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Issues:	Net-to-Gross and Technical Resource Manual
Witness:	Michael L. Stahlman
Sponsoring Party:	MO PSC Staff
Type of Exhibit:	Surrebuttal Testimony
Case No.:	EO-2012-0142
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MISSOURI PUBLIC SERVICE COMMISSION

UTILITY OPERATIONS DIVISION

SURREBUTTAL TESTIMONY

OF

MICHAEL L. STAHLMAN

UNION ELECTRIC COMPANY d/b/a AMEREN MISSOURI

CASE NO. EO-2012-0142

Jefferson City, Missouri
May 2012

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

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

AFFIDAVIT OF MICHAEL L. STAHLMAN

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

Michael L. Stahlman, of lawful age, on his oath states: that he has participated in the preparation of the following Surrebuttal Testimony in question and answer form, consisting of 20 pages of Surrebuttal Testimony to be presented in the above case, that the answers in the following Surrebuttal Testimony were given by him; that he has knowledge of the matters set forth in such answers; and that such matters are true to the best of his knowledge and belief.

[signature]
Michael L. Stahlman

Subscribed and sworn to before me this 4th day of May, 2012.

LAURA HOLSMAN
Notary Public - Notary Seal
State of Missouri
Commissioned for Cole County
My Commission Expires: June 21, 2015
Commission Number: 11203914

[signature]
Notary Public

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Q. Please state your name and business address.

A. Michael L. Stahlman, P.O. Box 360, Jefferson City, Missouri 65102.

Q. By whom are you employed and in what capacity?

A. I am a Regulatory Economist with the Missouri Public Service Commission (Commission).

Q. Please describe your background.

A. I have been employed with the Commission as a Regulatory Economist since 2010. I graduated summa cum laude from Westminster College in Fulton, Missouri, in 2007 with a Bachelor of Arts degree majoring in Economics, and from the University of Missouri in 2009 with a Master of Science degree in Agricultural Economics. Further details are attached to this testimony as Schedule MLS-1.

Q. What is the purpose of your surrebuttal testimony?

A. I present Staff's response to the rebuttal testimony of Missouri Department of Natural Resources (DNR) witness Adam Bickford, Office of the Public Counsel (OPC) witness Ryan Kind, and National Resource Defense Council, Sierra Club and Renew Missouri (NRDC) witness Phillip Mosenthal. Specifically, I respond to their testimony regarding Ameren Missouri's proposed "net-to-gross (NTG) ratio" and Ameren Missouri's proposal to implement its demand-side management programs prospectively, by using estimated energy efficiency benefits contained in the Company's proposed Technical Resource Manual (TRM) to calculate the performance incentive component in Ameren Missouri's Demand-Side Investment Mechanism (DSIM).

My surrebuttal testimony on NTG ratios and use of the TRM support Staff's recommendation that the performance incentive component of Ameren Missouri's DSIM be implemented on a retrospective basis—that is, at the end of the three-year Missouri Energy Efficiency Investment Act (MEEIA) plan, with all energy savings used to calculate that incentive being measured through evaluation, measurement and valuation (EM&V). As explained in my testimony, a third-party EM&V evaluator could decide to establish a NTG ratio for each program, then apply that NTG ratio to a program's gross energy savings to arrive at a measurable and verifiable amount of net energy savings, for which the Commission is required by the MEEIA statute to provide a timely earnings opportunity.

I explain that Staff does not support DNR witness Bickford's recommendation that the Commission approve Ameren Missouri's proposal to assume that a particular program's gross total forecasted energy savings equals the actual net savings of the program—that is, to assume that the NTG ratio equals 1.0—in calculating the Company's net shared benefit performance incentive.

I also explain Staff's support for OPC witness Kind's recommendation that estimates of program performance in the TRM should not be used as a replacement for determining program performance by using estimates of net savings that are verified by EM&V.

I also explain Staff's support for the TRM recommendations discussed on page 33 of DNR witness Robert Fratto's rebuttal testimony. While a TRM is useful, it is Staff's view that the best way to determine net savings from DSM programs is to measure the actual savings retrospectively, and that the determination of how to measure and verify those savings is best left to independent third-party evaluators.

Q. How is your testimony organized?

A. First, I define NTG ratios and explain why they are significant. Second, I explain the components that make up a NTG ratio. Next, I discuss applying NTG ratios. Then, I discuss the TRM, and finally I summarize Staff's conclusions on these matters.

Definition and general significance of NTG ratios

Q. What is NTG?

A. The NTG ratio is the percentage of total energy efficiency gains that directly result from a particular energy efficiency program. For example, a program with an NTG ratio of 90 percent indicates that, on average, 90 percent of the gross energy efficiency savings are directly attributed to the program. In the case of Ameren Missouri, the gross savings are the calculations and estimates contained in its TRM.

The NTG ratio is used to adjust the cost-effectiveness results "so that they only reflect those energy efficiency gains that are attributed to, and are the direct result of, the energy efficiency program in question."[1] The NTG ratio helps evaluators accurately estimate energy (kWh) and demand (kW) savings achieved as a direct result of demand-side management (DSM) program expenditures "by removing savings that would have occurred even absent a conservation program."[2]

Q. Why should the Commission be concerned about NTG ratios?

[1] NAPEE 2008, pp 4-9.
[2] (NAPEE 2008, pp 4-9).

A. The NTG ratio provides important information about whether a utility is receiving a timely earnings opportunity associated with cost-effective measurable and verifiable efficiency savings.

As explained by OPC witness Ryan Kind in his rebuttal testimony, the NTG ratio is used to calculate the utility's shared net benefits (p 12, ll, 20-23). The MEEIA statute and MEEIA rules allow the utility to retain a portion of these net benefits as an incentive for delivering cost-effective demand-side programs. Thus, a high NTG is good for both the utility and the ratepayer—the higher the NTG, the more the utility will recover, and the more benefits the ratepayer will receive from the demand-side programs.

However, artificially assuming a NTG ratio based on prospective estimates (rather than calculating a NTG ratio based on retrospective results) eliminates the incentive for Ameren Missouri to minimize free riders and maximize spillover, which can result in the actual NTG ratio being lower than the assumed ratio. As NRDC witness Mosenthal explains in his rebuttal testimony, a NTG ratio is essential for estimating "the actual net savings attributable to the DSM program (compared to what would have occurred if the program did not exist)" (p 12). Establishing a NTG ratio means verifying that the Company earns the incentive payments made through the DSIM. Moreover, an improper NTG ratio "could result in perverse incentives to Ameren [Missouri]" (p 5) since it would encourage utilities to favor measures that consumers would likely install without incentives.

OPC Witness Kind also recognizes the importance of NTG ratios in designing "effective programs that minimize free ridership" (p 21). The 2008 National Action Plan for Energy Efficiency (NAPEE) guide, *Understanding Cost-Effectiveness of Energy Efficiency Programs: Best Practices, Technical Methods, and Emerging Issues for Policy-Makers*, states, "Establishing the NTG [ratio] is critical to understanding overall program success and identifying ways to improve program performance." (pp. 4-9)

Ameren Missouri also recognizes the importance of analyzing NTG ratios in crafting useful, effective programs. In response to Staff Data Request No. 0039 (attached as Schedule MLS-2), Ameren Missouri provided a study[3] which states:

> Not examining free ridership and spillover ex post will make it impossible to distinguish and control for poorly designed / implemented programs, as well as for programs that may have declining performance over time and may have outlived their usefulness, at least in their current incarnation. Some interviewees said 'deemed savings are ridiculous' for this reason.

This view was further repeated in Skumatz and Vine, 2010, which Ameren Missouri also cites in its response to Staff Data Request No. 0039.

In addition, the 2007 NAPEE guide, *Model Energy Efficiency Program Impact Evaluation Guide*, at page 5-1, states:

> Generally speaking, net savings are of most interest for regulated government and utility programs: the responsible party (for example, a city council or utility regulator) wants to know if the use of public or ratepayer funded programs are actually having an influence.

These studies all agree that it is important to examine the components of the NTG ratio in order to properly evaluate the effectiveness of program design and implementation.

Q. Can a utility influence the NTG ratio?

A. Yes. A utility can take action to minimize free riders and maximize spillover. Both OPC witness Kind[4] and NRDC witness Mosenthal[5] explain that Ameren Missouri can influence the NTG ratio. Additionally, Commission Rules 4 CSR 240-3.164 (2)(C)15. and

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[3] Skumatz et al., 2009, p 6
[4] p 2,1 ll 17 through 23
[5] p 14, ll 9 through 18

16.[6] contemplate a utility's potential to influence the NTG ratio in a way that will result in more effective, efficient energy efficiency programs. Because of this potential, it is important for "[a]ny utility incentive component of a DSIM [to be] implemented on a retrospective basis and all energy and demand savings used to determine a DSIM utility incentive revenue requirement must be measured and verified through EM&V."[7] This creates an incentive for a utility to analyze its energy efficiency programs and make adjustments to improve NTG ratios.

Q. Does DNR witness Bickford or NRDC witness Mosenthal advocate a retrospective examining the components of the NTG ratio for each of Ameren Missouri's programs?

A. No. They support Ameren Missouri's proposal to implement its utility incentive component on a prospective basis, based on Ameren Missouri's estimate of gross energy efficiency savings contained in the TRM.

Their testimonies differ in that Dr. Bickford accepts Ameren Missouri's assumption of net benefits equaling gross benefits in the calculation of its incentive component, while Mr. Mosenthal is willing to deem the NTG ratios based on prior evaluations. They make two chief arguments for deeming NTG ratios and TRM savings, but both arguments cannot be true at the same time. The first argument is that deeming provides certainty to Ameren Missouri,[8] and the second is that the evaluations will validate the deemed savings[9].

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[6] Rule 4 CSR 240-3.164(2)(C)15.-16. provides: "When a electric utility files for approval of demand –side programs or demand-side program plans as described in 4 CSR 240-20.094(3), the electric utility shall file or provide a reference to which commission case contains the following information… (C) Detailed description of each proposed demand-side program to include at least:… 15. Description of any strategies to reduce free riders; 16. Description of any strategies used to maximize spillover."
[7] 4 CSR 240-20.093(2)(H)3.
[8] Phil Mosenthal p 15, ll 15-18; Adam Bickford p 13, ll 10-12
[9] Phil Mosenthal p 15, ll 13-15; Adam Bickford p 19, ll 3-6

Q. How does Staff's recommendation differ from that of Dr. Bickford and Mr. Mosenthal?

A. Staff agrees with OPC witness Kind that "the performance incentive should be based on the level of annual net benefits achieved and verified through Evaluation, Measurement and Verification (EM&V) including the net to gross (NTG) factors verified through EM&V"[10] in accordance with Commission Rule 4 CSR 240-20.093(2)(H)3. During this EM&V process, a third-party evaluator should decide what components[11] to analyze in calculating the NTG for each program, and how to determine gross savings. A knowledgeable independent third party evaluator should be the one to arrive at a measurable and verifiable amount of energy savings for which the Commission is required to provide timely earnings opportunity.

In contrast, simply assuming that the NTG ration equals one eliminates the evaluators' opportunity to study how well the programs are actually working and "will make it impossible to distinguish and control for poorly designed / implemented programs, as well as for programs that may have declining performance over time and may have outlived their usefulness, at least in their current incarnation."[12]

<u>Components of NTG ratios</u>

Q. What are some examples of components of NTG ratios?

A. The 2008 NAPEE guide identifies six key components addressed through NTG ratios: free riders, spillover, installation rate, persistence/failure, rebound effect, and take-back effect. However, the number of key components addressed in the NTG ratio and the definition of those components is not consistent from study to study. For instance, the 2007

[10] Ryan Kind, p 4
[11] Components such as free ridership, spillover, etc.
[12] Skumatz et al., 2009, p 6

NAPEE guide, cited by the 2008 NAPEE guide above, cites only three primary components mentioned in the 2008 NAPEE guide-free riders, spillover and rebound, and a fourth component not mentioned, transmission and distribution losses.

Q. Does Mssrs. Mosenthal, Kind or Dr. Bickford discuss the components of NTG ratios?

A. Yes. Mr. Mosenthal focuses on two components: free ridership and spillover. Mr. Kind mainly focuses on free ridership. Mr. Mosenthal also discusses installation rate and persistence when discussing adjustments to the TRM gross savings. Although the rebound effect is not specifically mentioned by Mr. Mosenthal in his rebuttal testimony, he discusses aspects of the rebound effect on page 45, line 15 through page 46, line 43. Mr. Kind also implicitly refers to the rebound effect on page 23, lines 3 through 11, of his rebuttal testimony. Dr. Bickford only directly refers to the free ridership and spillover components, although he also discusses potential divergence between calculated and measured savings.

Q. Please describe the six key components of NTG ratios as described in the 2008 NAPEE guide.

A. The 2008 NAPEE guide describes the six key components as follows:

- "Free riders" are customers who take advantage of the incentives available through energy efficiency programs even though they would have installed the efficient equipment on their own without the program incentives.
- The "spillover effect" is customers who adopt efficiency measures because they are influenced by program-related information and marketing efforts, but they do not actually take the incentives and are thus not participating directly in the program.
- The "installation rate" takes into account measures that are not installed or removed after installation, such as a customer who removes a compact fluorescent light bulb (CFL) because the customer does not like the light.

- The "persistence/failure" component attempts to correct for measures that fail or are removed prior to the end of useful life.
- The "rebound effect" and "take-back effect" are similar in that both are an increase in usage due to a perception of reduced price or bills, but the rebound effect also includes increased usage in the times before or after the savings occur. An example of the rebound effect which is not take-back is a program that limits air conditioning during a peak hour; the energy saved during that time can be consumed later when the air conditioning is trying to catch up.

Q. Please describe the four key components of NTG ratios as described in the 2007 NAPEE guide.

A. The 2007 NAPEE guide described the four key components as follows:

- The free rider factor is similar to the free rider in NAPEE 2008, but is divided into three groups: full, partial, and non-free rider. The partial free rider is a person who would have installed a less-efficient model without the rebate but more than baseline.
- The spillover effects in the 2007 NAPEE guide is also more extensively defined than in the 2008 NAPEE guide; it includes extra actions participants take because of program participation, market transformation that occurs as a result from the program, energy efficiency design changes by architects and engineers as a result of a program, and changes in energy use by non-participants that occurs as a result from the program.
- The rebound factor is also similar to NAPEE 2008, although take-back is treated as a subset of the rebound factor.
- The final factor, transmission and distribution losses, attempts to correct energy savings for the differences between savings that occur at the point of use to the savings that occur at generation.

This guide also lists some non-key factors that can determine NTG ratios, such as the state of the economy, energy prices, and changes in facility operations. Staff's view is that a knowledgeable third-party EM&V evaluator can best decide what components to examine in calculating a NTG ratio for a particular energy efficiency program.

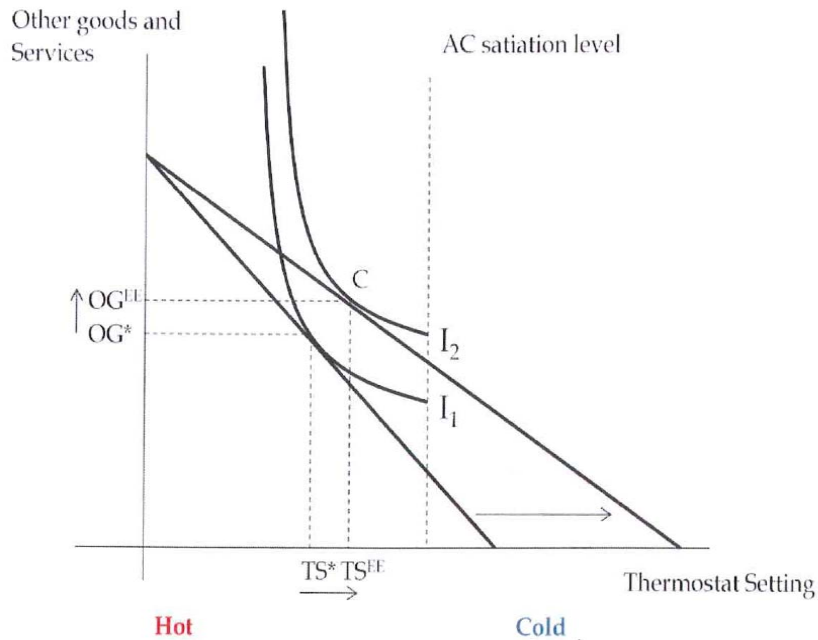
Q. Could you describe the rebound effect in greater detail?

A. Yes. The rebound effect was first noted by W. S. Jevons in "The Coal Question" (1866) when he noted that aggregate amount of coal consumed in the United Kingdom paradoxically increased rather than decreased as the efficiency of coal-fired steam engines increased.[13] Similar observations have been made about the consumption of gasoline with improvements in automobile efficiency.

The rebound effect is generally divided into three categories: direct rebound, indirect rebound, and an economy-wide effect (also known as the Jevons paradox, general equilibrium effect, and the Khazzoom-Brookes postulate).[14] The direct and indirect rebound effects can be seen graphically in Figure 1 below.

[13] Croucher, 2010
[14] Croucher, 2010

Figure 1: Individual in Equilibrium after a More Efficient AC Unit is Installed



Source: Croucher, 2010

In this example, an individual installs a more efficient air conditioning unit which changes the marginal cost of cooling the house. As a result, the individual reacted to the lower marginal cost by lowering their thermostat setting from TS* to TS^{EE}, which is the direct rebound effect. The reduced cost, in this example, also allows the individual to increase his/her purchases of other goods and services, which, if they consume energy, further reduce net energy savings. This indirect rebound effect is the movement of OG* to OG^{EE}.[15] The economy-wide effect, which is not graphed, is essentially that the increase in efficiency can result in the increased productivity of the whole economy, which can result in the consumption of more resources.[16]

Lutzenhiser et al. (2010) notes that current modeling techniques are insufficient in explaining real world energy use in part because they generally fail to take behavior [rebound]

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[15] Croucher, 2010
[16] Croucher, 2010

into account. "The differences between building-level simulation model results and real world energy use is commonly as much as 80-100%."[17]

Q. What is the significance of the rebound effect?

A. The significance is that savings calculated using engineering equations are not likely to equal measured savings. People are not engineering models, and their behavioral response can drastically affect the results. Croucher (2010a) states: "Frankly though, utilities can only assist with ensuring that *opportunities* or the *potential* to reduce electricity consumption is put in place… The final decision to reduce electricity consumption ultimately resides with the utilities [sic] customer" (p 15 – 16). Lutzenhiser et. al. (2010) states that modeling household energy consumption "involves hundreds of potentially important factors" and faces several issues, including "variability in consumption within and across households, data quality issues, conflicts among various modeling approaches and underlying theoretical constructs, and tacit beliefs about causal relationships" (pp. 7-167). Even though energy use appears to be a smooth transition from peaks to valleys when all the households are aggregated, the aggregation really masks large variations within a household, and even larger variations between households; the "differences in environmental conditions, building performance, appliances, and the interactions behavior of other factors… [result in] some households consuming 10-15 times as much energy as others." (pp. 7-175) Some households that were designed with energy efficiency in mind (including the installation of energy efficient equipment) resulted in higher energy use than conventional households![18]

Again, evaluators may look at a number of different factors in order to arrive at the most accurate NTG ratio possible for a given program. By simply assuming that the NTG

[17] Lutzenhiser et al., 2010, pp 7-168
[18] Lutzenhiser et. al. 2010

ratio equals one, the evaluators and the state as a whole will miss this important opportunity to judge a program's cost effectiveness, as discussed in Staff Witness John Rogers' surrebuttal testimony.

Applying NTG

Q. What components of NTG ratios are generally adjusted in an evaluation?

A. NRDC witness Mosenthal states that the NTG ratio is generally adjusted for free ridership and spillover. This is consistent with Skumatz et al. (2009) which states that the main adjustments are these two factors, and to a lesser extent the rebound or take-back effects. However, some other components of the NTG ratio may be accounted in adjustments to the gross savings, as discussed in Mr. Mosenthal's rebuttal testimony.

Q. On page 15 of Mr. Mosenthal's rebuttal testimony, he states that the NTG ratios, on average, are likely to not vary dramatically. Do you agree?

A. Not necessarily. The 2011 lighting program evaluation for New York City and state states that the "[A recommended NTG ratio of 0.41] is substantially lower than the NTG ratio produced in the 2008 multistate modeling effort (1.06), but the reduction in the NTG ratio is in keeping with the trends in other mature program areas, such as California and Massachusetts, which also saw NTG ratios plummet in a short period of time."[19] Additionally, the Energy Independence and Security Act of 2007 can also have a large impact on the NTG ratios. Although there is currently no enforcement funding, this act is still the law. Table 1 discusses the transition dates:

[19] NMR Group, Inc., 2011, p 7-1

Table 1: EISA Transition Dates and Coverage

Tier	Effective Date	EISA-Rated Lumen Ranges	Efficacy Requirement	Major Incandescent Wattage Categories Affected (W)
1	2012	1,490 -2,600	Maximum wattage: 72 W~21-36 lumens/W	100 and 150
	2013	1,050 -1,489	Maximum wattage: 53 W~20-28 lumens/W	75
	2014	750 -1,049	Maximum wattage: 43 W~17-24 lumens/W	60
	2014	310-749	Maximum wattage: 29 W~11-26 lumens/W	40
2	2020	All	No less than 45 lumens/W*	All

* EISA Tier 2 will require all lamps to have an efficacy of at least 45 lumens/W unless higher standards are otherwise determined by DOE.

Note: For more information, see http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_public_laws&docid=f:publ140.110.pdf

Source: 2010 CFL Market Profile - Energy Star, http://www.energystar.gov/ia/products/downloads/CFL_Market_Profile_2010.pdf

Q. On page 13 of NRDC witness Mosenthal's testimony, he states that a large portion of the participants in the lighting program are likely to be free riders due to market transformation. Does he cite any evidence to support that statement?

A. The only evidence he cites is a lower NTG ratio for a similar program in Massachusetts. The multistate study Cadmus performed indicates that the NTG ratio for Ameren Missouri's lighting program was 0.96, however Cadmus did not report any confidence intervals. This multistate study included 11 areas with lighting programs and four areas without lighting programs. Ameren Missouri's sample was less than six percent of the total sample (87 of 1533) and included only a half year of programs. Staff found a copy of that same multistate study for the lighting programs for the city and state of New York.[20] The model used to determine a NTG ratio of 0.96 for Ameren Missouri resulted in a similar NTG of 1.05 for New York state, but the confidence interval ranged from 0.59 to 1.82.

[20] NMR Group, Inc., 2011

Additionally, when this study included eighteen months of data, rather than half a year of programs, the NTG ratio for New York state dropped to 0.45, with a confidence interval of 0.09 to 0.88. Ultimately, the recommendation was for New York state to use a NTG ratio of 0.45 for its lighting program because the maximum likelihood R^2 increased to 0.18 from 0.12 with the additional year of data.

The Cadmus study does not appear to isolate free riders, but the study indicates that participants who purchased program CFLs were already likely to have purchased CFLs. The survey results show that these customers purchased 78 percent of the weighted program CFLs. The survey also showed that an additional 14 percent of the weighted program CFLs were purchased by customers who answered "no" or "don't know" as to their intent to purchase CFLs. Cadmus did not consider this as evidence of free ridership "since there is not enough information to know whether customers' intention to purchase CFLs was due to earlier program exposure" (p 35). However, on the very next page Cadmus states, "Since a significant portion of program marketing occurs at the point of purchase through signs advertizing the discounts, it is expected that most customers do not have prior knowledge of the program." (pp 36). Cadmus's survey found that 92 percent of customers surveyed did not have prior knowledge of Ameren Missouri's CFL program.

Q. Would Staff support a NTG ratio of 1.0 based on the theoretical arguments of DNR witness Bickford made on page 16, line 4 through page 17, line 7 of his rebuttal testimony?

A. No. The cost effective efficiency savings should be measurable and verifiable. Since "there are no straightforward and valid methods for identifying rates of spillover,"[21] spillover cannot be included in a NTG ratio calculation. However, a knowledgeable

[21] Adam Bickford, p 17

independent third party evaluator should make the determination of what is measurable and verifiable.

Q. Do you agree with Dr. Bickford that NTG ratios that only consider free ridership may underestimate savings?

A. Not necessarily, it is not clear whether a NTG ratio based solely on free ridership would underestimate or overestimate actual savings. A literature review of current research has revealed that there is considerable discussion about the importance of NTG components in program development, but there is little discussion of their actual values or confidence intervals, and considerable disagreement on the best way to measure these values.[22] Measuring demand-side savings is very different from measuring supply-side production; with supply-side investments you have material production that can be measured in watts or watt-hours. However, demand-side savings can only be measured by statistical inference—by trying to compare what energy is being consumed in this world to the energy consumption in a non-existent world in which everything is the same, except there are no demand-side programs.

According to Skumatz and Vine (2010), the main sources of controversy in calculating NTG ratios are, (1) error and uncertainty in identifying an accurate baseline, identifying and implementing a control group, or relying on self responses to a survey; (2) the expense of high quality analysis; (3) identifying and analyzing up stream baselines and effects (as in market transformation); (4) separating out the "chatter" of other programs, and (5) the concerns of risk and uncertainty with the financial performance of the utility. Many of these concerns have been repeated in other articles. For example, Lutzenhiser et al. (2010) noted the

[22] Skumatz and Vine, 2010

difficulty in developing a good baseline because current forecast models are just not good at predicting the future.

> The forecasting models that operate at national or regional scales offer an often crude fit to actual, observed conditions and measured energy use, and must be "calibrated" (adjusted after the fact) for cautious use in producing both "business-as-usual" and alternative policy scenarios. The differences between building-level simulation model results and real world energy use is commonly as much as 80-100%.[23]

Additionally, accurately measuring the factors that go into the NTG ratio requires inferences about the participants' and non-participants' motivations; the Database for Energy Efficiency Resources, a California Energy Commission and California Public Utilities Commission (CPUC) sponsored database, notes:

> Customer motivation to purchase a package of light bulbs on any given day is difficult to discover or accurately estimate even if they are interviewed moments after the purchase. Measuring customer motivation by asking them questions about why they made a specific purchase three to six months after the purchase is very difficult in practice and subject to large uncertainties unrelated to the program effects.[24]

Furthermore, a utility's energy efficiency program is not occurring in isolation from other programs; it may be impossible to isolate the impact of the utility's program from the programs of other actors, such as the Department of Energy and the messages regularly seen in the public media about going green. Entities like these have been pushing for energy efficiency devices and behavioral changes for years through media campaigns, rebates, and tax credits. And with the increased focus on energy efficiency, the market transformation baselines can be changed by developers seeking to achieve a price premium on energy efficient designs and from major retailers adopting a corporate strategy of being a "green"

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[23] Lutzenhiser et al., 2010, p 7-168
[24] Database for Energy Efficient Recourses (DEER), 2008, p 2-5.

retailer, all independent of the utility's energy efficiency program, but further confounding the impacts of a utility's program.[25]

To some extent, it depends on the methodology of the evaluation. If the program is evaluated using actual measured and observed savings results, some NTG ratio components become less necessary. For instance, the installation rate which takes into account measures that are not installed or removed after installation, such as a customer who removes a CFL because the customer does not like the light, would automatically be captured in an *ex post* evaluation that measures the change in energy consumption. It also depends on what components went into the calculation of gross savings. In the case of Ameren Missouri's lighting program, Cadmus included the installation rate as a portion of determining gross savings. Cadmus also included a leakage rate in the gross savings calculation to account for incented light bulbs that left Ameren Missouri's service territory.

Technical Resource Manual

Q. What is Staff's opinion of NRDC witness Mosenthal's recommendations of Ameren Missouri's TRM?

A. Staff agrees with Mr. Mosenthal's recommendation that additional review is required.

Q. What is Staff's opinion of DNR witness Robert Fratto's recommendations to Ameren Missouri's TRM on page 33 of his rebuttal testimony?

A. Based on a limited review, Staff supports the revisions Robert Fratto recommends, with the provision that additional review of TRM is made as discussed above.

[25] DEER, 2008

Q. Does Staff agree with OPC witness Kind that the TRM should not be used "as the basis for determining program performance in place of EM&V verified estimates of net savings for each program" (p 23)?

A. Yes. Staff agrees that the recovery for demand-side programs should not be permitted, unless they result in energy or demand savings that are beneficial to all customers in the customer class. These cost effective efficiency savings should also be measurable and verifiable.

Q. Does Staff agree with Mr. Kind that the TRM is not ready to be relied on as a tool for future planning efforts?

A. Yes. As NRDC witness Mosenthal also states, "The [proposed] TRM omits commonly used gross savings adjustment factors" (p 57). As discussed above, Staff also agrees with the revisions proposed by DNR witness Fratto. Although the proposed TRM needs some revision, the TRM can become a valuable resource for future planning efforts. However, this should not supplant the role of full EM&V in determining actual demand and energy savings.

Conclusion

Q. Please summarize Staff's position.

A. Staff disagrees with DNR witness Adam Bickford's support for Ameren Missouri's proposal to use estimated savings from its TRM to calculate its utility performance incentive, and Staff disagrees with DNR's support for Ameren Missouri's proposal to assume a NTG ratio of one for its energy efficiency programs.

Staff agrees with OPC witness Ryan Kind's recommendation that estimates of program performance in the TRM should not be used as a replacement for determining program performance through a NTG ratio calculated by EM&V.

Staff agrees with DNR witness Robert Fratto that, while a TRM is useful, the only way to determine net savings from DSM programs is to actually measure the savings retrospectively through a third-party EM&V evaluator.

Q. Does this conclude your surrebuttal testimony?

A. Yes.

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Background of Michael Stahlman

CASE INVOLVEMENT
AO-2011-0035 – Status Reports of Energy Efficiency Advisory Groups and Collaboratives
GC-2011-0045 – SMNG Complaint Case
GR-2010-0347 – SMNG Small Rate Case
GC-2011-0339 – OPC v MGE Complaint Case
GR-2010-0363 – Ameren Missouri Rate Case
GM-2011-0354 – MGU/SMNG Merger
GT-2011-0049 – MGE Energy Efficiency Tariff Filing
GT-2011-0335 – Atmos Energy Efficiency Tariff Filing
GT-2011-0410 – Ameren Missouri Energy Efficiency Tariff Filing

COLLABORATIVE/ADVISORY GROUP INVOLVEMENT
Ameren Missouri, Atmos Energy Corporation, Empire District Gas, Laclede Gas Company, Missouri Gas Energy (MGE)

EDUCATION

2009	M. S., Agricultural Economics, University of Missouri, Columbia.
2007	B.A., Economics, Summa Cum Laude, Westminster College, Fulton, MO.

PROFFESIONAL EXPERIENCE

2010 -	Regulatory Economist, Missouri Public Service Commission
2007 – 2009	Graduate Research Assistant, University of Missouri
2008	Graduate Teaching Assistant, University of Missouri
2007	American Institute for Economic Research (AIER) Summer Fellowship Program
2006	Price Analysis Intern, Food and Agricultural Policy Research Institute (FAPRI), Columbia, MO
2006	Legislative Intern for State Representative Munzlinger
2005 – 2006	Certified Tutor in Macroeconomics, Westminster College, Fulton, MO
1998 – 2004	Engineering Watch Supervisor, United States Navy

SELECTED MANUSCRIPTS AND POSTERS

Stahlman, Michael, Laura M.J. McCann, and Haluk Gedikoglou. "Adoption of Phytase by Livestock Farmers." Selected poster at the American Agricultural Economics Association Annual Meeting, Orlando, FL, July 27-29, 2008. Also presented at the USDA/CSREES Annual Meeting in St. Louis, MO in February 2009.

McCann, Laura, Haluk Gedikoglu, Bob Broz, John Lory, Ray Massey, and Michael Stahlman. "Farm Size and Adoption of BMPs by AFOs." Selected poster at the 5th National Small Farm Conference in Springfield, IL in September 2009.

Stahlman, Michael. "The Amorality of Signals." Awarded in top 50 authors for SEVEN Fund essay competition, "The Morality of Profit."

Pending: Stahlman, Michael and Laura M.J. McCann. "Technology Characteristics, Choice Architecture and Farmer Knowledge: The Case of Phytase." For Agriculture and Human Values

Ameren Missouri
Response to MPSC Data Request
MPSC Case No. EO-2012-0142

Data Request No.: MPSC 0039 - Michael Stahlman

Please provide the citations and a copy of the reports for all the studies Ameren Missouri used to develop section 3.4 "Gross vs. net Savings" in the MEEIA Report. Additionally, please identify any and all factors of the Net-to-Gross ratio examined by Ameren Missouri.

RESPONSE

Prepared By: Richard A. Voytas
Title: Manager, Energy Efficiency and Demand Response
Date: April 9, 2012

The citation to the one graph in Section 3.4, Figure 3.6 is from the "Final Report Volume 2: Assessment of Energy and Capacity Savings Potential in Iowa February 15, 2008." This study was submitted as a workpaper to the Company's MEEIA filing.

Section 3.4 on the policy issue of gross vs. net savings was developed by the Company based on two decades of experience in the design, implementation and evaluation of DSM programs. It is also based on two decades of discussions and interactions with national thought leaders at the Ameren Council For An Energy Efficient Economy ("ACEEE"). Consortium For Energy Efficiency ("CEE"), Midwest Energy Efficiency Alliance ("MEEA"), Lawrence Berkley National Laboratory ("LBNL"), Regulatory Assistance Project ("RAP"), Association for Demand Response and Smart Grid ("ADS"), North American Electric Reliability Council ("NERC"), National Action Plan for Energy Efficiency Leadership Group ("NAPEE"), and other states' investor owned utilities. Documentation regarding the gross vs. net savings issue that the Company is aware of and has copies of papers and presentation includes:

1. Lessons Learned and Next Steps in Energy Efficiency Measurement and Attribution: Energy Savings, Net to Gross, Non-Energy Benefits, and Persistence of Energy Efficiency Behavior
2. Survey of Current Energy Efficiency Program Evaluation Practices and Emerging Issues
3. Salt River Project Net-to-Gross: Updating Research
4. The Trouble With Free Riders
5. Best Practices for Evaluation of Efficiency Programs for New Mexico
6. An approach for evaluating the market effects of energy efficiency programs
7. A National Review of Best Practices and Issues in Attribution and Net-to-Gross: Results of the SERC/CIEE White Paper
8. A National Survey of State Policies and Practices For The Evaluation of Ratepayer-Funded Energy Efficiency Programs

A copy of each paper cited above is attached.

The Company considers the relevant factors in the net-to-gross determination to be free ridership, participant spillover, nonparticipant spillover, and market effects.