Pennsylvania as
7 comparison states to serve as a baseline for California.

8 **Q. What was the conclusion of their 2010 study?**

9 A. From the executive summary of:

10 **Assessment of Whether Savings Can be Claimed as a Resource**

11 Market effects from upstream CFL programs have been claimed as savings
12 throughout the United States. Recent evaluations in Massachusetts (2006),
13 Vermont (2005), and New York (2005), in fact, have identified NTG ratios
14 (inclusive of free ridership and spillover) that exceeded 100%. In other
15 words, in the relatively recent past, the programs found total CFL sales in the
16 respective utility service territories were far greater than they would have
17 been in absence of the program, so the utilities could claim savings from
18 more CFLs that they incented. Given the intensive marketing and outreach
19 of these programs, the substantial price buy-downs they offered, and the
20 nascent CFL market a few years ago, these findings do not appear
21 unreasonable.

22 However, the **CFL market has changed substantially in more recent**
23 **years and the findings from this report indicate that the baseline for**

1 **CFL sales has risen throughout the U.S., including regions with no**
2 **utility efforts to promote CFLs.** Because this study did not find evidence
3 that market effects energy/demand savings attributable the 2006-2008 ULP
4 can be unequivocally a resource for the 2006-2008 program cycle. This is
5 not to say that CFL market effects cannot be reliably estimated; rather, that
6 they were not observed in 2008 (emphasis added).⁴³

7 Table 7 provides a breakdown of design elements and differing conclusions from the Ameren
8 Missouri and California Cadmus studies.

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⁴³ Cadmus (2010). Compact Fluorescent Lamps Market Effects Final Report. http://uc-ciee.org/downloads/Final_CFL_Market_Effects_Report.pdf

1 **Table 7: Comparison between Cadmus California and Ameren Missouri Studies**

	Cadmus California Study	Cadmus Ameren Missouri Study
Program period	2006 – 2008	2013
Had the program intervention concluded?	Yes, Impact study in 2010	No, Impact study conducted 5- 6 months into a 36 month cycle ⁴⁴
Years prior to EISA standards	Eight to six years	One year
Control group	Yes (KS, PA, GA)	No
NTG conclusion	0.54 (2006-008) ⁴⁵ and 0.23 (just 2008) ⁴⁶	1.25
Are spillover and market effects the same or separate inputs into NTG ratio?	Same ⁴⁷	Separate ^{48 49}
How many utilities included in the study?	Three	One
Did market effects happen?	No <i>“This is not to say that CFL market effects cannot be reliability estimated; rather, that</i>	Yes <i>“LightSavers’ potential to generate market effects also has become readily evident, given its significant role within Ameren’s</i>

⁴⁴ “During May and June 2013, Cadmus sent representatives to 172 single-family households in the Ameren Missouri service territory.” Cadmus (2014) Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013 p. 108.

⁴⁵ Conclusion of 2009 EM&V report prepared by Cadmus and KEMA

⁴⁶ “Through a regression approach, this study estimated that cumulative 2008 total net impacts, inclusive of both free ridership and spillover, were 0.23 (i.e., 23% of IOU claimed gross savings). This estimate, although inclusive of market effects, is lower than the estimated NTG ratio in the Residential Retrofit Upstream Lighting Report, which recommends a NTG of 0.54 across the three IOUs” (Cadmus (2010) p. viii, [http://uc-ciee.org/downloads/Final CFL Market Effects Report.pdf](http://uc-ciee.org/downloads/Final_CFL_Market_Effects_Report.pdf)).

⁴⁷ “Although the goal of this analysis was to examine **market effects (i.e., spillover)**, this statistical approach could not disaggregate these various efforts” (p. 35 and p. 81.).

⁴⁸ The NTG estimate includes market effects, nonparticipant spillover and participant spillover each as a separate input.

⁴⁹ “**Time presents the only difference between spillover and market effects:** spillover usually occurs within the program cycle, while market effects result from structural changes and long-term impacts” Cadmus (2014) Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013 p. 144, footnote 46.

	<i>they were not observed in 2008.”</i>	<i>2013-2015 residential portfolio.”</i>
--	---	--

1
2 One of the most prominent differences between the two studies is the tone. The California
3 study centers on trying to determine whether or not market effects or a market transformation
4 actually occurred. In contrast, the Ameren Missouri study reads as though market effects are
5 a foregone conclusion. Below is an excerpt from the Ameren Missouri study:

6 **To observe changes caused by 2013 program activities required a**
7 **saturation study timed well past 2013.** As we needed to provide an
8 estimate of market effects this program year, we proposed using the
9 observed market effect, based on 2010-2013, as a proxy for what we will
10 observe upon conducting the next saturation study. **As it is not feasible to**
11 **measure spillover and market effects from the beginning to the end of**
12 **PY13, we use average historical spillover and market effects rates as a**
13 **proxy for PY13.** Embedded in this approach is an assumption that PY13
14 spillover and market effects occur at the same rate as that exhibited between
15 mid-PY10 and mid-PY13 (emphasis added).⁵⁰

16 **What can be learned from the California example**

17 **Q. Since you have begun discussing the California program, would you please summarize**
18 **Mr. Voytas’ objection to your inclusion of the example of California’s upstream**
19 **lighting program from your Response to the Change Request.**

⁵⁰ Cadmus (2013) Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013 p. 51-52

1 A. Mr. Voytas distorts my testimony by stating that I believe the 2006-2008 upstream lighting
2 program contributed to moving the market in Ameren Missouri's service territory in 2013. In
3 a Q&A from his direct testimony he states:

4 *Q. How can California influence Missouri CFL sales from 1,500 miles*
5 *away?*

6 *A. It should be obvious that California does not meaningfully influence the*
7 *Missouri market for sales in 2013. It is unreasonable to compare the most*
8 *mature energy efficiency market in the U.S. with a less mature Midwestern*
9 *U.S. market. The state of California has had active EE programs since the*
10 *mid-70s.⁵¹*

11 **Q. Did you say that?**

12 A. I did not. At no point in my discussion of the California program did I state that it had
13 an influence on Ameren Missouri's efficient lighting sales in 2013. Rather, for
14 comparative purposes, I summarized the conclusions made by the California State
15 Public Service Commission's regarding whether to include "market effects" for their
16 three-year program—they concluded market effects did not happen (which I
17 expounded on above).

18
19 As an aside, however, parties to the California study/program did support the proposition that
20 the 2006-2008 California lighting program moved the market for CFL sales across the United
21 States. Most notably, Ameren Missouri's own evaluator Cadmus stated in California:

22 It is also important to note that any quantitative analysis is limited by the
23 qualitative assessment, presented above, that the **California IOU programs**

⁵¹ Voytas, p 42, lines 5-11

1 **have arguably accelerated CFL sales throughout the U.S.** While this
2 impact cannot be accurately quantified (there is no way to “undo” the
3 significant program activity that has occurred in California), it means
4 estimated baseline **sales for all states**—including the comparison states
5 examined as part of this study—may be overestimated. In other words, **sales**
6 **outside California—and estimated baseline sales—might have been**
7 **lower if no program activity had taken place in California.** Note that
8 other programs with mature CFL programs, such as Massachusetts, can also
9 argue that their CFL programs also played a role in increasing CFL sales
10 throughout the U.S (emphasis added).⁵²

11
12 **Ameren Illinois’ leakage**

13
14 **Q. What were Mr. Voytas’ objections to your assertion that “leakage” of Ameren Illinois’**
15 **program may have had an influence on Cadmus’s market effects calculations?**

16 Leakage occurs when program-incented efficient products are installed outside of the funding
17 utility’s service territory. Leakage can be a significant problem in states where rebates are not
18 uniformed across utilities. For example, in 2012 leakage could have been a significant
19 problem for Ameren Illinois because Ameren Missouri did not have a lighting program.

20
21 Mr. Voytas disputes the suggestion from my Response to Change Request that leakage
22 (Ameren Missouri ratepayers purchasing Ameren Illinois CFLs) may have been an
23 underreported factor in determining the NTG of market effects, and that I should have better
24 reviewed my research.

⁵² (Cadmus (2010) p.105. http://uc-ciee.org/downloads/Final_CFL_Market_Effects_Report.pdf).

1 *If Mr. Marke would have reviewed the Ameren Illinois 2012 EM&V report,*
2 *which is in the public domain, he would have seen the following*
3 *quantification of leakage for the Ameren Illinois CFL program . . . The*
4 *leakage into Ameren Missouri was actually 1 of the 898 bulbs that leaked*
5 *out of Ameren Illinois. This factual evidence on actual Ameren Illinois CFL*
6 *leakage data further dispels Mr. Marke’s creative theory that CFL market*
7 *effects in Missouri were caused by the Ameren Illinois CFL program.*⁵³
8

9 **Q. Please Respond.**

10 A. Mr. Voytas is incorrect. I did review the publicly available Ameren Illinois 2012 EM&V
11 report before I submitted my comments. There is not one mention of the word “leakage” in
12 the entire report: *Impact and Process Evaluation of Ameren Illinois Company’s Residential*
13 *Lighting Program (PY4).*⁵⁴
14

15 **Q. Then what report is Mr. Voytas quoting?**

16 A. He is quoting from the Ameren Illinois 2013 EM&V report.⁵⁵ It should not be surprising that
17 there was only one bulb claimed to have leaked out of Ameren Illinois into Ameren Missouri
18 in Ameren Illinois’ 2013 EM&V report. This is because Ameren Missouri had the exact
19 same program in place during that time. Mr. Voytas misses the point of my example entirely.
20 The large leakage rates of CFLs would have occurred in 2012 when there was no program in
21 Ameren Missouri’s service territory and not in 2013.
22

⁵³ Voytas, p. 39 lines 20-22 & p. 40, lines 3-6.

⁵⁴ http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPY4/AIC_PY4_Residential_Lighting_Program_Final_Report.pdf

⁵⁵ http://ilsagfiles.org/SAG_files/Evaluation_Documents/Ameren/AIU%20Evaluation%20Reports%20EPY5/AIC_PY5_Residential_Lighting_Report_FINAL_2013-01-22.pdf

1 To put it another way, OPC asserts that one can conclude that during the entire year of 2012,
2 when there was no Ameren Missouri LightSavers program, purchases of energy efficient
3 lighting in Illinois occurred by Ameren Missouri ratepayers and that this phenomenon is not
4 properly accounted in the evaluator's report.

5 Those CFLs, subsidized by Ameren Illinois ratepayers, then have contributed to the overall
6 amount of CFLs in use today in Missouri.

7 This is important because the market effects estimate made by Cadmus is centered largely on
8 the fact that there was an increase of CFL light bulbs in Ameren Missouri's service territory
9 between 2010 and 2013. One of the issues that OPC has continued to raise throughout this
10 filing is that other market intervention strategies are not properly being accounted for during
11 those non-MEEIA years (2010, 2011, and 2012) and likely contributed to the increase in
12 saturated CFLs in 2013.

13
14 In Mr. Voytas' defense, Ameren Illinois' program year runs from June until May. Each
15 report effectively represents a half of a calendar year. Knowledge of the exact timing of the
16 evaluation may be able to shed some insight on the leakage result disparities in the Ameren
17 Illinois PY4 and PY5 EM&V reports. Even so, the 2013 report Mr. Voytas cites states that
18 in the fifth year of their upstream lighting program, Ameren Illinois was exhibiting still a
19 10% leakage rate driven primarily from municipal ratepayers. In contrast, the first year of
20 Ameren Missouri's program only exhibited leakage rates of only 3.3%. This would seem to
21 run counter to common sense.

22
23 **Q. Please explain.**

24 A. In their fifth year of the upstream lighting program, 10% of all CFLs purchased through
25 Ameren Illinois' program were purchased by non-Ameren Illinois ratepayers. Keep in mind
26 that Ameren Illinois is not the only major utility in Illinois with an upstream lighting

1 program. Commonwealth Edison Illinois (ComEd) services the northern part of Illinois and
2 has had a similar program in place during the same time frame.

3
4 However, in Missouri, this was the first time an electric utility had ever utilized an upstream
5 lighting program to promote CFLs. No matter, according to Cadmus' estimates only 3.3% of
6 all of the CFLs were purchased by non-Ameren Missouri ratepayers. Table 8 provides a
7 high-level breakdown in the differences between the two studies for comparative purposes.

8
9 **Table 8: Leakage results from Ameren Missouri and Illinois**

	Ameren Missouri	Ameren Illinois
Program maturity	1 st year of program	5 th year of program
Customer sample	495	898
Leakage result	3.3%	10.0%
Does study identify what electric utility provider received the program bulb?	No	Yes

10
11
12 **Q. Please summarize Mr. Voytas' criticism of your inclusion of the Southwestern Electric**
13 **Power Company's (SWEPCO) high leakage results in Arkansas as a useful**
14 **comparison.**

15 **A.** Although mentioned in a different part of my testimony and not directly tied to the Ameren
16 Illinois example, Mr. Voytas essentially believes that I am cherry picking my examples when
17 he states:

1 *There is no logic in Mr. Marke's assertion that Arkansas and not any other*
2 *jurisdiction in the nation should be the leakage value North Star for Ameren*
3 *Missouri.*⁵⁶
4

5 **Q. Please respond.**

6 A. The SWEPCO example was included to provide a recent example of the importance of what
7 we count and how we classify items. In Arkansas, the question of leakage was a material
8 concern because it was a first-year lighting program that was adjacent to service territories
9 that have never implemented an upstream lighting program. This should also have been a
10 material concern in Missouri as Ameren Missouri rolled out their first-year upstream lighting
11 program in a service territory that is adjacent to multiple service territories that have never
12 implemented an upstream lighting program.

13
14 In total, 3,509,926 (84.2%) lighting measure were sold in PY2013 through the upstream
15 markdown program. According to Ameren Missouri and its evaluator, only 105,298 of them
16 were purchased by non-Ameren Missouri ratepayers is overly optimistic. Comparisons with
17 other jurisdictions suggest that this assessment is overly optimistic. Especially when one
18 factors in that, in Missouri alone, there was no lighting program like this for the other:

- 19 • 2 additional investor-owned electric utilities,
20 • 40 cooperative electric utilities, or the
21 • 67 municipal utilities

22 Given these factors, it is much more likely that, in Missouri, the leakage rate was higher than
23 the questionable 3.3% found by Cadmus and at the very least, on par with what Cadmus
24 discovered in the fifth-year of Ameren Illinois' lighting program—10%.
25

⁵⁶ Voytas p. 39, lines 15-16.

1 **Q. Was Mr. Voytas critical about anything else regarding the inclusion of Ameren Illinois’**
2 **program into the discussion?**

3 A. Yes. Mr. Voytas implies that the high NTG ratio in Missouri compared to Illinois is largely
4 because Illinois deployed a minimalist marketing campaign. He states:

5 *It is important for Mr. Marke to know what he does not know. Ameren*
6 *Illinois used very minimal mass media advertising to inform and educate*
7 *Ameren Illinois customer about CFL technology and related discounts. . . .*
8 *Since Ameren Missouri used mass media to promote residential lighting and*
9 *Ameren Illinois did not use such media, market effects from the Missouri*
10 *program were due in part to the Ameren Missouri media campaigns and not*
11 *the Ameren Illinois point-of-purchase promotions.⁵⁷*

12 **Q. Please respond.**

13 A. I attempted to examine the extent of Ameren Missouri’s mass media advertising campaign.
14 It appears that the company did not pursue a very rigorous program in Missouri. To confirm
15 Ameren Missouri’s PY2013 mass media advertising, I observed Ameren Missouri’s energy
16 efficient commercials and other efforts. I scanned 67 Ameren Missouri promotional or
17 education videos. Of those 67 videos, there is one video related to lighting titled: *Save*
18 *Money on CFLs and LEDs from our online store.*⁵⁸ It is not clear whether or not this video
19 ever appeared as a TV commercial, or if it appeared aired or was viewed in any form in 2013.
20 I could not locate any other mass media advertising as it relates to the LightSavers program.
21

⁵⁷ Voytas p. 38, lines 13-15, 21-22 and p. 39 lines 1-2.

⁵⁸ <http://www.youtube.com/watch?v=ltjAG7BKGx4&list=UU51xwEJKIs4gJhZab5dsEPg> as of 11/10/14

1 I then looked at how program specific marketing was allocated in PY2013 budget and found
2 the following information reprinted in table 9 (and highlighted for emphasis) below from the
3 Cadmus evaluation of Ameren Missouri's LightSavers program:

4 **Table 9: Ameren Missouri marketing expenditures by program in PY2013⁵⁹**

5 **Table 36. Program-Specific Savings and Marketing**

Program	Program Ex Post Gross Savings (MWh)	Percentage of Portfolio Savings	Total Marketing	Percentage of Total Marketing
ApplianceSavers	6,963	2.6%	\$542,242	35.1%
CoolSavers	25,098	9.4%	\$824,949	53.4%
LightSavers	227,132	84.8%	\$33,146	2.1%
PerformanceSavers	316	0.1%	\$73,145	4.7%
RebateSavers	8,409	3.1%	\$71,788	4.6%
Total	267,918	100%	\$1,545,270	100%

6
7 The mass media promotion of the residential lighting program about which Mr. Voytas
8 speaks actually represented the smallest percentage and smallest expenditure of total
9 marketing for any of the residential programs.

10 The idea that at \$33,146 in total advertising expenditure in St. Louis and other media
11 markets, even if that sum does not include production costs, could translate into any
12 meaningful mass media advertising campaign is doubtful.

13 **Q. Was there anything else that Mr. Voytas included regarding Ameren Illinois?**

14 **A.** Yes, he attempted to portray Ameren Illinois' low NTG ratio as a result of insufficient
15 EM&V funding. Mr. Voytas states:

16 *In defense of the minimalist CFL NTG approach in 2013 order by the ICC, it*
17 *is important to remember that by Illinois statute, Illinois IOUs are limited to*

⁵⁹ Cadmus (2014) Ameren Missouri LightSavers Impact Evaluation p. 59

1 *no more than 3% of the DSM program budgets on EM&V whereas Ameren*
2 *Missouri has a 5% EM&V budget. Consequently, Ameren Illinois is limited*
3 *by budget on how robustly they can perform EM&V.*⁶⁰
4

5 **Q. Please respond.**

6 A. According to the Ameren Illinois Electric and Gas Energy Efficiency and Demand-
7 Response Plan (Program Years: June 1, 2011 – May 31, 2014)⁶¹ the following amount
8 of expenditures are set for EM&V work for electric programs.
9

10 **Table 10: Ameren Illinois Costs Allocated to Electric Programs EM&V:**

	PY 4 (2011-12)	PY 5 (2012-13)	PY 6 (2013-14)
Ameren Illinois EM&V costs	\$1,315,594	\$1,276,668	\$1,235,379

11
12 Table 11 is a copy of the Cadmus Residential report on Ameren Missouri portfolio
13 costs in 2013 (EM&V costs highlighted by the author).
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⁶⁰ Voytas, p. 41, lines 20-22 & p. 42, lines 1-2

⁶¹ See 2011-2014 Portfolio Plans: <http://www.ilsag.info/administrative-portfolio-plans.html>

1 **Table 11: Ameren Missouri spending data for PY2013 residential programs⁶²**
 2

Table 4. Ameren Missouri Spending Data - PY13

Ameren Missouri Energy Efficiency Expenses - PY13			
Residential EE PROGRAM COSTS	Non-Incentive Costs	Incentive Costs	Total Costs
2013			
ApplianceSavers	\$1,058,783	\$0	\$1,058,783
CommunitySavers	\$3,818,888	\$0	\$3,818,888
ConstructionSavers	\$361,549	\$46,900	\$408,449
CoolSavers	\$2,041,496	\$2,922,505	\$4,964,001
LightSavers	\$2,752,349	\$4,324,865	\$7,077,214
PerformanceSavers	\$118,560	\$63,309	\$181,869
RebateSavers	\$714,539	\$678,473	\$1,393,012
Total Residential Programs	\$10,866,164	\$8,036,052	\$18,902,216
OTHER PORTFOLIO COSTS			
2013			
Residential Evaluation, Measurement, & Verification	\$2,029,425	\$0	\$2,029,425
Educational Outreach	\$64,394	\$0	\$64,394
Portfolio Administration	\$1,961,424	\$0	\$1,961,424
Potential Study Costs	\$664,856	\$0	\$664,856
Data Tracking Costs	\$213,824	\$0	\$213,824
Total Other	\$4,933,924	\$0	\$4,933,924
Total Portfolio Costs	\$15,800,088	\$8,036,052	\$23,836,140



3
 4
 5 As you can see from the table above, the residential EM&V comes out to \$2,029,425. This
 6 amount represents 8.5% of the total portfolio costs for the residential programs and suggests
 7 that Cadmus and Ameren Missouri may have exceeded their expenditures for EM&V
 8 purposes in PY2013 by 3.5%. Additional investigation appears to be warranted to determine

⁶² Cadmus (2014) Ameren Missouri Residential Portfolio Evaluation Summary: Program Year 2013 p. 11.

1 how EM&V expenditures were allocated for PY2013 and what impact that will have on
2 future expenditures for EM&V work for PY2014 and PY2015 as well as commercial and
3 industrial programs. The current Ameren Missouri PY2013 MEEIA prudence review under
4 way will no doubt verify the validity of the aforementioned concern.

5
6 **Impact of EISA Standards**

7
8 **Q. What were Mr. Voytas' objections to your assertion that the Energy Independence and**
9 **Security of Act of 2007 (EISA) is an offsetting factor to the claimed energy savings for**
10 **Ameren Missouri's LightSavers program?**

11 **A.** Mr. Voytas does not actually directly address this mitigating impact. Instead he suggests I
12 failed to account for a changed baseline standard for lighting in the U.S. market with respect
13 to EISA compliant Halogen bulbs.

14 *However, Mr. Marke fails to acknowledge that while EISA changed the*
15 *minimum energy efficiency standards, which ended the manufacture of most*
16 *standard incandescent light bulbs, it did not set the new efficient baseline at*
17 *the efficiency level of CFLs. Mr. Marke's testimony does not mention the*
18 *simple fact that EISA compliant halogen bulbs are the new baseline*
19 *technology in the U.S. market as a DIRECT result of the EISA legislation.⁶³*

20 **Q. Please explain.**

21 **A.** The value of the baseline for the bulb is important because it impacts the energy savings that
22 will be claimed by the company. Mr. Voytas would have one believe that Ameren Missouri
23 already has accounted for changed baselines in the PY2013 results. This is not correct. The

⁶³ Voytas, p. 43 lines 7-11.

1 baseline for lighting assumed in the PY2013 study is an incandescent light bulb (for standard
 2 60W and 40W light bulbs). That means that Ameren is claiming savings from a baseline set
 3 for pre-EISA standard bulbs in the vast majority of the CFLs counted for the performance
 4 incentive. Taken from the Cadmus LightSavers EM&V report Table 12 below is reprinted
 5 and highlighted for emphasis to show that both 60w and 40w incandescent baselines were not
 6 adjusted for PY2013.

7 **Table 12: Cadmus adjustments and effective dates used in the savings analysis⁶⁴**

Table 20. Watts_{Base} by Lumen Range

Minimum Lumens	Maximum Lumens	Incandescent Equivalent Pre-EISA 2007 (WattsBase)	Incandescent Equivalent Post-EISA 2007 (WattsBase)	Effective Date from Which Post-EISA 2007 Assumption Should Be Used**
1,490	2,600	100	72	June 2012
1,050	1,489	75	53	June 2013
750	1,049	60	43	June 2014*
310	749	40	29	June 2014*

*Not relevant for the PY13 evaluation

**As the legislation only requires that specified bulbs cease manufacturing on January 1, a lag period of six months accounts for remaining bulbs left on the shelves.

8
 9 I did not mention the halogen change because that change went into effect in 2014. The issue
 10 at hand with this EM&V is program year 2013. But since Mr. Voytas discussed the matter, I
 11 will take this opportunity to explain the potential impact of this baseline change if the gross
 12 savings are not adjusted in PY2014 and PY2015.

13 **Q. Please continue.**

14 **A.** As mentioned in my prior testimony, there are three ways the utility is “made whole” for
 15 implementing an energy efficiency program:

⁶⁴ Cadmus (2014) Ameren Missouri LightSavers Impact and Process Evaluation: Program Year 2013. p. 41.

- 1.) Program costs
- 2.) Throughput disincentive
- 3.) Performance incentive

For purposes of this EM&V, the third component has been the primary focus. But the second element, “the throughput disincentive,” or “lost revenue mechanism” represents a much greater amount of ratepayer money. Whether the lost revenue mechanism would represent net savings estimates (i.e., savings that can be directly attributed as a result of the utility sponsored programs) or gross savings estimates (i.e. savings as a result of the utility sponsored program regardless of the nature or the extent) was the primary source of angst amongst stakeholders in Ameren Missouri’s initial MEEIA application.

In Missouri, we have conducted both net and gross savings estimates. The net savings are applied to the utilities performance incentive, but the gross savings have been applied to the throughput disincentive in Ameren Missouri’s MEEIA cycle 1 case. In virtually all cases, gross will be greater than net. Remember, net savings are intended to measure what actually happened (e.g., free riders, spillover, etc...). In determining what savings to count for the throughput disincentive, Ameren insisted on gross savings.

Other stakeholders were concerned doing as Ameren suggested could create a “slippery slope” where the utility could 1) over collect on ratepayers by counting sales on measures that would likely already have taken place, and 2) accordingly over count the energy savings attributable to Ameren’s program. Despite those concerns, stakeholders agreed to move forward with a deemed (estimated average) gross savings for the throughput disincentive and a net savings estimate for the performance incentive. The hope, at the time, was that the EM&V process would be transparent and parties could move forward productively.

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Q. So what does the shift in lighting to halogen as a baseline mean for the throughput disincentive?

A. It means the utility may be over collecting the throughput disincentive for PY2014 and PY2015 if the DSMore model⁶⁵ is not adjusted to account for this change in baseline.

Q. Why wouldn't the DSMore model adjust savings estimates to account for the federal standard shift?

A. The Ameren Missouri 2012 MEEIA Cycle 1 Stipulation and Agreement is not clear on this issue. In section 6. b. *Final Recovery/True-up of Ameren Missouri's TD-NSB Share*⁶⁶ the following section discusses the calculation:

For purposes of determining the Ameren Missouri's TD-NSB Share, **the only changes that will be made to the inputs into the DSMore model** that was utilized for the MEEIA Report when the DSMore model is re-run (at any point in time) to calculate actual NSB are (i) the actual number of energy efficiency measure (by type) installed in each month up to that point, (ii) the actual program costs in each month incurred up to that point; and (iii) for Commercial and Industrial Custom measures for which the TRM does not provide a deemed value, savings determined according to the protocol provided for at pages 85 to 98 of the TRM. EM&V shall not be utilized to

⁶⁵ DSMore is the software model used to calculate the throughput disincentive for the 2012 Ameren Missouri MEEIA application.

⁶⁶ Throughput-Disincentive Net Shared Benefit

1 calculate the NSB for the purposes of determining Ameren Missouri's TD-
2 NSB Share (emphasis added).⁶⁷

3 At present, I do not know whether or not the original DSMore model submission accounted
4 for federal energy efficiency standards when deemed gross savings were calculated. Because
5 the throughput disincentive presents a much greater degree of exposure to ratepayers in the
6 MEEIA rider than does the incentive payment this is an issue that needs to be confirmed moving
7 forward.

8
9 **Events leading up to the 2013 EM&V reports**

10 **Q. Were stakeholders aware that Ameren Missouri was going to perform a market effects**
11 **study for the LightSavers program in 2013?**

12 A. Stakeholders were not aware of any such intent until three months into the calendar year. In
13 March, stakeholders were told that Ameren Missouri and Cadmus would be conducting a
14 cross cutting study (market effects study) on the residential lighting program with the
15 expressed purpose of claiming additional energy savings. This incident and the events
16 immediately following it have been documented and filed in the initial Staff Change Request
17 in Addendum 9-1 and 9-2, which includes a letter to Mr. Voytas from the Missouri Public
18 Service Commission Staff's Director of Tariff, Safety, Economic and Engineering Analysis,
19 Natelle Dietrich.

20 The letter provides a list of dates documenting concerns and objections leading up to the
21 formal submission of the letter including:

⁶⁷ EO-2012-0142 Unanimous Stipulation and Agreement Resolving Ameren Missouri's MEEIA Filing item no. 119, Appendix A. p. 9.

- 1 • March 11, 2013: Staff is made aware of planned cross-cutting activities (market effects
2 study)
- 3 • March 18 and April 15, 2013: Staff raises concerns about the study at stakeholder
4 meetings.
- 5 • May 9, 2013: Meeting with Ameren Missouri and Staff regarding concerns about the
6 study.
- 7 • May 21, 2013: Formal letter sent stating the primary reasons for objecting to the study
8 and the inclusion of market effects in the NTG ratio as being:

- 9 *1. Lack of discussion in the Company's 2013 – 2015 Energy Efficiency*
10 *Plan of any established industry best practices for estimating energy*
11 *impacts from non-participants due to market effects as required by Rule*
12 *4 CSR 240-22.070(8).*
- 13 *2. Including energy savings for market effects from the Cross-Cutting*
14 *Study, when that impact was not part of the negotiated Demand-Side*
15 *Programs Investment Mechanism (DSIM).⁶⁸*

16 Ameren Missouri had been notified by the Commission's Staff in a formal letter that market
17 effects should not be considered. The meaning of that letter was reiterated in Staff's initial
18 Change Request—along with a recommendation to exclude market effects.

19 Yet one month later, Ameren Missouri and Cadmus would move forward with a 2013
20 saturation study with the expressed purposes of adjusting the NTG ratio and annual energy
21 savings in an attempt to document market effects for the LightSavers program for PY2013.

22 Nine months later (February of 2014) stakeholders were given the first draft of Cadmus'
23 EM&V report which included the quantification of market effects.

⁶⁸ Included in attachment GM-2.

1 Clearly stakeholders did not believe market effects were adequately addressed during the
2 2012 MEEIA application as evidenced by the documented objections that occurred even
3 before the study had formally begun.

4 **Q. Please respond to Mr. Voytas' assertion that his surrebuttal testimony from 2012**
5 **supports the inclusion of market effects when calculating annual energy savings.**

6 A. Mr. Voytas appears to be asserting that he spent 22-pages of his testimony discussing the
7 necessity to calculate market effects.

8 *Yes. I sponsored surrebuttal testimony on May 4, 2012, with discussion of*
9 *the necessity to calculate market effects from pages 26 to 48 in my*
10 *testimony.⁶⁹*

11 Once again, a closer examination of the cited works shows that Mr. Voytas' assertion is
12 overstated. Within the 2012 surrebuttal, Mr. Voytas does talk about the NTG ratio but the
13 majority of his testimony centers on his opinion that the EM&V profession is more art than
14 science. The only section in the 67-page surrebuttal testimony where he goes into detail about
15 market effects is on page 27. The market effects testimony on that page consists of the
16 following:

17 *Finally, market effects capture the change in the way supply chains in*
18 *energy efficiency markets operate as well as the change in the availability of*
19 *products or practices due to the influence of utility sponsored DSM*
20 *programs. Examples of market effects are:*

- 21 • *Increased SEER level of stocked heat pumps and air conditioners*
- 22 • *Stocking only premium efficiency motors*
- 23 • *CFLs and LED bulbs increasing shelf space*
- 24 • *Home design and building practices become more energy efficient⁷⁰*

⁶⁹ Voytas, p. 10, lines 4-5.

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The 2012 testimony does not represent that calculating market effects is an evaluation necessity, as asserted by Mr. Voytas. Instead, his 2012 testimony mentioning market effects offers is merely a definition for market effects, nothing more.

Q. Did any other stakeholders single out market effects during the 2012 Ameren Missouri MEEIA application?

A. Only one other stakeholder, National Resource Defense Counsel’s witness, Phil Mosenthal, used the term market effects. It was used parenthetically and as a synonym for spillover in a 77-page surrebuttal testimony. To illustrate the minimal testimony on market effects from the 2012 application I have included table 13 showing all the expert witnesses who submitted testimony as it pertains to market effects, the NTG ratio and/or EM&V discussions as well as the four Commission transcripts included in the MEEIA application.

⁷⁰ Voytas Surrebuttal Testimony (2012), p. 27, lines 2-9.

1 **Table 13: Summary of Ameren Missouri MEEIA application witness testimony and**
 2 **whether NTG ratio, EM&V or market effects were included in testimony**

Submitted Testimony	NTG ratio &/or EM&V discussed	Market Effects discussed (in any form)
Staff Witness: John Rogers Rebuttal	Yes	No
Staff Witness: John Rogers Surrebuttal	Yes	No
Staff Witness: Hojong Kang Rebuttal	Yes	No
Staff Witness: Hojong Kang Surrebuttal	Yes	No
Staff Witness: Michael Stahlman Rebuttal	Yes	No
Division of Energy Witness: Adam Bickford Rebuttal	Yes	No
Division of Energy Witness: Adam Bickford Surrebuttal	Yes	No
Division of Energy Witness: Bob Fratto	Yes	No
Office of Public Counsel Witness: Ryan Kind Rebuttal	Yes	No
Office of Public Counsel Witness: Ryan Kind Surrebuttal	Yes	No
National Resource Defense Counsel Witness: Phil Mosenthal Rebuttal	Yes	Yes
Ameren Missouri Witness: Rick Voytas Surrebuttal	Yes	Yes
Commission Transcript #1	No	No
Commission Transcript #2	No	No
Commission Transcript #3	No	No
Commission Transcript #4	Yes	No

3 In the filings related to the 2012 Ameren Missouri MEEIA application only Mr. Voytas and
 4 Mr. Mosenthal used the term market effect or market transformation in their testimony. On the other
 5 hand, there was considerable testimony from other parties over the NTG ratio and gross and net
 6 savings discussions..

7

1 **Response to the 2012 Phil Mosenthal observations**

2
3 **Q. Are there any other observations you would like to make regarding the 2012 Ameren**
4 **Missouri MEEIA application?**

5 A. Yes. In 2012 the big topic of discussion for stakeholders centered on whether gross (NTG
6 ratio = 1.0) or net savings (NTG ratio = +/- 1.0) would be utilized for the lost revenue
7 mechanism (often referred to as the throughput disincentive or TD-NSB). The fear at the
8 time was that a utility with deemed (average) gross savings for all of its measures would have
9 a perverse incentive to pursue certain measures that could be targeted to claim overstated
10 energy savings. An example given by Mr. Mosenthal involved CFLs as the low-hanging
11 fruit and is reflected in the following Q & A:

12 Q. Can you provide an example of how deeming a single 1.0 NTG ratio
13 for all programs and measures in DSIM creates perverse incentives?

14
15 A. Yes. Different programs, technologies and strategies will result in
16 different NTG ratios, and utilities delivering programs can have significant
17 influence over ultimate NTG ratios, even within a specific market,
18 technology or program. **For example, in Massachusetts utilities apply a**
19 **NTG ratio of only 0.43 for standard CFLs in a program very similar**
20 **to Ameren's. While they are still cost-effective and worthwhile to**
21 **capture, because the market has significantly transformed in recent**
22 **years, a large portion of participants are likely to be free riders who**
23 **would have purchased the CFLs anyway.** On the flip side, LED lamps
24 are a relatively new technology, are significantly more expensive than
25 CFLs, and enjoy much less customer awareness. As a result, LED lamp
26 promotions would likely have a very high NTG ratio. LED lamps also

1 offer significant cost-effective efficiency, with the promise that programs
2 focused on this technology can spur even greater innovation and price
3 declines over time, ultimately resulting in greater and more cost-effective
4 savings.

5
6 Under the current DSM, Ameren would count a kWh of gross savings
7 equally from these two technologies. However, if the actual NTG ratio for
8 CFLs was 0.43 and for LEDs 1.0, then each kWh of gross LED savings
9 would actually be worth more than twice as much to ratepayers and
10 society, and result in more than twice as much lost revenue to Ameren.
11 However, **because CFLs are cheaper and savings from them are easier**
12 **to capture at this stage, Ameren would have a perverse incentive to**
13 **pursue more CFLs at the expense of efforts to promote LEDs, thereby**
14 **resulting in lower overall net benefits to ratepayers but higher net**
15 **earnings to Ameren.** (emphasis added).⁷¹

16
17 Ameren Missouri was able to secure their lost revenue mechanism at a set deemed gross 1.0
18 NTG ratio. In retrospect, Mr. Mosenthal's commentary on the importance of the net savings
19 over gross savings can now be seen as a blueprint for how a utility would use MEEIA to its
20 financial advantage through emphasis on a lighting program directed at CFL bulbs and allow
21 Ameren Missouri to attempt to over-collect in both the MEEIA lost revenue mechanism and
22 in the performance incentive.

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⁷¹ Surrebuttal testimony, Mosenthal, p. 13 lines 3-20 & p. 14 line 1.

1 **Free Ridership Adjustment**

2 **Q. Mr. Voytas disputes your recommendation to reject Ameren Missouri's proposed**
3 **downward adjustment of Cadmus's free ridership estimates. Please respond.**

4 A. Mr. Voytas makes two arguments to attempt to discredit my objection to Ameren's
5 downward adjustment. The first centers on my objection to his use of irrelevant secondary
6 data in place of primary data. Voytas states:

7 *Mr. Marke attempts to discredit the source of adjustments that Ameren*
8 *Missouri proposes to be made in the free ridership scores. Mr. Marke did*
9 *not consider the FERC 2009 National Assessment of Demand Response*
10 *Potential study. Having worked on this project and other energy efficiency*
11 *and demand response studies with FERC staff, I find it hard to believe that*
12 *FERC would either work with or cite a subject matter expert, the same*
13 *subject matter expert on whose work Ameren Missouri calculated*
14 *adjustments to free ridership scores predisposed to minimize the potential of*
15 *energy efficiency.*⁷²

16 In OPC's Response to Change Request, I objected to the use of proprietary data from a
17 polling research firm, YouGov as an appropriate substitute for the primary data collected by
18 Cadmus. Further, I expressed concern that the author Mr. Voytas had cited, Dr. David
19 Lineweber, was not actually credited with the white paper provided to me in response to
20 OPC's data request seeking more information to substantiate Mr. Voytas' claims.

21 Mr. Voytas' attempts to counter my concerns by pointing out that I had not considered the
22 *FERC 2009 National Assessment of Demand Response Potential Study.*

23

⁷² Voytas, p. 53, lines 15-22.

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Q. Did you consider the FERC 2009 National Assessment of Demand Response Potential Study?

A. No. I did not.

Q. Have you considered that study since you filed your previous comments?

A. I have. However, it has not altered my initial objection about the use of unsubstantiated proprietary data to alter the results of Cadmus and ADM evaluations.

Mr. Voytas is correct insofar as asserting that Dr. David Lineweber is mentioned in the 254-page report. Specifically, he is cited in a footnote on page 62 of the 252-page report where the authors of the report reference a presentation he co-delivered at an Energy Conference 2006 titled, “Real Mass Market Customers React to Real Time-Differentiated Rates: What Choices Do They Make and Why?” I have included the opening introduction to that presentation to give readers a sense of the topic being covered:

There has been a good deal of speculation over the years about whether—and why—mass market customers would choose to participate in multi-part time-differentiated rates.⁷³

I fail to understand how a 2006 co-delivered presentation on smart meter pricing in California is germane to Ameren Missouri’s free ridership adjustment for 2013, and how this somehow discredits my objection.

⁷³ Schultz, D and David Lineweber (2006) Real Mass Market Customers React to Real Time-Differentiated Rates: What Choices Do They Make and Why? 16th National Energy Services Conference. San Diego, CA. February 2006. http://library.aesp.org/resources/Docuworks/file_display.cfm?id=433

1 **Q. Please continue.**

2 A. Mr. Voytas then suggests that I offered no meaningful analysis as to why Ameren Missouri is
3 incorrect in its readjusted estimate of free ridership.

4 *Mr. Marke addresses the free ridership issue only at a high level to an extent*
5 *too ephemeral to actually present a meaningful analysis. Mr. Marke takes*
6 *issue theoretically and in general terms without actually explaining what the*
7 *proper measure of free ridership should be and how the approaches of*
8 *Ameren Missouri specifically depart from that approach. He presents*
9 *absolutely no meaningful analysis or evidence of any type to refute the*
10 *Ameren Missouri Change Request on free ridership.*⁷⁴

11 Pages 19-25 of my Response to Change Request provides a detailed explanation of my
12 rationale for objecting to Ameren Missouri's downward adjustment to the free ridership
13 score. To summarize, I do not think it is appropriate to substitute or alter primary data
14 collected from Ameren Missouri customers with an opaque, non-peer reviewed,
15 unsubstantiated 5-page write-up from 2010, on customers without demographic information,
16 and without knowing the products or services that were being examined.

17 Ameren Missouri's downward adjustment on free ridership is entirely too speculative and
18 unsupported by any credible evaluation or transparent source, and so, it cannot be followed
19 here.

20 **Q. Has this method of calculating free ridership ever been utilized in any EM&V study to**
21 **your knowledge?**

22 A. No. It has not.

⁷⁴ Voytas p. 54, lines 25-27 & p. 55, lines 1-2.

1 **Net Shared Benefits Definition**

2 **Q. Mr. Voytas objects to your interpretation of the net shared benefit calculation. Please**
3 **explain.**

4 A. From Mr. Voytas' testimony:

5 *Mr. Marke points to the Commission definition of Net Shared Benefits and*
6 *says that since it includes the word "incentives" then the performance*
7 *incentive itself must be part of the calculation.*⁷⁵

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

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

15 I have highlighted two key terms from this definition—"end-use measures" and "incentives."
16 Mr. Voytas' explanation for incentives conflates them with end-use measures and presents a
17 problem in double-counting. An end-use measure is the product itself—the CFL, the furnace,
18 the HVAC that is rebated or, given away for free. An incentive, within the context of this
19 definition and the MEEIA rules, is clearly the utility performance incentive as this multi-
20 million dollar cost functions as a return on investment in much the same way, and was
21 intended, as a traditional supply-side resource. "End-use measures" and "incentives" receive
22 separate treatment in the rules, are not interchangeable, and must be treated distinctly.

⁷⁵ Voytas p. 57, lines 10-12.

1 The utility performance incentive is a real cost that will be borne by ratepayers on their
2 electric bill following the conclusion of Ameren Missouri’s MEEIA Cycle 1. When
3 factoring in the appropriate benefits attributable to Ameren Missouri’s energy efficiency
4 efforts, all applicable costs—including the performance incentive—as defined above also
5 must be considered.

6 Regarding the use of the utility cost test in place of the total resource cost test to determine
7 the net shared benefits, I point out that the TRC is the statutorily-preferred test and Ameren
8 Missouri offers no credible rationale for diverging from this clear statutory preference. Table
9 14 illuminates the difference between the two tests just for the residential programs in
10 PY2013:

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1 **Table 14: Comparison between the Utility Cost Test and the Total Resource Costs Test for**
 2 **Ameren Missouri’s Residential Programs in PY2013.**

Table 7. Utility Cost Test (UCT) Inputs and Results

UCT Calculations		
	Benefits	Costs
Avoided Electric Production	\$101,117,367	
Avoided Electric Capacity	\$9,416,419	
Avoided T&D Electric	\$6,449,924	
Incentives		\$8,036,052
Program overhead costs		\$15,800,088
Total	\$116,983,710	\$23,836,140
UCT Benefit - Cost Ratio	4.91	

Table 8. Total Resource Cost Test (TRC) Inputs and Results

TRC Calculations		
	Benefits	Costs
Avoided Electric Production	\$101,117,367	
Avoided Electric Capacity	\$9,416,419	
Avoided T&D Electric	\$6,449,924	
Participant Costs (Net)		\$16,074,379
Program overhead costs		\$15,800,088
Total	\$116,983,710	\$31,874,467
TRC Benefit - Cost Ratio	3.67	

3

4 **Clean Power Plan considerations**

5 **Q. Mr. Voytas believes that Public Counsel’s objection to the joint settlement position of**
 6 **Staff and Ameren Missouri is not in the customer’s best interest. Please respond.**

7 **A.** Mr. Voytas suggests that all parties, including all Ameren Missouri ratepayers would be
 8 better off accepting a fictional world where Ameren Missouri can claim additional energy

1 savings for actions that would have happened naturally or did not happen at all. He cites the
2 upcoming proposed Clean Power Plan as support for this argument.

3 *In a carbon-constrained world as would exist under the proposed EPA*
4 *Greenhouse Gas (“GHG”) reduction rules, taking a downward biased view*
5 *of the components of the NTG equation will cost customers far more than*
6 *any savings in terms of a reduced payment of a financial performance*
7 *incentive to Ameren Missouri.⁷⁶*

8 Mr. Voytas’ Clean Power Plan outcome is predicated on uncertain assumptions. As the
9 Commission is well aware, the Clean Power Plan is an unfinished rule. Once finished, many
10 people believe it will take years of litigation before any regulatory requirements are known.
11 Further, according to Ameren Missouri’s own analysis of the EPA’s proposed guidelines,
12 energy efficiency savings in PY2013 may not be eligible for inclusion towards future
13 emissions reduction goals.

14 In fact, one day prior to submitting direct testimony on this case, Mr. Voytas was a guest
15 speaker at the Missouri Public Service Commission Statewide Collaborative. His
16 presentation was titled: *The Role of Energy Efficiency in Section III(d) Compliance*, Mr.
17 Voytas’ discussion focused on Ameren Missouri’s analysis of the plan. Included in that
18 analysis and reprinted here for reference are slides 20 and 21 of his presentation in figure 4:

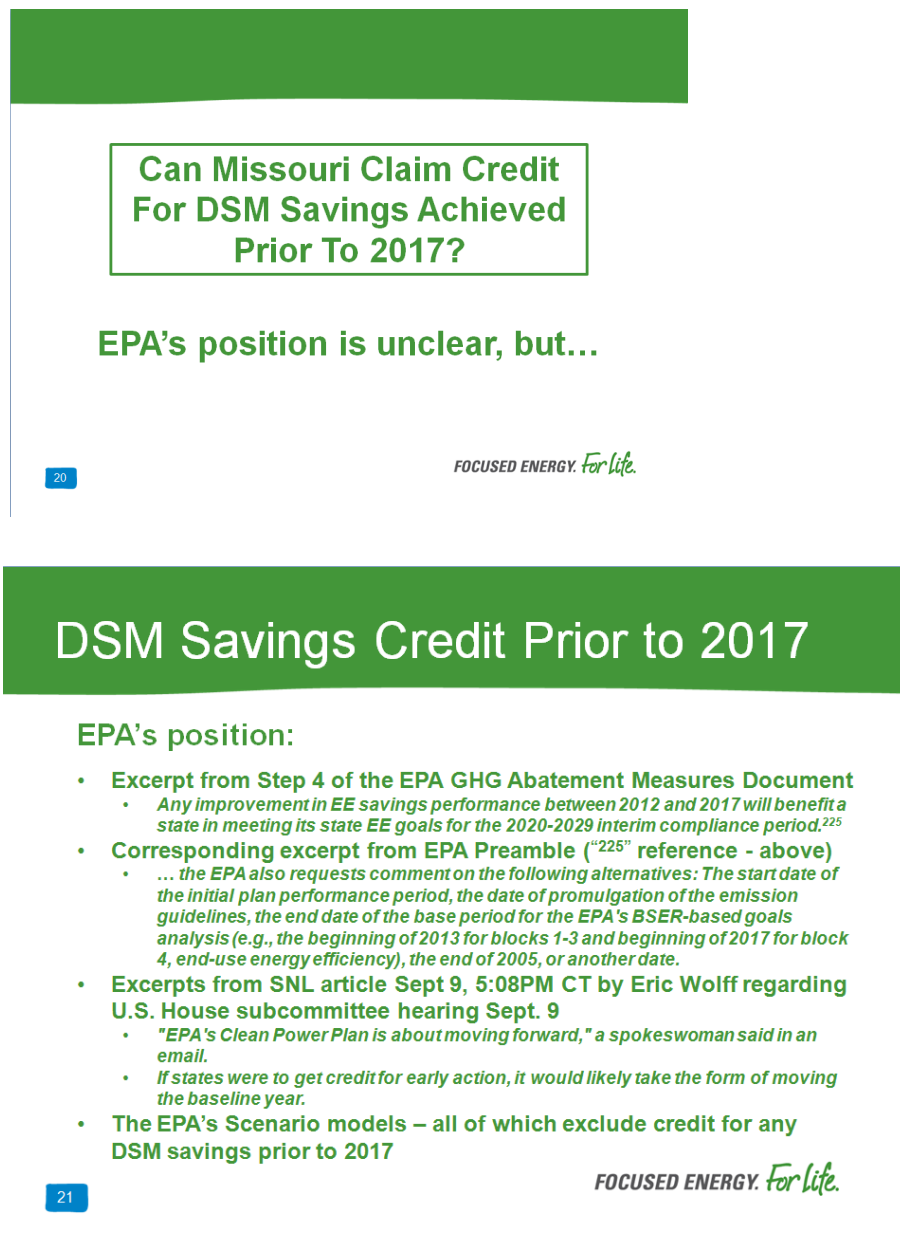
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⁷⁶ Voytas p. 62, lines 21-23 & p. 63, lines 1-2.

1 **Figure 4: Slides 21 & 22 of Ameren Missouri’s Analysis of 111(D) and the prospect of energy**
2 **efficiency savings counting towards future emission reductions⁷⁷**



⁷⁷ Ew-2013-0519 item No. 25: Statewide Collaborative Presentation—October 21, 2014—Role of Energy Efficiency in Section 111(d) Compliance—Rick Voytas—Statewide Collaborative Presentation—October 21, 2014.

1 It is uncertain whether future carbon reductions will be judged based on the individual
2 polluting utility, the state as a whole, or possibly even a region-wide combination. But in any
3 event, if we assumed the Clean Power Plan does go into effect, we would still have to explain
4 to the EPA how a utility's efforts in 2013 changed a lighting market despite the wealth of
5 evidence suggesting the market was already changed.

6 It should be noted that Ameren Missouri's publicly-stated opposition to the Clean Power Plan
7 is inconsistent with its present argument here. Ameren Missouri is transparently attempting
8 to use the threat of the regulatory risk it associates with the Clean Power Plan as a shield
9 against meaningful inquiry of its purported PY2013 energy savings, while at the same time in
10 other venues seeking to undermine that very plan. No matter what, the vague specter of
11 complying with the Clean Power Plan cannot and should not be used to justify retention of
12 inflated energy efficiency results in this case.

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

14 **A.** Yes, it does.
15
16



Commissioners
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Chairman
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WILLIAM P. KENNEY

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JOSHUA HARDEN
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CHERYL D. VOSS
Director of Regulatory Review

May 21, 2013

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

Dear Mr. Voytas:

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

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

This decision is primarily based on the following facts:

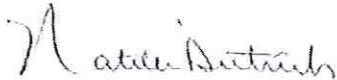
1. Lack of discussion in the Company's *2013 - 2015 Energy Efficiency Plan* of any established industry best practices for estimating energy impacts from non-participants due to market effects as required by Rule 4 CSR 240-22.070(8).
2. Including energy savings for market effects from the Cross-Cutting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

Mr. Richard A Voytas
May 21, 2013
Page 2 of 2

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

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

Sincerely,



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

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

Appendix F

Program-Level Participant and Nonparticipant Spillover Guidance

1. Introduction

The purposes of this Appendix to the *Evaluation Plan Guidance for EEPS Program Administrators* (Guidelines) are to underscore certain methodological principles regarding the reliable estimation of spillover savings, i.e., estimates that are reasonably precise and accurate, and to provide additional guidance based on DPS reviews of evaluation plans and completed reports.

The Guidelines define spillover as:

... the energy savings associated with energy efficient equipment installed by consumers who were influenced by an energy efficiency program, but without direct financial or technical assistance from the program. Spillover includes additional actions taken by a program participant as well as actions undertaken by non-participants who have been influenced by the program.

This definition is consistent with the somewhat more detailed definition contained in the California Energy Efficiency Policy Manual (2008):

Reductions in energy consumption and/or demand in a utility's service area caused by the presence of the DSM program, beyond program related gross or net savings of participants. These effects could result from: (a) additional energy efficiency actions that program participants take outside the program as a result of having participated; (b) changes in the array of energy-using equipment that manufacturers, dealers and contractors offer all customers as a result of program availability; and (c) changes in the energy use of non-participants as a result of utility programs, whether direct (e.g., utility program advertising) or indirect (e.g., stocking practices such as (b) above or changes in consumer buying habits)." Participant spillover is described by (a), and nonparticipant spillover, by (b) and (c). Some parties refer to non-participant spillover as "free-drivers." (TecMarket Works Team, 2006)

Some evaluators subdivide participant spillover into "inside" and "outside" spillover. Inside spillover occurs when, due to the project, additional actions are taken to reduce energy use at the same site, but these actions are not included as program savings. Outside spillover occurs when an actor participating in the program initiates additional actions that reduce energy use at other sites that are not participating in the program.²⁶

²⁶ It is worth noting that one implication of all of these definitions is that how a piece of savings is classified may depend in part on the objectives of the program and what outcomes the program has chosen to track. As a key example, program influence achieved through the provision of technical information (henceforth called information-induced savings for shorthand) is clearly a legitimate source of savings, but, depending on the specifics of the situation, could end up being classified either as in-program savings, participant spillover, or non-participant spillover. If the provision of information is considered sufficiently central to the program objectives for the program to directly track this outcome, then information-induced measures may be classified as in-program savings. If information-induced measures are not tracked but are adopted by participants who also adopted rebated measures, and thus entered the tracking system, then they may end up being classified as participant spillover. If untracked information-induced measures are adopted by end-

Because causality is inherent in the very definition of spillover, the spillover savings are inherently net.

The Guidelines further explain that free ridership and spillover are captured in the net-to-gross (NTG) ratio to reflect the degree of program-induced actions. Specifically, the gross energy savings estimate, refined by the realization rate, is adjusted to reflect the negative impacts of free ridership and the positive impacts of spillover. Equation 1 illustrates this adjustment.

$$\text{NTG ratio} = (1 - \text{Free ridership}) + \text{Spillover} \quad \text{Equation 1}$$

Clearly, ignoring spillover results in a downward bias in the NTG ratio.

While underscoring the importance of spillover and supplying important methodological references, the Guidelines provide no additional guidance for estimating spillover. The goal of this Appendix is to provide these general guidelines for estimating both participant and nonparticipant spillover.²⁷

2. Key Decisions for Evaluators

Before evaluators decide to estimate spillover, they must make a number of critical decisions:

- a. Will the evaluation address participant spillover, nonparticipant spillover, or both?
- b. Does the size of the expected savings warrant the expenditure of evaluation funds needed to estimate these savings at an appropriate level of reliability?
- c. Which of the two levels of methodological rigor discussed in these guidelines, *standard* or *enhanced*, should be used?
- d. Will spillover be estimated based on data collected from end users, those upstream from end users (e.g., vendors, installers, manufacturers, etc.), or both?
- e. What is the level of aggregation? Although participant spillover is always estimated at the program level, if an evaluator is attempting to estimate nonparticipant spillover, will the evaluator estimate it at the program level or the market level? One potential reason for estimating nonparticipant spillover at the market level is that, in some circumstances, reliably teasing out the spillover savings attributable to one specific program among many may be nearly impossible due to the difficulty nonparticipants may have in attributing any of their installations to a specific

users who did not also adopt a measure for which they received a rebate, then they may be classified as non-participant spillover. While all of this suggests that the precise meaning of these terms can be somewhat specific to the situation, this document is intended to provide methodological guidance that is resilient in the face of such distinctions.

²⁷ While the spillover guidance provided in this Appendix focuses entirely on estimating benefits, PAs should not forget that they must also estimate the incremental costs associated with each spillover measure. Both the benefits and costs of spillover measures must be included in the total resource cost (TRC) test and the societal test.

program. In such a case, evaluators can choose to conduct market effects studies which include naturally occurring adoptions, program-rebated adoptions, participant and nonparticipant spillover, other program effects that cannot be reliably attributed to a specific program (e.g., upstream lighting programs and the effects of the portfolio of programs on such things as increases in the allocation of shelving space to efficient measures), and other non-program effects due to such factors as DOE Energy Star, programs funded by the American Recovery and Reinvestment Act (ARRA) and the gradual non-program induced evolution of the market in terms of attitudes, knowledge and behavior regarding energy efficiency. The net savings resulting from market effects studies must be included in the portfolio-level benefits-costs analyses.

- f. If an evaluator decides to conduct a market effects study, then they must decide whether the study should be focused on the region targeted by a given PA, multiple regions or even the entire state.

Once these questions are answered, evaluators can then use these guidelines in estimating spillover.

3. Program-Specific Methods

3.1. Level of Rigor

Various types of spillover can be estimated using data collected from participating and nonparticipating end users and from participating and/or nonparticipating market actors upstream from the end users (e.g., vendors, retailers, installers, manufacturers). These savings can also be estimated at varying levels of methodological rigor. Program administrators should propose whether a given spillover analysis should receive *standard* or *enhanced* treatment. DPS will review PA proposals and make a determination based on the value of the data balanced against the cost of the research. The primary criterion for whether a given spillover analysis is subject to standard vs. enhanced requirements is the expected magnitude of spillover savings. Factors that the PAs should consider in making its proposal and that DPS staff will consider in making a determination regarding expected magnitude of spillover savings include among others:

1. Past results for the same PA program
2. Program theory or market operations theory
3. National research literature for similar programs.
4. Size of the program
5. Size and complexity of the market
6. Nature of the technology(ies) promoted by the program

Table 1 presents the standard and enhanced levels of rigor for estimating both gross spillover savings and program influence for both end users and those upstream from the end users.

Table 1. Level of Methodological Rigor for Estimating Gross Spillover Savings and Program Influence

	Standard Rigor	Enhanced Rigor
Overall Methodological Approach	May rely solely on self-reports from end-users and upstream market actors to support estimates of gross savings or program influence.	Basic self-reports from end-users and upstream market actors typically not sufficient as sole method to support estimates of gross savings or program influence
Estimation of average gross savings for spillover measures for end users (participants and/or nonparticipants).	Simplifying assumptions may be made, such as average gross unit savings being the same for spillover measures as for in-program measures.	Average gross unit savings for spillover measures must be documented empirically, based on a combination of self-reports and/or on-site visits.
Estimation of gross savings from upstream actors (participants and/or nonparticipants).	Self-reports generally sufficient.	Researchers must attempt to confirm self-reports using methods such as changes in sales, stocking or shipment data, review of planned or completed project or permits, or on-sites.
Estimation of program influence for end users (participants and/or nonparticipants).	Basic self-reports generally sufficient.	Enhanced self-reports generally sufficient ²⁸ .
Estimation of program influence for upstream actors (participants and/or nonparticipants).	Basic self-reports generally sufficient.	Either additional methods such as quasi-experimental design, econometric analysis, or Delphi panels ²⁹ should be deployed or a case should be made that such methods are either not viable or not cost-effective.
Documentation of causal mechanisms	Recommended but not required.	Required, using methods such as self-reports from end-users or market actors regarding the manner in which the program influenced their behavior, and/or theory-driven evaluation practices. ³⁰

²⁸ Basic self-reports typically involve interviewing one participant decision-maker or market actor. Enhanced self-reports on the other hand typically involve more intensive data collection and analysis in the estimation of the net-to-gross ratios. For example, it can include collecting data from more than one participant decision-maker as well as from others such as relevant vendors, retailers, installers, architectural and engineering firms, and manufacturers. It can also include the consideration of past purchases and other qualitative data gleaned from open-ended questions.

²⁹ Delphi panels can be useful as long as members are provided sufficient market-level empirical data to inform their deliberations. Delphi panels should not be confused with brainstorming.

³⁰ Documentation of causal mechanisms can include verification of the key cause and effect relationships as illustrated in the program logic model and described in the program theory. Weiss (1997, 1998) suggests that a theory-driven evaluation can substitute for classical experimental study using random assignment. She suggests that if predicted steps between an activity and an outcome can be confirmed in implementation, this matching of the theory to observed outcomes will lend a strong argument for causality: "If the evaluation can show a series of micro-steps that lead from inputs to outcomes, then causal attribution for all practical purposes seems to be within reach" (Weiss 1997, 43).

3.2. Double Counting

PAs should propose methods to avoid double counting both participant spillover and nonparticipant spillover. For example, some participant or nonparticipant spillover measures might have received assistance (information and/or incentives) from some other PA programs. In such cases, measures receiving assistance from other PA programs should be subtracted for the spillover estimates. Or, in other cases, two programs could be targeting the same market for the same measures. In such cases, because it would be challenging to accurately allocate spillover savings attributable to each program, expert judgment may be used. Under no circumstances, when the possibility of double counting exists, should a PA claim the sum of the spillover savings separately estimated for each program without making the appropriate adjustments. Determining how the estimated spillover savings should be allocated among different programs within a given PA's portfolio and/or across PA portfolios can be based on such factors as the size of the program budgets, program theories and logic models that demonstrate the causal mechanisms that are expected to produce spillover, and the results of theory-driven evaluations (Weiss, 1997; Donaldson, 2007).

3.3. Calculation of the Program-Level Spillover Rate

While PAs are free to calculate spillover rates in a variety of ways, there must be at least one method that is used consistently across all PAs. The formulation of a NTG ratio presented in the Guidelines is repeated in Equation 2:

$$\text{NTG Ratio} = (1 - \text{Free Ridership}) + \text{Spillover} \quad \text{Equation 2}$$

Equation 2 illustrates that the spillover rate is added to 1-Free Ridership to produce the NTGR. Given the additive nature of the spillover rate in Equation 2, the spillover rate must be calculated as in Equation 3:

$$\text{Spillover Rate} = \frac{\text{Net PSO} + \text{Net NPSO}}{\text{Ex Post Gross Program Impacts}} \quad \text{Equation 3}$$

4. Estimating Spillover at the Market Level

In some cases, it might not be possible to reliably estimate nonparticipant spillover at the program level due to multiple program interventions in the same market involving multiple market actors. In such cases, market effects studies can be done for specific measures and markets, e.g., commercial HVAC. This Appendix does not provide any guidelines for conducting such studies but rather refers evaluators to other sources such as Eto, Prah, and Schlegel (1996), Sebold et al. (2001) and TecMarket (2005).

5. Sampling and Uncertainty

Sampling for both program-level and market level spillover studies should be done in accordance with the *Sampling and Uncertainty Guidelines* in Appendix E.

6. Levels of Confidence and Precision

As discussed in the main body of the DPS guidelines, the minimum standard for confidence and precision for overall net savings at the program level is 90/10. Here, overall net savings includes both in-program net savings and any reported spillover savings. The achieved level of confidence and precision for overall program net savings must be reported at the 90% level of confidence.

If reported savings results include spillover savings, there is no required level of confidence and precision specifically for the individual components of net savings from in-program measures and net savings from spillover. However, PAs are still accountable for achieving 90/10 for overall program net savings. The standard error of overall program-level net savings can be calculated by combining the achieved levels of confidence and precision for the net savings from in-program measures and for spillover savings using standard propagation of error formulas (Taylor, 2006; TecMarket, 2004).³¹ While there are no precision *requirements* for the individual components of net savings from in-program measures and the net savings from spillover measures, the precision actually achieved for each of these components should be reported at the 90% level of confidence, in order to help facilitate assessment of the reliability of the results.

7. Deemed Approaches

Of course, there might be situations in which all key stakeholders are willing to agree that spillover is not zero but the expense to estimate it reliably is prohibitive. In such cases, a PA may negotiate a deemed spillover rate based on a review of the literature and the program theory and logic model that together describe reasonably well the causal mechanism that is expected to generate spillover.

³¹ This is generally true as long as each of the individual components making up the total net savings estimate (e.g., gross savings, free riding, spillover, etc.) has been estimated based on independent random samples and methods that allow for the calculation of standard errors. However, there are legitimate circumstances under which the sample designs and methods for one or more components do not meet these requirements. One example is a market effects study in which total net program impacts are estimated using a preponderance of evidence approach. Another example (some aspects of which are discussed in the next section) is a case in which one or more components are deemed. A third example is a case in which multiple methods are used to estimate net impacts or the net-to-gross ratio, and a Delphi analysis is used to integrate the results. If *none* of the individual components meet these requirements, then clearly the issue of precision does not apply. If some components meet these requirements but others do not, then the program administrator should take clear note of this fact and propose an approach to ensuring that the components of the study that do meet these requirements are performed in a manner that gives due attention to limiting the effects of sampling error.

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