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BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

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

REBUTTAL TESTIMONY OF PHILIP MOSENTHAL

ON BEHALF OF

NRDC, SIERRA CLUB AND RENEW MISSOURI

April 13, 2012

Q. Please state your name and business address.

A. Philip H. Mosenthal, Optimal Energy, Inc., 14 School Street, Bristol, VT 05443.

Q. On whose behalf are you testifying?

A. I am testifying on behalf of the Natural Resources Defense Council (NRDC), Sierra Club and Renew Missouri. All work developing my testimony has been completed by me or under my direction.

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

A. I am the founding partner in Optimal Energy, Inc., ("Optimal Energy") a consultancy specializing in energy efficiency and utility planning. Optimal Energy advises numerous parties including utilities, non-utility program administrators, government, and environmental groups.

Q. Please provide a summary of your qualifications and experience.

A. I have 30 years of experience in all aspects of energy efficiency, including facility energy management, policy development and research, integrated resource planning, cost-benefit analysis, and efficiency and renewable program design, implementation and evaluation. I have developed numerous utility efficiency plans, and designed and evaluated utility and non-utility residential, commercial and industrial energy efficiency programs throughout North America, Europe and China.

I have also completed or directed numerous studies of efficiency potential and economics in many locations, including China, Colorado, Kansas, Maine, Massachusetts, Michigan, New England, New Jersey, New York, Quebec, Texas, and Vermont. These studies ranged from high level assessments to extremely detailed, bottom-up assessments evaluating thousands of measures among numerous market segments. Recent examples of the latter are analyses of electric and natural gas efficiency and renewable potential along with the development of suggested programs for New York State, on behalf of the New York State Energy Research and Development Authority (NYSERDA).

I am currently a lead advisor for business energy services in Rhode Island and Massachusetts on behalf of the Energy Efficiency Resource Management Council and the Energy Efficiency Advisory Council, respectively, overseeing and advising on utility program administrator's plans, program designs, implementation and performance.

I have been actively engaged in the Illinois Stakeholder Advisory Group (SAG) since its inception, representing the People of Illinois on behalf of the Illinois Office of the Attorney General. I have also been involved in the past few years on issues in Missouri related to KCP&L's and Ameren's IRP filings, as well as a witness on behalf of NRDC, the Sierra Club and Renew Missouri in the current KCPL&L GMO MEEIA filing, docket EO-2012-009.

Prior to co-founding Optimal Energy in 1996, I was the Chief Consultant for the Mid-Atlantic Region for XENERGY, INC. (now KEMA). I have a B.A. in Architecture and an M.S. in Energy Management and Policy, both from the University of Pennsylvania.

Q. Have you previously testified before this Commission?

A. Yes. I submitted direct and rebuttal testimony in the most recent Ameren UE IRP docket, EO-2011-0271. In addition, I submitted rebuttal testimony in the current KCP&L MEEIA filing docket, EO-2012-0009.

Q. Please summarize your Testimony.

A: My testimony addresses Ameren's proposal for adoption of a DSIM tracker to include program cost recovery, a share of net benefits designed to reimburse the Company for lost margins and an additional share of net benefits as a performance incentive. I also address issues related to establishment of a Statewide Collaborative, evaluation, monitoring and verification (EM&V), the Technical Resource Manual (TRM), and program designs. I support the overall structure Ameren has proposed to establish a reasonable framework for an incentive mechanism that provides Ameren with appropriate and timely recovery of direct and indirect program costs as well as a reasonable incentive for exemplary performance. I also support Ameren's proposed initial demand-side management (DSM) targets that, if expressed as net savings, are a reasonable first step in a ramp-up to all cost-effective achievable DSM resources, consistent with the intent of MEEIA, and meeting the default MEEIA targets for the first 3 years of program delivery.[1] However, I address a number of concerns with the specifics of Ameren's proposal, as follows:

[1] Note that the MEEIA rules envisioned goals beginning in 2012. Because of the current timing, in theory Ameren's proposed savings for 3 years are lower than intended by the MEEIA rules because program would not begin until 2013. However, as the first full post-MEEIA program cycle of program delivery, I believe this one year shift in default goals is reasonable.

1. The DSIM tracker would provide three components of financial flows from ratepayers to the Company. First, recovery of direct program costs. Second, a 15.4% share (after tax, actual before tax share is 25%) of net electric system benefits that would be necessary to make Ameren "whole" in terms of recovery of indirect costs (also referred to as the throughput disincentive, or as lost margins). Third, an additional 4.8% share (after taxes, actual before tax share is 7.8%) of net electric benefits as a performance incentive. This last component would vary up or down depending on performance as compared to savings goals, with 4.8% the expected value at performance equal to100% of goal. While I support much of this framework, this proposal includes some problematic approaches that will inappropriately insulate Ameren from most of the performance risk associated with earning this incentive. Specifically, I propose some modifications to ensure appropriate mechanisms to true-up awards based on EM&V results, as described more fully below. Failure to do this could result in perverse incentives to Ameren, and will increase risk to both Ameren and ratepayers of inappropriate and unintended financial flows to or from ratepayers and Ameren.
2. I do not support Ameren's proposal to base its goals and DSIM calculations on gross savings rather than net savings.
3. The program cost recovery component should be adjusted slightly to more accurately reflect the time value of money.
4. The DSIM 15.4% share of benefits component is intended to make Ameren "whole" in terms of in-direct costs of delivering DSM programs. As such, it is designed to recover lost margins related to the net savings from the programs.

However, Ameren has also proposed an *additional* lost margin component separate from the share of benefits portion of the DSIM. This additional component would come from increasing residential monthly customer charges from $8 to $12.[2] Ameren claims this rate change would lessen the share of net benefits necessary for Ameren to fully recover lost margins by 0.6%. I do not support this change for reasons discussed below, and suggest that instead Ameren be permitted to collect the full 16.0% (26% before taxes) share of net benefits, subject to any conditions below regarding EM&V.

5. I support the additional "performance incentive" (PI) that Ameren has proposed as a mechanism to provide some up-side earnings for Ameren shareholders tied directly to evaluated performance. Ameren claims this PI was designed based on ensuring that Ameren would earn an equivalent amount from pursuing DSM as it would from traditional supply-side solutions. I find Ameren's calculations of the potential lost earnings from future supply-side resources flawed, and recommend a reduction in this share of benefits to properly align with true lost opportunities for future earnings. I also recommend some minor modifications to the structure of the PI to more heavily reward truly exemplary performance.

6. I then address issues related to a statewide stakeholder collaboration and evaluation, monitoring and verification. These suggestions will ensure a rigorous and independent EM&V process, while balancing Ameren's desire for certainty with ratepayers' interests in ensuring that any financial payments provided to Ameren are properly justified and accurate. I also address limited specific issues

[2] Ameren 2013-2015 Energy Efficiency Plan, p. 31.

with Ameren's proposed Technical Resource Manual (TRM) and the process for updating it.

7. Finally, I have some concerns related to specific program designs. I fully support the MPSC allowing utilities flexibility to modify program designs, add or delete measures promoted or programs delivered, and even shift funds and effort between programs, with some restrictions.[3] I believe that this flexibility is appropriate and desired, and in the benefit of ratepayers as well as Ameren. If an appropriate framework is established, Ameren should have the proper incentives and authority to modify programs as appropriate to maximize net benefits to ratepayers, and this should also translate into maximized Ameren earnings. However, based on the current filing, I have some limited recommendations addressing Ameren's proposed programs.

Q: You indicate that you support the overall framework proposed by Ameren for cost recovery and Ameren's proposed DSM goals. Please elaborate on why.

A: Ameren has developed a proposed framework that generally is consistent with the intent and specifics of the MEEIA statute and rules. Specifically, Ameren proposes a DSIM Tracker that would provide Ameren with timely recovery of direct and indirect program costs and a performance incentive. Ignoring for the moment the performance incentive component, based on Ameren's planning estimates, this would return a 2013 present value of $136 million to Ameren over the 3-year plan cycle as a direct reimbursement of program costs, plus an additional present value after taxes of $56M as

[3] Restrictions should include adequate equity protections such as ensuring each customer class is only paying for DSM services available to that class, minimum low income requirements, and perhaps other key Missouri policy criteria.

reimbursement for planned lost margins.[4] This roughly reflects recovery of all actual direct program costs (trued up periodically to account for any time value of money at an agreed upon interest rate), and recovery of expected lost margins for the DSIM plan cycle until a new rate case. As Ameren shows, under this framework the likely outcome of meeting 100% of the goals, after spending 100% of the full program budgets, would be roughly a break-even proposition for Ameren.[5] In other words, they would be "made whole" in recovering all direct and indirect costs of DSM delivery, but not any significant amount more. I believe this is a fair and reasonable arrangement that ensures Ameren has no strong disincentives to aggressively pursue DSM, while protecting ratepayers from unnecessary and excessive additional costs. In addition, I believe the DSIM design of being tied to a share of net benefits is a reasonable and workable approach, and consistent with the MEEIA rules.[6] It provides a positive incentive to Ameren to maximize the net benefits achieved within the budgetary and other constraints it faces. As a result, Ameren's and the ratepayers incentives are sufficiently aligned in that both parties will benefit from maximizing the net benefits captured.[7]

[4] See, for example, Ameren 2013-2015 Energy Efficiency Plan pp. 22-27.
[5] See, for example, Ameren 2013-2015 Energy Efficiency Plan, Table 2.3, which shows that under the DSIM current planning assumptions, Ameren net PV income is equal to $17M, which reflect the PV expected value of the additional PI award.
[6] Note, under MEEIA rules the share of net benefits is based on the net benefits under the Utility (or program administrator) Cost Test (UCT), which is equal to gross benefits less utility costs only.
[7] I believe that completely removing disincentives could be better done through a DSIM direct cost recovery mechanism combined with decoupling. As a general rule, focusing on exactly reimbursing utilities for "lost revenues" from DSM programs rather than decoupling the electric delivery to profits is not the best practice for aligning incentives. That said, I believe that given the policy and regulatory environment in Missouri Ameren has developed a reasonable and workable proposal. Because Ameren can increase its earnings by capturing more cost-effective efficiency, overall the alignment between Ameren shareholders and ratepayers is reasonable.

In addition to the direct and indirect program cost recovery, the PI offers Ameren an additional earnings opportunity more directly based on performance toward goals.[8] I also support this additional component, with modifications. As currently designed and envisioned, the first two parts of the DSIM serve to "make Ameren whole" thereby removing a significant *disincentive*. However, it does not provide a significant *positive* incentive, and in the long run DSM could still be viewed by Ameren as less desirable than future new investments in traditional supply on which it could earn a rate of return. I therefore support the creation of an additional positive incentive to encourage Ameren to strive for maximum DSM performance. While some may argue utilities should simply be mandated to deliver DSM programs without financial incentives under traditional least-cost principles, I believe the long term result of aligning ratepayer and shareholder interests will result in better, more aggressive, and more efficient DSM efforts. In my experience, utilities mandated to perform DSM that believe it is not in their best interests will likely not do as good a job and ultimately ratepayers suffer.

Finally, I support Ameren's proposed first 3-year plan goals of 0.6%, 0.7% and 0.8% incremental kWh savings per year for the three year period, respectively. The MEEIA rules' default targets for the first 3 years are 0.3%, 0.5% and 0.7%, or a cumulative savings of 1.5% by the end of the 3-year period. Ameren's cumulative proposal is 2.1% and it exceeds the MEEIA targets in each year. Because 2013 will effectively be the first full year of programs under the MEEIA rules, while technically the

[8] Note that the lost margin recovery component of the DSIM, because it is designed as a share of electric system net benefits achieved, can also be considered a performance incentive in that the DSIM amount is directly related to the DSM achievements as well.

MEEIA targets begin in 2012, I believe this is a reasonable first step in a long term goal of capturing all cost-effective achievable savings.

I note that Ameren's proposal falls short of the coincident peak demand MEEIA savings goals. While Ameren is planning 0.5%, 0.7% and 1.0% in incremental kW savings per year, the MEEIA rule targets are 1.0% each year. However, MEEIA envisioned both energy efficiency and demand response programs. As Ameren notes, the Ameren system and MISO currently enjoy significant excess capacity. As a result, signing up demand response program participants offers little short term value to ratepayers, and DR programs would likely not be used to shed significant load in the near term. Therefore, I believe the efficiency program goals are the most important, and Ameren will still capture durable, hardware-related peak demand impacts from these programs that will provide greater value to ratepayers. Further, I believe the trade-off of achieving more energy savings (than default goals) with somewhat less demand impacts is an overall positive benefit to ratepayers.

Demand-Side Investment Mechanism

Q: Please address the specific concerns you have with the DSIM Tracker as proposed by Ameren?

A: As mentioned above, Ameren's proposed financial framework should help align incentives between Ameren and ratepayers, who both will benefit from maximizing net benefits captured from the DSM portfolio. However, a number of features of the detailed mechanics of how the DSIM would be calculated unfortunately undermine this incentive alignment. As a result, these details work against the overall benefits of the framework, and introduce risk to both Ameren and its ratepayers that actual payments may be inappropriately too high or too low. In addition, because much of the performance of the DSM portfolio will be within the control of Ameren, it creates significant perverse incentives that could encourage Ameren to pursue strategies that ultimately are not in the best interests of ratepayers, but could provide Ameren with excess earnings. This concern relates to Ameren's proposal to rely on gross savings rather than net savings for calculations of net benefits. Specifically, the DSIM would not calculate actual net benefits based on the *net* savings achieved. Rather, they would assume a 1.0 net-to-gross ratio for all programs, despite the fact that Ameren already has credible NTG estimates for its existing programs that are on average less than 1.0.[9]

Net versus Gross Savings

Q: Please explain Net-To-Gross ratios?

A: Net-to-gross ratios generally adjust for two primary things: free-ridership and spillover. Free riders are customers who participate in a program but who would have installed the efficiency measure anyway. As a result, a pure free rider does not actually create any new (or "net") savings compared to the reference case of no DSM program because by definition they would have installed the measure anyway. Spillover refers to customers who were influenced by the program (either in the short or long term) to save energy, although did not directly participate in a program and were not tracked and accounted for in program savings data. For example, a customer may choose to install a

[9] The term gross savings here refers to the total tracked savings of the program based on the estimated savings of each measure installed. Net savings are the net difference between estimated energy usage with and without the DSM program effort. In other words, net-to-gross ratios are designed to account for any portion of gross savings that would have occurred even without the DSM programs. This is explained in more detail below.

high efficiency measure because of vendor recommendations and program marketing that are due to the program strategies, but may never actually complete a rebate form and get counted by the program tracking system. To estimate the actual net savings attributable to the DSM program (compared to what would have occurred if the program did not exist), the gross tracked savings from all the measures installed in the program must be adjusted for these factors.

Q: What is your concern related to Net-To-Gross ratios?

A: In developing its DSIM, Ameren has assumed 1.0 NTG ratios for all programs. Essentially, Ameren proposes for purposes of DSIM to calculate all savings at the gross, rather than net level.[10] However, the primary component of DSIM beyond direct program cost recovery is related to lost margins. Lost margins reflect lost revenues to Ameren because of the impact of *net* DSM savings — in other words, revenues are "lost" when DSM reduces the actual kWh usage below *what it would have been absent DSM.* As a result, relying only on gross savings calculations undermines the inherent elegance of the DSIM in directly scaling in proportion to the actual amounts of lost margins occurring. Further, I believe it would provide Ameren with excess payments, because these 1.0 NTG assumptions appear to flow to Ameren's estimates of actual lost margins as well. What is perhaps more important, deeming 1.0 NTG ratios creates perverse incentives to Ameren that could encourage it to pursue less than optimal strategies simply because it could maximize its financial reward.

[10] Ameren 2013-2015 Energy Efficiency Plan, pp. 8-9.

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

A: Yes. Different programs, technologies and strategies will result in different NTG ratios, and utilities delivering programs can have significant influence over ultimate NTG ratios, even within a specific market, technology or program. For example, compact fluorescent lamp (CFL) promotions often have low NTG ratios compared with some other programs or measures. For example, in Massachusetts utilities apply a NTG ratio of only 0.43 for standard CFLs in a program very similar to Ameren's.[11] While they are still cost-effective and worthwhile to capture, because the market has significantly transformed in recent years, a large portion of participants are likely to be free riders who would have purchased the CFLs anyway. On the flip side, LED lamps are a relatively new technology, are significantly more expensive than CFLs, and enjoy much less customer awareness. As a result, LED lamp promotions would likely have a very high NTG ratio.[12] LED lamps also offer significant cost-effective efficiency, with the promise that programs focused on this technology can spur even greater innovation and price declines over time, ultimately resulting in greater and more cost-effective savings.

Under the current DSIM, Ameren would count a kWh of gross savings equally from these two technologies. However, if the actual NTG ratio for CFLs was 0.43 and for LEDs 1.0, then each kWh of gross LED savings would actually be worth more than twice as much to ratepayers and society, and result in more than twice as much lost revenue to

[11] Massachusetts Electric and Gas Energy Efficiency Program Administrators (October 2011), *Massachusetts Technical Reference Manual for Estimating Savings from Energy Efficiency Measures, 2012 Program Year – Plan Version*.

[12] Given the early stage of LED products and potential significant market transformation effects from promoting these in programs, actual NTG ratio for a well-designed LED initiative could exceed 1.0.

Ameren. However, because CFLs are cheaper and savings from them are easier to capture at this stage, Ameren would have a perverse incentive to pursue more CFLs at the expense of efforts to promote LEDs, thereby resulting in lower overall net benefits to ratepayers but higher net earnings to Ameren. Because of Ameren's approach of only counting gross savings, under this scenario Ameren would recover more than double the actual lost revenue for every kWh associated with additional CFL (over and above the proportional amount assumed in Ameren's plan), possibly resulting in a windfall to Ameren under DSIM.

While the above is just one example, there are numerous ways a utility can influence NTG ratios. As a result, rewarding the utility financially for only gross rather than net savings can encourage a utility to pursue gross savings that actually are less worthwhile in terms of net savings, or even intentionally target free riders which would drive down actual NTG ratios. Because actual net savings drive lost margins, Ameren would benefit from collecting DSIM on gross savings but actually minimizing the true net savings. I am not suggesting Ameren has any intent to do this, or that it would. However, I believe it is bad policy to create perverse incentives, and ultimately unfair to utility staff, who will naturally feel some conflict between maximizing overall societal benefits versus maximizing shareholder earnings.

Q: Doesn't requiring use of specific estimates of NTG ratios create undue risk for Ameren?

A: No. It increases some risks slightly, however, it also reduces some risks as well, and is critical to ensuring ratepayers are not overpaying for DSM. I propose that the

DSIM still allow for deeming NTG ratios and using them prospectively, with updates to these deemed values when new evaluation results become available to be used going forward. In theory, this presents some future risk to Ameren because it does not know in advance what the impact evaluation results will be. However, this risk is small under my proposal of prospective use only. Ameren would be held harmless for any retroactive adjustments, and would be able to modify program strategies after reviewing evaluations to address any prospective changes. Under the current framework, Ameren will almost definitely *over collect lost margins.* This is because NTG ratios over a whole portfolio are almost always lower than 1.0, often significantly so. As a result, Ameren's proposed 15.4% (after tax) share of net benefits is designed to recover the lost margins associated with gross savings, only some of which will be truly net savings that will impact lost revenues.

Ameren has already evaluated its existing programs and has estimates of their NTG ratios. While these can change, they are likely to be reasonable planning estimates and on average will likely not vary dramatically. Furthermore, by allowing deeming of the actual program or measure specific NTG ratios, it still allows Ameren to rely on defined rules and formulas without exposing it to risk of retroactive adjustments from a new evaluation that indicates a much lower NTG ratio. More important, however, is that the actual financial impacts on Ameren from lost margins are directly related to actual *net savings, not gross savings.* Using net results ensures the ultimate amount much more accurately reflects the real indirect costs to Ameren from delivering the DSM effort and the real benefits that accrue to ratepayers.

Q: If Ameren is currently assuming a 1.0 NTG ratio, could it ever be higher?

A: Yes. NTG ratios account for both free riders and spillover. Spillover refers to savings that resulted (directly or indirectly) from program strategies, but does not get directly counted in data tracking systems. For example, a builder who has been trained by the program in how to build high efficiency homes may continue to build these types of homes despite not directly collecting rebates from the program. Therefore, there are certainly occasions where NTG ratios can exceed 1.0.

However, if actual NTG ratios are lower than assumed Ameren would over collect lost margins. In fact, the lower the actual NTG ratios, the greater the windfall would be to Ameren — a directly opposite incentive to the interests of ratepayers. While it is certainly possible that a NTG ratio for some program or measure may exceed 1.0 (in which case the ratepayers could benefit and Ameren might under collect), the record shows that overall Ameren has NTG ratios lower than 1.0 from past program activity, and this is typical of the DSM industry.

Q: So, because NTG ratios could vary in either direction, does relying on net savings provide any *benefit or risk reduction* to Ameren?

A: Yes. In theory Ameren could pursue an innovative market transformation program designed explicitly to modify consumer behavior in ways that could create large spillover benefits (also termed "market effects"). Under Ameren's approach of counting only gross savings, they would actually be hurt and under collect lost margins if this program was successful and achieved a NTG ratio above one. While this is not typical of most programs, the real concern here is twofold: 1) reliance on gross savings breaks the link between estimated net benefits (that Ameren is awarded a share of) with actual net benefits to society and with actual lost margins; and 2) it introduces perverse incentives for Ameren to avoid high NTG ratio program strategies and to drive down NTG ratios. Both of these problems are fundamentally at odds with good policy and the interests of ratepayers. The former means that any meaningful true-ups of financial flows will not happen and ratepayers will likely overpay for lost margins. The latter encourages poor DSM design and delivery practices that could enhance overall Company earnings.

Q: Please explain how the deeming of NTG ratios would work?

A: Ameren has proposed deeming gross measure level savings values based on its Technical Reference Manual (TRM), which I address in more detail below. NTG ratios can be deemed in a similar fashion. In fact, Ameren indicates that actual estimates of NTG ratios are in provided in the TRM despite their proposal to ignore them. However, I could not find them. 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. This could result from review of similar evaluated programs in other jurisdictions, combined with various experience around the U.S. and expert judgment. As I discuss below, I suggest a stakeholder collaborative be created. I recommend this forum be used to agree on initial NTG ratios by program and/or major technology or strategy prior to Ameren beginning its plan, anticipated for Summer of 2012.

Once these NTG values are established, they would be deemed for use until the end of the program year when new evaluation results are available. These new values would then be used prospectively beginning in the following program year. This approach facilitates review and verification of savings annually and ensures transparency by avoiding mixing different savings values within a program year based on whether a project was recorded before or after a specific evaluation report data. It also provides Ameren time to consider any appropriate program or plan changes for the next program year in light of the new NTG information.

Ameren's current evaluation proposal calls for full impact evaluations, including estimating NTG ratios, be conducted in the first year of its program.[13] Presumably this refers to evaluation of the first year of program activity. As a result, it appears Ameren intends that these evaluations would be complete early in PY2. Therefore, these new NTG ratios would be applied starting at the beginning of PY3. Continuing with this proposed cycle would result in new NTG estimates every three years, with prospective adjustments.

Q. Why do you recommend deeming the NTG ratios rather than using retroactive evaluated results for all calculations?

A: I believe using retroactive results from evaluations would be acceptable, and in theory (assuming accurate evaluations) provide the greatest accuracy. However, I also recognize that this creates a great deal more uncertainty for both Ameren and ratepayers because they will not know until after the fact what those values will be. This also creates

[13] Ameren 2013-2015 Energy Efficiency Plan, corrected pp. 98-99. This is an addendum to the original file distributed by Ameren on April 11, 2012.

problems around regulatory lag and when Ameren can receive cost recovery. In addition, because evaluated results exist for most programs now, I don't believe deeming reasonable NTG ratios from past evaluations will result in major inaccuracies. Under this method, it avoids possible wild swings in the DSIM tracker that could occur from unexpected evaluation results. Finally, some utilities perceive retroactive NTG risk to be so burdensome that it in itself can create risk-avoiding behavior that undermines willingness to try new and innovative ideas because they don't know what the evaluation results will be like.

In theory my proposed approach preserves a slight *short-term* perverse incentive in that Ameren could choose to do things that might reduce actual NTG ratios while still collecting the DSIM based on a deemed value until the next evaluation round. However, a strategy like this would ultimately harm Ameren so they would have strong incentives to continue to try to maximize NTG ratios. This is because if NTG ratios are driven down, then the next set of evaluations would result in deeming lower NTG ratios for DSIM and make it significantly harder for Ameren to meet savings goals and capture desired financial rewards. I believe this long term incentive to maximize NTG ratios is sufficient such that the additional certainty and consistency with short term deeming of NTG ratios is reasonable.

Q. Do you have any concerns about NTG ratios specific to Ameren's plan, as opposed to other jurisdictions?

A. Yes. Ameren notes that some other states allow counting of gross savings. While this is a current trend, I do not support it. Because DSM effectively requires ratepayers to pay for efficiency programs, they should be assured of proper and transparent accounting of the actual benefits that result from this substantial public investment. Because net savings determine this actual impact compared to the reference case of no DSM programs, without evaluating and adjusting based on NTG ratios, this ability for the Commission, stakeholders and ratepayers to know if funds are being spent effectively is completely eliminated.

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. As a result, while I still believe they should all monitor and evaluate net savings, if there are no penalties or financial rewards based on performance, this requirement becomes more academic in nature. Obviously, in the case of Ameren, it is proposing very significant funds be awarded to the Company based on the performance of it DSM portfolio. As a result, under the Commission's obligation to ensure ratepayer funds are expended prudently determining and accounting for net savings is an imperative.

Finally, Ameren has indicated that its 2010 potential study suggested that Missouri customers are different from those in other jurisdictions, and less interested in investing in efficiency.[14] If this is true, combined with relatively low rebate levels for many of Ameren's programs, it will likely mean that free ridership may be significantly higher in Ameren's programs than those in other jurisdictions. There are also program design reasons that this may be true. 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

[14] Ameren 2013-2015 Energy Efficiency Plan, p. 68.

programs that are much more proactive in pursuing customers and offering substantial technical assistance, handholding, and other facilitation services to help customers identify cost-effective projects and move forward with implementation. All these issues will likely mean that it is even more important to evaluate and address free ridership especially in the early years of Ameren's DSM efforts.

Q: Please discuss any other issues related to deemed factors in the DSIM?

A: There are ultimately many factors that are used in the DSIM calculations that should be deemed. For example, the avoided costs, discount rates, line losses, and other factors necessary to calculate the benefits that I have not discussed above. It is entirely appropriate to deem these factors because they help to control for things like gas costs that can be very volatile and could result in wildly erroneous outcomes. These factors are largely outside of Ameren's control, and therefore do not create perverse incentives, but rather simply define the rules and help to create greater certainty and accuracy for all stakeholders including the ratepayers.

In addition to deeming these global assumptions, Ameren proposed deeming gross measure-level impacts in its TRM. I support this as a general approach, although I address below some specific concerns related to the TRM, including processes for updating with new evaluation results. For example, under Ameren's proposed deeming of gross measure savings the annual EM&V verification process would primarily focus on ensuring accurate counts of measures installed, and proper data integrity and calculations. This provides Ameren with drastically reduced performance risk by locking in how different measures will count toward their savings goals. However, as I discuss below it it would not sufficient savings verification of all programs or measures.

Q: Do you have any other concerns related to gross versus net savings?

A: Yes. Ameren has proposed reasonable goals for its first 3-yr MEEIA plan. However, they have defined these goals as gross savings, which I do not support. Goals should reflect actual net impacts from DSM efforts, and it is inappropriate to count gross savings toward meeting goals. This results in all the same perverse incentives discussed above related to using gross savings in net benefits calculations. Further, because the performance incentive component of DSIM is based on the achievement toward goals, these perverse incentives are magnified. I recommend the Commission adopt Ameren's goals as expressed in MWh and peak demand impacts, but stated as net goals.

Program Direct Cost Recovery

Q: What is your concern with the direct program cost recovery component of the DSIM tracker?

A: While relatively minor, I believe Ameren has erroneously calculated the amount of program cost recovery that should accrue to the DSIM tracker. In a desire to include this component in base rates at a constant value for 3 years, Ameren has proposed using the average annual program budget over the years to set the recovery rate. However, because programs are ramping up considerably, this would result in a slight overpayment to Ameren of about $1.8 million in present value terms. Rather, the correct amount to include in rates would be an amortized value that results over the three years in the correct present value payments. The table below shows Ameren's proposal, and my recommended change. Basically, this would change the annual amount credited in DSIM from $48.43 million to $47.79 million.

	Program Budget (millions $)	Ameren Proposed Annual Amount	Corrected Annual Amount
Year 1	$ 35.24	$ 48.43	$ 47.79
Year 2	$ 45.97	$ 48.43	$ 47.79
Year 3	$ 64.09	$ 48.43	$ 47.79
Average Annual budget	$ 48.43		
NPV (6.95% DR)	$134.25	$136.06	$134.26
Difference in NPV		$1.81	$0.00

As I understand it, Ameren would track actual collections and expenditures and adjust this program cost recovery account periodically for any discrepancies to align collections with expenditures and accrue interest. Therefore, while this fix could and presumably would be captured in those periodic reconciliations, I suggest the initial base rate should be set on the expected value.

Lost Margin Component

Q: Why do you oppose the increase in the residential monthly customer charge from $8 to $12?

A: Ameren has proposed capturing approximately 96% of its projected lost margins through the DSIM 15.4% (after tax) share of net benefits. However, it also suggests increasing the residential customer charge by $4/month. This would provide about 4% of the lost margins. Without this piece the share of net benefits would go up a small amount, 0.6%. My objection to increasing the residential customer charge is three-fold.

First, moving more fixed-cost recovery to monthly customer charges results in lower marginal volumetric charges. This results in a lower price per kWh or marginal usage that, all else equal, will result in less encouragement for efficiency and make efficiency projects less cost-effective. This has the effect of undermining the intent of DSM which is to encourage efficiency practices.

Second, this increase, while relatively small, can still be a burden for some low income customers, and raises some equity concerns. Also, recovering more fixed costs thru volumetric charges also provides greater inherent equity in the sense that customers will contribute to these costs in proportion to their electric usage.

Finally, because the DSIM charges would be captured through volumetric charges across all customer classes (excepting any customers that exercise the opt-out option), having some of the lost margin recovery coming only from additional residential charges could result in equity issues where residential customers are effectively contributing a proportionally higher share of the costs than appropriate, with commercial and industrial customer contributions proportionately lower.

Because the customer charge increase only covers 4% of the lost margins, my recommendation is to simply raise the share of net benefits by the extra 0.6%. If the Commission determines during a rate case that customer charges are not appropriate, that is a separate issue and should be dealt with as part of a rate case.

Performance Incentive Component

Q: Please explain your concerns with the Performance Incentive Component?

A: Ameren has indicated that it has developed its PI proposal to allow it to earn a commensurate amount on investment in DSM resources as it would on traditional supply-side resource options. It has used the estimated capital cost and earnings from building a combined cycle gas plant in 2029 that was part of its preferred plan in its 2010 IRP.[15]

I support the basic premise of putting DSM resources on an equal financial footing to supply-side resources to ensure utilities have a clear incentive to pursue them. However, I also note that Ameren's pursuit of a new power plant in 2029 carries some risk to the Company. As Ameren has structured its proposal for DSM, they are insulated from most risk. As a result, one could argue that a lower rate of return based on this lower

[15] Ameren 2010 IRP, Chapter 10, p. 16.

HC risk would be appropriate for DSM incentives. In addition, under the PI, Ameren would lock in these earnings in advance of any need to build a new power plant, thereby reducing risk even further. Finally, it is somewhat speculative to base a DSM incentive on a projected cost and earnings far out in the future, when costs and resource options will likely change dramatically. That said, I believe this approach is overall a reasonable one, given that Ameren's expected future earnings are currently based on these assumptions and therefore absence of a PI would still create at least a perceived disincentive to investment in DSM resources.

My concerns relate primarily to the way Ameren calculated the value of these earnings.[16] Ameren has suggested that the present value of eliminating the first 10 years of earnings resulting from a combined cycle turbine (CCT) plant going into service in 2029 is **$_______________**. They have calculated an amortized annual amount of **$_____________** that will return them this present value if paid out as an incentive over 27 years (until 2039, presumably the Ameren intended deferral date of the CCT). I find two problems with Ameren's calculations. The first is that rather than calculating the lost earnings from shifting out the power plant ten years, they have simply taken the present value of the first 10 years' worth of earnings. Because earnings decline significantly over time as the asset is depreciated, these represent the bulk of the earnings present value. So, effectively, Ameren's estimate is actually very close to the full present value of complete avoidance of ever building the new power plant at all. Simply shifting the earnings stream out ten years results in a much lower present value of only **$____

[16] Ameren HC work paper: EE Incentive.xlsx

HC ______**. I show this calculation in Schedule PHM-1 (HC) at the end of my testimony. All else equal, this would result in reduction in the PI of about 40%.

However, because Ameren has proposed an amortized value over 27 years to be earned as a PI, there would still be no need for this new plant (as compared to what would otherwise be needed without DSM, based on default MEEIA goals expressed in the rule, which would ramp up to 1.9% per year incremental savings) even in 2039.[17] I calculate if Ameren indeed follows the MEEIA default "all cost-effective" goals through 2039, the likely deferral of the combined cycle plant would in fact be about 17 years.[18] This is based on this plant being 600 MW as indicated in Ameren's 2010 IRP, with an assumed capacity factor of 90%.[19] Recalculating the deferral of earnings for a full 17 years results in a present value of potential lost earnings of **$____________**.

The bigger problem with Ameren's calculation is that they have established a fixed amortized annual amount of incentive for all 27 years, regardless of the level of expected DSM investment and effort. The first year goal is 0.6% of load, however under MEEIA default goals of all cost-effective this would ramp up to 1.9% by 2021, more than 3 times as much. It makes no sense to award Ameren a PI for capturing 0.6% savings that is as generous as when they have ramped up to 1.9%. Also, the 4.8% (after tax) share of

[17] I do not suggest that I am forecasting the need for new resources, but rather refer to the DSM case versus a reference case of no DSM. While loads could grow and Ameren may well add new supply resources, so long as DSM saves enough to defer one combustion turbine, then that additional plant would not be needed.

[18] Based on the energy output assuming a 90% capacity factor, as compared to the net cumulative energy savings from 27 years of DSM. Note that while the "need" for new power plants is generally based on peak demand impacts, the future demand goals are unclear since Ameren is diverging from the MEEIA values. In addition, the CCT is not intended to be a peaking unit built primarily to focus on meeting peak needs. Finally, a rough analysis based on peak demand indicates a similar deferral timeframe. I therefore base the analysis on energy savings that will offset the annual energy production of the CCT.

[19] Ameren 2010 IRP, Chapter 10, p. 16.

net benefits Ameren proposes to capture this would result in dramatically over compensating Ameren in the future because as goals ramp up so would the net benefits. Therefore, the net effect of adopting a fixed incentive level share of net benefits would be a very large windfall over time to Ameren.

I have recalculated a stream of target incentive values (based on meeting 100% of goals) that scales with actual savings goals, expected net benefits and program costs. This stream would still provide Ameren the appropriate present value earnings over the 27 years that match the lost earnings from a 17 year deferral. However, they would start lower than Ameren has proposed, while offering higher incentives (in pure dollars, but still a constant share of net benefits) once they ramp up to all cost-effective savings. Schedule PHM-1 (HC) shows these values. Under my proposal, the total present value three-year PI award to Ameren for meeting 100% of goals would be $10.2 million *before tax*.[20] This is roughly 40% of what Ameren has proposed.[21] This would result in a nominal share of net benefits of 2.8% at 100% of goal achievement. Note this 2.8% is *before* taxes and is comparable to Ameren's proposed before tax share of 7.8% (4.8%/(1-0.3839)).

Q: How does this PI compare with other performance incentives?

A: Under my proposal, if Ameren achieved 100% of its goals spending exactly its budget, its PI earnings would be 7.6% of program costs. This is right in the range of most performance incentives in North America, many of which vary from 5-10% of program costs. In addition, some jurisdictions that award PIs do not have full lost margin recovery,

[20] Note this is just a projection based on Ameren's plan numbers. The actual PI award would be determined based on the estimated actual net benefits achieved, and will likely vary from this amount.
[21] Ameren proposes a $17 million PV after taxes, which computes to roughly $26 million PV before taxes.

so arguably this is more generous than many jurisdictions. Combined with the total DSIM package this award should substantially reward Ameren's shareholders for exemplary performance. As discussed above, because of the significantly lower risk to Ameren of DSM versus supply-side resources, and the long delay and possibility of never needing this combined cycle unit anyway, this adjusted PI would more than amply reward Ameren for this speculative forgone earnings opportunity. In total, with the before tax lost margin component of 26% of net benefits, the award at 100% of goal would equal 28.8% which is quite generous compared to many jurisdictions.[22]

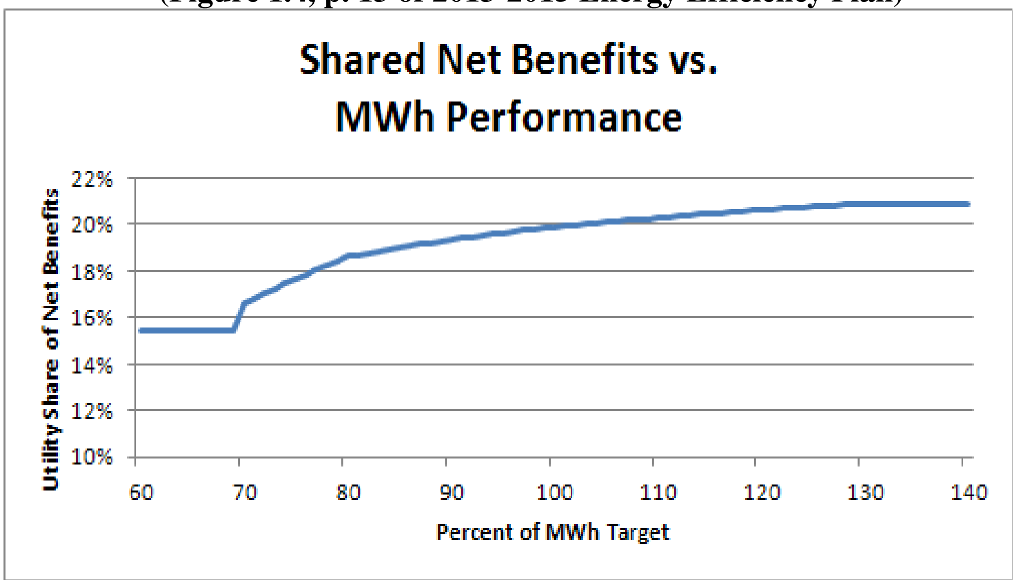
Q: Do you recommend any other adjustments to the PI?

A: Yes. Below I show Ameren's proposal graphically. As can be seen, the slope of the curve is steepest from 70% to 80% of goal achievement. It then shifts to a lower slope. This means that the marginal increment of benefit to Ameren is most generous from 70-80% of goal, and then reduces as Ameren continues to exceed 80% of goal, all the way up to 130%. While I agree some award is appropriate beginning at a threshold level, the most generous marginal rewards should not be for performance that is still short of the full goal. I therefore propose a consistent scaling (in dollar terms) as shown in the following figure. I also show graphically how the actual additional share of net benefits (in addition to the base 26% lost margin component) scales with achievement. Note that my proposal would cap the share of net benefits at the 130% level of achievement. This would be 4.31%. However, Ameren could still take advantage of additional earnings if they achieved greater than 130% of goal. This is because as achievements grow, the total

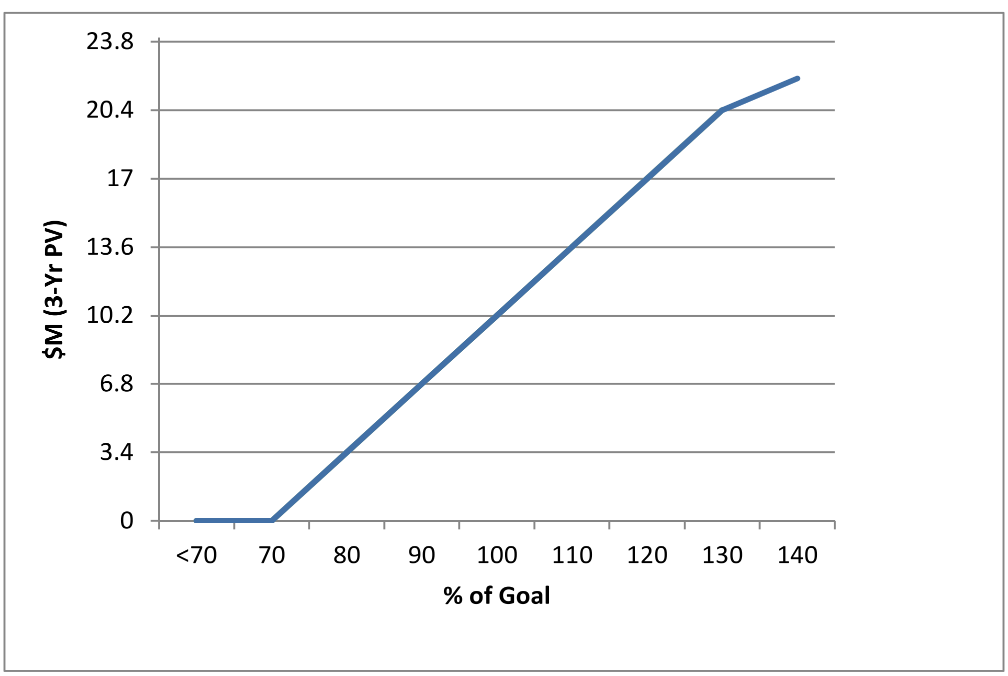
[22] Note the 26% before tax amount is assuming the residential monthly customer charge is eliminated and Ameren's proposed lost margin component would grow from 15.4% *after tax* to 16.0%. This translates to 26% *before* taxes (16/0.3839).

net benefits will grow as well. So, while the share of net benefits would not continue to increase Ameren would still have a strong incentive to pursue even higher savings. I also show this data in tabular format with the specific anticipated financial levels.

Ameren Proposed Performance Incentive
(Figure 1.4, p. 13 of 2013-2015 Energy Efficiency Plan)



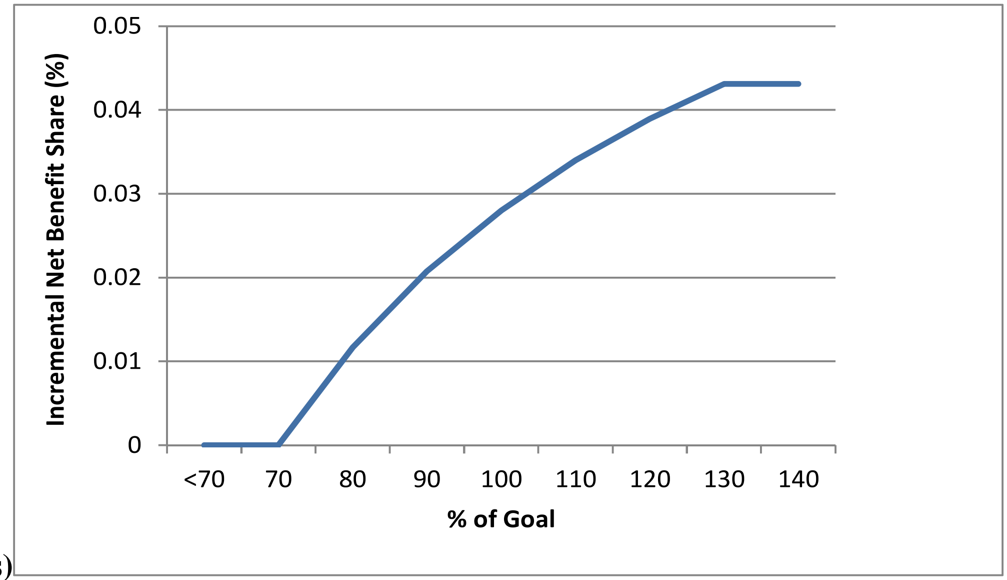
NRDC Proposed Performance Incentive
(present value 3-yr dollar awards, in millions)



Note: All dollar values are estimates based on Ameren's projection of net benefits. Actual awards will depend on final estimated net benefits and will likely vary somewhat from these values.

NRDC Proposed Performance Incentive

(Additional Percent Share of UCT Net



Benefits)

NRDC Proposed Performance Incentive

% of goal achieved	Incremental Additional Share of Net benefits*	PV 3-year Award ($M)**
<70	0	0
70	0.00%	0
80	1.17%	3.4
90	2.08%	6.8
100	2.80%	10.2
110	3.40%	13.6
120	3.89%	17
130	4.31%	20.4

* Additional award added to lost margin component award of 26% before taxes.

** All dollar values are projections based on Ameren's projected net benefits. Assumes net benefits scale linearly with program achievements. Actual dollar values will be determined based on actual estimates of net benefits which will likely vary.

Percent of net benefits capped at 4.31% for performance over 130%. However, because net benefits would increase with greater performance, dollar award would still increase for performance above 130% of goal.

Q: Do you have any other proposed changes to Ameren's PI mechanism?

A: It is not clear from Ameren's proposal how it would calculate the percentage of goals it achieves, given that it has separate energy and demand goals. I suggest two possible solutions. The first is to calculate a weighted average value of energy and demand impacts, based on the electric avoided cost benefits expected from each, and use this weighting of the percentage achievements for energy and demand to arrive at a single percent achievement metric. Alternatively, the entire metric could be restated as percent achievement toward total planned net benefits. This would implicitly result in the same metric as a weighting of energy and demand because each would contribute toward the net benefits in proportion to the weights applied under the first approach. While either of these would result in the same awards, I recommend the former method of weighting the energy and demand percentage achievements because I believe it offers a more transparent understanding of how the Company performed.

Customer Benefits of DSM

Q: You state that your total proposal would result in an expected award before taxes of 28.8% of net benefits (26% lost margins and 2.8% performance incentive at 100% of goal achievement). Ameren has claimed that even with its higher proposed share that customers will still retain 91% of the net benefits. Do you agree with Ameren's analysis?

A: Absolutely not. I find Ameren's analysis confusing and it relies on mixing apples and oranges to arrive at this erroneous conclusion. Ameren states "the recovery of those fixed costs [lost margins] does not reduce the benefits retained by customers."[23] This is clearly not true. If the customers give Ameren back a present value of $122 million as Ameren is proposing, clearly customers are worse off by that amount compared to not providing it to Ameren. This comes directly out of what would otherwise be customer's bill savings, and is clearly a transfer of benefits from customers to Ameren. In fact, Ameren effectively admits this three pages later when it states "Those regulatory lag 'savings' [the lost margins] represent a windfall to customers since energy efficiency does not reduce fixed costs between rate cases."[24] So, effectively, Ameren is asking to

[23] Ameren 2013-2015 Energy Efficiency Plan, p. 14
[24] Ameren 2013-2015 Energy Efficiency Plan, p. 17.

recoup this "windfall" customers would otherwise get. Clearly, this means customers are losing a benefit that would otherwise accrue to them in bill savings.

I agree with Ameren that fixed costs are not a real societal cost from a TRC perspective. This is because the TRC test does not consider distributional equity, but rather only the total impact on all of society as a whole. However, distributional equity (who incurs what costs and accrues what benefits) is exactly the issue here. Namely, how much of the overall societal net benefits will accrue to ratepayers versus the Company.

Q: Ameren shows in Table 2.10 customer economics from a revenue requirement standpoint to support its Claim. Do you disagree with these figures?

A: Yes. Below I show Ameren's Table 2.10.[25] The error Ameren has made is to consider only utility costs and ignore the substantial financial contribution customers must make to participate in the programs. This customer co-pay represents the customers' share of the cost of efficiency measures net of any rebates that Ameren provides. Ameren's Table 3.6 provides this figure, which is a present value of $106 million.[26] When adding this cost to Ameren's Table 2.10, actual net customer savings are $225 million (PV) rather than the $331 million (PV) Ameren claims. This reflects only 62% of the UCT net benefits used for sharing purposes (225/364). As a share of TRC net

[25] Ameren 2013-2015 Energy Efficiency Plan, p. 35

[26] Ameren 2013-2015 Energy Efficiency Plan, p. 43, calculated as the difference in TRC and UCT costs.

benefits, customers would keep 87% (225/258).

Table 2.10 Total Customer Cost ($MM)

	Lifetime Present Value	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Ongoing (Present Value)
Program Cost Recovery	**$136**	$48.4	$48.4	$48.4	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	**$0**
Performance Mechanism	**$122**	$32	$32	$32	$14.5	$13.5	$12.6	$0.0	$0.0	$0.0	$0.0	**$0**
Retail Non-Fuel Revenues	**($94)**	($8.2)	($22.4)	($39.0)	($25.7)	($11.7)	($1.5)	$0.0	$0.0	$0.0	$0.0	**$0**
FAC Sharing	**$3**	$0.2	$0.6	$1.2	$0.9	$0.5	$0.1	$0.0	$0.0	$0.0	$0.0	**$0**
Net Fuel Savings	**($461)**	($3.9)	($13.3)	($26.7)	($43.0)	($52.0)	($60.7)	($66.6)	($70.8)	($71.6)	($78.3)	**($130)**
Avoided T&D	**($37)**	($1.0)	($2.4)	($4.6)	($4.7)	($4.8)	($4.9)	($4.9)	($4.6)	($4.3)	($4.2)	**($8)**
Net Customer Cost	**($331)**	$68.0	$43.4	$11.8	($57.9)	($54.4)	($54.4)	($71.4)	($75.5)	($75.9)	($82.4)	**($138)**

When looked at purely from the perspective of the customers' direct economics, the share of net benefits goes down even further. The Table below shows under Ameren's proposal customers would retain only 53% of the UCT net benefits. As a share of TRC net benefits, customers would receive 74% (192/258).

Category of Costs/Savings	**Millions PV $**	**Notes**
Bill Savings	556	RIM costs - UCT costs, p. 73
Program Cost Recovery	-136	Covers Direct Program Costs (actual NPV of Ameren proposal)
Additional share of benefits given to Ameren	-122	Covers Throughput Disincentive and PI
Customer Co-Pay	-106	
Net Customer Savings	192	Customer Lifetime PV Cash Savings
Customer Savings as Share of Net Benefits	53%	

Q. What is the significance of these customer benefit figures?

A. First, it is important to understand what any final framework and mechanism means for ratepayers. Second, it is critical that the Commission understands the true impacts of its decisions related to the DSIM, and not be fooled by apples to oranges comparisons that ignore real costs to customers. That said, it also shows that even with these relatively generous incentives to Ameren, ratepayers still capture a slight majority of the total benefits and are clearly better off in the long term with DSM programs than without, even under Ameren's proposal. At the end of my testimony I summarize the net effect of all my recommended changes and show what the ultimate customer impacts would be. In this case, customers are somewhat better off than under Ameren's proposal, and will still capture significant net benefits.

Statewide Collaborative

Q. Can you describe the nature of the stakeholder collaboration the Commission ordered in the MEEIA rules approved by the Commission in May 2011 (xxconfirm date)?

A. The MEEIA Rules provide for a stakeholder/utility collaborative and the joint consideration of a variety of issues as follows.[27]

> *"Electric utilities and their stakeholders shall form a state-wide advisory collaborative to: 1) address the creation of a technical resource manual that includes values for deemed savings, 2) provide the opportunity for the sharing, among utilities and other stakeholders, of lessons learned from demand-side program planning and implementation, and 3) create a forum for discussing statewide policy issues".*

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[27] The MEEIA rules are 4 CSR 240-3.163. 4 CSR 240-3.164, 4 CSR 240-20.093 and 4 CSR 240-20.094.

Q. Can you summarize your experience in DSM collaboratives in other jurisdictions?

A. Yes. I have been involved as a technical advisor in numerous collaboratives for more than 20 years, representing both utilities and non-utility parties. These have included everything from very formal, relatively "binding" collaboratives where all parties are committed to reach full consensus on issues before moving forward, to those that reflect more of a stakeholder advisory group that has the opportunity to review and express views on issues, but ultimately decisions are made by the program administrators. Examples of the former include long term collaboratives in Maryland, Massachusetts, New Jersey, Rhode Island, and Vermont. A current example of the latter is the stakeholder advisory group (SAG) in Illinois. Note that fundamentally all collaboratives can be considered advisory in that the collaborative entity typically does not have legal standing as a party or decision maker. Often collaboratives develop out of a settlement process. In my experience the most effective collaboratives are those where the parties are committed to working through consensus under this "settlement" process. While technically program administrators are not bound by any collaborative decisions, the threat of litigation over important issues often has the effect of encouraging all parties to reach reasonable compromises that result in enhanced benefits to ratepayers, more effective DSM, and lower litigation and regulatory costs.

I also believe the most effective collaboratives are those where either the collaborative as a whole or key non-utility parties are able to retain expert advisors as part of the overall collaborative costs, funded through ratepayer efficiency funds. Without this ability, resources are highly asymmetric. This is because the utility or program administrator has far more resources than other parties, and generally is free to bring in any experts it wishes using ratepayer funds that it controls, as well as bill all utility staff time related to the collaborative to program budgets. Without this similar ability for the other parties, they are at a distinct disadvantage and cannot generally engage in a dedicated and meaningful way on the issues.

Q. Has the above rules language resulted in a well functioning collaborative as envisioned by the Commission?

A. I don't believe so. My understanding is that the Collaborative has met formally on only one occasion and has not yet substantially addressed the specific issues outlined in the MEEIA Rules. While Ameren has engaged with stakeholders through technical conferences to discuss many of these issues, this does not really substitute for an effective collaborative. Rather, these technical conferences have generally been after Ameren has already developed its plan and are more for clarifying questions about what Ameren has proposed, as opposed to a group of peers developing policies, strategies, or agendas collectively. For example, while Ameren has held a technical conference to answer questions about its TRM, I believe the MEEIA rules anticipated a more collaborative process of development of the TRM itself and the procedures and rules around how it is used and maintained. To my knowledge this has not happened.

While these technical conferences are a positive step, in comparison with collaboratives in other jurisdictions these discussions have been extremely infrequent and have not allowed for a great deal of detailed discussion and consensus decision-making among the participants. As a result, the Missouri statewide collaborative has provided limited opportunities for stakeholders to contribute timely in-depth critiques and suggestions and to focus on consensus building.

Q. What are the implications of the lack of an effective forum for stakeholder input into energy efficiency policy?

A. The lack of an effective collaborative impedes the establishment of a reasonable balance between the interests of ratepayers and the public, on one hand, with the financial and organizational interests of the utilities administering the ratepayer funded programs. If this is remedied, I believe that closer and more frequent collaboration would produce at least six major benefits:

1. Consolidation of stakeholder discussions into a statewide process would result in reduced redundancies, minimize the need for PSC staff resources and produce a clear improvement in regulatory economy.
2. Agreement with stakeholders can result in a reduction in regulatory uncertainty for Ameren and other utilities and also reduce the likelihood of litigation over EM&V results and other potentially contentious issues.
3. Agreement among parties on EM&V issues can reduce the need for certain unnecessary and expensive EM&V activities, thereby reducing ratepayer costs.
4. Participation by multiple parties will increase public and Commission confidence in the subsequent calculation of energy savings, lost revenue, and Company shareholder incentives.
5. Utilities can learn from each other as well as stakeholders through a single statewide collaborative. This offers value to the utilities themselves, as well as

significant opportunities to explore efficiencies such as joint program or marketing strategies, combined outreach to contractors and builders, and other opportunities to avoid redundant services and learn from peers.

6. The development of higher quality programs and regulatory policies that can flow out of a more diverse, informed and interactive discussion of alternatives.

Q. Based on your experience with other collaboratives why has the Missouri Collaborative failed to provide an effective forum for energy efficiency policy issues?

A. In my view, the Collaborative currently lacks several essential elements as follows:

1. The lack of clearly designated leadership charged with scheduling collaborative meetings, defining agendas and identifying timelines for specific Collaborative deliverables or decisions.
2. The lack of Commission identified Collaborative deliverables and associated timelines. The MEEIA Rules provide for meetings but do not identify any specific work products, reports or recommendations to be developed by the Collaborative. Additional Commission guidance of this type appears necessary to stimulate effective discussion and compromise among stakeholders.
3. Meetings and conference calls are too infrequent to enable an in-depth consideration of alternatives and to familiarize the parties with the legitimate perspectives of other parties.

Q. How should the Commission consider potential enhancements to the Missouri Collaborative process?

A. Advisory collaborative groups have been widely utilized by regulators to inform energy efficiency policy in many jurisdictions. In some cases these collaboratives have played an important role for 20 or more years.[28] I would suggest that the Commission follow models used for extensive collaborative efforts in other jurisdictions as well as the suggestions on collaboratives made by the National Action Plan on Energy Efficiency.

One nearby example is in the state of Arkansas where the APSC has, since 2010, relied extensively on a variety of collaboratives to inform its decisions on a range of energy efficiency policies and the initial development of initial large scale comprehensive gas and electric efficiency programs.[29]

Q. What are your specific recommendations on enhancing the Collaborative process in Missouri?

A. In this docket alone, Ameren is proposing programs and a DSIM mechanism that would cost ratepayers more than $250 million in present value terms. Given the likely magnitude of ratepayer expenditures on energy efficiency I encourage the Commission to provide more specificity on the scope and expectations for an effective collaborative process similar to the directions provided by Commissions in other jurisdictions. Specific suggestions include the following:

For example, I was involved in a Maryland Collaborative with the Potomac Electric Power Company beginning in 1990.

[29] See the February 2010 Arkansas PSC "roadmap" order for examples of collaboratives as constituted by the APSC.

1. The Commission should designate a mechanism for a clear leadership role in the statewide Collaborative with periodic expert assistance and facilitation as needed for certain technical issues such as program evaluation. This could be a facilitator/coordinator position filled by someone independent of the parties chosen by the Collaborative members, or perhaps the PSC Staff could play this role. However, this leader should be independent of the utilities.
2. The Collaborative should be identified as an advisory body charged with providing the PSC with recommendations and alternatives that may inform final Commission decisions, as well as reaching consensus on program and evaluation decisions that may not need to go before the Commission unless consensus cannot be reached.
3. The Commission's order should identify specific deliverables to be produced by the Collaborative as well as timelines for the completion of these work products. These could include, for example, detailed requirements for uniform program reporting applicable to all Missouri utilities and recommendations with respect to a periodic review process for the Technical Reference Manual and other issues.
4. The Commission should encourage more frequent Collaborative meetings and other communications. Given the range of policy issues and scale of ratepayer investments substantial monthly or at least quarterly stakeholder meetings appear to be appropriate.
5. Expenditures by the Collaborative, approved by parties, should be considered an appropriate energy efficiency program expense and are in the interests of ratepayers. For example, funding for periodic expert assistance (either on behalf

of the collective collaborative or to support key parties that need this expertise to effectively engage on issues) should be authorized as a legitimate program planning expense to be collected in a manner similar to other program expenses.

Q. What specific areas of such collaboration do you suggest might be useful in the near future?

A. In the immediate term, I would suggest that the Collaborative focus on issues associated with the evaluation (EM&V) of utility efficiency programs such as prioritizing near term EM&V objectives, a close review of the TRM and the development, development of an "independent" EM&V review capability. The latter could be through a collaboratively hired EM&V "auditor" or through the engagement of collaborative parties in planning and overseeing evaluation activity to ensure a level of independence between evaluators and the utilities.

Evaluation, Monitoring and Verification

Q: Please summarize the evaluation, monitoring and verification (EM&V) concerns you address?

A: Ameren has not filed detailed evaluation plans. Below I address three major areas of EM&V:

1. Timing and type of evaluations, and how evaluation results will be used—either retrospectively or prospectively—to update savings estimates, net benefits, lost margins, and the TRM.
2. Appropriate roles of Ameren and other stakeholders in the evaluation planning and performance process.

3. Evaluation budgets and their sufficiency to support best evaluation practices.

Q: Please describe Ameren's intended evaluation timing and type of evaluations?

A: Ameren has proposed performing both process and impact evaluations every year on every program. However, it is not completely clear what will be evaluated when.[30] As I understand Ameren's proposal, they would complete a full set of comprehensive impact evaluations following the completion of the first year of the programs.[31] These would presumably include all traditional impact evaluation activities, including estimating NTG ratios, and appropriate engineering, metering, and/or billing analyses for custom measures and a thorough review of all TRM assumptions for prescriptive measures and any variances evaluators find between TRM assumptions and actual estimated prescriptive measure savings. Because this is not clear, I encourage the PSC to specify that these first year evaluations should address all these issues.

It is also appropriate to complete full process evaluations after this first year of program delivery, as it appears Ameren intends. Because this will be the first year for some programs, early feedback on the procedures and strategies that work well and those that don't is critical to Ameren being able to identify problems and engage in continuous improvement. Process evaluations should also address awareness and market actor perceptions about the programs, effectiveness of marketing and outreach services, and other less quantitative aspects of programs. After the first full round of process evaluations, I suggest the Collaborative determine where best to focus future EM&V

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[30] See, for example, Ameren 2013-2015 Energy Efficiency Plan amended pp. 107-110

[31] Note, Ameren indicates this as "year 1" but because it is necessary to have at least one complete year of program delivery prior to conducting meaningful evaluations, I assume the completions of evaluations will lag program delivery by one year. This appears consistent with Ameren 2013-2015 Energy Efficiency Plan p. 110 which shows first year evaluation reports becoming available at the end of the first quarter 2014.

funds in terms of process evaluations and market assessments. It is likely that some programs it may be appropriate to go a number of years before repeating process evaluations.

Q: What are Ameren's plans for evaluation after the first year?

A: Following the first full evaluation year, Ameren proposes much more limited "impact" evaluations. Ameren suggests that "the TRM will contain deemed savings values for measures. In PY2 and PY3, the evaluator's primary role in the impact evaluation will be to verify the installation of measures; taking instrumented readings of energy consumption will not be a part of the process. This verified number of measures will be multiplied by the deemed savings values to determine program savings."[32] I view this as more of a "verification" process than an impact evaluation. Essentially Ameren is suggesting a data review to confirm that the measure counts in its database are accurate, and that it has applied the correct TRM value to each measure. I have two significant concerns with this approach.

First, the TRM does not cover all measures that will be installed in the programs. For example, the C&I Custom Program is by definition related to customized, site-specific opportunities. Many mature portfolios capture the largest share of C&I savings from custom measures, and this is true for Ameren's plans as well. Also, custom approaches especially address those very large projects such as custom measures for industrial process or very large buildings or campuses, which often have an inordinate impact on savings and greater uncertainty because you cannot rely on "average" assumptions that hold true when dealing with large numbers of participants. These

[32] Ameren 2013-2015 Energy Efficiency Plan, corrected p. 107.

custom measures by definition will not use the TRM,[33] and estimates of savings will be completely under the control of Ameren staff or contractors to estimate as they deem appropriate. As a result, it is critical that these subsequent “impact” evaluations properly evaluate custom savings, which will typically involve some site visits, customer interviews, project file reviews, engineering analyses, and often spot metering. Without the level of annual scrutiny on these projects, there is no independent review of Ameren’s assumptions and calculations, and they essentially are free to arrive at any savings estimates they choose.

Second, as discussed further below, the TRM should undergo, at least initially, annual reviews by evaluators. By performing more traditional impact evaluations evaluators can identify inappropriate equations and assumptions in the TRM that vary significantly from what they find in the field. For example, an evaluator might find that average commercial lighting hours of use are significantly lower for those participating in the Business Standard Program than were initially estimated. While I agree it is OK to deem these values and only adjust them prospectively, this prospective review and adjustment needs to be made on a regular basis, informed by evaluation results. After the first three year planning cycle, if evaluators find that the TRM has become quite stable and significant variances are no longer found, the collaborative parties might agree to relax this to a comprehensive review less often and focus on those particular markets or technologies that are changing rapidly on an annual basis.

[33] Note the TRM does touch on some guidelines and assumptions for certain types of custom measures, however, this is by no means comprehensive, and appears to completely ignore industrial process measures.

Q: How important is it to adopt your recommendations for more comprehensive impact evaluations rather than simple measure installation verification?

A: Given Ameren's proposed DSIM it is critically important. Ameren has proposed $122 million (PV) of awards based on the results of its savings. This is a substantial amount of ratepayer money, and it is therefore essential that ratepayers and stakeholders have assurance that the ultimate payments to Ameren reflect accurate estimates of savings and net benefits. To allow erroneous payments for three years before checking them is not acceptable and will likely undermine public support for DSM. I note that Ameren's total evaluation budget is only $4 million, or roughly only 3% of the customer funds that are riding on the results of these evaluations.

Q: Please describe your proposal for the Collaborative's role in EM&V?

A: As mentioned above, Ameren has not provided detailed evaluation plans. It proposes issuing an RFP soon after an Order in this docket, and then hiring evaluators. I believe all collaborative stakeholders should play a significant role in establishing the priorities for evaluations and development of a comprehensive 3-year evaluation plan that balances the limited evaluation budgets with the numerous evaluation activities that could occur. This will include necessary trade-offs that will influence both the levels of precision within individual evaluations, as well as the ability to research and better understand markets, and an understanding of where the major risks are (in terms of savings size and accuracy) to best allocate these funds across numerous evaluation opportunities.

In addition, the Collaborative should play a key role in reviewing evaluation RFPs, work plans and draft deliverables and have an opportunity for substantive and timely input. It appears Ameren is open to at least the latter recommendation, as it has indicated distribution of draft evaluation reports would be distributed simultaneously to all parties.[34] The Illinois Stakeholder Advisory Group is a good example of this practice. Not only have stakeholders had a significant role in developing evaluation plans and RFPs, selecting evaluation contractors, and reviewing work plans and draft results, but they have also met regularly with the evaluation contractors at SAG meetings to engage directly on the methods and findings. I recommend the PSC direct that the statewide collaborative play a similar role in Missouri.

Ameren discusses an evaluation auditor to oversee evaluations and perhaps perform some of these functions. I suggest the Collaborative can play this role, either collectively by the parties and experts, or more formally through the Collaborative hiring an independent evaluation expert to serve on behalf of the whole Collaborative. I believe the PSC should allow the Collaborative flexibility in determining how this involvement and oversight should be done.

Q. What are your comments on the adequacy of Ameren's proposed EM&V budgets?

A. The table below identifies anticipated expenditures for Ameren EM&V for the period 2013 to 2015.[35] In this schedule Ameren anticipates spending $4.0 million for evaluation during the three year period. This represents 2.7 % of total direct program expenditures.

[34] Ameren 2013-2015 Energy Efficiency Plan, corrected p. 110.
[35] Percent of portfolio costs by year from Ameren 2013-2015 Energy Efficiency Plan, corrected p. 98.

Ameren Proposed EM&V and Direct Program Costs

	Program Expenditures ($MM)	% EM&V	EM&V($MM)
2013	35.2	5.0%	1.8
2014	50.0	2.0%	1.0
2015	64.1	2.0%	1.3
Total	**149.3**	**2.7%**	**4.0**

I am concerned that the level of planned activities and EM&V expenditures are considerably lower than the best practice standards in place in other jurisdictions and as identified by independent national bodies such as the National Action Plan for Energy Efficiency. Atypically low levels of EM&V will undermine public and PSC confidence that the estimates of energy savings and resulting shared net benefits have been calculated in a thorough and unbiased manner.

Q. What level of EM&V spending is required by the Commission's MEEIA rules?

A. No specific level of EM&V expenditures is required. However, the Rules state that EM&V spending cannot exceed 5% of total program budgets.[36] Although the Rules do not specify a particular level of EM&V activity or expenditure they do require that such EM&V be sufficient to "measure and verify" the savings associated with the programs such that lost net revenue and shareholder incentives can be accurately estimated.[37]

[36] 4 CSR 240-20.093(7)(A)
[37] 393.1075 RSMo.

Q. How does Ameren's planned EM&V expenditure levels compare with EM&V spending in other jurisdictions with similar programs and costs? Is there a "best practice" level of EM&V expenditure?

A. There is no precise level of EM&V expenditure that is applied universally in all jurisdictions and for all programs. The level of evaluation expenditures is typically driven by several factors including: 1) the level of uncertainty associated with current energy savings estimates; 2) the scale of financial incentives or lost revenue associated with EM&V results; 3) the comparative maturity of the programs; and 4) regulatory requirements by state commissions.

In my view, at least the first three of the above criteria suggest that Ameren's EM&V planned expenditures may be inadequate and should likely reflect the higher side of common ranges of evaluation expenditures during the first 3-year MEEIA plan. First, Ameren's current estimates of savings have not yet been fully independently reviewed and linked to Missouri-specific data. This suggests a fairly high uncertainty in these initial estimates. Second, the scale of share of net benefits awards associated with EM&V results is quite high, amounting to an estimated present value of $122 million (Ameren's proposed value) during 2013 to 2015—over 30 times the evaluation budget. Finally, many of Ameren's programs are new to the Missouri marketplace and have a limited track record, which raises the need for more early evaluation. All of these factors conspire to indicate that above average levels of EM&V expenditures would be appropriate initially.

Q. What level of EM&V expenditure has been identified as "best practice" by the National Action Plan For Energy Efficiency?

A. NAPEE's technical reference Model Energy Efficiency Program Impact Evaluation Guide suggests the following guidelines:[38]

> *While it is difficult to generalize, the National Action Plan suggests that a reasonable spending range for evaluation is 3 to 6 percent of program budgets.[3] In general, on a unit-of-saved-energy basis, costs are inversely proportional to the magnitude of the savings (i.e., larger projects have lower per-unit evaluation costs) and directly proportional to uncertainty of predicted savings (i.e., projects with greater uncertainty in the predicted savings warrant higher EM&V costs).*

In 2009 Maryland PSC Staff concluded that best EM&V practices in other states range from 5-7% of total energy efficiency program budgets.39 This reflects research and consensus by Staff and a variety of stakeholders in a statewide process of investigating potential state evaluation frameworks. On page two the Report states the following:

> *Staff outlined the key component of a successful EM&V process and several examples of "best practice" EM&V programs in other states. Costs for such "best practices" programs generally range for 5% to 7% of total energy efficiency program budgets.*

Q. Empire District Electric operates efficiency programs in Arkansas as well as planning program offerings in Missouri. What level of EM&V expenditures are required by the Arkansas PSC for efficiency programs that state?

A. The Arkansas PSC requires that EM&V activities equivalent to that of "national best practices" and that all utility (including Empire) EM&V plans and budgets comply

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[38] Model Energy Efficiency Program Impact Evaluation Guide, a resource of the Nation Action Plan for Energy Efficiency. (http://www.epa.gov/cleanenergy/documents/suca/evaluation_guide.pdf), page 7-11.

[39] Consensus Report on the EmPower Maryland EM&V Process, which reflects research and consensus by Staff and a variety of stakeholders in a statewide process of investigating potential state evaluation frameworks. Maryland Case 9153-9157.

with these standards and be subject to review by the Commission's independent EM&V expert.[40]

Q. Do you have additional evidence that higher levels of EM&V expenditures are typical in other jurisdictions?

A. Yes. EM&V expenditures of 5% of program expenditures are quite common. I suggest that the Commission review the survey results of utility EM&V expenditures conducted in 2011 by the Lawrence Berkeley National Laboratory, which are presented in *National Energy Efficiency Evaluation, Measurement and Verification Standards: Scoping Study of Issues and Implementation Requirements*.[41]

Q. What additional EM&V activities would be possible if Ameren's annual evaluation budgets were increased to a level of approximately 5% of program expenditures?

A. An increase to the NAPEE recommended levels of EM&V spending would likely enable the following additional activities.

1. Annual impact evaluations that comport with my recommendations above, and go beyond simple verification of measure installations. Note, I still envision only addressing NTG ratio estimation every three years.
2. Initial free-rider and market evaluations to estimate typical customer response profile and appropriate program designs for the unique Missouri market.

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[40] The Arkansas PSC issued Order No. 11 in Docket No. 10-100-R on September 29, 2011. This order confirmed that all utility EM&V practices must comply with national "best practices." It also approved detailed statewide EM&V protocols that included the review of all utility EM&V plans, expenditures, and methodologies by an independent evaluation monitor ("IEM") that is reportable to the Commission.
[41] LBL Evaluation study at http://eetd.lbl.gov/ea/emp/reports/lbnl-4265e.pdf

3. Modification and enhancement of TRM in 2014 to reflect EM&V results from the first year of impact evaluations, followed by less intensive updates in years two and three based on feedback from the more limited impact evaluations.
4. Opportunities to more fully address process and market assessment issues, including research to better assess current markets, baseline practices, likely market impacts from programs related to education, outreach, awareness and other key factors essential for long term success.
5. Hiring and training of "in-house" evaluation professionals to staff Ameren's programs, interface with EM&V contractors and provide a more proactive role in EM&V analysis and reporting.
6. Ameren staff and stakeholder expert participation in substantial stakeholder discussions about EM&V issues, planning and results.

Q. Should the commission require specific EM&V expenditure levels for every program?

A. No. Such a uniform requirement, applied to all programs, would be excessively rigid and might result in unnecessary EM&V expenditures where EM&V activities are unwarranted. However, I do believe that the Commission should provide clear guidance in respect to reasonable levels of EM&V expenditures in keeping with national "best practices," as well as for the Collaborative role I suggest above in helping to shape and monitor evaluation plans and activities. Based on national experience I recommend that utilities should be encouraged to dedicate approximately 5% of total portfolio costs to evaluation activities.

Q. Ameren has indicated that by deeming the TRM substantial evaluation cost savings can accrue as compared to other jurisdictions. Do you disagree with?

A. I agree that this can provide some savings. However, as discussed above, it is essential, especially in the early "start-up" years of DSM program development, that these deemed values be scrutinized and evaluated to ensure reasonable accuracy. I therefore believe the ultimate savings from this will be significantly less than Ameren has projected. I note that its projection is based on the much more simplified measure installation verification process, which is not sufficient. Also, I note that Ameren has not discussed market assessments and other evaluation-type research that will be important for any on-going DSM effort to ensure programs understand and respond to market changes.

Q. What would be the implications of inadequately funded EM&V?

A. In Missouri, inadequate EM&V funding would result in a greater uncertainty about the calculation of large share of net benefits payments to Ameren, perhaps leading to reduced public confidence in the programs and Ameren's ability to administer them in the public interest. Inadequate EM&V budgets will also impair the identification of opportunities to improve program administration and delivery. Such problems can include inadequate financial controls, inappropriate rebate payments, inadequate technical review of large projects, and the continued expenditure of ratepayer money on ineffective programs.

Technical Reference Manual

Q. Please summarize your Technical Reference Manual (TRM) concerns?

A. Below I discuss some specific technical shortcomings I have identified in the TRM. However, the most important issue with the TRM is how it will be updated and maintained, and whether it can be relied on to accurately estimate savings from standard "prescriptive" measures. As mentioned above and discussed more below, I believe initially it is critical that comprehensive impact evaluations that include a comprehensiveness review of the TRM and proposals for any modifications be completed. Initially, because of the developing nature of Ameren's DSM efforts, this should be done after the first year of program evaluations are complete, and again perhaps at a somewhat lower level of detail after the two following annual impact evaluations. Going forward, I believe the TRM would not need this ongoing evaluator review. However, I recommend a process whereby any Collaborative stakeholder can raise concerns about a specific TRM entry and a process developed to update it if appropriate. Below I discuss in more detail some of the technical shortcomings of the TRM based on a very limited review.

Q. Have you had an opportunity to completely review the Technical Reference Manual developed by Ameren?

A. 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. Have you participated in the review of TRMs in other jurisdictions?

A. Yes. In fact, I served as the principle lead for commercial and industrial sectors in development of the first in the nation TRM by Efficiency Vermont starting in 2000. Since then, my firm and I have been involved in developing TRMs for numerous clients, including in Vermont, New York, Massachusetts, New Jersey, Rhode Island, Illinois, the Mid-Atlantic States, and others.

Q. Have you reviewed the critique of the Ameren TRM conducted by GDS Associates under the auspices of DNR? What is your response to the findings of that critique?

A. The analysis conducted by GDS Associates for NMR is valuable and has produced a number of excellent recommendations. However, I would also hesitate to describe it as comprehensive since its scope was constrained by limited resources and time made available for the review. As a result, savings estimates for a sizeable number of Ameren measures were not reviewed and there were several other important elements of the Ameren TRM that were apparently outside the scope of the GDS effort.

In general, the GDS review identifies areas of strength in the Ameren TRM as well as areas that need substantial improvement. In my view, this represents a valuable, but insufficient, review of the TRM. I strongly recommend that provision for additional review of this technical document be made.

Q. Do you support the TRM recommendations made by DNR's consultant?

A. I agree with all eight of the GDS recommendations. I strongly agree with GDS that some additional evaluation research is required to provide more confidence around certain energy savings assumptions, clearer source citations are needed and that corrections to certain equations should be made. I also agree that certain adjustment factors are conspicuously absent, in some cases potentially resulting in an overstatement of gross savings.

Q. Beyond the GDS recommendations do you see any other significant shortcomings in the Ameren TRM?

A. Yes. I see several as follows:

1. The TRM omits commonly used gross savings adjustment factors. These include omission of "in service" and persistence factors. In-service factors reflect the fact that not all customers who purchase products promoted by programs follow through and install them. This generally applies to screw-in lamps, although could apply to some other products as well. Much evaluation evidence has shown that certain types of programs suffer from very low in-service rates, where a customer for example might purchase 10 CFLs, but initially only install a few of them, resulting in much lower total savings. Persistence refers to how savings degrades over time, and can include both measure persistence (e.g., has the efficient measure been removed?) as well as savings persistence (e.g., does the actual savings degrade over time because of lack of proper installation, maintenance, or some other reason?). In aggregate,

the use of these gross savings factors represents a calculation of "adjusted gross savings."[42] Omission of these factors may result in an over-calculation of actual field gross savings. These factors should be included in the TRM reflecting the best available information about specific measures.

2. The GDS critique states that it did not have sufficient resources to review the Ameren computer simulations that produce the savings estimates of "weather sensitive" measures such as air conditioning. These TRM savings assumptions and simulations should be reviewed.

3. The GDS critique focused on assessing estimates of annual energy savings but did not appear to review Ameren's assumptions with respect to coincident peak demand reductions. Demand reductions associated with efficiency programs can represent a sizeable proportion of total calculated program benefits. For this reason further review of the TRM's coincident demand reduction assumptions is appropriate.

4. In its analysis GDS did not consider the reasonableness of the measure life assumptions made in the Ameren TRM. GDS did a comparison of the annual savings assumptions between various TRMs but failed to compare the lifetime energy savings assumptions based on divergent utility assumptions about measure life in other TRMs. In large part, Ameren's measure life assumptions appear to come from a single source rather than on the basis of assumptions approved by regulators in other jurisdictional TRMs.[43] Since Ameren's

[42] Adjusted gross savings does not reflect the impact of free-ridership or spillover. The inclusion of these two factors are used to calculate "net savings."
[43] In the TRM Ameren cites the Morgan Measures Library as the source of the majority of the measure life assumptions used for lifetime savings calculations. Whether these assumptions are the result of primary research

incentive and lost net revenue payments will be calculated on the basis of lifetime net benefits this could result in a serious over or under calculation of ratepayer payments associated with program savings.

5. The GDS analysis also did not appear to review the many assumptions about operating hours of installed efficient equipment such as commercial lighting systems. These assumptions are critical to the calculation of annual energy savings and should be reviewed and compared to confirmed findings in other jurisdictions.

Q. Can you provide a specific example of how the exclusion of the above "adjusted gross" factors could result in an overestimate of annual gross savings?

A. A very simple example would be the calculation of gross savings of rebated residential lighting fixtures. Integrating leakage[44] and in service rate factors for California and New Jersey results in annual gross savings estimates as much as 31% lower than Ameren's estimates of gross savings for the identical measure.[45] Note that this does not include any effects from free-ridership or spillover and is only related to estimating accurate gross savings.

conducted by Morgan Marketing is unclear. A preferable source of measure life values would be jurisdictional TRMs which have been closely reviewed and approved by regulators in other jurisdictions.

[44] Leakage reflects the percentage of rebated measures (such as lamps) that are actually installed outside of a utility's service territory.

[45] Based on a presentation made by Dominion Virginia Power to its stakeholder collaborative in November 2011. In the context of a discussion of appropriate adjustment factors Dominion's EM&V consultant (KEMA) researched various adjustment factors in diverse jurisdictions. The intent was to determine the most appropriate adjustment factors for Dominion's residential lighting programs.

Annual Savings Estimates

	Simple Gross kWh	In Service %	Leakage	Adjusted Gross kWh	Simple vs Adjusted Gross
Ameren	37.4	NA		37.4	NA
California	37.4	71%	0.025	25.9	-31%
New Jersey	37.4	84%	0	30.6	-26%

Q. Can you provide a similar example of how divergent assumptions about measure lives can affect the calculation of lifetime energy savings and benefits?

A The simple example below, also reflecting CFLs, indicates that Ameren's lifetime kWh savings would be 42% to 54% lower if the shorter California or New Jersey measure lives were used instead of the nine years measure life assumed by Ameren. Reflecting this lower estimate of lifetime savings would be a similar reduction in calculation of benefits associated with program savings.

Lifetime Savings Estimates

	Measure Life	Lifetime kWh	Simple vs Adjusted Gross
Ameren	9	336.6	NA
California	6	155.3	-54%
New Jersey	6.4	196.0	-42%

Q. Please provide an example of where the issue of coincident demand requires further review?

A. According to the Ameren TRM a single coincidence factor of 0.95 is assumed for a number of commercial lighting measures. [46] This means that the TRM assumes that 95% of the FULL connected load demand savings from these measures will occur at system peak, regardless of the type or size of customer and regardless of nature of the project (e.g., new construction or retrofit, the type of measure, etc.). This blanket assumption of 0.95 lighting coincidence is in stark contrast to the assumptions made in other TRMs as seen below in an extract from the 2010 Massachusetts TRM.[47] In this document coincidence factors (CF) range from a value of 0.37 for small customers to 1.00 for exit signs which are of course on 100% of the time. These factors are based on the nature and size of the customer, the type of efficiency measure and market, and whether the peak is summer or winter. So, for example, if Ameren is doing an indoor lighting project with a small customer, all else equal it would estimate coincident peak impacts of 2.6 times (0.95/0.37) as many kW as a Massachusetts utility would.

Q. Do you have any concerns about other specific assumptions made in the Ameren TRM?

A. As mentioned above, there are hundreds of individual assumptions that underlie the savings assumptions in this document. I have reviewed only a small fraction of them. However, one area of specific concern to me are the TRM's many assumptions about operating hours as identified on page 39 of the Ameren TRM as extracted below.

[46] See page 40 and following pages of the Ameren TRM.
[47] See page 165 of the Massachusetts Statewide TRM, October 2010.

These operating hour assumptions are the likely the single most critical element in determining the magnitude of energy savings Ameren will report in its commercial efficiency programs, as interior lighting typically accounts for a very large fraction of commercial savings. However, they are sourced entirely from a single Ameren evaluation, the scale and statistical validity of which is not clear. Nor do we know the relevance of these operational estimates in the current economic climate. In my experience reviewing numerous data on commercial lighting hours of use, these values appear significantly high to me. If so, the use of these assumptions would result in significant overstatements of actual energy savings. This is an example of where additional review is needed of the more recent findings of the many extensive lighting impact evaluations completed in other jurisdictions.

Commercial Lighting

Interior Lighting Operating Hours by Building Type		
Building Type	Annual Hours	Building Mix Weighting**
Assembly	5,397	4.2%
Big Box Retail	6,439	4.0%
Fast Food Restaurant	6,492	2.4%
Full Service Restaurant	4,850	1.2%
Grocery	6,702	6.2%
Hospital	3,758	5.9%
Hotel	8,760*	1.7%
Large Office	5,571	11.3%
Light Industrial	5,594	43.0%
Primary School	3,149	7.2%
Small Office	4,342	5.6%
Small Retail	4,883	2.0%
Warehouse	5,063	5.3%
Weighted Average	5,202	100%

Q. Ameren is proposing that its TRM be used for a three year period prior to substantial review and modification. Should the Commission support this approach?

A. No. As discussed above, a three year period for a TRM that has been insufficiently reviewed is excessive and is an insufficient basis for the very large ratepayer cost exposure for that period. I recommend that a modified TRM be conditionally approved for the program year 2013 and that an extensive review be conducted following completed program evaluations in 2014. I further recommend that future reviews of the TRM reflect the input of an independent EM&V expert as well as provision for substantial input from stakeholders.

Q. Have other jurisdictions adopted a TRM approval and modification process similar to the one you suggest for the Ameren TRM?

A. Yes. In 2011 the Arkansas PSC approved a similar arrangement for the statewide TRM exclusively developed by the investor owned utilities in that state. In its Order No. 11 in September 2011 the Arkansas Commission conditioned approval of the utility TRM on an extensive TRM review by the statewide EM&V stakeholder collaborative established by the Commission.[48] Subsequent to this stakeholder review and associated modifications the Arkansas Commission approved the utility TRM but required that it be comprehensively reviewed by September 1, 2012. This comprehensive review is to include integration of findings from EM&V evaluation research completed by that date. Note that Empire Electric has service territories in both Arkansas and Missouri and fully participated in both the TRM review and EM&V stakeholder collaborative process.

Program Recommendations

Q. Please address your concerns related to Ameren's proposed program portfolio?

A. Ameren has provided "program templates" in Appendix B of its plan. These are fairly brief program descriptions, although at the level common for many utility filings. However, the devil is always in the details when it comes to program design and implementation. As such, it is difficult to fully assess and critique the programs since

[48] The Arkansas PSC issued Order No. 11 in Docket No. 10-100-R on September 29, 2011 that approved a detailed scope of work for the statewide EM&V Collaborative including review and refinement of the state TRM.

many of the details are not provided or yet determined. However, as discussed above, I support the Commission providing Ameren flexibility to modify programs as they identify new opportunities, changing markets, and learn what is working and not working. I believe with the appropriate incentives and EM&V oversight, as discussed above, this will ensure that Ameren has the flexibility to maximize the effectiveness of programs in ways that will align with ratepayer interests.

Overall, I believe the portfolio Ameren proposes is a reasonable set of programs for a utility just beginning to seriously pursue DSM. I also believe they cover the major opportunities and most typical programs industry-wide, for a utility with goals at the level of Ameren's first 3-year MEEIA plan. Based on the limited detail available on the programs, I have a few comments.

Portfolio-Wide Comments

Q. Do you have any concerns related to Ameren's overall program portfolio?

A. Yes. Ameren has covered many of the major markets for efficiency opportunities. However, there are a few key markets for which they are not proposing programs. These include small commercial customers and market-based multifamily buildings. Both of these markets have significant cost-effective efficiency potential but suffer from unique and generally more intransigent market barriers.

For example, small business customers generally do not have the resources to effectively understand and identify efficiency opportunities, nor to navigate program requirements often designed for more sophisticated customers with in-house technical resources. They also commonly suffer from split incentives, as a large portion of small commercial businesses are tenants who pay electric bills but do not own the energy-using equipment. Business downtime to coordinate and implement efficiency is also often a major barrier. Finally, many small businesses do not have the available capital to cover the first cost investment in efficiency.

A common solution to these small business barriers is to offer a direct installation (DI) turn-key program. Under these programs, a utility staff or contractor visits the facility, completes an audit, provides a proposal with the recommended efficiency measures and associated financial package offered, and then if the customer agrees, immediately schedules the work and comes back and implements the measures, usually within a few weeks. Many of these programs provide significant rebates as well as on-the-bill financing for the balance of the cost. As a result, projects can provide customers not only with brand new equipment but also an immediate positive cash flow because their loan payments on their electric bill are lower than their monthly energy savings. Under this approach, many programs typically achieve participation rates of around 75-80% of customers offered the upgrades. While this program can be more costly than typical programs, they are still quite cost-effective. Ameren should consider adding this program to its portfolio over time as it gets more experience delivering programs and goals and budgets increase. I suggest that this and other future program enhancements be considered by both Ameren and the Collaborative for future implementation.

Multifamily buildings also suffer from some unique barriers. Split incentives between landlords and tenants are a major one. In addition, multifamily buildings tend to straddle the residential and the C&I sectors and programs. For example, the appropriate efficiency opportunities within tenant units are more similar to those things provided in single family residential programs. However, common are lighting and central HVAC systems can only be addressed effectively through C&I services. In addition, often common area electric meters are identified by the utility as commercial customers while tenant space is treated as residential. Because of these issues, multifamily buildings can benefit from discrete targeted programs that span various services and program features of both residential and C&I programs. Efforts to treat multifamily buildings comprehensively under this hybrid approach have worked well in other places. As with the small business market, Ameren should consider adding a unique multifamily program in future years.

As Ameren desires to ramp up to all cost-effective efficiency, additional opportunities such as behavioral programs have been shown to be cost-effective. Currently, given the relatively low goals I do not recommend significant investment in behavioral programs because the more durable and cost-effective hardware-related programs should be the priority. However, as Ameren strives in future plans to capture all cost-effective efficiency behavioral programs should be considered as well.

Residential Programs

Residential Home Energy Performance

Q. What concerns do have related to Ameren's Residential Home Energy Performance Program?

A. The Home Energy Program is a discretionary retrofit program designed to educate customers about their home energy use and encourage building upgrades. The focal point of the program is an energy audit and the direct installation of low cost measures such as faucet aerators, CFLs and low flow showerheads. Each audit consists of a walk-through of the customer's home to identify opportunities for reducing energy consumption like heat losses and air leaks through the attic, windows or walls. Upon completion of the audit, the contractor leaves a list of certified contractors qualified to complete the identified tasks. My concerns with this program is that the major opportunities for home improvements and energy savings will come from customers acting on these audit recommendations. However, without more direct help in navigating through identifying contractors, assessing bids, and understanding exactly what makes sense in their home, the likely uptake of these more major home improvements will not likely happen. In addition, I have concerns about whether the audits are of a sufficient level to actually identify the correct opportunities. The program description does not indicate whether blowerdoor and ductblaster services will be provided, which are critical to understanding opportunities for reducing air infiltration in homes. For example, the first year incremental cost of the energy audits to Ameren is $21,027 for 568 home audits or approximately $37 per audit.[49] The cost of typical audits in these types of programs are typically on the order of more like $400. I am not even sure how Ameren can cover travel time and expenses of an auditor given the level it has budgeted.

In addition, Ameren is offering relatively low incentives and without the critical facilitation services it is unlikely many customers will follow through with installation of these measures. Other programs offer more turn-key services where the auditor can help

[49] See Appendix B at pgs. 15-17.

schedule the work, or provide reviews of contractor bids and other assistance and follow-up to encourage measure implementation. Finally, many home performance upgrades can be very capital intensive, often in the thousands of dollars. Without offering financing (preferably on-the-bill) it will be difficult for Ameren to achieve significant participation in this program.

Commercial and Industrial Programs

Q. With regard to the Commercial sector, are there any general program concerns that you have?

A. Yes, there are several. But, let me first state that Ameren's proposed commercial programs are fairly typical for a utility that is just beginning to ramp up a slightly more ambitious energy efficiency effort. According to Appendix B, Ameren intends to offer the following commercial programs:

	Three year total budget				
	Utility Cost	MWh savings	Spending as % of total portfolio	Savings as % of total portfolio	First yr Costs (kWh)
Bus - Standard	$21,833,386	101,365	15%	13%	0.22
Bus- Custom	$35,292,060	171,609	24%	21%	0.21
Bus - RCx	$1,081,306	7,560	1%	1%	0.14
Bus - NC	$4,140,591	12,359	3%	2%	0.34
Total Business	**$62,347,343**	**292,892**	**43%**	**37%**	0.21

Many utilities that are just beginning to roll out energy efficiency programs include these types of programs, and I support Ameren's first 3-year commercial portfolio generally. However, it is very difficult to determine whether Ameren's programs are well designed or will follow best practices given the level of detail provided. In general, I believe the costs per kWh savings for these programs are reasonable and fairly consistent with programs in other jurisdictions. The one exception to this is the Standard Program, which at 22 cents per first year kWh saved is fairly inexpensive, which may indicate that incentives are very low, which would likely result in high free ridership levels and less participation than could be captured with higher incentives. Often these types of programs cost closer to 30 cents/kWh.

There are also some numerical figures in the program plans that seem very low. It is not clear if these are errors, or what exactly they represent. For example, under the Standard program, the plan indicates that first year incremental costs for "heating" measures will be only $61.00, which represents only 2 measure installations that save 1,007 kWh annually.50 Similarly, under the Retro-Commissioning Program, the plan indicates that first year costs for compressed air system measures will be $54.00 for 3 projects saving 608 kWh annually.51 These represent very small incremental costs and numbers of projects. Without knowing what the specific measures Ameren has in mind are it is difficult to draw conclusions about this. However, it implies that, for example, the compressed air measures would only cost about $18 each, and that over a whole year they only anticipate they would be able to do 3. Similarly, in the standard program the cost would be about $30 each but only 2 customers out of Ameren's entire territory are expected to submit applications. As Ameren rolls out its programs, I recommend that Ameren engage with the Statewide Collaborative discussed above to discuss program designs in more detail and solicit stakeholder feedback on appropriate modifications for programs over time. This kind of input, which is also a fairly typical arrangement, can

[50] Ameren 2013-2015 Energy Efficiency Plan, Appendix B, pp. 27, 29.
[51] Ameren 2013-2015 Energy Efficiency Plan, Appendix B, pp. 35, 37.

provide the Company with critical input on program designs and implementation strategies, such as making clear distinctions on how the programs approach market-driven opportunities versus early retirement, time-discretionary projects.

Business Standard

Q. Do you have any additional comments on the proposed Standard Program?

A. Yes. The Company states that Ameren's implementation contractor will be pursuing a "channel management" strategy. Such as strategy can allow the Company to encourage market actors "upstream" to the customer (i.e. retailers, installation contractors, manufactures and distributors) to stock and promote the sale of high efficient products over standard products. This is a good strategy that I support. I would only add that the Company should consider more aggressive upstream efforts that might include more direct "participation" by upstream actors as well as incentives to these actors. Recent efforts in Massachusetts, California and New Brunswick moving standard rebates for lighting and HVAC measures completely upstream where distributors are provided an incentive based on wholesale incremental costs for each unit they sell have been very successful. In Massachusetts for example, after only a few months of an upstream lighting program program administrators have captured far more savings for the upstream products (high performance T8 and LED lamps) than they were capturing with downstream rebates, at lower utility cost. In addition, experience has shown that once manufacturers and distributors agree to participate these programs have a dramatic effect in terms of transforming markets quickly. This is because they can sell the high efficiency products at the same customer cost as lower efficiency products, thereby only stocking and promoting the high efficiency equipment.

Business Custom

Q. Do you have any concerns with the Custom program?

A. Yes. The program description appears to characterize many salient aspects of a typical custom program that I would agree with. At the same time, however, I am more concerned over what the program description omits. In my experience working in several jurisdictions, commercial custom programs include important enhancements and complementary services focused on providing greater customer service and "handholding", as well as detailed technical assistance, which are critical to getting customers to participate in significant numbers. These strategies seem to be missing from the program descriptions. For example, the program plan indicates a primarily reactive approach where Ameren will simply make available a rebate application and wait for customers to submit them for review. Without more aggressive proactive efforts to engage with customers initially and help them identify and develop these projects, experience indicates participation will likely reflect a high level of free ridership and much lower participation than could be captured. These additional services include:

- Active account management for medium and large customers (e.g., customers with demand of 200kW and/or 500 MWh annually or more). This includes proactive, customer specific energy efficiency planning and continuous energy improvement strategies designed to reduce the customer's energy use intensity, as well as a single point of engagement with the utility to facilitate customer identification and assessment of opportunities and coordinate the process of moving forward with an application and implementation. Account managers would also play a major role in engaging with customers as a marketing strategy. Experience indicates that personal, one-on-one marketing in the medium and large commercial and industrial sector is the most effective way to drive participation.

- At the customer's request, the provisions of tiered energy services starting with on-premise walk-thru energy audits (tier I) at no/low cost to the customer.
- Provision of detailed technical assistance and feasibility studies (tier II). Many utilities offer these services initially with a customer contribution of 50% of the cost. If the customer follows through with implementation the 50% is waived and the program covers 100% of the study. This strategy has been quite effective. By requiring an initial commitment of half the cost if the customer does not follow through, it weeds out those customers that are not really serious about making efficiency investments, while at the same time creates a strong incentive for customers to pursue the measures once they are analyzed.
- Turnkey project management services that includes energy efficiency project identification, scoping and documentation services, such as assisting in filling out program materials, engaging with design professionals and contractors, and generally helping to coordinate the participation and implementation process.

Business New Construction

Q. Do you have any concerns related to the Business New Construction Program?

A. Yes. My concerns are similar to those on the Custom Program related to customer outreach, engagement, and facilitation and technical services. As described in Appendix B, the program will provide "education materials" via direct mail and training to "trade ally sales staff."52 But, the main activity of the program is to review applications and provide assistance with completing applications "as they are received."53 My concern is that this program does not seek to proactively address this important lost opportunity market. The described activities fall well short of best practices. To effectively address the commercial new construction market, it is critical for the program to engage with design professionals and customers at the beginning of the design process to steer them toward comprehensive efficiency solutions. A mostly reactive approach will likely miss these opportunities and be relegated to being able to only influence a few incremental pieces of equipment because the building design will already be fairly fixed. These types of measures are likely to come through the Standard Program and miss the large opportunities in new construction. I recommend the following refinements:

- Employ strategies for aggressive outreach, training and engagement with architects, engineers, design-build firms and lighting designers.
- Intervene at the very beginning of the design phase with customers and design professionals rather than simply react to requests for incentives after design decisions have been made.
- Provide comprehensive technical assistance focused on whole building design and operation. As with the Custom Program, a good model is initially cover 50% of this cost, with the other 50% covered if the customer follows through with implementation.
- Support and advance energy codes in State, and train officials in energy code compliance.

[52] Ameren 2013-2015 Energy Efficiency Plan, Appendix B at page 40.
[53] Ameren 2013-2015 Energy Efficiency Plan, Appendix B at page 39.

- Consider offering design incentives to the design professionals to undertake the technical assistance work. Often, these professionals can be a barrier to projects because analyzing additional high efficiency options, comparing them with baseline code practices, running models, etc. create additional costs for the architects and engineers.
- Aggressive monitoring of all future construction activity through things such as Dodge reports, new service requests, and other available information to identify customers and design professionals at the earliest stage, combined with personal contact marketing to the key players to encourage early and comprehensive engagement.

Conclusions

Q. Can you summarize the total financial impact of adopting all your recommendations for the DSIM?

A. Yes. Under my proposal Ameren's award for the direct cost recovery portion would drop very slightly, from $136.1 million (3-yr PV) to 134.3 million.[54] Ameren's award for the lost margin component would increase slightly due to removal of the residential fixed customer charge increase, and total $58.24 million after taxes (as oppose to Ameren's request for $56 million) to Ameren but reflect a total cost before taxes to ratepayers of $94.5 million. Finally, Ameren's PI component would decrease significantly, from a before tax level of $31 million to $10.2 million. The table below shows each of these components and the net impact, which is a reduction to Ameren of $19.1 million.

[54] Note Ameren shows the NPV cost recovery at the same $134 million that I am proposing, however, based on their description of setting to recover the average annual amount of $48.3 million the actual NPV is higher than Ameren has stated.

Component	Ameren Proposal	NRDC Proposal	Variance
	(Prent value, 3-yr, $Millions)		
Cost Recovery	136.1	134.3	-1.8
Lost Margins	91	94.5	3.5
Performance Incentive	31	10.2	-20.8
Total	**258.1**	**239**	**-19.1**

Q. What is the net impact on customer economics from your proposal?

A. Below I repeat the analysis done above that considers the customer economics. The net impact under the latter is that customers would retain net benefits of $211.3 million, which represent 58% of UCT net benefits and 82% of TRC net benefits. Since TRC net benefits really define the overall societal benefit, one can see that customers are still significantly better off with Ameren's proposed DSM programs and my proposed mechanisms than without them. They still capture the majority of benefits.

NRDC Proposal Customer Economics

Category of Costs/Savings	Millions PV $	Notes
Bill Savings	556	RIM costs - UCT costs, p. 73
Program Cost Recovery	-134	Covers Direct Program Costs
Additional share of benefits given to Ameren	-104.7	Covers Throughput Disincentive and PI
Customer Co-Pay	-106	
Net Customer Savings	211.3	Customer Lifetime PV Cash Savings
Customer Savings as Share of Net Benefits	58%	

Q: Does this conclude your testimony?

A: Yes.

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