Exhibit No.:	
Issue(s):	Estimating Energy Savings; Technical Resource Manual; Net-to-Gross; Demand Response
Witness:	Richard A. Voytas
Sponsoring Party:	Union Electric Company
Type of Exhibit:	Surrebuttal Testimony
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MISSOURI PUBLIC SERVICE COMMISSION

Case No. EO-2012-0142

SURREBUTTAL TESTIMONY

OF

RICHARD A. VOYTAS

ON

BEHALF OF

UNION ELECTRIC COMPANY
d/b/a Ameren Missouri

St. Louis, Missouri
May, 2012

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SURREBUTTAL TESTIMONY

OF

RICHARD A. VOYTAS

CASE NO. EO-2012-0142

Q. Please state your name and business address.

A. My name is Richard A. Voytas. My business address is One Ameren Plaza, 1901 Chouteau Avenue, St. Louis, Missouri 63103.

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

A. I am employed by Ameren Services Company ("Ameren Services") as Manager of Energy Efficiency/Demand Response. Ameren Services provides various technical and corporation support for Ameren Missouri and its sister companies, including in the area of energy efficiency and demand response.

Q. Are you the same Richard A. Voytas who authored a portion of the report filed January 20, 2012 in this case?

A. Yes, I am.

Q. What is the purpose of your surrebuttal testimony?

A. The primary purpose of my surrebuttal testimony is to address the following issues: (1) the use of an Ameren Missouri-specific Technical Resource Manual ("TRM") to prospectively deem energy savings estimates for individual measures for purposes of tracking and reporting the Company's implementation period energy savings arising from the programs contained in the Company's *2013 – 2015 Energy Efficiency Plan* ("MEEIA Report") and (2) the rationale for why, during the implementation period, it is reasonable to assume that the net energy savings and gross energy savings are

equivalent. I will discuss the benefits of this approach for customers, the Commission, the Company and stakeholders.

Q. Will your testimony address any other issues?

A. Yes. I will also rebut Staff witness Randy Gross' contention that the Commission should find Ameren Missouri's MEEIA proposal is inconsistent with the state policy reflected in MEEIA; that is, "to value demand-side investments equal to traditional investments in supply and delivery infrastructure."

I. Overview of Estimating Energy and Demand Savings Attributable To Demand-Side Management ("DSM").

Q. One of the biggest differences between Ameren Missouri's proposal and that of other parties, especially the Staff, is the insistence upon using retrospective Evaluation, Measurement and Verification ("EMV") to retrospectively change energy savings used in the calculation of the net shared benefits that underlie the calculation of the net benefits and incentive components described in the Company's MEEIA Report. Please address the role of retrospective EMV in assessing energy savings attributable to Ameren Missouri's MEEIA portfolio of energy efficiency programs.

A. There appear to be misconceptions associated with EMV. It is almost as if some parties believe that retrospective EMV is able to provide precise impact analyses for energy efficiency programs and this assumed precision (which does not exist, as I discuss further below) then, from their perspective, justifies retroactively changing the energy savings relied upon when the programs were put in place.

Q. What is the purpose of EMV?

A. EMV provides assessments of both the performance, in terms of reduced energy and demand, and implementation of a DSM program. EMV will also provide a multitude of new information to be used prospectively as we refine and gain more experience with DSM programs. Examples of new information include program delivery enhancements, changes in customers' use of energy efficiency technologies, program improvement opportunities and identification of trends in a changing marketplace.

Q. Starting with the first aspect of EMV, performance assessments, is there only one "correct" answer for the energy and demand impacts associated with a DSM program?

A. No. It is important to remember that the objective is to estimate, not measure, energy that is not consumed. By definition this necessarily is an estimate because there are no meters to rely upon to collect this data. Adding even more uncertainty to the estimation process, and unique to utility DSM programs, is the additional challenge of attempting to scale energy savings estimates by applying a net-to-gross ("NTG") factor that attempts to adjust energy savings estimates to account for the fact that some customers would have purchased and installed energy efficiency products and services even without a utility DSM program. I address the NTG issues in more detail below. This translates into an inexact process of taking an estimate of the energy savings of a program, based on a sample to which precision and accuracy can be ascribed, and multiplying it by another estimate of NTG for which neither precision nor accuracy can be ascribed. The conundrum is that the gross impact estimates attributable to a DSM program and the ensuing net benefits are discounted by a subjective NTG

factor which typically is biased in the direction of a reduction to savings estimates rather than an increase to savings estimates. Even using the same methodologies, different EMV contractors will almost certainly arrive at different net impact estimates for the same program or group of programs.

Q. Is it possible to assign accuracy and precision to estimates of NTG?

A. In my opinion – no. It is rare for EMV contractors to report confidence ranges or even discuss uncertainty when they report estimates of NTG. NTG is commonly determined through the use of customer self-reporting surveys. When customers are asked questions about energy efficiency purchase decision processes a year after the fact, a variety of responses are possible. There exist concerns regarding whether customers fully understand the hypothetical questions inherent in the surveys. Later in my testimony, I describe the issues associated with even identifying, much less quantifying, one of the two most important components of NTG – spillover.

Q. Will it be possible to replicate energy savings attributable to specific energy efficiency measures year-after-year through EMV studies?

A. Generally, the answer is "no." It is rare that energy savings attributable to any individual energy efficiency measure stay the same after each EMV analysis. For example, one of the more basic energy efficiency measures is a compact fluorescent light ("CFL") bulb. There are year-to-year variances in the energy savings attributable to CFLs. These differences are attributable to changes in operating hours, changes to in-service rates, changes in how customers may replace existing incandescent bulbs with different equivalent wattage CFLs, and differences in approaches to estimating NTG.

The examples of potential sources of change can serve to either increase or decrease energy savings.

Q. Please give another example of why any belief that energy savings attributable to a single measure can be replicated year after year would reflect a misconception of how EMV actually works.

A. A common residential energy efficiency program is the refrigerator recycling program. This is a program whereby Ameren Missouri picks up secondary or tertiary working refrigerators from customers and disposes of them in an environmentally acceptable manner. The reduced energy consumption associated with removing the refrigerators permanently from service is the energy savings attributable to the program. In evaluating this program for a particular year, an EMV contractor may choose to rely on refrigerator manufacturer test data to ascribe annual energy savings to the program. Or an alternative approach is to rely upon sub-metering studies of similar programs in other jurisdictions. Another alternative approach is to complete a sub-meter study for Ameren Missouri participants. Changing components in the analysis of energy savings include the mix of refrigerators beings recycled, the age of refrigerators being recycled, the type and location where each refrigerator was used, etc.

Q. What is the point in addressing misconceptions about the nature of EMV?

A. The point is that the estimation of energy savings from energy efficiency programs is an art not a science. There is no one "right" answer. The utility is subjected to significant evaluation risk that is out of its control if impact assessments are based on retrospective EMV impact assessments. Deeming NTG prospectively for three years and

using a TRM are the best means to address evaluation risk in an open and transparent manner. It provides the Company's management the parameters upon which it may decide whether or not the values set in the TRM are reasonable and, on that basis, whether or not to invest in demand-side programs. My surrebuttal testimony will provide extensive analyses to support this critical topic in the Company's MEEIA Report.

II. Technical Resource Manual

Q. What is a TRM?

A. A TRM is a document that provides methods, formulas and deemed or stipulated values for estimating energy and peak demand impacts from measures and projects. The Company has proposed a TRM focused on measures and projects that are the basis of the plan reflected in Ameren Missouri's MEEIA Report.

The Company's TRM is organized by customer class (residential and commercial/industrial) and by end-use. Each section provides mathematical equations for determining savings as well as deemed energy savings assumptions. Energy savings assumptions are based on Ameren Missouri-specific EMV data where available. When Ameren Missouri-specific data is not available, Ameren Missouri notes the data source for the measure energy savings data.

A) The TRM is an Essential Element of the Company's MEEIA Report

Q. What is the relevance of the TRM in the MEEIA Report?

A. The TRM is one of the six key elements of the plan discussed in the MEEIA Report. The six key elements are listed on page V of the Company's MEEIA Report. Even more important to Ameren Missouri's plan than the TRM itself is the philosophy in the application of the TRM. That philosophy is the *prospective deeming* of

savings for purposes of tracking, reporting and regulatory compliance. Together, the TRM and the prospective deeming of energy savings provide the certainty necessary for the Company's management to value demand-side investments equally with supply-side investments. In other words, the TRM and the prospective application of the TRM are both prerequisites for the Company to aggressively pursue energy efficiency. Ameren Missouri witness Warren Wood's surrebuttal testimony addresses this issue in more detail.

Q. Why is approval of the TRM and the prospective application of the TRM necessary for the Company to be able to pursue energy efficiency?

A. As I discussed earlier in my testimony, quantifying energy that is not consumed is an art, not a science. Energy that is not consumed cannot be measured but can only be estimated. Savings are estimated by comparing energy use and demand after a program has been implemented to what is presumed would have occurred had the program not been implemented. Different EMV contractors evaluate the same program differently. The subjective nature of such comparisons injects significant uncertainty into the estimation of final energy savings results. This high degree of subjectivity provides room for second-guessing of estimates by all parties. Hence, the inherent evaluation risk is high and discourages utility support for demand-side programs. As Mr. Wood discusses, it also creates the wrong incentive for all parties, when the focus should be on doing the best job that can be done up-front to estimate the savings, with all parties then "living with" those estimates throughout the life cycle of a set of programs – here, three years. Then, after EMV, we take what we learned during that life cycle, refine the estimated savings, and use those (hopefully) better estimates prospectively. The

prospective deeming of energy savings for measures in the TRM addresses evaluation risk and incentive issues in an open and totally transparent manner for the Company, Commission and all stakeholders.

Q. Does adoption of a TRM provide benefits to customers as well as to the Company?

A. It does. The value of energy efficiency for customers is that the long run costs of customers being more energy efficient (using less energy) is less expensive than the alternative of Ameren Missouri building new generation to meet future load growth. Therefore, it is in the customers' best interests for Ameren Missouri to implement cost-effective energy efficiency programs. Customers require reasonable assurance that energy efficiency is the least cost option. That assurance can come at a wide range of costs without a commensurate increase in precision and accuracy. The TRM is valuable to customers because it assures customers that experts from the Company as well as from the Missouri Public Service Commission Staff ("Staff"), Office of the Public Counsel ("OPC"), the Missouri Department of Natural Resources ("DNR") and other interested stakeholders have come together to make the most informed decisions possible as to the average annual energy and demand savings attributable to energy efficiency programs in the Ameren Missouri energy efficiency implementation plan. This assures customers that their monies are not used to engage consultants to argue different points of view in a future docket as to what the Commission should consider the best estimate of the energy savings attributable to energy efficiency measures, when we know that such debates could not lead one to the "right" answer anyway. Consequently, reliance on the TRM reduces the amount of customer funds necessary for EMV. This allows the Company to

allocate resources to other areas, such as customer incentives, where customers receive the most benefit.

Q. How does the TRM mitigate the evaluation risk you describe in the previous question?

A. In the spirit of total transparency, the Company is asking the Commission and all interveners in this case to review, assess and offer constructive input as to the reasonableness of the measure energy savings estimates in the TRM on a before the fact or *ex ante* basis. This is exactly what DNR did by engaging GDS Associates ("GDS") to review the TRM. The Company applauds both DNR and GDS for their thorough reviews and solid recommendations for improvement. The Company is willing to change its proposed deemed energy savings values and algorithms based on the constructive input of others, so long as those values and algorithms are set as part of approving the TRM and so long as they are used for the entire three-year life cycle of the programs, even if later in the cycle EMV results indicate higher or lower values. The point, as is made on page 52 of the Company's MEEIA Report, is that cost and savings estimates in the TRM should be based on the best available information *at the time* these estimates and/or calculations were made. If after the fact or *ex post* estimates of costs and savings for energy efficiency measures differ from estimates in the TRM for the first MEEIA cycle of programs, the *ex post* estimates should be the preferred values for use in the second MEEIA cycle of programs.

Q. Are there other states that have developed TRMs?

A. Yes. 21 states currently have TRMs. A map of those states is shown in Figure 3.5 on page 53 of the Company's MEEIA Report.

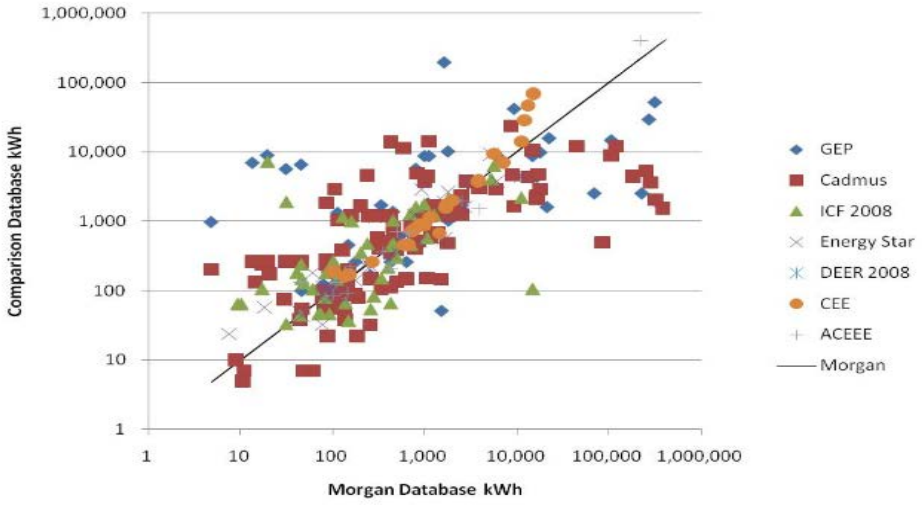
Q. Do the other state TRMs generally use the same deemed savings estimates and energy savings algorithms?

A. No. In fact, the State Energy Efficiency Action Network ("SEE") reports that there is a wide variation in savings estimate methodologies, technical assumptions, and input variables for estimating individual energy efficiency measure savings among the 21 states that have TRMs. Again, these variations in estimated impacts of energy efficiency savings illustrate the evaluation risks that Ameren Missouri faces when energy efficiency measures have not been deemed at the time an energy efficiency implementation plan has been approved.

Q. Has Ameren Missouri done its own sanity checks when assessing the reasonableness of its energy efficiency measure databases?

A. Yes. Figure 3.15 on page 91 of the Company's MEEIA Report show the sanity checks that Ameren Missouri did in its 2011 IRP filing comparing individual measure savings estimates from a total of eight different DSM databases. The same wide variation pattern as reported by the SEE Action Network exists.

Figure 1: (MEEIA Report Figure 3.15 Measure kWh Values by Database)



B) Positions of DNR, Staff and OPC on the values contained within the Company's proposed TRM.

Q. Setting aside the rebuttal testimony of Environmental Interveners'[1] witness Phillip Mosenthal for a moment, what do other witnesses recommend regarding the TRM?

A. Staff witness Hojong Kang recommends that the Commission not approve Ameren Missouri's TRM until Staff has the opportunity to review the revisions contained in the rebuttal testimony of DNR and provide its views on them to the Commission. Kang Rebuttal, p. 21, l. 1-3. Staff witness John Rogers repeats the recommendation of Mr. Kang. Rogers Rebuttal, p. 7, l. 9-12. OPC witness Ryan Kind opposes the use of demand and energy savings from the proposed TRM as the basis for determining program performance in place of EMV verified estimates of net savings for each program. Kind Rebuttal, p. 23, l. 3-5. Mr. Kind claims that during one of the technical conferences in this case, DNR cited and explained numerous deficiencies in the TRM and these should be addressed before the TRM can be relied upon for planning future programs. Adam Bickford of DNR, the only party to have conducted a review of the Company's proposed TRM, recommends that the Commission approve the Company's TRM (with certain modifications) and agrees with the Company's plans for using a TRM and deemed savings to estimate DSM program savings. Bickford Rebuttal, p. 19, l. 8-9.

Q. Starting with DNR's testimony, what is significant about its endorsement of the Company's TRM?

A. DNR is the only intervener that engaged a national expert, Mr. Robert Fratto of GDS Associates, to do a measure-by-measure, equation-by-equation analysis of

[1] Sierra Club, Natural Resources Defense Council and Renew Missouri.

Ameren Missouri's TRM. Mr. Fratto followed up with a formal report of his findings. The report contained eight specific recommendations for improvement opportunities to the TRM. The Company is grateful to DNR and Mr. Fratto for the constructive feedback on the TRM. The Company has agreed to incorporate all eight recommendations (which I address further below) into its TRM. A copy of the TRM, revised to incorporate the recommendations from the GDS Associates report, is attached as Schedule RAV-S1. I am also attaching a red-lined copy, so that it is apparent what changes were made. I should also note that GDS's analysis of the TRM examined non-weather sensitive measures only (about 70% of the measures covered by the TRM). I address the weather sensitive measures further below.

Q. Please list the eight recommendations for the TRM from Mr. Fratto and the Company's response.

A. (1) All equations identified as incorrect should be revised.

Response: Ameren Missouri has made these corrections.

(2) All key assumptions that are identified as missing, incorrectly stated, not defined or not sourced should be added or corrected.

Response: Ameren Missouri has made these corrections.

(3) Equations identified as non-calculative should be revised such that they will actually calculate base and efficient use based on key inputs such as equipment wattage, horsepower, operating hours, and efficiency ratings.

Response: Ameren Missouri has changed these equations.

(4) Interactive factors, in-service rates and in situ adjustment factors should be added to equations where they have been identified as missing. It is important to identify

these factors in all energy savings equations, whenever it is appropriate, even if the factor values are set to 1.0.

Response: Ameren Missouri has added these factors into the equations.

(5) Alternative equations suggested by GDS to improve the precision of the energy savings estimates should be either adopted by Ameren Missouri or an explanation should be provided explaining why the current equation is preferred.

Response: Ameren Missouri has changed these equations.

(6) Other issues with equations that have been identified by GDS should be reviewed by Ameren Missouri and any necessary TRM changes should be made or a response should be provided.

Response: Ameren Missouri has changed these equations.

(7) In the absence of new evaluation data addressing measures with questionable savings estimates, additional research should be conducted on those measures in Table 3.2.2 above that have been identified as having savings estimates that are outside the range of estimates from other TRMs and also differ by more than ± 10% from the average "other TRMs" energy savings. The purpose of this additional research would be to determine if the differences identified by GDS are valid and if not, to make any necessary changes to energy savings values.

Response: Ameren Missouri quantified the impact of these measures and determined the impact on the portfolio was de minimus. The measures identified in Table 3.2.2 with the highest impact on the portfolio, and the associated MWh contributions, are listed in Table 1.

Table 1: (GDS Report Table 3.2.2 Measures Impacting MEEIA Portfolio)

Original Table Sort	Measure Type	Measure Name	Annual kWh Savings	Savings Source	Low	Average	High	Does Ameren Estimate Fall in Range?	Difference of Ameren Savings from Other TRMs Average	Is Ameren Savings within +/- 10% of Other TRMs Average?	Comparison TRMs	Cumulative MEEIA Installs	Cumulative Impact Difference (MWh)
1	Res Lighting	CFL POST-EISA 23 Watt	51.2	MML	42.7	44.7	46.2	No	15%	No	OH, PA, Mid-Atlantic	976619	-6348
2	Res Lighting	CFL - High Watt 65 Watt	113	MML	124	159.9	192	No	-29%	No	MA, OH, NY, PA, VT,	30167	1415
3	Res Lighting	CFL - Specialtly 26.5 Watt	44.1	MML	48.3	59.2	75.8	No	-26%	No	MA, OH, NY, PA, TX, VT, Mid-Atlantic	351950	5314
4	Res Lighting	CFL POST -EISA for Multifamily 13 Watt	31.5	MML	24	25.8	27.6	No	22%	No	OH, PA	47465	-271
19	Com Motors	VFDs for Air Compressors	5.8	MML	405	602.3	800	No	-99%	No	OH, PA	10989	6555
													6,666
	6,666	Total MWh difference if Ameren were to accept the GDS average savings											
	793,102	MWh in MEEIA portfolio											
	0.84%	Overall % impact on portfolio MWh savings											

(8) In the absence of additional evaluation data addressing measures for which only one or no comparative values from other TRMs could be found, Ameren Missouri should conduct additional research to assess the reasonableness of energy savings estimates for such measures.

Response: After discussions with GDS and DNR, Ameren Missouri agrees to continue its sanity check process and will incorporate more data sources where feasible in future TRMs. Ameren Missouri understands this to be an iterative process for all TRMs subsequent to this filing.

Q. What is the impact of the eight recommendations on the overall energy savings in the Company's MEEIA implementation plan?

A. If the Company were to change its measure savings to the values reported in the GDS report, then the energy savings for the MEEIA 3-year implementation plan would change by approximately 0.1%. This shows that the energy savings reflected in the

original TRM were reasonable, but as noted, we have no objection to refining them based upon GDS's analysis.

Q. Should the endorsement of the proposed Ameren Missouri TRM by DNR as a result of the technical assessment by GDS Associates impact the support of the TRM by Dr. Kang, Mr. Rogers and Mr. Kind?

A. Yes – according to their rebuttal testimonies. All three witnesses condition their support, in part, on the opportunity to review the rebuttal testimony of DNR.

Q. You noted earlier that GDS evaluated the non-weather sensitive measures. Please define weather sensitive energy efficiency measures.

A. Weather sensitive measures include building shell measures such as insulation or windows, HVAC measures such as air conditioners or chillers, or temperature control technologies such as thermostats. Just as the name suggests, weather sensitive measures are those efficient technologies whose energy savings fluctuate with weather.

For Ameren Missouri's MEEIA Report, Morgan Marketing Partners provided the following descriptions of weather sensitive measures.[2] The HVAC measures for residential buildings include split system central air conditioners, air source heat pumps and dual fuel heat pumps, furnaces with and without efficient motors, and ground source heat pumps. Setback thermostats, duct insulation and leakage sealing, and refrigerant charge correction measures were also analyzed. Shell measures include roof, wall, floor,

[2] Appendix A – Technical Resource Manual, p. 91.

crawlspace and basement insulation upgrades, high-performance glazing, and air leakage sealing. Whole house fans and efficient ceiling fans were also analyzed.

The HVAC measures for small commercial buildings include single package rooftop air conditioners and heat pumps, split system air conditioners and heat pumps, packaged terminal air conditioners and heat pumps, and water loop heat pumps. Setback thermostats, air side economizers, and refrigerant charge correction measures were also analyzed. HVAC measures for large commercial buildings include air cooled and water cooled chillers, chilled water setback control, and variable frequency drives on fans and pumps. Shell measures include window films, high-performance glazing, and cool roofs.

Q. What did GDS have to say about the weather sensitive measures in the Company's TRM?

A. While GDS did not conduct a detailed analysis of the weather sensitive measures, Mr. Fratto states at page 5 of his rebuttal testimony that he endorses the Company's approach -- conducting detailed building simulation analysis of weather sensitive measures -- and that such simulation analysis is the most accurate approach to estimating weather sensitive measure energy savings.

Q. How many measures in the Ameren Missouri TRM are considered weather sensitive?

A. Of the 136 measures found in the TRM[3], approximately 41 measures are weather sensitive, representing 30% of the measures found in the TRM.

[3] Bickford Surrebuttal Testimony, p. 14

Q. Of the total 793,102 MWh that the Company projects will be saved over the three-year MEEIA implementation plan, how many of those MWh are projected to come from weather sensitive measures?

A. Weather sensitive measures contribute approximately 205,071 MWh of savings, representing 26% of the MEEIA plan portfolio savings.

Q. Describe the basis for the estimate of energy savings associated with weather sensitive measures in the Ameren Missouri TRM.

A. In addition to the description found on pages 86-94 of the MEEIA Report, there is a substantial discussion of the building simulation process found in Appendix A of the filing, which is the TRM, beginning on page 91. The following is a high level summary of the process used to estimate weather sensitive measure level savings.

Ameren Missouri contracted with Morgan Marketing partners to develop a database of measure level savings, costs, and useful lives. This database is used in multiple jurisdictions including North Carolina, South Carolina, and Michigan. To most accurately capture weather sensitive measure level savings, building simulations were run by a subcontractor, Architectural Energy Corp. ("AEC"), who developed the REM/Rate tool that is commonly used for energy modeling. United States Department of Energy ("DOE") developed DOE 2.2 building simulation software was used to run the multiple simulations (over 2,000 individual DOE 2.2. analyses were performed).

Ameren Missouri provided Missouri specific weather that was representative of the Company's service territory (Lambert Field Typical Meteorological Year ("TMY") data). Further details surrounding building stock were provided by Ameren Missouri to AEC.

For the residential sector, prototype models for single family detached, multifamily and manufactured homes were developed. Prototype models for small commercial buildings were developed for small retail, big-box retail, small office, fast food restaurant, full service restaurant, school, assembly, warehouse, grocery and light industrial buildings. Large commercial building prototypes for large office, hospital, and hotel building types were also developed. The results of these simulations were compiled into a database containing measure savings and measure costs by building type. Energy savings estimates were developed from the prototype models.

Q. Turning more specifically to the rebuttal testimony of Dr. Kang, he alleges that Ameren Missouri used projections of gross savings rather than net savings in the TRM. Is he correct?

A. No. Dr. Kang appears to misunderstand the type of energy savings estimates in the TRM. They are simply energy savings estimates – neither net nor gross. Net versus gross is about customer attribution at the program level – i.e., did the customer take an energy efficient action as the direct result of the Company's program? Stated another way: would the customer have taken the same action without the Company's program? Consequently, net-to-gross ratios are applied at the program level and not at the measure or TRM level. Therefore, Dr. Kang's criticism is misplaced.

C) Testimony of Philip Mosenthal on the TRM and EMV

Q. Did Mr. Mosenthal provide expert testimony with a detailed review of the Ameren Missouri TRM as did DNR witness Robert Fratto?

A. No. Mr. Mosenthal's rebuttal testimony (pages 55-56, lines 19-21, 1-2) states:

> Due to limited time and resources my review of the Ameren TRM has been comparatively limited. Like all TRMs, the 132 page Ameren document contains savings estimates that are the product of literally hundreds of distinct assumptions. I have reviewed the major elements of the document but I would not describe my review as fully comprehensive.

Q. What areas of Mr. Mosenthal's testimony regarding EMV will you address?

A. I will address Mr. Mosenthal's testimony on the following issues:

- EMV for Ameren Missouri's business Custom Program and applicability to the TRM;
- Annual review of TRM by EMV contractors;
- Proposed statewide collaborative role in EMV; and
- EMV budget recommendations.

Q. Mr. Mosenthal states that Ameren Missouri's business Custom Program is an example of a program typically not included within a TRM due to the fact that custom programs can have unique, customer specific processes that do not lend themselves to deeming, which means it must be closely examined during EMV. Do you agree, and does that mean it should not be included in the TRM?

A. I agree it can be evaluated, but I disagree that the TRM cannot contain deemed values for these programs. Taking the second question first, for the most part, custom programs have consisted of an amalgamation of standard energy efficiency measures configured in a unique way for a specific customer. Because standard measures

can be deemed, an amalgamation of standard measures can also be deemed. On the question of how these programs are evaluated, it is my presumption that Mr. Mosenthal is not aware of the level of detail contained within the EMV reports for this program. These reports contain detailed facility-by-facility reports for the projects that have been completed under the Custom Program. Consequently, the evaluation recommended by Mr. Mosenthal is actually business as usual for Ameren Missouri's review and evaluation of its Custom Program and those results were used in developing the TRM values.

Q. What does Mr. Mosenthal state in his testimony regarding the role of EMV contractors in the TRM?

A. He states that the TRM should undergo, at least initially, annual review by evaluators.

Q. Was the TRM reviewed by the Company's residential EMV contractor, the Cadmus Group ("Cadmus"), and business EMV contractor, ("ADM")?

A. Yes. Both Cadmus and ADM reviewed the proposed TRM and found that the TRM could be adequately used to conduct impact evaluations of Ameren Missouri's programs.

Q. Mr. Mosenthal proposes a statewide collaborative for EMV and also provides a list of issues that the collaborative could address. Is Mr. Mosenthal's proposal reasonable?

A. No, because much of his list is duplicative of work that is already on-going. This is probably because Mr. Mosenthal is relatively new to Ameren Missouri's energy efficiency practices. A prime example is the research that Mr. Mosenthal

recommends be done on market assessments. Market assessment research is precisely what Ameren Missouri's already completed DSM Market Potential study did and what future potential studies will continue to do. In addition, the Company employs two full-time, in-house EMV professionals devoted to EMV issues for both residential and business programs. There is already substantial stakeholder participation on DSM potential study issues, program design, program implementation and program EMV, via the quarterly regulatory stakeholder meetings that we have been holding for some time.

Q. What did Mr. Mosenthal state in regards to accountability for his proposed statewide collaborative?

A. Mr. Mosenthal did not address how this statewide collaborative would be accountable to customers who would ultimately have to pay for it, and he made no mention of his proposed governance structure for the collaborative. It appears that he believes the Commission should allow the collaborative flexibility in determining how the collaborative involvement and oversight should be done. This in effect would lead to a situation where there is unspecified funding for the collaborative without any accountability to customers, the Commission or the utilities impacted by it.

Q. Does Ameren Missouri support this recommendation?

A. The Company believes it can be helpful to bring in experts with broader experience elsewhere from time-to-time. The Company's real concern is if the collaborative were to be given decision-making authority. The Company's idea of a collaborative leaves decision-making responsibility with the Company, especially as the Company's proposal provides a strong incentive for the Company to run the best

programs possible. Granting other parties decision-making authority is counter to the type of regulatory structure Ameren Missouri has proposed in this case.

I have been involved in the Illinois collaborative mentioned by Mr. Mosenthal. His description may leave the wrong impression about how that group functions. The Illinois Commerce Commission ("ICC") has not given the Illinois Stakeholder Advisory Group ("SAG") functional control of utility DSM programs.

Q. What did Mr. Mosenthal state in regards to the cost of the additional stakeholder experts, research work, additional Company in-house staff, collaborative meeting facilitators, TRM annual updates, more intense review of the TRM by EMV contractors, and duplication of annual impact assessments using both the TRM and EMV contractors' independent assessments?

A. Mr. Mosenthal believes that an increase in the Ameren Missouri EMV budget from 3% to 5% will fund his proposed list. It will not. Ameren Missouri allocated 5% of its total DSM program budget in Cycle 1 to EMV as compared to an average annual budget estimate of 3% for the MEEIA implementation plan. The reduction from 5% to 3% is attributable to the existence of the TRM and the ensuing ability to do impact evaluations for only one of the three implementation years. As described in the Ameren Missouri MEEIA Report, the funds freed up by the decreased EMV budget were then re-allocated in the form of increased incentives for energy efficiency products and services to customers in order to make the energy efficiency programs more effective resulting in more energy savings. Perhaps Mr. Mosenthal envisions each stakeholder allocating the necessary funds to do the work he proposes whereby each stakeholder hires their own individual DSM consultant experts. Or

perhaps, Mr. Mosenthal envisions asking Ameren Missouri customers to pick up 100% of the cost of the collaborative and its associated research and meeting activities. Either way, adopting this recommendation without the details being worked out in advance may be, despite the best of intentions, counterproductive towards the goal of reaching all cost effective energy efficiency.

Q. Mr. Mosenthal recommends a 5% budget for EMV. Please translate the difference between 3% and 5% in dollars.

A. The difference is shown in the table below:

Table 2: EMV Budget Impacts

		2013	2014	2015	Total
MEEIA Budget		$ 35,239,613	$ 45,965,915	$ 64,087,685	$ 145,293,213
As in MEEIA	3%	$ 1,057,188	$ 1,378,977	$ 1,922,631	$ 4,358,796
Mr. Mosenthal's Proposal	5%	$ 1,761,981	$ 2,298,296	$ 3,204,384	$ 7,264,661
Difference		$ 704,792	$ 919,318	$ 1,281,754	$ 2,905,864

This table replicates what is shown in the Company's MEEIA Report, which can be found on page 54 lines 33 – 38. The bottom line is that an increase from 3% to 5% in the EMV budget amounts to an increase in costs of $2.9 million.

Q. Is 5% really typical of what other jurisdictions spend on EMV as Mr. Mosenthal states?

A. No. An Itron 2008 Best Practices Approach study states the following is best practice for EMV:

Table 3: National EMV Budgets

			Approximate Funding Level	
Portfolio Administrator	**Types**	**Free Ridership Assessed**	**$/year (millions)**	**% of budget**
Energy Trust of Oregon	Impact, Process and Market	Yes	$2 million	3.90%
Efficiency Vermont	Impact, Process and Market	Yes	$0.4 million	2.70%
NYSERDA	Impact, Process, Market, Program Theory/Logic, Attribution, Cost-effectiveness	Yes	$2.4 million	1.70%
Xcel Energy (MN)	Impact, Process and Market	Yes	$0.5 million	1.10%
Florida Power and Light	Impact, Process and Market	Yes	$1 million	0.80%
MidAmerican Energy	Process and limited Impact	No	$1.1 million	2.60%
California IOUs	Impact, Process and Market	Yes	$54.3 million	7.60%

As the Commission can readily see, only California spends 5% on EMV. A copy of the Itron report is attached as Schedule RAV-2 to my testimony.

Q. What about Illinois, which Mr. Mosenthal suggests has a good Statewide DSM Collaborative?

A. By Illinois statute, EMV budgets are capped at 3%.

Q. Why is it that Mr. Mosenthal thinks that an increase in EMV budgets will benefit Ameren Missouri customers?

A. Mr. Mosenthal hypothesizes on what inadequate funding of EMV might mean to Ameren Missouri customers on page 54, lines 13-20 of his rebuttal testimony. He suggests that customer angst over uncertainty regarding the amount of net benefits is one reason to increase funding. He also states that 5% is necessary to identify individual program improvement opportunities – including improved program delivery and

administration which can lead to "the continued expenditure of ratepayer money on ineffective programs."

Q. Do you agree with Mr. Mosenthal?

A. No. Ameren Missouri's EMV budgets allow for robust impact and process evaluations of each of Ameren Missouri's programs just as similar or lower EMV budgets do for the best practice utilities identified in the Itron report referenced earlier in my testimony.

Q. Mr. Mosenthal also recommended that a statewide collaborative should be used to hire an independent EMV auditor. Do you agree with this recommendation?

A. No, I believe the process set forth in the Commission's rules at 4 CSR 240-20.093(7), requires the Commission to hire an independent auditor to audit and report on the work of each utility's independent EMV contractor.

III. Net-To-Gross

Q. In layman's terms, what is NTG?

A. NTG is a construct that perhaps is only used in the evaluation of DSM programs. This construct attempts to determine the issue of attribution – who or what organization should receive all or partial credit for changing customer energy consuming behavior.

Q. Why is NTG important in the Company's MEEIA Report?

A. NTG, but more importantly the prospective deeming of NTG, is important because the calculation of NTG, if based solely on a subjective assessment of free

ridership, results in a biased analysis which could undervalue the benefits of utility DSM programs.

Q. You mentioned the terms before, but please expand on the meaning of the terms "free ridership" and "spillover."

A. Ameren Missouri's DSM programs are designed as market transformation programs. Market transformation programs promote the manufacture, purchase, and use of energy-efficient technologies through customer, manufacturer, and installer education, incentives, rebates, and tax credits. The goals of these programs are to overcome market barriers to the adoption of energy efficient technologies. Market transformation programs attempt to change customer, retailer, and service provider behaviors to become more energy efficient. For example, a CFL market transformation program attempts to encourage the entire lighting delivery channel from manufacturer to retailer to customer to both stock and buy more energy efficient products – not just CFLs. There is a segment of customers who would purchase CFLs without the added benefit of a utility program to offer financial incentives to reduce the price of a CFL. This segment of customers is called "free riders." It is equally true that the utility program is designed to inform and educate customers on the benefits of energy efficiency to encourage customers to buy more CFLs than the customers would have without the program. The program is also designed to encourage customers to purchase other energy efficient products and services. These two examples are called participant spillover. Non-participant spillover is when customers' friends and neighbors decide to take energy efficient actions as the result of interactions with customers who participate in utility DSM programs. Non-participant spillover is also when retailers or service providers who do not participate in

the utility's DSM program decide to take more energy efficient actions just to meet what their competitors who participate in utility programs are doing. Finally, market effects capture the change in the way supply chains in energy efficiency markets operate as well as the change in the availability of products or practices due to the influence of utility sponsored DSM programs. Examples of market effects are:

- Increased SEER[4] level of stocked heat pumps and air conditioners
- Stocking only premium efficiency motors
- CFLs and LED bulbs increasing shelf space
- Home design and building practices become more energy efficient

Q. So if an NTG analysis focused solely on free ridership, it would present a "biased" analysis, is that correct?

A. That is correct. This analytic asymmetry undervalues energy efficiency by incorporating only subtractions (such as free riders) from gross savings and ignoring potential additions (such as spillover). As noted earlier, spillover occurs when there are reductions in energy consumption or demand caused by the presence of the energy efficiency program but which the program does not directly influence.

Q. How exact is the science of quantifying free ridership, spillover and market effects?

A. Classifying the quantification of free ridership, spillover and market effects as a "science" is a stretch. It is more appropriate to consider it an "art."

Q. Why?

A. There is considerable and growing controversy regarding the use of NTG, particularly in regulatory proceedings. The concern is that the EMV process carefully

[4] Seasonal Energy Efficiency Ratio ("SEER") is the cooling output in Btu (British thermal unit) during a typical cooling-season divided by the total electric energy input in watt-hours during the same period. The higher the unit's SEER rating, the more energy efficient the air conditioner.

estimates gross energy savings that energy efficiency measures deliver. But then the savings and the associated net benefits that are tied directly to a utility's financial performance incentives are discounted by a free ridership factor measured by methods that are less trusted and to which precision and accuracy cannot be assigned.

Q. Describe what you mean by "methods that are less trusted."

A. Gross savings are measured by EMV contractors based on statistical analysis of meter readings or billing records or sophisticated building simulation modeling. Free ridership and spillover are typically based on self-report surveys of hypothetical decisions and behavior that customers say they would have taken in a variety of scenarios. It is rare, almost unheard of, for an NTG study report to contain any confidence ranges or even discussions of uncertainty.

Q. What is a self-reporting survey?

A. Self-reporting surveys for residential customers are typically conducted via telephone. They are generally conducted long after a customer made the purchase of an energy efficient product or service. The survey attempts to ask questions that require the customer to recall the purchase experience – i.e., whether the customer went into a store specifically to buy an energy efficient product or service, what they eventually purchased, what the alternatives considered were, the impact of price on the purchase decision, how influential the program's incentive offering was in their purchasing decision, and any other post-shopping energy efficient actions the customer may have taken.

Q. What are some of the more well known issues with self reporting surveys?

A. One of the problems inherent in asking program participants if they would have installed the same equipment or adopted the same energy savings practices without the program is that customers are being asked to recall actions they took in the past. Recall error is a noted problem. As one can imagine, customer recall of why they bought a package of CFLs on a trip to Lowe's a year ago is not necessarily all that reliable.

Worse than recall error is the fact that self-reporting surveys ask customers to report on hypothetical situations – what customers would have done in absence of the program. In many cases, customers may simply not know or cannot predict what would have happened in the absence of a program.

The situation described above is a circumstance ripe for biased answers with low reliability. In this case, reliability would be defined as the likelihood that a customer would give the same answer to the same question whenever or wherever it is asked.

The next commonly recognized motivation for biased answers is that some people have a propensity to portray themselves in a positive light. In other words, they might like to think that they would have installed energy efficient equipment without any utility incentive. Of course, this type of motivation could result in an artificially low net-to-gross ratio.

Q. What are the self-reporting survey issues associated with attempting to estimate spillover?

A. The same concerns that apply to self-reporting surveys described in the previous question apply to spillover installations as well. In addition, there are extra

hurdles that evaluators must face if a persuasive case is to be made for program influence on spillover installations. For one thing, it is difficult to identify where spillover has occurred – especially for program non-participants. Once identified, it is even more difficult to identify the efficient equipment and/or practices that were installed directly as a result of spillover.

Q. Do you have an idea of the cost to attempt to adequately quantify estimates of free ridership, spillover and market effects?

A. No. The reason is that there is such a limited body of work on the subject of quantifying spillover. There is an equally limited body of work on the subject of making adjustments to free ridership to account for the well known self-reporting bias issues discussed in my testimony. One thing is for sure, cost is directly proportional to the amount of rigor to attempt to quantify difficult to quantify parameters.

Q. For the DSM industry as a whole, has much study been devoted to analyzing the issues of attempting to quantify free ridership, spillover and market effects?

A. Yes. I will both list and include in Schedule RAV-3 to my testimony those papers that I consider to offer the most insight. They include:

- *The Trouble With Freeriders*
- *A National Review of Best Practices and Issues in Attribution and Net-to-Gross: Results of the SERA/CIEE White Paper*
- *A National Survey of State Policies and Practices For The Evaluation of Ratepayer-Funded Energy Efficiency Programs*
- *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*
- *Survey of Current Energy Efficiency Program Evaluation Practices and Emerging Issues*
- *Salt River Project Net-To-Gross: Updating Research*
- *Assessment of Energy and Capacity Savings Potential in Iowa*

- *An Approach For Evaluating The Market Effects of Energy Efficiency Programs*

Q. Is there a common theme among the national research on the quantification of NTG?

A. That is a very broad question. Each paper/study stands on its own merits and has its own unique aspects. If there is a common theme it is that there is no universal agreement on how to address NTG, that it is a difficult and subjective process, and that it is time to move on and consider more pragmatic approaches to address the issue.

Q. Is it in the customers' best interests for Ameren Missouri to spend whatever amount of customer money it may take to attempt to estimate as accurately as possible free ridership, spillover, and market effects?

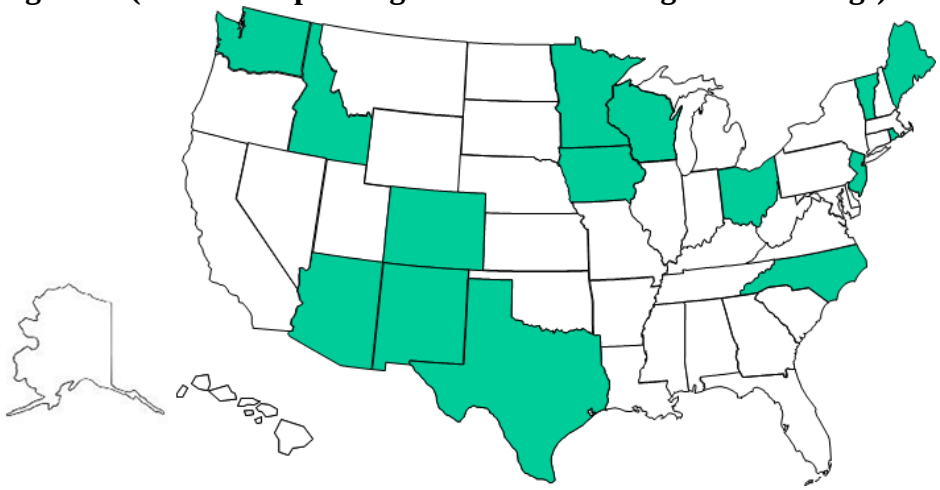
A. No. As explained previously, any attempt to estimate free ridership, spillover, and market effects is at best complicated and unclear. Ameren Missouri believes it is in customers' best interests, at least for the first cycle of the Company's MEEIA programs, to set net equal to gross. There should be a high probability that Ameren Missouri's proposed energy efficiency programs in its first 3-year MEEIA implementation plan will have high net-to-gross ratios, perhaps even greater than 1.0, if these programs are well designed, because:

- Of experience in other states;
- Attempts to quantify the attribution of energy savings and demand reductions is both a complex and non-exact process;
- Missouri does not have a history of significant ratepayer-funded energy efficiency programs; and
- Electricity prices in Missouri are among the lowest in the nation.

Q. Is Ameren Missouri alone in its thinking of setting net equals gross on a prospective basis?

A. No. As is shown in Figure 3.6 on page 59 of the Company's MEEIA Report, there are approximately 15 states that have reached the same conclusion. Other states follow various approaches including deeming NTG and defining net-to-gross to only include free ridership.

Figure 2: (MEEIA Report Figure 3.6 States Using Gross Savings)



A) Testimony of Staff Witnesses Hojong Kang and John Rogers Regarding NTG

Q. What does Dr. Kang recommend regarding NTG?

A. Dr. Kang's testimony is that he believes it is not proper to assume that net savings are equal to gross savings. He states that "the gross tracked savings from all the measures installed in the program must be adjusted for more of the NTG factors described above, factors such as the rebound factor." p. 18, l. 18-20.

Q. Is Staff witness John Rogers' testimony on NTG identical to Dr. Kang's?

A. Yes.

Q. What are the "other" NTG factors that Dr. Kang recommends?

A. Dr. Kang lists those factors on page 16 in his rebuttal testimony and cites the 2008 National Action Plan for Energy Efficiency ("NAPEE") as the source of his information. The factors Dr. Kang cites are:

- Free riders
- Installation rate
- Persistence/failure
- Rebound effect
- Take-back effect
- Spillover

Q. Are you familiar with each of the six factors?

A. Yes. While those factors have a place in the evaluation of programs, not all of those factors have a place in the estimation of the NTG ratio.

Q. Please explain.

A. NTG is a quantification of the attribution of energy efficiency savings due to the effects of electric utility DSM programs. Therefore, components of NTG are free ridership, spillover and market effects. The other effects noted by Dr. Kang are estimated by independent EMV contractors in assessing the *magnitude* of energy savings for individual energy efficiency measures in utility DSM programs; they have nothing to do with *attribution*. For example, "installation rate" is synonymous with "in service rate" and is most commonly found in instances where residential customers buy a multi-pack of energy efficient light bulbs but actually only install a portion of the light bulbs from the multi-pack in the year in which the light bulbs are purchased. EMV contractors account for this in the energy savings ascribed to the sum of measures installed in a program, not in the NTG ratio. Persistence/failure addresses the expected useful lives of

measures and is not actually measured by EMV contractors at all, but rather is deemed or stipulated based on their national experiences.

i. Rebound Effect

Q. What about the rebound effect?

A. Rebound effect is an old term that was dismissed from mainstream DSM discussions in the 1990s. However, a series of relatively recent news articles have resurrected the old hypothesis that energy efficiency policy paradoxically increases the amount of energy consumed – i.e., the rebound effect. The fact remains that the rebound effect, even if it did exist to a small degree, is virtually impossible to quantify. NRDC recently wrote a comprehensive white paper on the rebound effect that concluded that the rebound effect not only is trivial, but might well be a net positive. The NRDC paper titled *"Are There Rebound Effects From Energy Efficiency? – An Analysis of Empirical Data, Internal Consistency, and Solutions"* is attached as Schedule RAV-4 to my testimony.

Q. Do you know why Dr. Kang stated in his testimony that the Company should adjust NTG to account for other factors such as the rebound factor?

A. No. Based on Dr. Kang's response to Data Request Number 003, Dr. Kang's sole source of information on each of the six factors is from the one page discussion in the NAPEE document. Dr. Kang did no independent research. He did indicate, however, that he reviewed the Ameren Missouri EMV report on the Residential Lighting and Appliance program and saw reference to installation rates. It should be noted that in the same report the quantification of installation rates had nothing to do with the estimate of the NTG ratio.

Q. Dr. Kang cites in his footnote 11 on page 17 of his rebuttal testimony that the NAPEE guide that he referenced for his information was authored by Steven R. Schiller, Schiller Consulting, Inc. Do you know of Mr. Schiller and his work?

A. Yes. Mr. Schiller and I worked together on the Leadership Group of NAPEE. Ameren Missouri also hired Mr. Schiller in 2008 to assist in the development of the RFP to hire independent third party EMV contractors to evaluate its first 3-year cycle of DSM programs. Mr. Schiller helped develop the RFP, evaluate the bids, advised on the development of the Statement of Work ("SOW") for the EMV contractor engagements and served as a subject matter expert for Ameren Missouri.

Q. Did Mr. Schiller address NTG in his EMV consulting work for Ameren Missouri?

A. Yes. Mr. Schiller advised the Company on how to calculate NTG ratios, involving identification of free-riders, free-drivers and spillover. Notably, he did not include a rebound factor in the calculation of NTG.

Q. It appears that Dr. Kang has a limited understanding of the methodologies used to estimate NTG. Do you agree?

A. Yes. Beyond the issues discussed above, Dr. Kang goes so far as to state that transmission and distribution losses enter into the NTG calculation. Kang rebuttal, p. 17, l. 4. I think it should be obvious to the Commission that line losses have no role in the estimation of the *attribution* of utility program efforts to encourage customers to become more energy efficient, which is the *only* thing that NTG measures. Again, line

losses are relevant in estimating the *magnitude* of energy savings at either the customer meter or at the generator.

ii. Staff's Focus on Free Ridership without Commensurate Focus on Spillover

Q. Is there anything that you find particularly troublesome with Dr. Kang's testimony on NTG aside from the misunderstandings of the components of the NTG estimation?

A. It appears that Dr. Kang has focused his analysis of NTG on free ridership within existing Ameren Missouri DSM programs and has ignored the substantial evidence provided by Ameren Missouri on the identification of spillover. This is precisely the issue – the asymmetric or biased view of NTG that the Company is addressing in its MEEIA Report.

Q. Please give an example of Dr. Kang's one-sided view of Ameren Missouri program NTG.

A. Dr. Kang provided a Table 3 in his rebuttal testimony, which is an extract of Table 3.9 on page 57 of the Ameren Missouri MEEIA Report. But Dr. Kang omitted key columns from the Table 3.9 that showed spillover was identified in each of Ameren Missouri's DSM programs. The fact that Dr. Kang chose not to present the data showing spillover does not mean it does not exist.

iii. Staff Witness John Rogers

Q. What does Mr. Rogers state in his testimony regarding NTG?

A. It is difficult for me to discern exactly what Mr. Rogers' recommendation is. Mr. Rogers on page 5, beginning on line 12 of his rebuttal testimony states "Following Ameren Missouri filing a specific demand-side program plan for its DSM

programs that include estimates of annual energy and demand savings through the use of NTG ratios from EMV reports, the Commission approve Ameren Missouri's proposed demand-side programs…." Mr. Rogers is aware from multiple meetings with Ameren Missouri that, with the exception of the residential lighting program, NTG ratios for Ameren Missouri programs are based solely on estimates of free ridership and do not include estimates for spillover. Despite the clear evidence of the existence of spillover for each of the Ameren Missouri programs, EMV contractors did not quantify it. It appears that Mr. Rogers has jumped to the conclusion that if spillover was identified but not quantified by EMV contractors then spillover is zero. Ameren Missouri prepared Table 3.9 on page 57 of its filing to identify for the Commission the results of the NTG determination by EMV contractors for each of Ameren Missouri's programs. Clearly, Mr. Rogers' recommendation is based on reporting subjective assessment of free ridership and ignoring spillover.

Q. Does it appear that Mr. Rogers has a clear understanding of net and gross savings estimates developed by Ameren Missouri?

A. It is obvious to me that there is some type of misunderstanding. This particular question and answer from Mr. Rogers on page 26, lines 10-12 of his rebuttal testimony highlights my basis for this concern:

> *Q. Are the annual energy and demand savings for RAP and MAP in the Ameren Missouri DSM Market Potential Study gross savings or net savings?*
>
> *A. Gross savings.*

Mr. Rogers' assertion that the DSM potential study reported gross savings is simply wrong. The Ameren Missouri DSM Potential study reported <u>*net savings*</u>, not

gross savings. I personally worked with Mr. Rogers extensively in comparing and contrasting the Ameren Missouri DSM Potential study to the KEMA Missouri statewide DSM Potential study. One of the many issues with the KEMA study was that the first draft of the study was presented in terms of gross savings potential. The KEMA study was eventually revised to reflect net savings so as to be consistent with the Ameren Missouri study.

Q. You have discussed Staff's propensity to focus on the free ridership aspect of NTG and ignore the equally important spillover aspect. Is there other evidence of Staff's propensity to focus solely on free ridership, especially relatively high estimates of free ridership, in estimating NTG for Ameren Missouri?

A. Yes. Mr. Rogers' testimony in File No. ER-2011-0028 dated April 15, 2011 is a prime example. A copy of Mr. Rogers' testimony is attached as Schedule RAV-5. In that case, Mr. Rogers disputed the NTG estimates of the Ameren Missouri residential EMV contractor, the Cadmus Group, in their determination that the residential lighting program NTG is 0.96. Rather, Mr. Rogers proposed to use only a portion, the free ridership portion, of a subset of the Cadmus work and recommended that the NTG for the program be 0.32 or 33% of what Cadmus determined the actual NTG to be.

Q. What would be the implications to Ameren Missouri of such a drastic reduction as that recommended by Mr. Rogers in the NTG for the residential lighting program?

A. The residential lighting program accounts for the majority of energy savings in the Ameren Missouri residential DSM portfolio. I asked Ameren Missouri witness William Davis to help me assess the financial implications in the Company's

MEEIA Report of eliminating approximately 66% of the reported net savings from the residential lighting program if Mr. Rogers' recommended NTG of 0.32 had been approved. The estimate has the following elements:

Table 4: MEEIA Financial Metrics Assuming RES Lighting NTG = 0.32

Metric	**RES Lighting As Proposed**	**RES Lighting NTG = 0.32**
Portfolio MWh	793,100	602,380
Performance Target	100%	76%
Financial Incentive	$10 million	$4.4 million
Throughput Disincentive	$105 million	$76 million
Net Benefits	$364 million	$301 million
RES Portfolio Performance	**505,469 MWh**	**314,752 MWh**

Q. What conclusions do you draw from Mr. Rogers' recommendations to change the NTG for the Ameren Missouri residential lighting program from 0.96 to 0.32 in File No. ER-2011-0028?

A. Mr. Rogers' testimony highlights succinctly the high level of evaluation risk that Ameren Missouri would face in the case of retrospective application of NTG. It is precisely for this reason that the Company management requires that NTG be deemed on a prospective basis in order to aggressively pursue cost effective demand-side savings.

Q. Was the NTG for the residential lighting program ever resolved in case ER-2011-0028 or anytime afterwards?

A. No. Mr. Rogers dropped his objection to including the program costs in rates only after learning the program was cost effective with an NTG of 0.32 and never relinquished his belief that the NTG is 0.32. The Staff's position is uncertain given their willingness to set the MEEIA goals based on the 0.96 NTG. However, using the 0.96

NTG to set the goals in no way endorses the estimate since they are proposing retrospective EMV which gives them and any other party the opportunity to litigate the EMV findings.

Q. Was there a better way to estimate NTG for that program?

A. No, not to my knowledge. Ameren Missouri was a participant in a multi-state study that represented best practice EMV work. This example clearly highlights the nature of how the estimation of NTG can be refuted and ultimately create a stalemate situation because the true effects are never known with certainty.

iv. Spillover

Q. Returning to the issue of spillover – specifically Staff's preference to ignore it - how did the magnitude of the impact of spillover compare to free ridership for the business Standard and Custom Programs?

A. These are two Ameren Missouri DSM programs for which the EMV contractors attempted to quantify spillover. For the business Standard Program free ridership was quantified as 0.11 and spillover was quantified as 0.054. For the business Custom Program free ridership was quantified as 0.14 and spillover was quantified as 0.11. However, the contractor's review was limited to participant spillover and did not attempt to measure non-participant spillover. Interestingly, the Commission should note that even with the limited review of spillover by the EMV contractor, free ridership and spillover almost offset each other, even though non-participant spillover was not evaluated.

v. Conclusions Regarding NTG

Q. What are your conclusions regarding your analyses of NTG and the Staff's positions?

A. The conclusions are best stated by first repeating Table 3.9 in the Company's MEEIA Report.

Table 5: (MEEIA Report Table 3.9 Free Ridership and Spillover Existence In Ameren Missouri Programs)

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

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

Table 3.9 has information that is extremely valuable to the Commission in understanding NTG. Several things to note:

- The existence of spillover has been identified for every program that Ameren Missouri implemented in the past;
- Spillover, however, has only attempted to be quantified explicitly for the business Custom and Standard Programs;
- Ameren Missouri's MEEIA Report proposed the prospective deeming of net=gross or NTG = 1.0 for all programs during the MEEIA 3-year implementation plan;
- The straight, un-weighted average of the NTG for all programs listed in Table 3.9 as measured by EMV contractors is 0.864;
- Applying the average spillover quantified for business Custom and Standard Programs to all programs would increase the straight average NTG as measured by EMV to all programs from 0.864 to 0.946;
- Recognize that the spillover that was quantified focused solely on participant spillover and not non-participant spillover;
- Based solely on past EMV NTG analyses recognizing that attempts were made to quantify only a portion of spillover, a case can be made that the average program NTG should be, at a minimum, 0.946; and
- The evidence from past EMV analysis of NTG on Ameren Missouri DSM programs is strong that spillover impacts from programs exist and, if not quantified, will undervalue the net benefits attributable to Ameren Missouri DSM programs.

B) Testimony of OPC witness Ryan Kind Regarding NTG and Avoided Transmission and Distribution Costs

Q. What is Mr. Kind's testimony regarding NTG?

A. Mr. Kind's testimony is that "the Commission should require the Company to use net savings (i.e., with free-riders subtracted out) for determining the program benefits and therefore the amounts of shareholder incentives that will be awarded to the Company." Kind Rebuttal, p. 21, l. 23-25.

Q. How do you respond?

A. My response is identical to the response to Dr. Kang's testimony regarding NTG. The sole focus on estimating the quantification of NTG on free ridership undervalues the amount of energy efficiency directly attributable to the Company's

portfolio of DSM programs. The addition of the spillover impact of programs can be significant. Absent the quantification of spillover, it is reasonable to assume that the combination of free ridership and spillover offset each other during the MEEIA implementation period. Should the Commission order that spillover be quantified, the EMV costs could be substantial and produce results for which statistical precision and accuracy cannot be ascribed, thus resulting in the incurrence of substantial costs with marginal benefits.

Q. Mr. Kind claims that by using gross savings the Company is ignoring free ridership and overstating its energy efficiency programs. Is this a valid criticism?

A. Absolutely not. Mr. Kind fails to understand that by using gross savings the Company is acknowledging *both* free ridership and spillover; and, based on industry research, has concluded that those two effects offset each other resulting in net savings being equal to gross savings.

Q. Mr. Kind raised a question about the validity of Ameren Missouri's avoided transmission and distribution ("T&D") estimates. Please respond.

A. Yes, Ameren Missouri used the same avoided T&D estimates that it used in its 2011 IRP. To provide proper context it is important to understand that the avoided T&D benefits represent just 7% of the total benefits. Even if Ameren Missouri were to completely eliminate the avoided T&D benefits, the cost-effectiveness conclusions would remain virtually unchanged.

Table 6: Cost effectiveness under various avoided T&D scenarios

MEEIA Implementation Plan 2013-2015	TRC ($31 T&D)	TRC ($0 T&D)
RES-Lighting	3.66	3.56
RES-Efficient Products	1.55	1.47
RES-HVAC	2.11	1.85
RES-Refrigerator Recycling	2.23	2.03
RES-HEP	1.64	1.55
RES-New Homes	1.26	1.17
RES-Low Income	0.84	0.77
RES-TOTAL	**2.24**	**2.07**
BUS-Standard	2.14	1.97
BUS-Custom	1.77	1.64
BUS-RCx	1.70	1.58
BUS-New Construction	1.36	1.27
BUS-TOTAL	**1.85**	**1.71**
PORTFOLIO TOTAL	**2.07**	**1.92**

C) Testimony of Environmental Interveners Philip Mosenthal Regarding NTG

Q. What is Mr. Mosenthal's testimony regarding NTG?

A. Mr. Mosenthal states "I propose that initially Ameren deem NTG ratios from the most recent prior evaluations for any programs already evaluated and not having undergone major changes that would likely dramatically modify the NTG ratios. For any new programs or those that have undergone substantial changes or where the market has dramatically changed, the best estimate based on currently available information should be used." Mosenthal Rebuttal, p. 17, l. 13-16.

Q. How do you respond?

A. I appreciate and agree with Mr. Mosenthal's perspective to deem NTG values on a prospective basis. For the reasons I previously discussed, I disagree with Mr. Mosenthal's proposal to deem NTG from the most recent prior evaluations since all prior evaluations, with the exception of the residential lighting program, state NTG based

solely on free ridership even though EMV contractors found substantial evidence of spillover impacts.

Q. Mr. Mosenthal proposes that deemed NTG be deemed for use until the end of the program year when new evaluations are available. He recommends that these new values would then be used prospectively beginning in the following program year. Do you agree?

A. No. Due to the fact that Ameren Missouri is proposing a three-year tracker mechanism to recover costs, it is essential that changes to both TRM and NTG values be made in the next three-year MEEIA implementation plan and not during the current implementation plan. Otherwise the evaluation risks that impede the Company's ability to aggressively pursue energy efficiency will exist.

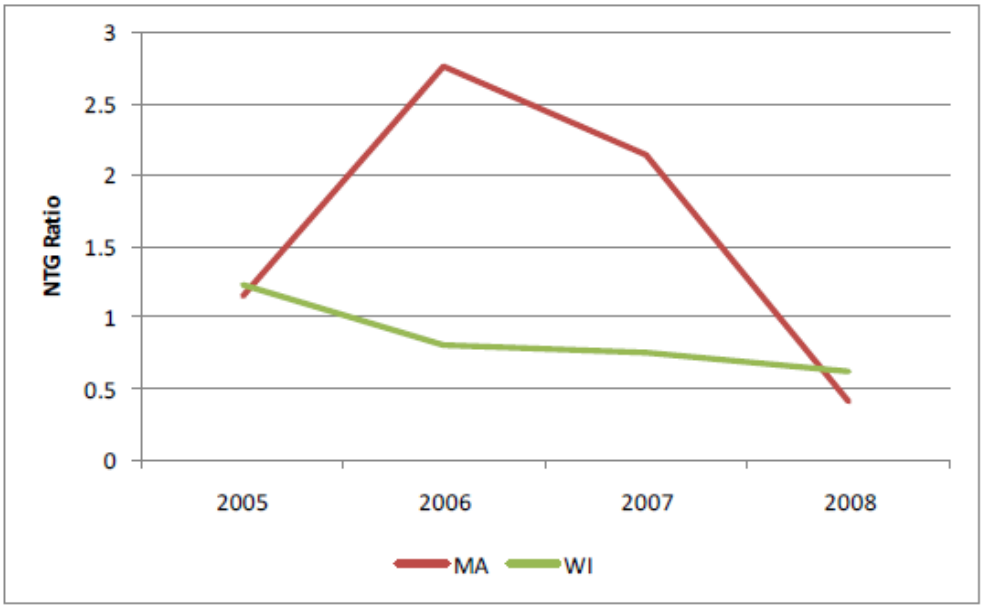
Q. Mr. Mosenthal states that deeming a single 1.0 NTG for all programs and measures creates perverse incentives and therefore opposes it. Do you agree?

A. No. Mr. Mosenthal's arguments and examples in support of his position are inaccurate and misleading. Mr. Mosenthal acknowledges the fact that spillover is a real impact. Yet his testimony is that if NTG is less than one (no spillover), then the Company might over-collect. As I have discussed and will further discuss using Mr. Mosenthal's own example, the more likely scenario is the spillover does exist and that NTG would be more than one. Mr. Mosenthal's testimony is that it is acceptable for Ameren Missouri to under-collect the throughput disincentive as long as customers receive the benefits. p. 16, l. 8-14. I should note the Company is opposed to this blatantly flawed and biased logic – especially when the evidence is so strong as to the existence of spillover impacts in the Company's DSM programs.

Q. Turning to other sections of Mr. Mosenthal's rebuttal testimony, please respond to Mr. Mosenthal's assertion on page 13, line 8 that Ameren Missouri's residential CFL program is similar to that in Massachusetts and that Massachusetts utilities apply a NTG ratio of only 0.43.

A. Obviously, Mr. Mosenthal's implication is that Ameren Missouri's proposal to set NTG equal to 1.0 overstates the energy savings of its CFL program. Massachusetts and Missouri are about as apples-to-oranges as two states can be. The length of time that Ameren Missouri has been implementing CFL programs is just a fraction of the time Massachusetts has been offering CFL programs, as Massachusetts began its CFL programs in 1998. Consequently, the amount of CFLs moved by Ameren Missouri is a fraction of that in Massachusetts. It is possible and in fact very likely that Missouri and Massachusetts will have very different NTG results. Finally, I would note that NTG for the Massachusetts CFL program has changed over time as stated in the Massachusetts 2010 Energy Star annual report is shown as Figure 3 below. The Massachusetts report is attached as Schedule RAV-5.

Figure 3: Massachusetts and Wisconsin CFL NTG ratios



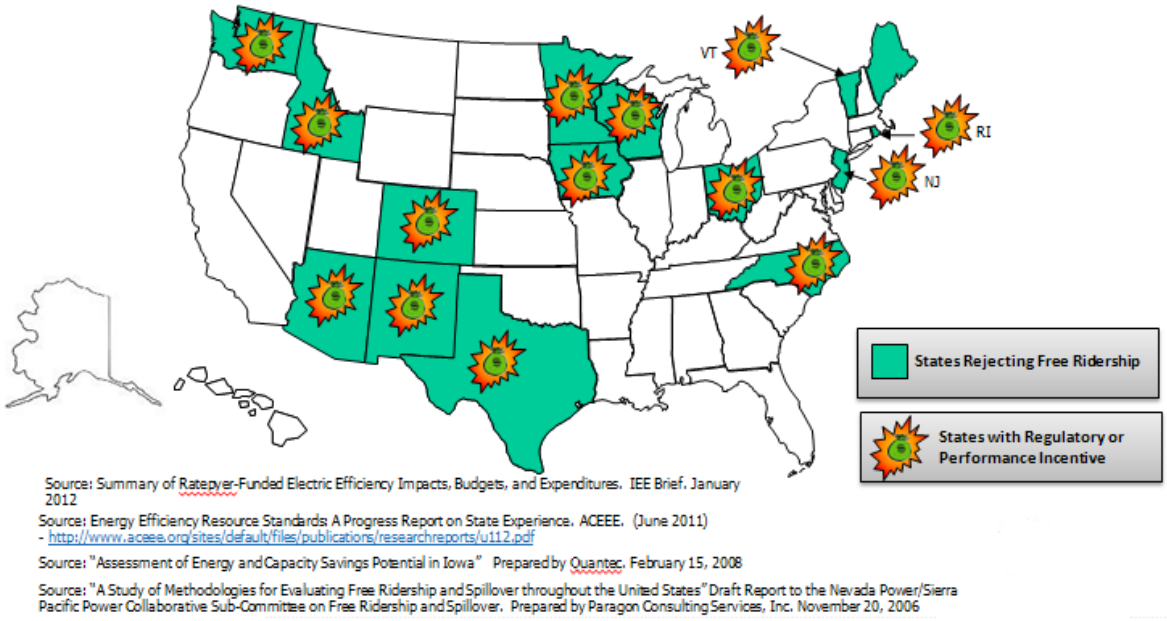
What Mr. Mosenthal does not reveal in his testimony is that the Massachusetts CFL program had NTG ratios that not only exceeded 1.0 but that exceeded 2.5 in the earlier program years. Therefore, Mr. Mosenthal's opinion that NTG less than 1.0 is "typical" of the DSM industry is clearly wrong by large multiples. This clearly demonstrates that the Ameren Missouri residential CFL NTG is not 0.43 and should not be similar to that in Massachusetts.

Q. Mr. Mosenthal states on page 20, line 7 of his rebuttal testimony that "second, and specific to Ameren, some of the states relying on gross savings do not provide substantial monetary awards to the utility based on performance." How do you respond to this assertion?

A. In response to NRDC data request number 0004 Mr. Mosenthal admitted that he has done no research to support this claim. Notably, Mr. Mosenthal couched his statement using the phrase "some states." A more accurate depiction would be that

almost all states that assume net equals gross savings have some form of financial performance incentives. The following map depicts states that have assumed net equals gross and also offer financial incentives (of such states, only 1 (out of 15) do not offer financial incentives):

Figure 4: States Assuming Net = Gross with Performance Incentives



Q. Mr. Mosenthal opines that NTG should be low because the Ameren Missouri 2010 potential study suggested that Ameren Missouri customers are different from those in other jurisdictions and less interested in investing in energy efficiency. Combined with his opinion that Ameren Missouri offers relatively low rebate levels, he somehow comes to the conclusion that free ridership may be significantly higher in Ameren's programs than those in other jurisdictions. How do you respond?

A. Mr. Mosenthal is also mistaken here. There is no need to speculate on the free ridership in the implementation of the prior cycle of Ameren Missouri programs.

Acknowledging the shortcomings described previously in my testimony with estimating free ridership primarily through the administering of customer self-reporting surveys, free ridership levels have been determined by third party, independent EMV contractors. That information was clearly synthesized and presented in Table 3.9 on page 57 in the Company's MEEIA Report, which I have also reproduced above. Looking back at Table 3.9, it is clear that for Ameren Missouri, a majority of free ridership estimates are low, not high as Mr. Mosenthal incorrectly opines.

Q. Mr. Mosenthal opines on page 20, lines 19-22 of his rebuttal testimony that there are also program design reasons why Ameren Missouri free ridership should be high. He states "For example, it appears Ameren's commercial and industrial Custom Program will be primarily reactive-essentially waiting for customers to identify their own projects and submit rebate forms-rather than best practice programs that are more proactive…." Please respond.

A. The first issue is NTG for the Custom Program. Table 3.9 in the MEEIA Report clearly shows that the Custom Program NTG, only considering free ridership, is 0.86. Including the spillover that was quantified as 0.11 the overall NTG for the Custom Program would be 0.97. Once again, Mr. Mosenthal has expressed a baseless opinion which is soundly refuted by the actual evidence in the Company's filing.

The second issue is Mr. Mosenthal's statement that Ameren Missouri would implement a commercial and industrial Custom Program where it passively waited for customers to come to the Company. This is an unfounded allegation with which most Ameren Missouri stakeholders who have participated in Ameren Missouri DSM collaborative meetings should not agree. It is unfortunate that Mr. Mosenthal is so

unfamiliar with Ameren Missouri DSM programs. There is evidence from previous business Custom Program EMV reports and the program template in Appendix B to the Company's MEEIA Report that identify proactive approaches Ameren Missouri has taken, and will continue to improve upon, to enroll customers and engage trade allies to assist customers in their custom projects through cooperative analysis and document review.

Q. What might be the consequences of the type of mindset that Mr. Mosenthal has expressed in his testimony on NTG for Missouri?

A. The consequence would be a significant understatement of net savings. The evidence in this case shows that using a NTG = 1.0 for the programs proposed in the 2013-2015 period is reasonable and appropriate.

D) Testimony of DNR's Adam Bickford Regarding NTG

Q. What is Mr. Bickford's testimony regarding the NTG proposal in the Ameren Missouri filing?

A. Mr. Bickford is supportive of the assumption that net is equal to gross. Mr. Bickford recognizes the asymmetry of focusing solely on the free ridership aspect of the NTG determination. Mr. Bickford understands the challenges to ascribing accuracy and precision to estimates of spillover – as real as the impact of spillover is.

IV. Demand Response ("DR")

A) Integrated Resource Plan. MEEIA Report

Q. Mr. Gross recommends Ameren Missouri rerun its Integrated Resource Plan ("IRP") analysis to re-evaluate DR programs. Do you agree with this recommendation?

A. No. Mr. Gross appears to be misinformed and has not presented evidence in support of his recommendation. I will address each of Mr. Gross' unsubstantiated allegations regarding how the Company analyzed the cost effectiveness of DR resources for its MEEIA implementation plan.

Q. What are the key differences in the planning assumptions in the IRP rules that Mr. Gross references versus the MEEIA rules?

A. The IRP rules require an analysis over 20 years. The Company's MEEIA Report, on the other hand, is a development of a three-year plan. The acknowledgment of the duration differences between the two rules is critical in the discussion of the cost effectiveness of DR resources.

Q. Please explain why the timing is so important.

A. The main reason is the unique nature of DR as a capacity resource. DR is typically not the same as an energy efficiency measure that a customer can buy, like a more efficient central air conditioning system. DR, on the other hand, is designed to change on-site demand in intervals from minutes to hours by transmitting changes in prices, load control signals or incentives to end-users reflecting production and delivery costs. DR is more about actions taken by customers to reduce demand rather than technology that happens to have DR benefits.

Q. So comparing the analysis for the IRP and the MEEIA Report is not appropriate?

A. Correct. As I mentioned above, the IRP analysis looks at a time horizon of at least 20 years while the MEEIA Report is only focused on the three year implementation cycle of 2013 – 2015.

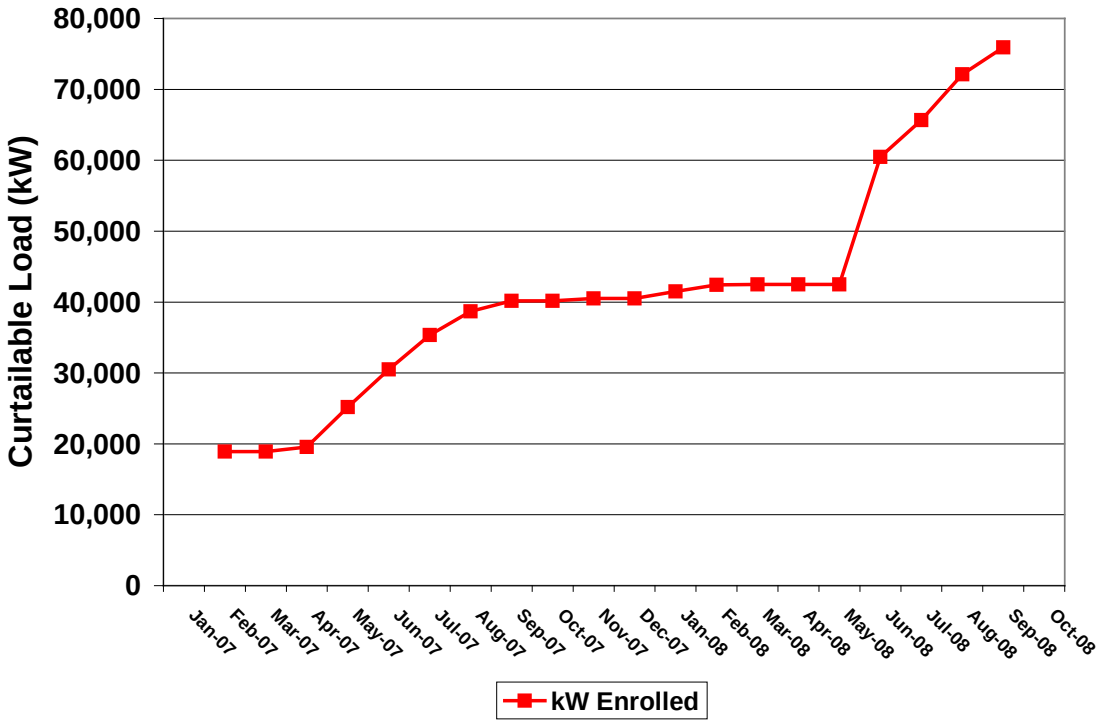
Q. What does the fact that DR is based more on customer actions rather than technology imply?

A. It means that DR is normally provided by third party contractors who specialize in working with customers to install processes and procedures to create the opportunity to provide DR at the customer home or business. It means that DR is a "modular" resource indicating that DR can be installed in discrete "chunks" at any point in time. Conversely, it means that DR can be removed in discrete "chunks" at any point in time.

Q. But Mr. Gross' rebuttal testimony on page 10, line 20 is that DR programs take time to establish?

A. Mr. Gross is mostly wrong – depending on the type of DR resource installed. Mr. Gross also references the Kansas City Power & Light ("KCPL") DR programs in his testimony. The following figure from a 2008 presentation from KCPL depicts how quickly KCPL developed the MPower resource referenced by Mr. Gross.

Figure 5: MPower Participation Growth



A copy of the presentation is attached as Schedule RAV-6 to my testimony.

B) Reliability

Q. Mr. Gross speaks to his concerns that the Company is not receiving the reliability benefits associated with DR. How do you respond?

A. My first response is that Mr. Gross has not shown that Ameren Missouri has the need for increased reliability from DR during the MEEIA implementation period. Mr. Gross confirmed in his response to MPSC Data Request Number 012 that he did not review Ameren Missouri reliability metrics during the MEEIA implementation period. It appears that Mr. Gross chose to ignore key evidence on reliability provided by the Company on page 100, Table 3.24 of the MEEIA Report. The table shows that the Company has more than sufficient capacity to meet its planning reserve margin

requirements during the MEEIA implementation period. Mr. Gross's reliability issue seems to be a solution in search of a problem, when the problem does not exist.

Q. Do you have additional insight on the subject of DR on reliability?

A. Yes. In 2006-2007 I served as Chairman of the North American Electric Reliability Corporation's ("NERC") Influence of DSM on Reliability Task Force. A copy of the task force's final report is attached as Schedule RAV-7 to my testimony.

Q. What was your key take away from your national work on the impact of DR on reliability?

A. All DR resources may benefit overall system reliability, though some DR options benefit system reliability more than others. The most dependable DR is incentive-based DR provided by load resources under contractual obligation to perform, subject to dispatch by grid operators, and meet measurement & verification standards consistent with their importance to grid reliability. Some DR options can have more reliability benefits than conventional supply-side peaking resources such as a combustion turbine generators ("CTG"). The reliability benefits of DR are a function of, among other things, any limits on annual interruptions, the frequency of interruptions, the duration of interruptions, the ramp-up time to reduce load, and penalties or sanctions for non-performance.

Q. Are you currently involved in any national DR work?

A. Yes. In March of 2012, I was elected Chairman of the Association for Demand Response and Smart Grid ("ADS"). ADS is the nation's largest national organization for DR and Smart Grid professionals. ADS is the leading organization

working with the Federal Energy Regulatory Commission and the Department of Energy on the development of the National Action Plan for Demand Response.

Q. How does your work with ADS enable Ameren Missouri to develop robust DR programs?

A. The networking opportunities garnered through my association with ADS are tremendous. I can call my counterparts across the nation with Independent System Operators such as PJM, NYISO, and ISONE who have extensive DR resources to discuss issues such as reliability, cost-effectiveness, best practices and incorporate the knowledge from those type of discussions into DR program design for Ameren Missouri. When DR becomes an effective option for Ameren Missouri to implement, I am confident we will have the knowledge and ability to do so in a timely manner.

C) Cost Effectiveness

Q. Mr. Gross states on page 3, line 17 of his rebuttal testimony that "The Company considers DR programs cost effective only in circumstances where it has identified a capacity shortfall." Please comment.

A. Mr. Gross has misspoken. The Company did not say that it ***only*** considers DR for capacity shortfalls in either the MEEIA Report or in Data Request No. 0003 –both cited as sources for Mr. Gross' information. A copy of Data Request No. 0003 is attached as Schedule RAV-8 to my testimony. That being said, Ameren Missouri is in the business of supplying electricity to its customers in a safe and reliable manner. To extend that concept to the procurement of non-cost-effective demand response resources prior to the time that they are needed to help address the provision of electricity in a safe and reliable manner makes no logical sense. Following Mr.Gross' logic the Company

should also be evaluating the construction of new merchant natural gas power plants for no other reason than they might lower the revenue requirement despite the fact that, as shown in Table 3.24 of the MEEIA Report, the Company has excess capacity.

Q. Does Mr. Gross acknowledge that the DR programs analyzed for the MEEIA Report are not cost-effective?

A. Mr. Gross appears to acknowledge that the programs are not cost effective for the three-year MEEIA implementation cycle. However, since DR programs were screened as cost effective in the Company 20-year analysis in the 2011 IRP filing, Mr. Gross jumps to the incorrect conclusion that non cost-effective DR programs should be implemented *during the three-year MEEIA implementation plan*.

Q. Please continue to explain.

A. Cost-effectiveness of DR programs is a function of the market prices for capacity. Capacity prices throughout most of the nation, but most especially in the Midwest, are severely depressed today and are projected to remain depressed throughout the MEEIA implementation period. Figure 3.9 on page 76 of the Company's MEEIA Report and replicated below shows the Company's forward view of avoided capacity costs:

****Figure 6: (MEEIA Report Figure 3.9 Avoided Capacity Costs**

[redacted]**

It is apparent that the market price for capacity is in the ** ** range during the MEEIA implementation period.

Q. What is the cost of acquiring direct load control DR resources during the same period?

A. Ameren Missouri sent out a Request for Information ("RFI") to acquire this information. Although I will not cite specific bids, the cost to acquire commercial and industrial direct load control DR is in the ** **kw-year range – something close to an order of magnitude, or factor of ** ** times, greater than market.

Q. What would be the incremental net benefits to Ameren Missouri customers during the MEEIA implementation plan period?

A. **

[redacted]

[redacted]

[redacted]**

Q. Is it true, however, that the MEEIA rules allow demand savings from energy efficiency to be counted towards the demand guidelines?

A. Yes. Table 1.2 in the Company's MEEIA Report shows the projected demand savings from energy efficiency. Table 1.2 is replicated below:

Table 7: (MEEIA Report Table 1.2 Incremental Savings and Costs)

	2013	2014	2015
Energy Delivery (MWH)	37,476,879	37,844,450	38,146,206
Energy Efficiency Savings (MWH)	240,397	255,445	297,260
System Peak (MW)	7,533	7,591	7,640
Peak Demand Reductions (MW)	39	54	77
Total Budget	$35,239,613	$45,965,915	$64,087,685
% MWH reduction (from energy delivery)	0.6%	0. 7%	0.8%
% MW reduction (from system peak)	0.5%	0.7%	1.0%

Note: The projected energy delivery, energy savings, system peak, and demand reductions are based on values at the meter.

Taking these energy efficiency demand benefits into account can have a dramatic impact on the previous DR analysis. Rather than having to acquire the full 80 MW of DR resources in my previous illustrative example, the Company would require 80 – 39 = 41 MW of DR in 2013, 80 – 54 = 26 MW in 2014, and 80-77 MW= 3 MW in 2015. Consequently, 2013 is year with the largest purchase of DR in the magnitude of 41 MW. 41 MW at a net cost of **[redacted]** would amount to a net cost, as opposed to net benefit, to customers of **[redacted]** in 2013. To summarize, even with the additional energy efficiency demand savings benefits offsetting DR resource acquisition costs, DR costs outweigh the benefits.

Q. How realistic is it to acquire such small increments of DR such as 41 MW in 2013 decreasing to 26 MW in 2014 and decreasing to 3 MW in 2015?

A. DR providers rarely pursue this small amount of peak demand reduction. But perhaps more importantly, it definitely is not in customers' best interests during the MEEIA implementation period for Ameren Missouri to acquire DR – doing so is likely to cost them money in the form of reduced net benefits.

Q. Mr. Gross discusses Aggregators of Retail Customers ("ARCs") in his testimony. Do the economics of DR work differently for ARCs than for IOUs?

A. No. The market price for capacity is the same for both entities. If the costs of doing business exceed the market price for which an ARC can sell its products and services, there is no business.

V. <u>Miscellaneous</u>

A) TRC Calculation For Ameren Missouri's Proposed Appliance Recycling Program

Q. Dr. Kang asserts in his Rebuttal Testimony that Ameren Missouri has miscalculated the TRC for its Appliance Recycling program; do you agree?

A. No, Dr. Kang is incorrect. Dr. Kang's entire premise that the "incentives" should be excluded from the TRC is that they "cancel out"; that is, he incorrectly claims that it is a positive cost to the utility and a negative cost to the participant.

Q. Why is Dr. Kang singling out only the Appliance Recycling program and not the other programs in Ameren Missouri's MEEIA DSM portfolio?

A. The Appliance Recycling program is rather unique insofar as it is the only program that encourages customers to remove an electric appliance rather than to purchase a more efficient version. That being said, financial incentives for energy

efficiency measures are determined on the basis of a percentage of the incremental cost difference between the efficient appliance model and the baseline appliance model. However, in the case of the Appliance Recycling program there is no incremental cost on which to determine a financial incentive. If Dr. Kang's logic that incentives "cancel out" and are not pertinent in the calculation of the TRC is followed, it would be possible to pay inducement fees to customers as ridiculously high as $1,000 per recycled appliance to encourage customers to remove secondary appliances. Of course, this would not make sense. My testimony will prove mathematically that it does not make sense.

Q Following Dr. Kang's logic, please simplify his own formula to calculate the total costs associated with the Appliance Recycling program.

A. Dr. Kang Testimony:

Total Costs = [Administration Costs + Implementation Costs + **Utility Incentive Payments** + Other Costs including EMV] + [Gross Expense - **Utility Incentive Payments**]

Simplified (cancelling out Utility Incentive Payments):

Total Costs = [Administration Costs + Implementation Costs + Other Costs including EMV] + [Gross Expense]

In this case the gross expense is equal to the gross incremental measure cost. It is important to understand that the gross expense is paid partially by the utility (using incentives) and partially by the participant. Therefore the incentives are in fact implicitly included in the Gross Expense. Dr. Kang is correct that the incentives "cancel out" but the incentives "cancel out" to avoid double counting, not to avoid being included in the calculation altogether. Incentives are only cancelled out to the extent that they offset the

incremental measure cost. Any incentive amount in excess of the incremental cost is a program cost.

Q. Can you please give an example?

A. Yes. Imagine a very simple example. The gross incremental cost of an efficient light bulb is $4. This light bulb creates $8 of benefits. The TRC is $8 divided by $4 which is 2; that is, the benefits are twice the costs. Now, imagine the utility provided $2 of incentives so the customer paid $2 out of the pocket. The TRC is still $8 divided by $4 because the TRC does not consider who paid for what portion but instead considers the gross expense of $4. But notice that the incentive did not "cancel out." If it had it would have been $8 divided by $2; proving the TRC costs implicitly includes the incentive. You can also see that it would be improper to double count the $2 incentive by including the gross expense of $4 plus the $2 incentive because it is obvious that the $2 incentive is implicitly included in the $4 gross expense.

Q. Can you provide another example?

A. Yes. Imagine the gross incremental measure cost to eliminate a measure is zero. For instance, a customer decides to simply remove a light bulb indefinitely. By eliminating a light bulb the customer produces $10 of benefits. But the customer would only remove this light bulb if the utility provides an "incentive" of $2. The utility cost test (“UCT”) is the $10 benefit divided by the $2 cost because the utility in fact had to entice the customer to remove the light bulb. The TRC has the same $10 benefit but remember that the customer had zero out of pocket cost to remove the light bulb yet the utility still had a $2 cost. Therefore the TRC is $10 divided by $2 which is the same as the UCT. This example is how the Appliance Recycling program works but Mr. Kang

wants to pretend like the $2 utility cost was "canceled out" and did not exist at all, yet obviously the cost was real.

Q. Can the TRC be higher than the UCT?

A. No. First because the TRC and UCT equations have the same benefits, and second, because the TRC is the total cost it must include costs that are equal to or greater than the utility costs. Even conceptually, how could the total costs be less than the utility costs? So if the TRC and UCT have the same benefits and the TRC must at least include all the UCT costs then the TRC cannot be higher than the UCT.

Q. Does Dr. Kang's proposal cause the TRC to be higher than the UCT?

A. Yes, Dr. Kang argues that the TRC should be 4.13 while the UCT is 2.93.

Q. Please explain.

A. Dr. Kang proposes to completely ignore the entire bucket of costs paid to customers in the Appliance Recycling program therefore reducing the TRC costs below the UCT costs, which violates the concept of a "Total" resource cost test. Table 8 below shows the costs and benefits of the Appliance Recycling program and proves that Staff's proposal excludes real costs and therefore violates cost-effectiveness analysis fundamentals.

Table 8: Appliance Recycling Program Cost Effectiveness Analysis

		TRC	CTU	Company	Staff
Costs	Admin.	Y		$4,799,954	$4,799,954
	Other	Y		$1,965,174	
	Incentives	N			$1,965,174
	Participant OOP*	N			
	Gross Expense†	Y			
	UCT Costs			$6,765,129	$6,765,129
	TRC Costs			$6,765,129	$4,799,954
Benefits	Avoid Costs			$19,821,389	$19,821,389
	UCT			2.93	2.93
	TRC			2.93	4.13

*OOP = Out-Of-Pocket †Gross Expense is the sum of Incentives and Participant OOP

Q. Does this impact whether the Commission should or should not approve the program?

A. No. The TRC clearly shows the benefits are greater than the costs but completely ignoring costs would inappropriately overstate the cost-effectiveness of the program.

Q. Did the Company meet with Dr. Kang to discuss the application of the TRC for the appliance recycling program?

A. Yes. This specific program, and Ameren Missouri's treatment of the "inducement fee" which encourages program participation, was discussed in detail with Staff (specifically, Dr. Kang and Michael Stahlman) during a face-to-face meeting that was held on Wednesday, February 15, 2012 from 10:00am-4:00pm at Ameren Missouri's General Office Building. Ameren Missouri attendees were Bob Willen, Kyle Shoff, Rick Voytas, Dat Ngo and Laureen Welikson. During this meeting, we explained how we performed cost effectiveness analyses using DSMore. The appliance recycling program was discussed as well as the other programs within Ameren Missouri's MEEIA Report.

Ameren Missouri provided the rationale behind their decisions in setting up and ultimately performing the cost effectiveness analyses using DSMore, and provided the Staff with all files (DSMore BatchTool files, all DSMore analyzed templates that were produced by the batch tools, all of the Aggregate tools, and all of the core DSMore prepared files necessary for the Staff to be able to run the analyses on Staff systems). In fact, Staff (Dr. Kang) actually ran the analysis of one of the programs to ensure that the Staff analysis of the program produced the same results that were obtained by Ameren Missouri's analyses. I have seen his results, and his analysis yielded the same results as Ameren Missouri's.

Q. Does this conclude your surrebuttal testimony?

A. Yes, it does.

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	)	File No. EO-2012-0142
Furtherance of Energy Efficiency as allowed by MEEIA.	)	

AFFIDAVIT OF RICHARD A. VOYTAS

STATE OF MISSOURI)
) **ss**
CITY OF ST. LOUIS)

Richard A. Voytas, being first duly sworn on his oath, states:

1. My name is Richard A. Voytas. I am employed by Ameren Services Company as Manager of Energy Efficiency/Demand Response.

2. Attached hereto and made a part hereof for all purposes is my Surrebuttal Testimony on behalf of Union Electric Company, d/b/a AmerenUE, consisting of 64 pages (and Schedules 1 through 9 if any), all of which have been prepared in written form for introduction into evidence in the above-referenced docket.

2. I hereby swear and affirm that my answers contained in the attached testimony to the questions therein propounded are true and correct.

Richard A. Voytas

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

Julie Donohue
Notary Public

My commission expires: 2/17/2013

Julie Donohue - Notary Public
Notary Seal, State of
Missouri - St. Louis City
Commission #09753418
My Commission Expires 2/17/2013