Ameren
MISSOURI

2016-18 Energy Efficiency Plan
December 22, 2014

Table of Contents

Chapter 1 - Executive Summary

Highlights

- *Ameren Missouri's 2014 Integrated Resource Plan identified realistically achievable energy efficiency as the most cost-effective resource option. This filing represents Ameren Missouri's continued commitment to offering cost-effective and realistically achievable energy efficiency programs to its customers through the tools made available to it by the Missouri Energy Efficiency Investment Act (MEEIA).*
- *MEEIA requires that the Missouri Public Service Commission ensure that 1) utilities are able to recover expenditures for energy efficiency programs in a timely manner, 2) utility financial incentives are aligned with helping customers use energy more efficiently and 3) timely earnings opportunities associated with energy efficiency savings are provided to utilities.*
- *The 3-year plan described in this report includes $135 million of estimated net benefits over the next 20 years.*
- *Ameren Missouri's existing programs are experiencing diminishing returns due to changes in efficiency baselines brought on by increasing Federal appliance standards, declining avoided costs, and reduced savings estimates based on 2013 Evaluation, Measurement and Verification.*
- *Ameren Missouri's 2016-18 plan calls for increased flexibility to make programs more adaptable to changing market conditions and relies on the continued use of a Technical Resource Manual to evaluate and establish savings achieved.*

In 2012, Union Electric Company, d/b/a Ameren Missouri (Ameren Missouri or Company) came before the Missouri Public Service Commission (Commission) with its first filing to implement energy efficiency programs under MEEIA. Following a collaborative process involving the Company and the regulatory Stakeholders, the Commission approved the largest utility sponsored three-year investment in energy efficiency programs in Missouri history. Part of what the Commission approved was an innovative Demand Side Investment Mechanism (DSIM), consistent with MEEIA, which aligned the interests of the utility with helping its customers use energy more efficiently and removed significant barriers to the aggressive pursuit of cost-effective energy savings by Ameren Missouri, as required by MEEIA. As of this filing, the Company is just over half-way through the three-year implementation period for that plan and has successfully delivered millions of energy efficient measures, millions of kilowatt-hours of energy savings and millions of dollars in net benefits to its customers.

This plan is the next, key step in building on the success of Ameren Missouri's 2013-15 MEEIA programs (MEEIA 2013-15). Ameren Missouri's MEEIA plan for 2016-18 (MEEIA 2016-18) reflects an additional three year investment of nearly $135 million on a suite of residential and business energy efficiency programs that is expected to deliver over 400,000 additional megawatt-hours of cost-effective energy savings while creating $135 million in net benefits[1]. The programs will be delivered over the years of 2016-18 and will leverage and build on the robust network of program implementation contractors, retailers and trade allies that Ameren Missouri established in implementing MEEIA 2013-15. The portfolio of programs is grounded in the Company's recently filed 2014 Integrated Resource Plan (IRP) and represents the implementation of the preferred resource plan, which calls for energy efficiency at the Realistic Achievable Potential (RAP) level.

Ameren Missouri also seeks to extend the DSIM framework from MEEIA 2013-15 for the next three-year period, with a few changes. As will be discussed fully in this report, the DSIM is critical to the success of Ameren Missouri's energy efficiency portfolio development. The regulatory mechanisms approved by the Commission for Ameren Missouri in MEEIA 2013-15 aligned utility financial incentives, provided timely cost recovery and provided an opportunity for earnings. As MEEIA recognizes, each of these is necessary to allow Ameren Missouri's decision makers to value demand-side investments in a manner that is equivalent to traditional investments in supply and delivery infrastructure. This creates the opportunity for energy efficiency to be a true win-win-win-win situation, creating cost-effective savings for customers, a compelling business case for the utility, attractive jobs in Missouri, and emissions reductions that benefit the environment.

1.1 Policy Context

MEEIA established a state policy of valuing supply and demand side resources equally and a goal of achieving all cost-effective demand-side savings. In support of that goal, and in recognition of the fact that the traditional regulatory model in Missouri did not provide proper alignment of utilities' incentives with that goal, the Commission was charged to do three things:

(1) Provide timely cost recovery for utilities for investments in energy efficiency;
(2) Ensure that utility financial incentives are aligned with helping customers use energy more efficiently and in a manner that sustains or enhances utility customers' incentives to use energy more efficiently; and
(3) Provide timely earnings opportunities associated with cost-effective and verifiable efficiency savings.

[1] Net benefits expressed are the net present value of lifetime avoided costs less the program implementation costs.

These three mandates seek to address what have been referred to in many contexts as the "three legs of the stool" to support energy efficiency. Each leg of the stool is essential if energy efficiency policy is to be successful.

Timely Cost Recovery. Recovery of the direct program costs is simply the dollar-for-dollar recovery of the direct costs associated with program administration (including evaluation), implementation, and rebates to program participants, all of which are necessary to obtain the benefits energy efficiency can provide. Timely cost recovery is also required for the impact of reduced sales on the utility.

Alignment of Utility Financial Incentives. The impact of reduced sales on utility financial performance is not about providing additional earnings to the utility but rather about making the utility whole, consistent with its existing regulatory framework and as required by MEEIA. In short, without proper alignment, energy efficiency causes negative effects to the utility's financial performance as both earnings and cash flows suffer. Providing alternative recovery, dollar-for-dollar, of these fixed costs simply reverses the negative financial effects, known as the throughput disincentive, associated with energy efficiency.

Timely Earnings Opportunities. The effect on shareholder value compared to supply-side alternatives recognizes the opportunity cost to the utility of substituting energy efficiency for supply-side alternatives. Demand-side resources cannot be valued equally to supply-side resources without providing an equivalent opportunity to enhance shareholder value. Providing timely earnings opportunities moves demand-side resources beyond a break-even proposition and allows fair competition with supply-side alternatives; thus allowing the utility to value the two options equally.

Ameren Missouri Expert/Witness: Steven M. Wills

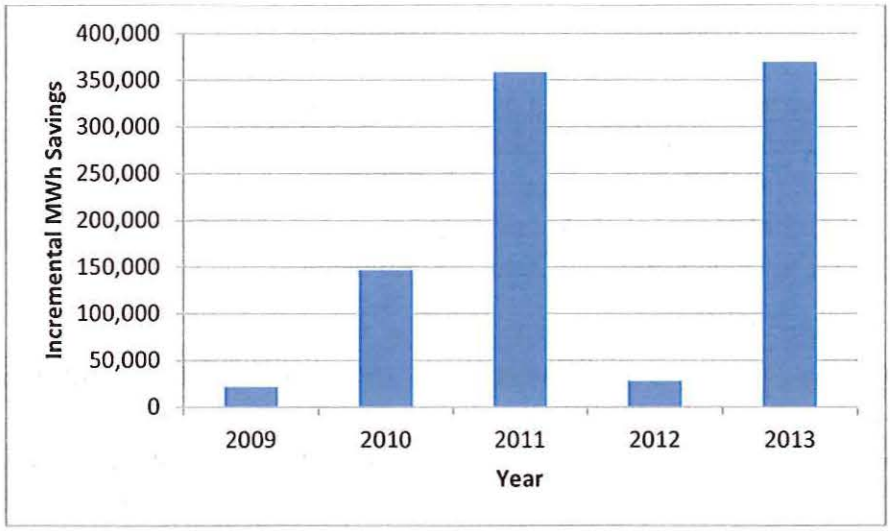
1.2 Past and Current Achievements

Ameren Missouri's recent history with implementation of large scale customer energy efficiency programs began in earnest in 2009. Since that time, and through the 2013 program year, Ameren Missouri has delivered total energy savings to its customers of greater than 900,000 MWh resulting in a myriad of benefits for its customers, including an estimated 600,000 tons of CO2 emissions reductions.[2]

The savings pattern in Figure 1.1 below demonstrates Ameren Missouri's energy efficiency efforts and clearly shows the impact MEEIA has had on the evolution of energy efficiency in the state.

[2] Emissions reductions estimated using 2013 carbon intensity of 0.6444 tons/MWh from the 2014 Ameren CDP Climate report. Actual emission intensity varies slightly year to year over this time period.

Figure 1.1: Historical Ameren Missouri Energy Efficiency Program Savings



From 2009 through September 2011, Ameren Missouri implemented full-scale energy efficiency programs including five residential and four business programs. As demonstrated by the significant ramp up of savings across those years shown in Figure 1.1, Ameren Missouri's commitment to energy efficiency started out strong. However, during Ameren Missouri's evaluation of the costs and benefits for customers and for the Company of its highly successful energy efficiency portfolio, an unsustainable imbalance caused by the pre-MEEIA, traditional regulatory framework was identified. Over the 2009 to 2011 period Ameren Missouri spent approximately $70 million in energy efficiency program costs and incurred financial losses of approximately $60 million due to the throughput disincentive resulting from those programs.

In July, 2009, Governor Nixon signed the Missouri Energy Efficiency Investment Act into law. The sponsors and supporters of MEEIA recognized the misalignment of financial incentives associated with implementation of utility-sponsored energy efficiency in the absence of changes to the traditional (pre-MEEIA) regulatory framework.

In September, 2010, Ameren Missouri filed an electric rate case which included a proposal to align utility and customer interests consistent with MEEIA to continue its energy efficiency programs. Throughout the course of that case, proposals and solutions for incorporating the principles of MEEIA for immediate implementation were considered. Ultimately, the parties to the rate case were unable to reach agreement on an appropriate regulatory solution for energy efficiency in the context of that case. Additionally, the Commission rejected Ameren Missouri's energy efficiency proposal. In doing so, the Commission acknowledged the fact that by implementing energy efficiency programs, the utility is knowingly causing financial harm to itself and that

MEEIA does not require the utility to implement energy efficiency programs.[3] As a result of the Commission's order in the rate case and in the absence of a regulatory framework consistent with the law, the Company allowed its energy efficiency tariffs to expire on September 30, 2011.

However, having a strong desire to preserve much of the valuable energy efficiency infrastructure it had established, Ameren Missouri proposed limited programs to bridge the period from September 30, 2011, until it was able to file for a new portfolio of programs under the Commission's MEEIA rule and begin implementation of the plan that became the first three year cycle of MEEIA programs. That filing was made on January 20, 2012. Ultimately, the parties to that case were able to agree on a framework that allowed Ameren Missouri to invest in the largest portfolio of utility-sponsored energy efficiency programs in Missouri history. The approved plan included a three year portfolio of seven residential and four business energy efficiency programs designed to produce 793,102 megawatt-hours (MWh) of savings with a budget of $147 million.

The outcome of that agreement has been clear. In 2013, Ameren Missouri's energy efficiency programs have achieved 369,500 MWh of energy savings which have resulted in $129.9 million in net benefits to customers.[4] While 2014 is still in progress, initial estimates show that the Company's programs will achieve at least another 300,000 MWh resulting in at least another $130 million in net benefits. These results demonstrate that, with the Commission's support through approval of MEEIA 2013-15, Ameren Missouri has been able to provide its customers with substantial cost effective energy savings. The delay in 2012 provided the opportunity for the Company and regulatory Stakeholders to utilize the MEEIA framework to align the incentives; poising Ameren Missouri for savings levels previously unseen in the state. This success is evidence of the powerful impact that arises from properly aligning customer and utility incentives.

It should also be noted that in delivering these savings, Ameren Missouri has had a positive economic impact on the State of Missouri. In addition to the fact that the net economic benefits of savings represent dollars that remain in customers' pockets to be spent in local businesses or reinvested in our communities in other ways, the delivery infrastructure established by Ameren Missouri also supports local jobs. As a part of the development of its programs, Ameren Missouri has hired ten contractors and enlisted more than 600 trade allies and more than 350 retail partners that all benefit from their

---

[3] *Re Union Electric Company, d/b/a Ameren Missouri,* Case No. ER-2011-0028, *Report and Order* (July 13, 2011), p. 37.

[4] Based on Non-Unanimous Stipulation and Agreement in resolution of Change Requests in Case EO-2012-0142.

partnership with Ameren Missouri. Jobs supported by energy efficiency cover a wide spectrum of disciplines ranging from electricians to architects, construction workers to engineers, and building technicians to software providers. In Ameren Missouri's 2014 IRP, the economic development impact of energy efficiency program spending at the RAP level was estimated to produce 7.5 jobs for every million dollars spent. With the level of spending that has occurred to date and the energy efficiency infrastructure that has been developed, Ameren Missouri's programs have benefited the local service territory economy in a meaningful way and will continue to do so with the approval of the next three year plan.

Ameren Missouri Expert/Witness: Steven M. Wills

1.3 Future Achievements – 2016-18 Plan

The analysis to support the Company's recently filed 2014 IRP once again found that the cost of saving a kWh of energy is generally cheaper than the cost of generating a kWh of energy from a new resource. The IRP describes Ameren Missouri's plan to transition its generating fleet to a cleaner and more fuel diverse portfolio in a responsible fashion over the next twenty years. Energy efficiency is foundational to that plan. In fact, due to the savings associated with energy efficiency programs, the Company now expects to be in a position to retire its Meramec Energy Center by 2022 without adding a similar amount of generating capacity to replace it, thus avoiding significant capital investment. The flexibility to retire older units and carefully plan the transition of Ameren Missouri's fleet is of tremendous value to Ameren Missouri, its customers, and the environment.

MEEIA 2016-18 is based on the pursuit of RAP levels of energy efficiency savings. The three-year plan is comprised of six residential and four business programs (the MEEIA 2016-18 Programs) with a three-year budget of $134.5 million and estimated energy savings of 426,382 MWh. The planned annual budgets and energy savings are detailed in Table 1.1 below:

Table 1.1: Incremental Energy Savings and Costs

	2016	2017	2018
Energy Delivery (MWh)	36,382,264	36,456,504	36,637,652
Energy Efficiency Savings (MWh)	136,720	134,333	155,329
System Peak (MW)	7,435	7,440	7,457
Peak Demand Reductions (MW)	37	36	41
Total Budget	$42,828,113	$43,488,272	$48,145,011
%MWh reduction (from energy delivery)	0.4%	0.4%	0.4%
%MW reduction (from system peak)	0.5%	0.5%	0.6%

The total avoided cost benefits associated with the plan on a 2016 Net Present Value (NPV) basis are $261 million, making the plan cost effective under both the Total Resource Cost (TRC) and Utility Cost Test (UCT) frameworks. As explained fully in Chapter 2, the TRC considers all incremental costs of energy efficient measures, while the UCT only considers that portion of the incremental measure costs paid through utility incentives or rebates. Table 1.2 below shows the net benefits from both a TRC and UCT perspective:

Table 1.2: Portfolio Summary – Cost Effectiveness Analysis ($MM)

	Total		Residential		Business	
	UCT	**TRC**	**UCT**	**TRC**	**UCT**	**TRC**
Avoided Cost Benefits	$261	$261	$89	$89	$172	$172
Program Admin. Cost	$70	$70	$38	$38	$32	$32
Customer Rebates	$56	$56	$14	$13	$42	$42
Net Participant Cost		$44		$14		$31
Total Cost	$126	$170	$52	$65	$74	$105
Net Benefits	$135	$91	$37	$24	$98	$67
Benefit/Cost Ratio	2.07	1.53	1.72	1.36	2.32	1.64

The MEEIA 2016-18 Programs consist of six residential programs and four business programs. The programs are similar to the programs Ameren Missouri successfully implemented during its 2013-15 MEEIA program. The exceptions are:

- The Residential New Construction program originally included in the 2013-15 plan was discontinued because evaluations demonstrated it was no longer cost effective.
- The Residential Home Energy Audit program does not pass the cost effectiveness test for MEEIA 2016-18 and has been eliminated.
- One new residential program, the EE Kits program, has been added for MEEIA 2016-18. This program is an extension of kits included in the Energy Efficient Products program from MEEIA 2013-15 but using a new distribution channel.

The programs are shown in Table 1.3 below:

Table 1.3: Realistic Achievable Potential Portfolio of Programs

Residential - Lighting	Incentives are provided to retail partners to increase sales and awareness of ENERGY STAR® qualified lighting products whereby the end-user receives a discount on the price of ENERGY STAR qualified or other high efficiency lighting products in stores or online.
Residential - Efficient Products	Incentives are provided to customers to raise awareness of the benefits of "high-efficiency" products whereby the end-user receives a discount on the price of qualified products via mail-in rebate or from program allies and contractors.
Residential - HVAC	Incentives are provided to customers for improving the efficiency of new and existing HVAC systems, heat pumps, and air conditioners by achieving electric energy savings.
Residential - Appliance Recycling	An incentive and free pickup is provided to customers for the retirement and recycling of an inefficient refrigerator or freezer in working condition. A turnkey appliance recycling company will verify customer eligibility, schedule pick-up appointments, pick up appliances, recycle and dispose units, and perform incentive processing.
Residential – Low Income	Delivers energy savings to low income qualified customers by directly installing measures and educating the customer regarding energy efficiency.
Residential – Energy Efficiency Kits	Kits provided to raise customer awareness of the benefits of "high-efficiency" products and educate residential customers about energy use in their homes and to offer information, products, and services to residential customers to effectively save on energy costs.
Business – Standard Incentive	Incents customers to purchase energy efficient measures with predetermined savings values and fixed incentive levels.
Business – Custom Incentive	Applies to energy efficient measures that do not fall into the Standard Incentive program. These projects are often complex and unique, requiring separate incentive applications and calculations of estimated energy savings.
Business - Retro-Commissioning	This program has a special focus on complex control systems and provides options and incentives for businesses to improve operations and maintenance practices for buildings, systems, and processes, achieving electric energy savings.
Business - New Construction	Provides incentives to overcome cost barriers to incorporating energy efficient building design and construction to achieve electric energy savings.

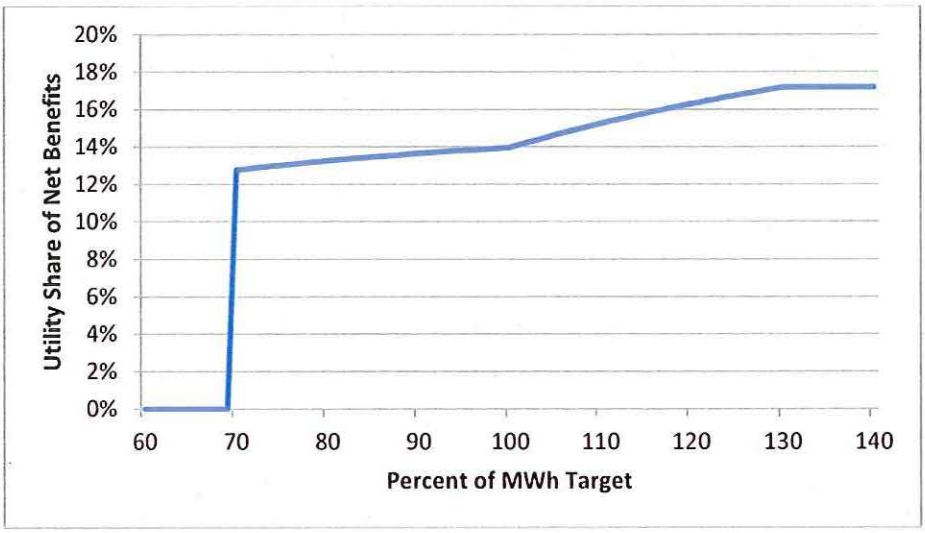
Ameren Missouri Expert/Witness: Richard A. Voytas

1.4 Demand Side Investment Mechanism

As discussed fully in Chapter 3 of this report, the Company's plan includes a similar DSIM structure to that employed in MEEIA 2013-15. All program-related costs and utility incentives will again be collected through the existing Energy Efficiency Investment Charge Rider (EEIC). The Rider will be based on annual collection of 100% of the forecasted program costs and 100% of the forecasted throughput disincentive collected contemporaneously with their incurrence, with true-ups to match billed revenues to the costs and throughput disincentive experienced. In order to offset the throughput disincentive, Ameren Missouri will need to retain approximately 33% of UCT net benefits.

The DSIM included in MEEIA 2016-18 also gives the Company the opportunity to earn a financial incentive associated with its performance in delivering on its savings goals in accordance with the MEEIA law's mandate to provide utilities with timely earnings opportunities associated with demand-side savings. MEEIA's stated policy goal of valuing supply side and demand side resources equally justifies an approximately 14% share of UCT net benefits at 100% of goal achievement. The actual incentive will be based on performance relative to the savings goal and will be based on the UCT net benefits generated by the programs. Both of these features provide the means by which the Company can value demand-side investments equally with supply-side investments. The full sharing curve is shown below in Figure 1.2:

Figure 1.2: Financial Performance Incentive



It should be noted that while the combined net benefits associated with the throughput disincentive and financial performance incentive approaches 50% of the UCT net benefits, customers actually do not experience this as a 50% reduction in their benefits. The UCT does not factor in the fixed cost bill savings that customers recognize between rate cases when implementing energy efficiency. These fixed cost bill savings are an additional benefit to customers that is not contemplated by standard cost effectiveness tests. The 33% of net benefits that offset the throughput disincentive is, by design, exactly equal on a Net Present Value basis to this additional customer benefit delivered through fixed cost bill savings, leaving only the 14% performance incentive as a reduction in the value created by the programs that is ultimately retained by customers. Consequently, customers can expect to retain over 85% of the net benefits generated by the programs.

Ameren Missouri Expert/Witness: Steven M. Wills

1.5 Key Aspects of the Plan

It is important to not only recognize the success of MEEIA so far, but also to look for opportunities to improve upon the framework to ensure that energy efficiency continues to progress in Missouri. Enhancements to the framework reflected in this filing recognize the very dynamic nature of energy efficiency programs. At their core, energy efficiency programs are marketing programs that must respond to a changing marketplace and keep up with new technology offerings, delivery channels, and customer preferences. MEEIA 2013-15 recognized the need for such flexibility by allowing a limited amount of changes to Ameren Missouri's programs, such as the ability to adjust program costs, targets, and incentives, start and stop programs, and reallocate funds among program elements. However, valuable experience from the first year of implementation of that plan indicates that there are far more opportunities to create a dynamic program that keeps pace with changes in the market. Below are some key aspects to Ameren Missouri's MEEIA 2016-18 that reflect valuable enhancements to our ability to continue to deliver cost-effective energy efficiency programs to customers.

Annual updates of Ameren Missouri's Technical Resource Manual (TRM) will ensure the latest and best information is used when determining savings. This will keep all measure-level savings estimates current with the realities of the market and ensure that programs evolve concurrently.

Simplified Evaluation, Measurement, & Verification (EM&V) practices will reduce program costs and reduce the likelihood of costly litigation over program impact assessments. The ongoing and significant effort spent evaluating savings attribution in the form of Net to Gross (NTG) ratios has proven to raise more issues than it solves. The 2013 EM&V process has demonstrated both the uncertainty in estimating the

components of NTG and the contentious nature of any attempts to resolve that uncertainty. Ultimately the goal of attribution is to ensure that energy efficiency funds are spent wisely and in a manner that causes customers to take actions they would not otherwise take. Therefore, our plan is to limit annual EM&V work to updating measure impacts prospectively while deeming NTG for the entire implementation period. In order to quantify NTG for Ameren Missouri's presumed next MEEIA plan (2019-2021), this plan incorporates a common sense approach based on completion of market assessments by the end of 2016 which will allow time for stakeholder vetting and integration with the next round of plan development.

A self-adjusting energy savings target will improve responsiveness to market conditions and eliminate ambiguity for all stakeholders. Under Ameren Missouri's plan, the energy savings target used to determine the performance incentive will scale up or down as programs are added or removed. Furthermore, the energy savings target will adjust automatically, on a prospective basis, as TRM values are updated annually. This structure will ensure that the incentive structure stays in sync with observed conditions in the market place.

Program continuity between MEEIA 2013-15 and MEEIA 2016-18 will ensure consistent availability of rebates to customers. Because many business efficiency projects can have long lead times, some taking two or more years to complete, having energy efficiency programs operate in discrete three-year cycles can cause challenges for individual customer projects. The program continuity feature of the plan will provide business customers the confidence needed to proceed with energy saving projects by guaranteeing rebate payments for committed projects.

Ameren Missouri Expert/Witness: Richard A. Voytas

1.6 Future Considerations

While this plan provides for three more years of robust programs that contribute significantly to the transition of Ameren Missouri's fleet to a cleaner and more fuel diverse portfolio, it also raises issues facing energy efficiency that must be resolved in order to ensure that Missouri is able to continue on the path toward achieving MEEIA's goals. We are at a point where, due to a confluence of factors, the current portfolio of energy efficiency programs is beginning to be impacted by diminishing returns. The fact is not lost on Ameren Missouri that the MEEIA 2016-18 portfolio budget is approximately 90% of the MEEIA 2013-15 program budget while the planned savings are just 54% of the previous three year cycle. This is not by any means an indication of a decrease in Ameren Missouri's commitment to energy efficiency. Instead, it is a manifestation of a dynamic marketplace that has already seen significant evolution from three years ago.

There are three primary factors driving the diminishing returns, as discussed more completely in Chapter 2 of this report. The first factor is the Federal appliance standards being implemented that have the impact of changing the baseline technology in a way that reduces savings available to utility programs. Second, 2013 EM&V results show actual measured savings from Ameren Missouri customers' homes and businesses that differ from previously established TRM savings associated with many key measures. As programs mature and more of the most inefficient appliances and end uses are replaced, future EM&V is likely to further reduce savings for many measures. As such, it is fair to say that the "low hanging fruit" is harvested first and additional savings become incrementally more difficult and costly to achieve. Finally, the decline of the expected market value of energy and capacity over recent years has made the benefits of energy efficiency experience a similar decline. Slow load growth and the emergence of relatively inexpensive natural gas associated with shale drilling technologies have reduced the price of energy in the market. This market price decline impacts the cost effectiveness of energy savings and can cause previously marginal measures to no longer be worth offering based on economics.

The changes wrought by new Federal appliance standards, declining measure savings over time, and cost-effectiveness challenges due to lower expected wholesale energy market prices manifest themselves as a reduction in energy efficiency potential. The reduced savings in the MEEIA 2016-18 plan relative to the previous three years are a direct result of these factors. At the same time, the importance of energy efficiency in the resource mix of utilities may never have been greater.

In the summer of 2014, the U.S. Environmental Protection Agency (EPA) issued proposed regulations regarding carbon dioxide emissions from existing power plant sources. EPA's proposed Clean Power Plan (CPP) is still in the comment period and is far from being in final form. Ameren Missouri is studying the regulation in detail and has provided a summary of significant early observations in its recent IRP filing. With that said, it is clear that the rule, as proposed, contemplates utility energy efficiency programs as a foundational building block of state and utility compliance plans. What is unclear is the upper limit of energy efficiency that could be achieved cost effectively by Ameren Missouri through 2030. The upper limit is a function of the Missouri rules and regulations covering the analysis of energy efficiency opportunities.

Because savings from traditional programs are beginning to decline while the importance of savings is so great, Missouri and the regulatory stakeholders must also use the time period during which the 2016-18 programs are implemented to make fundamental changes to MEEIA in order to unlock even more efficiency potential. Ameren Missouri is already in the process of considering a number of new and innovative programs to offer to try to grow future savings. Some programs under preliminary consideration include a small business direct install program, a pre paid

billing program, a company-owned street lighting program, a distributed generation program, and an electric vehicle program. Many of these program concepts are rooted in the goals of the CPP to reduce greenhouse gas emissions rather than just reduce kWh consumption. But several of the programs would also require modifications to either the MEEIA law or rules. For example, the MEEIA law and rules define a demand-side program as "any program conducted by the utility to modify the net consumption of electricity on the retail customer's side of the electric meter, including, but not limited to energy efficiency measures, load management, demand response, and interruptible load." Many of the programs described above may not qualify for treatment under MEEIA based on the current definition of a demand-side program. With some simple changes, however, the scope of MEEIA could easily be expanded to cover such programs.

These concepts are of critical importance if Missouri is to build momentum in the energy efficiency space rather than see equipment-related savings gradually dwindle as they are subjected to the law of diminishing returns. With this filing, Ameren Missouri not only requests the Commission's approval of its MEEIA 2016-18 plan along with all of its attendant benefits, but as explained in Chapter 5, also seeks a dialogue on the future. We look forward to engaging in this discussion with the regulatory stakeholders and the Commission as this proceeding unfolds.

Ameren Missouri Expert/Witness: Richard A. Voytas

Chapter 2 - Portfolio Overview

Consistent with the preferred resource plan in its recently filed IRP, the MEEIA 2016-18 programs are designed to achieve RAP energy savings. As described below, the RAP portfolio of programs is the appropriate choice to pursue MEEIA's goal of achieving all cost-effective energy efficiency.

The MEEIA 2016-18 plan portfolio is comprised of six residential and four business programs which are described throughout this chapter. The analysis of the programs is grounded in the primary market research and extensive analysis performed as a part of the 2013 DSM Market Potential Study[5], and has been updated for measure savings potential changes identified by 2013 EM&V work. The RAP portfolio for the three-year implementation period includes energy savings of 426,382 MWh at a total cost of $135 million. The largest share of the savings for the MEEIA 2016-18 plan, approximately 61% of the total MWh, are derived from the business programs, in contrast to the portfolio mix from MEEIA 2013-15 that featured 64% of the savings coming from residential programs.

It should be noted that while the three-year energy savings targets are identical to the implementation period analysis presented in the 2014 IRP, the annual allocation of savings and budgets to individual program years has been revised. The annual expenditures were leveled out from year to year to reflect the impacts of the MEEIA 2016-18 plan on program continuity between the 2013-15 and 2016-18 implementation periods[6]. The continuity feature of the MEEIA 2016-18 plan will be detailed thoroughly in the Implementation Chapter (Chapter 4) of this report. The planned savings and budget by portfolio and program year are summarized in Table 2.1 below:

[5] The full potential study was filed in the Company's IRP and can be accessed in its entirety in File No. EO-2015-0084; See Chapter 8, Appendix B.

[6] Table 8.5 in Chapter 8 of the IRP had a note that indicated that this change was a possibility.

Table 2.1: 2016-18 Realistic Achievable Potential Portfolio Targeted Savings and Budgets

	2016	2017	2018	Total
Res Net Energy Savings	58,505	45,690	61,472	165,667
C&I Net Energy Savings	78,215	88,643	93,857	260,715
Total Net Energy Savings	136,720	134,333	155,329	426,382
Res Net Demand Savings	14	9	13	36
C&I Net Demand Savings	23	27	28	78
Total Net Demand Savings	37	36	41	114
Residential Program Costs	$18,987,300	$16,497,977	$19,798,156	$55,283,433
Business Program Costs	$23,840,813	$26,990,295	$28,346,855	$79,177,963
Total Program Costs	$42,828,113	$43,488,272	$48,145,011	$134,461,396

2.1 Portfolio of Programs

Table 2.2 presents a high level summary of the MEEIA 2016-18 programs. The programs are similar to those that Ameren Missouri successfully implemented during its MEEIA 2013-15 programs and are detailed in the tariff sheets included with this filing. There are three exceptions: the Residential New Construction program has been discontinued because EM&V demonstrated it was no longer cost effective; the Residential Home Energy Audit program does not pass the cost effectiveness test for MEEIA 2016-18 and has consequently also been discontinued; and one new residential program, the EE Kits program which adds a new delivery channel for an existing measure, has been added for MEEIA 2016-18.

Table 2.2: Realistic Achievable Potential (RAP) Portfolio Programs

Residential – Lighting	Incentives are provided to retail partners to increase sales and awareness of ENERGY STAR® qualified lighting products whereby the end-user receives a discount on the price of ENERGY STAR qualified or other high efficiency lighting products in stores or online.
Residential - Efficient Products	Incentives are provided to customers to raise awareness of the benefits of "high-efficiency" products whereby the end-user receives a discount on the price of qualified products via mail-in rebate or from program allies and contractors.
Residential – HVAC	Incentives are provided to customers for improving the efficiency of new and existing HVAC systems, heat pumps, and air conditioners by achieving electric energy savings.
Residential - Appliance Recycling	An incentive and free pickup is provided to customers for the retirement and recycling of an inefficient refrigerator or freezer in working condition. A turnkey appliance recycling company will verify customer eligibility, schedule pick-up appointments, pick up appliances, recycle and dispose units, and perform incentive processing.
Residential – Low Income	Delivers energy savings to low income qualified customers by directly installing measures and educating the customer regarding energy efficiency.

Residential – Energy Efficiency Kits	Kits provided to raise customer awareness of the benefits of "high-efficiency" products and educate residential customers about energy use in their homes and to offer information, products, and services to residential customers to effectively save on energy costs.
Business – Standard Incentive	Incents customers to purchase energy efficient measures with predetermined savings values and fixed incentive levels.
Business – Custom Incentive	Applies to energy efficient measures that do not fall into the Standard Incentive program. These projects are often complex and unique, requiring separate incentive applications and calculations of estimated energy savings.
Business - Retro-Commissioning	This program has a special focus on complex control systems and provides options and incentives for businesses to improve operations and maintenance practices for buildings, systems, and processes, achieving electric energy savings.
Business - New Construction	Provides incentives to overcome cost barriers to incorporating energy efficient building design and construction to achieve electric energy savings.

Detailed program descriptions (labeled templates) of target markets, measures and incentives included, and implementation and marketing strategies among other things for each program can be found in Appendix A to this report.

The breakdown of the targeted portfolio energy saving and budget metrics by individual program is shown in Table 2.3 below:

Table 2.3: Ameren Missouri Portfolio Summary for Implementation Cycle 2016-18

	Net Incremental Energy Savings Targets (GWh)			Net Incremental Demand Reduction Targets (MW)			Expected Annual Budget ($M)		
	2016	2017	2018	2016	2017	2018	2016	2017	2018
Lighting	20.2	18.3	22.9	0.0	0.0	0.0	4.8	4.7	5.7
Efficient Products	5.7	1.9	6.7	2.1	0.7	2.2	1.9	1.1	2.0
HVAC	19.9	13.9	17.2	8.9	6.2	7.7	7.3	6.2	6.9
Appliance Recycling	3.0	2.7	4.1	0.7	0.7	1.0	0.8	0.7	1.0
Low Income	3.5	2.7	4.3	0.8	0.6	0.9	2.3	2.0	2.5
EE Kits	6.2	6.2	6.2	1.0	1.0	1.0	1.8	1.8	1.8
Residential Total	**58.5**	**45.7**	**61.5**	**13.7**	**9.3**	**13.0**	**19.0**	**16.5**	**19.8**
Standard	22.3	25.3	26.8	4.0	4.5	4.8	6.7	7.6	8.0
Custom	45.9	52.1	55.1	16.7	18.9	20.1	13.4	15.1	16.0
RCx	5.7	6.4	6.8	1.8	2.1	2.2	2.2	2.5	2.6
New Construction	4.3	4.8	5.1	1.0	1.2	1.2	1.5	1.7	1.8
Business Total	**78.2**	**88.6**	**93.9**	**23.5**	**26.7**	**28.2**	**23.8**	**27.0**	**28.3**
PORTFOLIO TOTAL	**136.7**	**134.3**	**155.3**	**37.2**	**35.9**	**41.2**	**42.8**	**43.5**	**48.1**

	Total System Energy (GWh)			Total System Peak (MW)		
	2016	2017	2018	2016	2017	2018
Baseline Forecasts	36,382	36,457	36,638	7,435	7,440	7,457
DSM as %	0.4%	0.4%	0.4%	0.5%	0.5%	0.6%

*All savings and baseline forecast values at the meter (i.e. do not include T&D losses)

Pursuing the Policy Goal of MEEIA

MEEIA's underlying policy is to allow the implementation of programs that reflect valuing demand-side investments equal to supply-side investments with the goal of achieving all cost-effective, demand-side savings. Ameren Missouri has demonstrated its commitment to pursuing this policy by implementing the largest utility energy efficiency program in Missouri history. While we believe this is a goal worth pursuing, it cannot be quantified today with any degree of accuracy for the next twenty years. Rather, it is a goal that will constantly be shaped and re-shaped through continuous implementation, evaluation, research, testing and adjustment.

Ameren Missouri conducted a Demand Side Management Potential Study prepared by a nationally recognized independent contractor team. That study reflects an energy efficiency market assessment using 100% Ameren Missouri appliance saturation surveys, demographic surveys and customer psychographic surveys. The primary objective of the study was to assess and understand the technical, economic, and achievable potential for all Ameren Missouri customer segments for the period from 2016 to 2034. The amount of energy efficiency potential from customers as a direct result of Ameren Missouri sponsored customer energy efficiency programs is defined as RAP. Assuming regulatory treatment that reflects the requirements of MEEIA, RAP represents all cost-effective energy efficiency. By definition, it represents a forecast of likely customer behavior under realistic program design and implementation.

It is noticeable that the targeted energy and demand savings associated with Ameren Missouri's MEEIA 2016-18 plan are lower than the Commission's MEEIA rules' targets for the same years. The three years of the plan have energy reduction targets defined in the rules as 1.1%, 1.3%, and 1.5% respectively, and demand reduction targets of 1% per year. However, current primary market research by an independent contractor indicates the level of opportunity that can actually be achieved is characterized by the RAP portfolio, which represents all cost-effective, demand-side savings as described above.

2.2 Cost Effectiveness Defined

Ameren Missouri calculated the cost effectiveness of its demand-side management (DSM) measures, programs, and portfolios using the TRC test, the UCT, the participant cost test (PCT), the societal cost test (SCT) and the ratepayer impact measure (RIM) test. In each year of the planning horizon, the benefits of each demand-side program are calculated. The cumulative energy and demand impacts are multiplied by all applicable avoided costs, and then summed into net present values for the timeframe considered. The definitions of the tests, drawing upon the California Standard Practice protocol for DSM economic assessment, are outlined below:

The Total Resource Cost test measures benefits and costs from the perspective of the utility and society as a whole. The benefits are the net present value of the energy and capacity saved by the measures. The costs are the net present value of all costs to implement those measures. These costs include program administrative costs and full incremental costs (both utility and participant contributions), but no incentive payments that offset incremental costs to customers and no lost revenues. The full incremental costs include single upfront costs and operational & maintenance costs where applicable. Programs passing the TRC test (that is, having a benefit to cost ratio greater than 1.0) result in a decrease in the total cost of energy services to all electric ratepayers.

The Utility Cost Test measures the costs and benefits from the perspective of the utility administering the program. As such, this test is characterized as the revenue requirement test. Like the benefits in the TRC, the UCT benefits are the net present value of the energy and capacity saved by the measures. Costs are the administrative, marketing and evaluation costs resulting from program implementation along with the costs of incentives but do not include lost revenues. Programs passing the UCT result in overall net benefits to the utility, thus making the program worthwhile from a utility cost accounting perspective. The only difference between the TRC and UCT is that the TRC includes full incremental measure costs whereas the UCT only includes the portion of incremental costs paid for with utility incentives.

The Participant Cost Test measures the benefits and costs from the perspective of program participants or customers as a whole. Benefits are the net present value of savings that participating customers receive on their electric bills as a result of the implementation of the energy efficiency measures plus incentives received by the customer. Costs are the customer's up-front net capital costs to install the measures. If the customer receives some form of a rebate incentive, those costs are considered a credit to the customer and added to the customer's total benefits.

The Societal Cost Test is a variation of the TRC that includes "externalities" and uses a social discount rate. Since there has been no protocol to establish inputs to the SCT

in Missouri, Ameren Missouri calculated the SCT for each of its DSM programs using "placeholder" values. Benefits were increased by 10% across the board and a lower discount rate was used to estimate SCT values for each program.

The Ratepayer Impact Measure test measures the difference between the change in total revenues paid to a utility and the change in total costs to a utility resulting from the energy efficiency programs. If a change in the revenues is larger or smaller than the change in total costs (revenue requirements), the rate levels may have to change as a result of the program.

Table 2.4 below visually summarizes the categories of costs and benefits that are incorporated in each cost effectiveness test.

Table 2.4: Summary of Cost Effectiveness Tests

Component	TRC	UCT	PCT	RIM	SCT
Energy and capacity related avoided costs	Benefit	Benefit		Benefit	Benefit
Incremental equipment and installation costs	Cost		Cost		Cost
Program overhead costs	Cost	Cost		Cost	Cost
Customer Rebates		Cost	Benefit	Cost	
Bill Savings			Benefit	Cost	
Non Energy Benefits					Benefit

Notice that "Bill Savings" are a cost in the RIM test. This recognizes the fact that fixed costs must be recovered from customers which ultimately cause an increase in customer rates. Furthermore, the bill savings are a function of rate design; that is, the participant's bill goes down based on the magnitude of the energy (and demand) savings and the volumetric rate. Since Ameren Missouri has a large portion of its fixed costs being collected in the volumetric rates, participants achieve greater bill savings while the utility's financial disincentive increases.

All of the cost effectiveness tests assume fixed costs are being recovered. However, unless addressed in the DSIM, the regulatory lag associated with Missouri's ratemaking process prevents timely recovery of those fixed costs and therefore creates a strong economic disincentive for the utility to engage in energy efficiency efforts. These ratemaking and utility financial issues are discussed in the DSIM chapter of this report.

2.3 Program and Portfolio Cost Effectiveness Results

The breakdown of cost effectiveness by individual program and in total for the portfolio is shown in Table 2.5 below:

Table 2.5: Cost Effectiveness Tests for Implementation Cycle 2016-18

	TRC	UCT	PCT	RIM	RIM (Net Fuel)	SCT
RES-Lighting	1.24	1.24	∞	0.33	0.39	1.90
RES-Efficient Products	1.48	2.47	2.66	0.69	0.80	2.22
RES-HVAC	1.45	2.25	3.51	0.56	0.63	2.02
RES-Appliance Recycling	1.73	1.73	∞	0.41	0.47	2.23
RES-Low Income	0.79	0.81	5.82	0.35	0.39	1.07
RES-EE Kits	1.53	1.53	15.43	0.38	0.44	2.05
RES-TOTAL	**1.36**	**1.72**	**5.67**	**0.46**	**0.53**	**1.93**
BUS-Standard	1.53	2.00	3.65	0.54	0.65	2.08
BUS-Custom	1.74	2.58	3.40	0.63	0.77	2.39
BUS-RCx	1.40	1.54	6.72	0.49	0.59	1.94
BUS-New Construction	1.48	2.48	2.77	0.64	0.78	2.13
BUS-TOTAL	**1.64**	**2.32**	**3.52**	**0.60**	**0.72**	**2.26**
EE PORTFOLIO TOTAL	**1.53**	**2.07**	**4.11**	**0.54**	**0.64**	**2.13**

The primary metric to review is the TRC, which the Commission's rules and the enabling MEEIA legislation define as a preferred cost effectiveness test for approving demand-side programs. In essence, the TRC is the screening test that indicates that a measure, program, or portfolio is beneficial on a system-wide basis. The UCT test is also important as it represents the total impact to utility revenue requirements and is the basis for calculation of the shared net benefits that make up the DSIM, as described in the DSIM chapter of this report.

Table 2.6 summarizes the benefits and costs associated with each test.

Table 2.6: Portfolio Cost Effectiveness Summary

Cost Test	NPV of Benefits	NPV of Costs
TRC	$261,306,074	$170,408,353
UCT	$261,306,074	$126,156,913
PCT	$411,303,529	$100,157,247
RIM	$261,306,074	$481,554,634
SCT	$375,672,084	$176,204,353

Looking specifically at the TRC, the benefits of the program total more than $90 million over the lifetime of the program (extending beyond three years as most measures in the portfolio have effective useful lives exceeding 3 years).

Avoided Costs

As discussed above, one of the primary inputs to the cost effectiveness testing is the avoided cost assumptions used to value saved energy and capacity. The development of the avoided cost curves that were used in the 2013 Energy Efficiency Potential Study were grounded in the analysis of the IRP and are discussed in detail in Chapter 2 of the IRP filing made on October 1, 2014 in File No. EO-2015-0084. Forward energy market prices were developed using modeling software provided by Ventyx and commonly referred to as "MIDAS." The results of this production cost model provided fifteen unique forward power price forecasts that would include probable environmental costs by adjusting the following input variables:

1. Natural gas
2. Load growth
3. Coal plant retirements
4. Cost of carbon

Each of these power price forecasts was given a weighting based on the combined probabilities of the inputs, and the final price was the probability weighted average of the fifteen scenario price forecasts. Finally, a basis adjustment was applied to adjust the Indy Hub prices to bring them in line with expected Ameren Missouri prices.

Table 2.7 shows the avoided costs used for the valuation of Ameren Missouri's DSM efforts in the IRP analysis and for purposes of this filing.

Table 2.7: Avoided Costs - **HC**

Year	Energy ($/MWH)	Capacity ($/kW-Year)	Distribution ($/kW-Year)	Transmission ($kW-Year)
2016	$27	** [redacted] **	$17	$6
2017	$29	** [redacted] **	$18	$6
2018	$32	** [redacted] **	$18	$6
2019	$34	** [redacted] **	$18	$6
2020	$36	** [redacted] **	$19	$6
2021	$39	** [redacted] **	$19	$6
2022	$42	** [redacted] **	$19	$7
2023	$45	** [redacted] **	$20	$7
2024	$48	** [redacted] **	$20	$7

NP

2025	$53	** [redacted] **	$21	$7
2026	$56	** [redacted] **	$21	$7
2027	$58	** [redacted] **	$21	$7
2028	$61	** [redacted] **	$22	$7
2029	$64	** [redacted] **	$22	$7
2030	$67	** [redacted] **	$23	$8
2031	$70	** [redacted] **	$23	$8
2032	$74	** [redacted] **	$24	$8
2033	$77	** [redacted] **	$24	$8
2034	$82	** [redacted] **	$25	$8

2.4 Comparison with MEEIA 2013-15 RAP Portfolio

One thing is immediately evident when reviewing the planned savings for MEEIA 2016-18 compared to the ongoing MEEIA 2013-15 programs. The energy savings are significantly less than the total savings from the 2013-15 period, while the costs of achieving those savings are similar. As one would expect, that causes the cost effectiveness ratios of the 2016-18 portfolio to be significantly less than the same ratios from 2013-15. While this may initially be surprising, there are three important reasons for the significant decline in savings potential. To facilitate the comparison of the two cycle portfolios, Table 2.8 below compares three-year total savings and budgets by program and portfolio.

Table 2.8: Comparison of 2013-15 and 2016-18 Targeted Savings and Budgets

	Net Incremental Energy Savings						Total Program Costs					
	2013-15 Portfolio			2016-18 Portfolio			2013-15 Portfolio			2016-18 Portfolio		
Residential Portfolio	MWh	% of Res Portfolio	% of Total Portfolio	MWh	% of Res Portfolio	% of Total Portfolio	$ Mill	% of Res Portfolio	% of Total Portfolio	$ Mill	% of Res Portfolio	% of Total Portfolio
Lighting	280,466	55%	35%	61,507	37%	15%	$19.7	24%	13%	$15.2	28%	11%
Efficient Products	48,367	10%	6%	14,280	9%	3%	$8.1	10%	6%	$5.0	9%	4%
HVAC	117,247	23%	15%	50,958	31%	12%	$30.4	36%	21%	$20.3	37%	15%
Appliance Recycling	37,577	7%	5%	9,743	6%	2%	$7.3	9%	5%	$2.5	4%	2%
HEP	3,211	1%	0%	0	0%	0%	$1.6	2%	1%	$0.0	0%	0%
New Homes	4,935	1%	1%	0	0%	0%	$2.3	3%	2%	$0.0	0%	0%
MFIQ / Low Income	13,666	3%	2%	10,543	6%	3%	$13.5	16%	9%	$6.8	12%	5%
EE Kits	0	0%	0%	18,636	11%	4%	$0.0	0%	0%	$5.5	10%	4%
Residential EE Portfolio Total	505,469	100%	64%	165,667	100%	39%	$82.9	100%	57%	$55.3	100%	41%

NP

	2013-15 Portfolio			2016-18 Portfolio			2013-15 Portfolio			2016-18 Portfolio		
Business Portfolio	MWh	% of Bus Portfolio	% of Total Portfolio	MWh	% of Bus Portfolio	% of Total Portfolio	$ Mill	% of Bus Portfolio	% of Total Portfolio	$ Mill	% of Bus Portfolio	% of Total Portfolio
Standard	100,269	35%	13%	74,476	29%	18%	$21.8	35%	15%	$22.3	28%	17%
Custom	167,619	58%	21%	153,110	59%	36%	$35.3	56%	24%	$44.5	56%	33%
Retro-commissioning	7,560	3%	1%	18,898	7%	4%	$1.1	2%	1%	$7.3	9%	5%
New Construction	12,185	4%	1%	14,231	5%	3%	$4.1	7%	3%	$5.1	7%	4%
Business EE Portfolio Total	287,633	100%	36%	260,715	100%	61%	$62.3	100%	43%	$79.2	100%	59%
MEEIA EE Portfolio Total	793,102		100%	426,382		100%	$145.3		100%	$134.5		100%

It is important to note that the decline in savings is almost entirely confined to the residential portfolio. Specifically, the largest decline in savings in the residential program comes from the lighting program. Despite the large drop in savings in the lighting program in particular and the residential portfolio in general, the budgets to achieve those savings are only slightly lower than the budgets from the 2013-15 programs. There are three over-riding factors that explain almost the entire decline in residential savings potential:

1. Enactment of Federal Appliance Efficiency Standards;
2. 2013 EM&V measure level savings estimates; and
3. Lower avoided costs yielding fewer cost-effective measures.

Federal Appliance Efficiency Standards

The largest single factor contributing to the decline in residential energy efficiency potential is the enactment of federal appliance efficiency standards. The largest part of that effect comes from a single standard; that is, the lighting standard that sets efficiency ratings for standard medium screw base light bulbs that was promulgated as a part of the Energy Independence and Security Act of 2007 (EISA). The EISA standard becomes effective in stages. The first stage covering the years of 2012-2014 phased in an efficiency requirement that traditional incandescent bulbs, which historically dominated the lighting market, could not meet. That change resulted in the baseline technology against which efficient options are measured moving from incandescent bulbs to halogen bulbs. The 2012-14 phase of EISA partially impacted the 2013-15 programs, but is fully in place prior to the initiation of the 2016-18 program cycle. Additionally, as efficient bulb technologies such as CFLs and LEDs have much longer lives than incandescent or halogen bulbs, the latter parts of the useful lives of lighting measures extend into the effective period of the 2020 EISA standard. That standard further moves the baseline, reducing the attributable savings to long-lived lighting measures that may be incented during the 2016-18 program years. The two phases of EISA that increasingly tighten the efficiency standard applicable to baseline lighting serve to markedly reduce the total lighting potential between the first and second MEEIA program cycles.

While the EISA lighting standard is the most notable contributor to decline in potential, there are numerous efficiency standards that are removing potential from utility programs. Figure 2.1 below shows a list of residential end uses and the standards that are coming in future years, most of which have the same directional impact on potential as the EISA lighting standard.

Figure 2.1: Residential End Use Efficiency Standards

Today's Efficiency or Standard Assumption
1st Standard (relative to today's standard)
2nd Standard (relative to today's standard)

End Use	Technology	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cooling	Central AC	SEER 13													
	Room AC	EER 9.8			EER 11.0										
	Evaporative Central AC	Conventional													
	Evaporative Room AC	Conventional													
Cooling/Heating	Heat Pump	SEER 13.0/HSPF 7.7			SEER 14.0/HSPF 8.0										
Space Heating	Electric Resistance	Electric Resistance													
Water Heating	Water Heater (<=55 gallons)	EF 0.90			EF 0.95										
	Water Heater (>55 gallons)	EF 0.90			Heat Pump Water Heater										
Lighting	Screw-in/Pin Lamps	Incandescent		Advanced Incandescent - tier 1 (20 lumens/watt)						Advanced Incandescent - tier 2 (45 lumens/watt)					
	Linear Fluorescent	T12		T8											
Appliances	Refrigerator/2nd Refrigerator	NAECA Standard		25% more efficient											
	Freezer	NAECA Standard		25% more efficient											
	Dishwasher	Conventional (355kWh/yr)		14% more effident (307 kWh/yr)											
	Clothes Washer	Conventional (MEF 1.26 for top loader)			MEF 1.72 for top loader			MEF 2.0 for top loader							
	Clothes Dryer	Conventional (EF 3.01)			5% more efficient (EF 3.17)										

While not yet as prominent in reducing business program potential, a similar list of commercial efficiency standards is shown in Figure 2.2 below that are reducing potential for those programs.

Figure 2.2: Commercial End Use Efficiency Standards

End Use	Technology	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Cooling	Chillers	2007 ASHRAE 90.1													
	Roof Top Units	EER 11.0/11.2													
	Packaged Terminal AC/HP	EER 11.0/11.2													
Cooling/Heating	Heat Pump	EER 11.0/COP 3.3													
Ventilation	Ventilation	Constant Air Volume/Variable Air Volume													
Lighting	Screw-in/Pin Lamps	Incandescent		Advanced Incandescent - tier 1 (20 lumens/watt)						Advanced Incandescent - tier 2 (45 lumens/watt)					
	Linear Fluorescent	T12		T8											
	High Intensity Discharge	88 lumens/watt													
Water Heating	Water Heater	EF 0.97													
Refrigeration	Walk-in Refrigerator/Freezer	EISA 2007 Standard													
	Reach-in Refrigerator	EPACT 2005 Standard													
	Glass Door Display	42% more efficient													
	Open Display Case	18% more efficient													
	Vending Machines	33% more efficient													
	Icemaker	2010 Standard													
Miscellaneous	Non-HVAC Motors	62.3% Efficiency					70% Efficiency								
	Commercial Laundry	MEF 1.26		MEF 1.6											

It is worth noting that the standards shown are only those that are already authorized to go into effect by the Federal government. There is a significant stream of new standards that continues to be proposed.

2013 EM&V Impacts

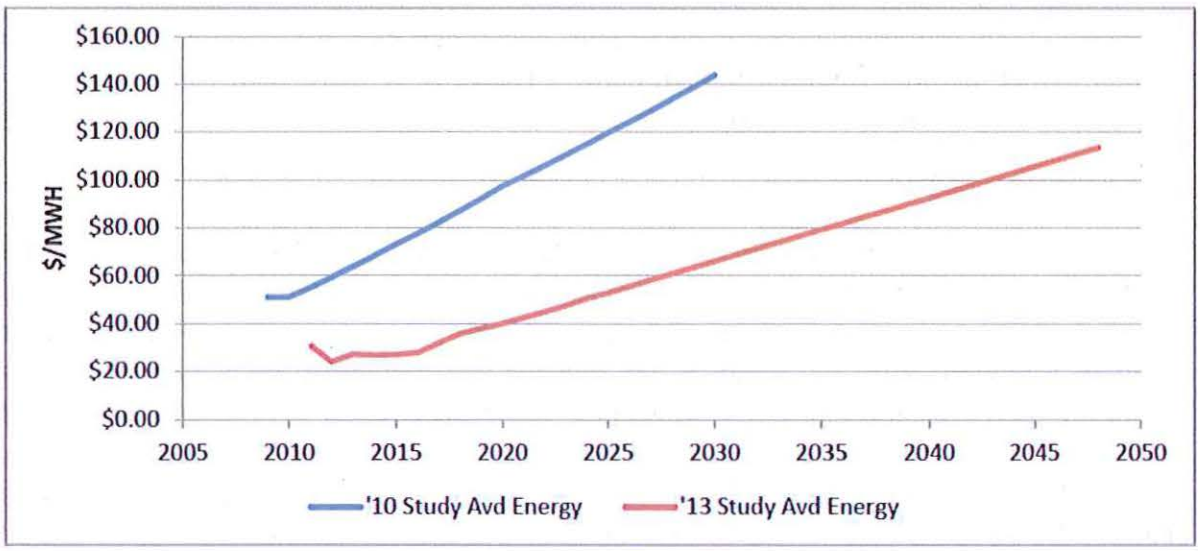
The second factor impacting 2016-18 program potential is the incorporation of the measure saving results of EM&V work from Ameren Missouri's 2013 program year. The potential study estimates savings potential through a process that identifies what measure adoption rates are likely to be realized by customers as a result of utility programs, then uses measure level savings to value the energy savings of the adopted measures. The measure level savings used in the MEEIA 2013-15 programs are contained in Ameren Missouri's TRM. With this filing, Ameren Missouri is updating its TRM for the 2016-18 cycle. The present updates incorporate savings from 2013 EM&V work performed by Ameren Missouri's independent evaluation contractors. While the updated measure savings exhibited both upward and downward revisions from existing TRM values, there was a preponderance of measures, including some key measures, which were assessed markedly lower energy savings than the previous TRM. It should be noted that the 2014 EM&V results will be used to update the TRM values before the new programs start in 2016. More explanation about that process is included in Chapter 4.

One measure that was a central part of the Company's portfolio plan was impacted so severely that it is no longer cost effective. That measure is programmable thermostats. 2013 EM&V found that, while programmable thermostats can generate meaningful savings, the majority of customers that have them installed override the settings and operate their thermostat in a manual mode. Of course, that means for such customers it saves nothing since the previous thermostat operated similarly. This is one of the more extreme examples, but there were many measures with similar declines in savings that resulted from EM&V.

Lower Avoided Costs

The market values of energy and capacity utilized to estimate Ameren Missouri's avoided costs were reported previously in this section of the report. What is not evident from Table 2.7 is how those avoided costs compare to those utilized for the MEEIA 2013-15 programs. In short, they are markedly lower. In fact, they are close to half of the former avoided cost curves. The 2013-15 and 2016-18 avoided energy cost curves are shown in Figure 2.3 below.

Figure 2.3: Avoided Energy Cost Comparison – 2013-15 vs. 2016-18



The decline is impossible to miss. There are two primary causes of the energy market price decline. First, lower load growth has been observed over the last few years due to the combination of a less robust than expected recovery from the severe recession of 2007-2009 and increasing customer energy efficiency induced both by utility programs as well as codes and standards. Secondly, and even more significantly, a marked decrease in the market price of natural gas, which is frequently the fuel that fires marginal generators that establish wholesale electricity market clearing prices, has significantly depressed peak power prices. The natural gas prices used in the 2010

study were based on 2009-2010 data, which was prior to the boom in production of gas from shale formations that has caused precipitous declines in observed market prices and expectations of future gas prices. The confluence of these two factors caused the marked decrease in the avoided costs illustrated above.

The impact of lower avoided costs on energy efficiency is that the benefits of energy efficient measures have become smaller. Lower avoided costs can cause marginally cost-effective measures to become no longer cost effective, reducing potential; or can cause cost-effective measures to simply be less cost effective. Either result reduces the total benefits realized by customers. As is relevant to the discussion of the comparison of 2013-15 planned savings to the 2016-18 planned savings, the important piece is the measures which are no longer cost effective. For MEEIA 2013-15, 47 residential, 104 commercial, and 43 industrial measures, representing a total of 194 measures, passed the economic screen for cost effectiveness. With the lower avoided costs described above, MEEIA 2016-18 programs include 43 residential, 100 commercial, and 39 industrial measures, for a total of 182 measures that were screened as cost effective. That is a net loss of 12 measures, representing 6% of the number that were previously cost effective.

An additional note, the 182 measures that are cost effective for MEEIA 2016-18 are less cost effective than they were in MEEIA 2013-2015. This is the majority of the reason that the cost effectiveness tests for MEEIA 2016-18 are roughly half of MEEIA 2013-15. The 2016-18 TRC of 1.53 compares to the 2013-15 TRC metric of 2.07. This will have significant ramifications on the levels of shared net benefits calculated for purposes of the DSIM in Chapter 3 of this report.

In summary, the savings Ameren Missouri is targeting for the 2016-18 program years is significantly less than its MEEIA 2013-15 plan at a similar budget. That should not in any way be viewed as a reduction in Ameren Missouri's commitment and effort toward delivering all cost-effective energy efficiency to its customers. It is in fact an outcome of circumstances outside of the Company's control. With approval of the MEEIA 2016-2018 plan, Ameren Missouri will continue to vigorously pursue cost-effective opportunities to generate savings for its customers as they are possible within the environment in which it is delivering programs.

Ameren Missouri Expert/Witness: Richard A. Voytas

Chapter 3 - Demand Side Investment Mechanism

The DSIM included in Ameren Missouri's MEEIA 2016-18 plan reflects a set of regulatory policies and practices that align the financial interests of the Company with helping its customers use energy more efficiently and in a manner that sustains or enhances its customers' incentives to use energy more efficiently. For Ameren Missouri's MEEIA 2016-18 energy efficiency programs, the DSIM from MEEIA 2013-15 provides a useful framework from which to begin. In fact, the basic structure of the DSIM proposed for MEEIA 2016-18 is very similar in most respects to the DSIM that is currently in place for the MEEIA 2013-15 programs. Ameren Missouri has updated its analysis to reflect new portfolio characteristics and avoided costs, from which Ameren Missouri has produced new sharing percentages for the throughput disincentive and financial performance incentive components of the DSIM. Overall the existing framework has been effective in aligning incentives and otherwise discharging the Commission's obligations under MEEIA, as evidenced by the success of the MEEIA 2013-15 programs to date. The key components of the existing DSIM should be retained for MEEIA 2016-18. The operation of the DSIM and its defined terms, which are explained in this report, are outlined in detail in the Rider EEIC 1618 tariff, included with this filing as Appendix B.

3.1 Program Cost Recovery

For the program cost recovery component of the DSIM, Ameren Missouri proposes to continue the practice of forecasting the coming year's program expenses[7] and including those expenses in its Rider EEIC 1618. Each month, the cumulative difference between actual program expenditures and actual revenues collected for program costs shall accrue short-term interest and be trued up through the Rider over the following year. In short, the Rider 1618 EEIC reflects identical treatment of program costs as reflected in the current Rider EEIC.

3.2 Throughput Disincentive

The second mechanism of the 2013-15 DSIM that is proposed to continue for MEEIA 2016-18 is the sharing of net benefits between customers and the Company in order to offset the throughput disincentive. The share of net benefits retained by the Company to offset the throughput disincentive is frequently referred to by the acronym "TD-NSB",

[7] Program costs eligible for recovery include such items as program design, administration, delivery, end-use measures and incentive payments, evaluation, measurement and verification, market potential studies and work on the TRM. The majority of costs are recorded on the Company's general ledger in account 908, with certain administrative costs going to account 930.

which is defined in Rider EEIC 1618. The throughput disincentive arises from regulatory lag and the traditional rate making process. Because the rates charged by the Company are based on historical cost and sales information, the nature of energy efficiency programs to reduce sales in the future can and does prevent the utility from recovering the costs it incurs to provide service to its customers.

As a more detailed illustration of this problem, consider the rate case that the Company filed on July 3, 2014. The test year for that case is the 12 month period ended March 2014. However, if the case follows recent practices, the final sales used in the denominator of the $/kWh rates the Company ends up charging will be based on customer usage from the 12 month period ended July 2014. The rates from that case are likely to take effect on or around the beginning of June 2015. Assuming a January 1, 2016 start for MEEIA 2016-18 programs, the Company will charge rates based on the current rate case when the MEEIA 2016-18 programs begin. Any savings from energy efficiency programs in 2016 and beyond will then drive sales lower than they otherwise would have been, and possibly lower than the sales from the test period of the rate case where rates were established. It should be fairly obvious that if energy efficiency drives sales lower than the levels from the rate case test year, the Company's ability to recover its fixed costs would be impaired. However, the fact is that even should total customer usage grow in spite of the impact of MEEIA programs, energy efficiency still negatively impacts the recovery of fixed costs. To understand why that is the case, it is important to remember that it is likely that the Company's costs will be increasing at the same time that energy efficiency savings are being created. In this case, MEEIA program kWh savings takes away some of the positive impact of regulatory lag associated with sales growth that helps offset the negative financial impacts of regulatory lag associated with increasing fixed costs. To the extent that the sales end up higher than the rate case test year, energy efficiency savings under the MEEIA programs are still detrimental to the utility's ability to collect its costs of providing service. The negative financial impacts of the MEEIA savings will persist for as long as the energy efficient measures are creating savings, or until another rate case is completed. A new rate case resets the rate to incorporate the impact of the energy efficiency savings on billing units used to establish that rate, along with all other relevant cost and usage trends. Once the first rate case is concluded after the savings occur, the impact from the energy efficiency programs that were realized during the test year are now part of the billing units used to establish rates and the impact of the throughput disincentive from those particular savings stops. However, since additional program savings impacts are likely to still be accumulating, a new amount of throughput disincentive impacts begins to build. Not until a rate case that has a test year after the entire 2016-18 program cycle is concluded will the full impacts of the throughput disincentive of this MEEIA cycle be remedied. The process of building all of the energy efficiency savings into rates is illustrated in Figure 3.1 below.

Figure 3.1: Regulatory Lag – Actual EE vs. EE in Rates

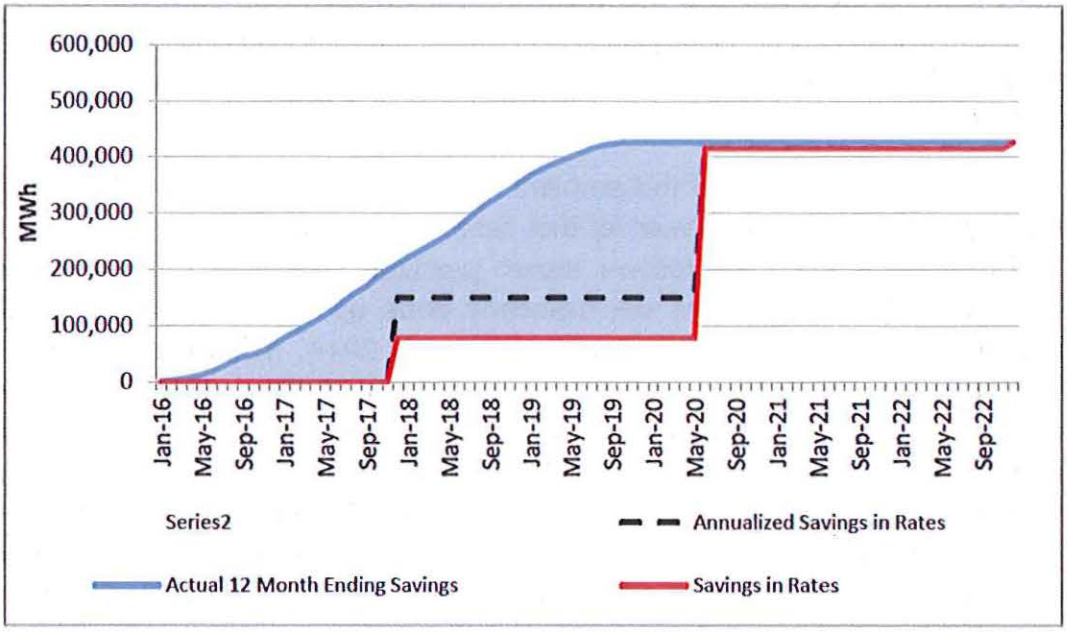


Figure 3.1 illustrates the problem of the throughput disincentive. The blue line represents the actual savings that are impacting customers' bills through lower usage, which accumulate continuously as energy efficiency programs are run. Since there are no savings from the programs embedded in the rates at the beginning of the programs, all of those savings negatively impact the utility's fixed cost recovery. Once a rate case occurs, some amount of energy efficiency which impacted bills during the test period for the case becomes embedded in rates. The red line represents that amount of savings that has impacted rate calculations.[8] The shaded light blue area represents the total amount of savings that is subject to the throughput disincentive. Said another way, these are the megawatt-hours of usage that the Company was counting on contributing to fixed cost recovery that it is no longer actually receiving.

[8] The dashed black line represents the amount in rates if the billing units in that case include an annualization adjustment for savings impacts. Later in this report Ameren Missouri will propose to utilize such an approach during MEEIA 2016-18. As is evident from the chart, this increases the amount of savings in rates and consequently reduces the impact of the throughput disincentive.

Analysis of the Throughput Disincentive

Fortunately it is possible to quantify the financial impact of the throughput disincentive with the aid of analysis such as that represented by Figure 3.1 from the above section. For its MEEIA 2013-15 filing, Ameren Missouri developed a model to estimate the throughput disincentive. That model, with a couple of enhancements, has been updated to estimate the throughput disincentive's financial impact on the Company for the MEEIA 2016-18 planned programs. As part of that analysis, there are several key inputs and assumptions necessary to calculate the foregone fixed cost recovery that makes up the throughput disincentive. It is necessary to establish the rate at which the foregone sales would have occurred. The Company has a variety of tariffs under which its customers take service and, even within an individual tariff, there are different charges for different units of consumption.

It is first necessary to assign the energy saved to customer classes in order to identify the tariff under which the saved kWh would have been sold. For this purpose, we use the residential and business portfolio plans to identify the savings that should be attributed to the respective tariffs. That is a simple exercise, as the savings are planned for these customer types in separate portfolios. All savings associated with the residential programs are priced at residential tariff rates and business savings are priced at rates from one of the business tariffs. To identify the specific tariffs from which the expected business savings will draw, the Company looked at the history of the MEEIA 2013-15 business portfolio. For the period of January 2013 through July 2014, the Company identified the reported customer class allocation of deemed savings and assumed that in the future the mix of rates where savings occur would be similar. For business program savings, the following allocation to tariffs was used:

Table 3.1: Rate Class Allocation of Business Savings

Tariff	Rate Class	Share of Business Program Savings
2M	Small General Service	11.8%
3M	Large General Service	51.8%
4M	Small Primary Service	22.4%
11M	Large Primary Service	14.0%

Once the tariff mix for the saved kWhs is identified, the next step is to establish the applicable rate or rates on each tariff that would have been used to price the foregone usage.

Marginal Rate Analysis

Once the tariff associated with the energy efficiency savings is identified, it is necessary to further identify the specific rate that is applied to usage of the customers that is reduced when implementing energy efficiency measures. This is more complicated than it may initially appear, as each customer class has a unique rate structure and not every kilowatt-hour of energy and kilowatt of demand is priced the same. In Ameren Missouri's MEEIA 2013-15 filing, the throughput disincentive calculation was based on average rates paid by each rate class. This meant that all of the revenue that was derived from variable charges other than that designed to collect variable net energy costs was divided by the total kWh of consumption from that class. The result was the average rate paid by customers per unit of electricity consumption. This method was a good and reasonably accurate method for performing the necessary analysis, but a more detailed methodology could produce a more accurate result.

For this filing, the Company determined the marginal rate for the average customer in each tariff class. The distinction between the average rate and the marginal rate is that the average rate, as described in the paragraph above, is what customers pay on average for all of their usage. Because of the unique rate structures, customers might pay a different amount for marginal usage or for the last kWh consumed. This is relevant in the context of the throughput disincentive because customers that use less energy due to installation of energy efficient measures experience a reduction on their bill according to the price of the last kWh consumed. Therefore, using marginal rates will be a more precise measurement of the bill savings to participants and of the throughput disincentive to the Company. This is a much more complicated analysis than calculating average rates, since the marginal rate might be different for every individual Ameren Missouri customer. Therefore, to come up with average marginal rates for each tariff class, every bill of every customer needed to be analyzed.

To do this, the Company first downloaded all of the bills for every customer from the twelve month period ended with the March 2014 billing month. This happens to be contemporaneous with the test year for the ongoing Ameren Missouri rate case, File No. ER-2014-0258. Every bill was then calculated manually based on the applicable usage characteristics and tariff rate components. Next, each bill's usage was reduced by 1%, 5%, and 10%. These usage declines were used to simulate the effect of various energy efficient measures. For example, replacing a couple of light bulbs at a customer premise that has a relatively large load might only impact that customers' consumption by a percent. Replacing the air conditioning unit for a customer might easily save 10% or more of their usage. By analyzing 1%, 5%, and 10% declines, we can see the marginal impact on the bill of assorted types of measures. For each scenario of usage reduction, the bill was recalculated. The result is to have a calculation representing the original bill and a bill after the implementation of various types of energy efficient

measures. The total energy consumption and total billed revenues for each scenario were then summed from the individual customer bills. The three scenarios of usage reduction were compared to the base case by calculating the change in revenue and change in consumption relative to that base case. The division of those two components ($/kWh) results in the average customer's marginal rate.

Table 3.2 below shows the calculations for the residential rate class assuming a 1% usage decline induced by energy efficiency.

Table 3.2: Marginal Rate Study – Residential Class 1% Energy Reduction

		Summer	Non-Summer	Total
Actual Bills	Class Usage (kWh)	4,662,650,000	9,325,760,000	13,988,410,000
	Class Revenue	529,681,301	634,585,613	1,164,266,914
	Average Rate	**$0.114**	**$0.068**	**$0.083**
1% Energy Reduction Case	Change in Usage (kWh)	-46,589,363	-93,249,742	-139,839,105
	Change in Revenue	-5,296,813	-5,474,315	-10,771,128
	Marginal Rate	**$0.114**	**$0.059**	**$0.077**
	Marginal Rate vs Average Rate	**100%**	**86%**	**93%**

Note that in the summer, the marginal and average rates are identical for this class. That is logical considering the rate structure. In the summer period, all kWh of residential demand are priced the same. If every unit of energy has the same price, by definition the average and marginal unit must have the same price. However, in the non-summer period, the first 750 kWh of consumption per customer per month are priced at one rate and any additional kWhs are priced at a lower rate. This is called a declining block rate structure, and effectively acts like a "volume discount" for large users in the winter period.[9] Since the marginal usage for many customers occurs in the lower priced block, the bill reductions will actually occur at something less than the average energy rate. In this case, after analyzing all of the bills from that one year period, the marginal rate is 93% of the average rate (or 7% lower). That marginal rate is used in the analysis to estimate the throughput disincentive.

For the other rate classes, the results are noticeably different. Each tariff has distinctive features of rate design. For the Small General Service (SGS) class, the rate design is

[9] The rationale for this type of rate structure is grounded in the fact that Ameren Missouri's maximum load occurs in the summer time. Capacity is built to meet that load, but often results in excess capacity in the winter. The declining block winter rate reflects lower costs associated with more efficient utilization of the company's existing fixed assets.

similar to residential, with one notable exception; the size of the block after which the non-summer period volume discount kicks in is variable and customer specific. Each customer's May through October billing month usage is used to establish the cut off point for the declining block rate. When a customer uses less in the May-October time frame as they implement energy efficient measures, they essentially establish for themselves a more favorable block cut off for the non-summer months, giving them a discount on more usage for the rest of the year. This unique feature of this rate actually causes the marginal rate to be higher than the average rate on an annual basis.

For the Large General Service (LGS) and Small Primary Service (SPS) rate classes, there is a common rate design that is sometimes referred to as an hours use rate. It is a quite complex rate that is not described fully here due to the technical complexity, but the workpapers with the filing have all of the supporting details. The notable feature of this rate is that because this rate is applicable to a wide range of usage levels of customer and incorporates interactions between a demand and energy charge, the hours use rate causes the average and marginal rates to be identical for all customers and usage levels that have a constant load factor[10]. The only way the marginal rate and average rate can be different is if the energy efficient measure impacts the customer's billing demand differently than its energy. To assess the relative impacts of energy efficiency on energy consumption relative to demand, the Company used the EM&V assessment of demand and energy impacts of its 2013 MEEIA programs. Even though the rate design is slightly different, a similar method was utilized for the Large Primary Service (LPS) rate class. The result is different on a class by class basis due to the load characteristics of that class and how they interact with the demand and energy savings associated with efficient measures. The results of the analysis for each class are presented in Table 3.3 below:

Table 3.3: Marginal Rate as a Percentage of Average Rate

Class	Summer	Winter	Annual
RES	100.0%	86.3%	92.5%
SGS	100.0%	103.3%	101.8%
LGS	95.3%	96.4%	95.9%
SPS	103.9%	102.8%	103.3%
LPS	105.7%	100.7%	103.0%

[10] The load factor is the ratio of the average usage level to the maximum usage level. It is informative about how efficiently a load utilizes capacity. A high load factor is indicative of a customer that has a relatively flat usage profile. This results in a lower average rate for the high load factor customer, since there isn't a need to build as much excess capacity that will remain idle during the customer's lower usage periods.

It should be noted that the various cases (i.e. 1%, 5%, and 10% reductions) produced extremely similar results to each other, to the point of being immaterial in terms of the differences. This indicates that regardless of the size of the impact of the energy efficient measure, the marginal rate is similar.

Additional Throughput Disincentive Analysis Assumptions

As described above, the Company identified the tariffs and rates that would have otherwise been applied to the kWh that end up being saved. Next, the Company assessed what portion of those rates would go toward variable costs and therefore have offsetting cost savings that would leave the Company's earnings unaffected. The costs that vary directly with usage are the net energy costs. Net energy cost recovery is governed by Ameren Missouri's Fuel Adjustment Clause (FAC) tariff. Using the terms of the FAC, we calculated how much of the retail revenue decline associated with energy efficiency usage reductions would actually be offset by a commensurate decline in net energy costs.[11] The result of that analysis was combined with the outcome of the marginal rate analysis above to determine the marginal rate associated only with the recovery of fixed costs.

That rate is based on currently effective tariffs. By the time the savings for MEEIA 2016-18 programs begin causing the throughput disincentive, the current rate case will be complete and new rates will be in effect. During or sometime following the MEEIA 2016-18 program years, another rate case will likely occur, further increasing the marginal rates at which lost fixed cost recovery is occurring. For purposes of this analysis, it is assumed that the rate request in the current rate case will be approved, increasing the impact of the throughput disincentive by 5.5% (the portion of the rate increase associated with fixed costs) and that for future rate cases, the fixed cost portion of the increase is assumed to be 4%.[12] It is also assumed that all rate charges within each tariff class will increase by the same percent as the total fixed cost portion of the rate increase.

Once the future marginal rate for lost fixed cost recovery is established, the Company returned to the data in Figure 3.1 above. Note that over time, the chart shows the amount of kWh savings that is observed in customers' loads but not reflected in the rates being charged to those customers. That volume of usage is priced using the fixed cost component of the marginal rate previously calculated to determine the financial impact of the throughput disincentive. The light blue shaded area in that chart represents the savings volume for which the Company would have anticipated to

[11] Based on the contribution that the existing net energy rate in the FAC tariff and the 5% share of incremental off-system sales revenue that would be retained by the Company pursuant to that FAC tariff.
[12] As described below, rate cases are assumed to be 30 months apart, so a 4% increase relates to the accumulation of roughly 1 ½% per year in cost increases.

receive recovery but for the effects of its energy efficiency programs. This chart itself has two key assumptions involved in its creation.

The first key assumption is the frequency of future rate cases. In its MEEIA 2013-15 filing, the throughput disincentive analysis assumed the Company would, on average, file rate cases every 18 months. That was consistent with recent experience and the Company's then current expectations. Since that time, there is now an example where the Company went 29 months between filing rate cases. The last two general rate cases filed by Ameren Missouri were ER-2012-0166 (filed in February of 2012) and ER-2014-0258 (filed in July of 2014.) That span of 29 months was notably longer than the 18 month assumption used in the 2013-15 MEEIA analysis. All other things being equal, the Company's ability to stay out of a rate case for that length of time causes it to under-recover the throughput disincentive given the sharing percentage it is using. Looking forward, Ameren Missouri anticipates the recent two cases to be closer to the norm, rather than the exception. The Company has been focusing vigorously on control of its operation and maintenance expenses in an effort to have fewer and smaller rate cases. The timing of future major capital projects also makes the need for rate cases during the 2016-18 timeframe even more uncertain. Based on these facts, the Company believes that the appropriate interval to assume for future rate cases is 30 months. While this assumption does increase the sharing percentage needed to offset the throughput disincentive relative to the 18 month assumption used for the 2013-15 cycle, there are other customer benefits associated with it, such as more stable future rates. As will be discussed in the Implementation chapter of this report, the Company will have some ability to mitigate the impact of this assumption should more frequent rate cases that are not currently anticipated become necessary.

The second material assumption embedded in Figure 3.1 is the presence of two scenarios for how rates would be established in future cases. In File No. ER-2012-0166, Ameren Missouri's rates were set based on billing units that included an annualization adjustment to account for the impacts of energy efficiency program savings. In Figure 3.1, the red line is associated with assumed rate cases that do not include an annualization adjustment. The dashed black line contemplates including an annualization adjustment. While the Company's 2012 rate case did incorporate energy efficiency annualization of the billing units, MEEIA 2013-15's throughput disincentive share of net benefits did not. For MEEIA 2016-18, the Company proposes that such an adjustment be used in all rate cases that have test years with MEEIA 2016-18 kWh savings in them. The adjustment works as follows:

In any test year of a rate case, the parties look at the actual sales to customers as adjusted for the impact of abnormal weather to establish the sales volumes on which rates are based. To the extent that energy efficiency savings occurred in that year, the sales volumes inherently reflect their impact. However, a measure that was installed

toward the end of a test year only impacted the full test year sales to a fraction of the degree that it will impact sales going forward. Consider, for example, a test year that coincides with a calendar year (January through December). If a customer implements a measure such as an LED light bulb in early December, there is only one month of sales data from that customer that includes the impact of the light bulb. In the twelve month period following the test year, the measure will be in place the entire time and have 12 times the impact that it had in the test year (12 months instead of 1 month). In the context of the rate case, the Company plans to analyze the measures installed by rate class, assess the time that those measures were in effect, and impute the savings that would have occurred had they been in effect for a full year into the test year sales. This lowers the test year billing units to a level that reflects the expectation that the energy efficient measure will be in place when the rates are in effect.

Making this annualization adjustment to rate case test year sales will reduce the impact of the throughput disincentive by providing a more timely reflection of kWh savings in rates. This is consistent with the types of adjustments usually contemplated in rate cases and mitigates the effects of the throughput disincentive in a way that reduces the required TD-NSB retained by the Company. In addition, the energy efficiency annualization adjustment will be applied only to the energy savings of the MEEIA 2016-18 programs so there will not be a conflict with the MEEIA 2013-15 DSIM.

Throughput Disincentive Analysis Results

Based on the assumptions detailed above, the marginal rate analysis, the proposed 30 month rate case interval with annualized billing units, and future rate increase magnitude assumptions, the Company has estimated the TD-NSB for its MEEIA 2016-18 programs. The 2016 net present value (NPV) of the total net avoided cost benefits, based on the UCT planned for the 2016-18 timeframe, are $135.1 million. The 2016 NPV of the throughput disincentive estimate is $44.0 million, resulting in a sharing percentage of 32.57%. This is larger than the 26.34% TD-NSB from MEEIA 2013-15, which is expected based on the lower avoided costs in this three year cycle as well as an assumption of less frequent future rate cases.

Sensitivity to Key Assumptions

The framework for conducting the throughput disincentive analysis is grounded solidly in the rate making process in Missouri. However, it is forward looking and sensitive to assumptions about the future. The most significant assumptions that could cause the actual impact of the throughput disincentive to differ from that modeled here are those around future rate cases. First, the timing of those rate cases comes into play. It is logical that the longer the time between rate cases, the larger the fixed cost recovery issue becomes, as the rate case is the ultimate mechanism to "reset" billing units and

therefore end the fixed cost recovery impacts of past energy efficiency program activity. The analysis is also not perfectly linear, meaning that it is not as easy as saying every month a rate case moves is worth some dollar level. Recall that the analysis showed that with 30 months between future rate cases, the 2016 NPV of the throughput disincentive was $44.0 million and 32.57% of net UCT benefits.

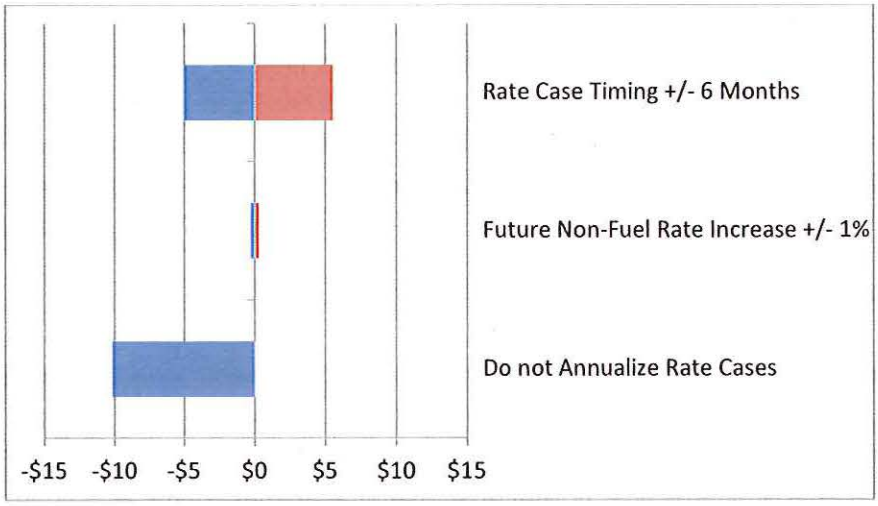
If the actual rate case timing should turn out to be every 24 months, the 2016 NPV of throughput disincentive impacts would decline by $5.0 million, or 3.7% of net UCT benefits. In the alternative, if rate case timing is further extended to 36 month intervals, the NPV of the throughput disincentive impact grows by $5.5 million, or 4.1% of net UCT benefits.

Another key assumption mentioned in the analysis of the throughput disincentive is the notion that in future rate cases, billing units for the test year will be annualized to account for the impact of all energy efficient measures sold by the end of the test year. Taking this step reduces the required TD-NSB. Should future rate cases forego this step (but still occur at the assumed 30 month interval), the 2016 NPV of the throughput disincentive would increase by $9.9 million, or 7.3% of net UCT benefits.

Finally, though less impactful than the two previous rate case assumptions, the magnitude of future rate increases (fixed cost portion) has influence on the realized fixed cost recovery issue. If, instead of 4% increases in future rate cases, the true increase is 5% or only 3%, the 2016 NPV impact is plus or minus approximately $300,000 (the throughput disincentive impact is smaller with smaller rate increases and vice versa), or 0.2% of net UCT benefits.

Figure 3.2 below summarizes the impacts of the key assumptions in the analysis of the financial impact of the throughput disincentive.

Figure 3.2: TD-NSB NPV Sensitivity to Key Assumptions ($MM)



3.3 Performance Incentive Award

As discussed above, MEEIA establishes a state policy of valuing demand side investments equal to traditional investments in supply and delivery infrastructure. In support of the policy, one of the three requirements established for the Commission is to provide utilities with timely earnings opportunities associated with cost-effective energy efficiency savings. This requirement demonstrates that the legislature clearly understood that in order for the state policy of valuing demand side and supply side resources equally to be effective, all stakeholders, notably including utility management and shareholders, must be fully committed to and engaged in the effort. Providing program cost recovery and removing the throughput disincentive help remove obstacles to utility engagement, while an earnings opportunity drives the utility to make delivery of outstanding energy efficiency programs a business priority, as outlined below.

When evaluating demand side resources relative to supply side resources, utility management will ultimately look at, among other things, the earnings impact of its choice. Supply side resources are generally assets constructed by the utility, requiring the utility to deploy capital on which it will eventually earn a return. The equity portion of that return is manifest as earnings to the utility. Investing in supply side resources therefore is ultimately the way that utilities grow their earnings and grow their business. In order to replicate that growth so that demand side and supply side resources can be viewed equally by utility management, demand side resources must provide a return, and one that is competitive with supply side alternatives.

IRP Analysis

The context for making decisions regarding the relative value of demand side and supply side resources is the IRP. Ameren Missouri filed its current IRP on October 1, 2014. In that filing, the RAP energy efficiency portfolio was identified as a part of the preferred resource plan. It should be noted, however, that the inclusion of the RAP portfolio in the preferred plan was conditioned on continuation of constructive regulatory treatment of programs consistent with the requirements of the MEEIA legislation.

As part of the IRP analysis, Ameren Missouri analyzed what an alternative resource plan would look like at the RAP level, both with and without energy efficiency. Under the no energy efficiency plan, Ameren Missouri would need to construct three supply side resources, all natural gas fired combined cycle plants, during the twenty year planning period to meet capacity needs (in addition to new renewables being built for Renewable Energy Standard compliance and portfolio diversification). The first combined cycle would be needed in 2023, the second in 2031 and the third in 2034. With RAP energy efficiency, the need for combined cycle plants in 2023 and 2031 would be deferred to 2034 and 2040. The alternative resource plan with combined cycle units much later in the planning period requires significantly less capital investment by the utility and consequently would produce significantly lower utility earnings over time. For purposes of understanding the performance incentive opportunity, it is instructive to understand the earnings difference that is manifest as an alternative resource plan moves from one without energy efficiency to one with it.

For purposes of this analysis, Ameren Missouri analyzed the annual earnings annuity that would be necessary for energy efficiency to generate in order to produce an equivalent NPV of earnings as the no energy efficiency version of the preferred resource plan. The analysis indicated that the pre-tax earnings annuity would have to be $23.3 million to replicate the NPV of earnings from the supply-side resources.

In Ameren Missouri's first MEEIA filing in 2012, a similar analysis was performed which indicated that a $10 million annual earnings opportunity was necessary to produce a comparable NPV of earnings to the deferred supply side investment. The increase in the result of this analysis from one IRP to the next is due to a number of factors, but most notably the acceleration of the planned retirement of the Meramec Energy Center in 2022 and the movement of the 20 year analysis window into a time period that includes the expected retirement of the Sioux Energy Center. These retirements are fully expected to take place and are driven by not only the age of the plants but the increasing pressure of environmental regulations on Ameren Missouri's coal fired generating fleet. As anticipated in Ameren Missouri's 2012 MEEIA report, over time the changing landscape of resource planning (avoided costs, environmental pressures, load growth, capacity needs and myriad other factors) can cause significant changes in the

value of the deferred earnings. Similarly, we would also observe large impacts in the results if the preferred supply side resource were to change to a more or less expensive technology. All of that being said, Ameren Missouri recognizes that due to the inherent variability of this analysis, one cannot take its results as the sole determinant of the necessary performance incentive for the proper utility incentive. It is also clear that any time the preferred resource plan changes, it will have an impact on utility earnings. However, utilities are not afforded the opportunity to earn based on the most attractive resource to utility management. Even with the context and caveats described above, it would be erroneous to ignore the IRP analysis as it represents the most comprehensive look at the existing incentive structure embedded in current regulatory practices. If, as MEEIA requires, an earnings opportunity is to be afforded utilities when implementing energy efficiency programs, the IRP earnings analysis must be considered, along with other available data points, in order to arrive at a reasonable incentive opportunity.

Incentive Benchmarking

The IRP analysis described above provides a relevant benchmark for establishing a performance incentive, indicating a $23.3 million annual incentive would allow utility decision makers to value demand side resources equally to supply side. Other data points for consideration can be drawn from other states' experiences in handling the same issue.

In an IEE report titled "State Electric Efficiency Regulatory Frameworks," published in July of 2013, there is a comprehensive review of shareholder incentive mechanisms offered in various states around the country. Twenty-eight states offer performance incentives for utility energy efficiency programs, with three additional states in the process of implementing incentives as of the time of the IEE report. Some of those incentives described in the IEE report are reported in terms of absolute dollars of incentives allowed. Since utilities generally, and their energy efficiency portfolios specifically may be of significantly different sizes, comparing absolute dollars of incentives is of little use. However, many state incentive programs are related in terms of either the percent of program costs that a utility may earn as an incentive, a percent of benefits the utility may earn, or in terms of a $/kWh incentive that may be earned. Each of these metrics may be useful for comparing across utilities.

It is also important to point out that some states, specifically restructured states where the distribution utilities no longer own generation, face a different set of incentives than traditional vertically integrated utilities such as Ameren Missouri. When the utility plans, constructs, and owns generation, as discussed in the IRP analysis section above, the earnings opportunities associated with supply side resources that is deferred by energy efficiency can be significant. Distribution only utilities do not have that same incentive to build supply side resources. So it is important to consider the business structure of the

utilities in various states when assessing whether the incentive benchmark is particularly useful for comparisons in Missouri.

With that context it is useful to review several states and the incentives that they allow. The full IEE report is attached to this filing as Appendix C. Some states of note include:

- Minnesota allows incentives up to 9 cents per kWh realized. A previous version of the IEE report indicated that Minnesota's incentives had been quantified at 30% of program costs.
- Texas, despite being a partially restructured state with less supply side incentive issues than Missouri, allows incentives up to 20% of program costs.
- Colorado offers a performance incentive of up to 15% of the net economic benefits for surpassing certain goals.
- Georgia offers an incentive that is 10% of the NPV of net benefits.
- Michigan has authorized an incentive mechanism that allows earnings up to 15% of program costs.
- New Mexico allows an incentive of $.005-$.01/kWh saved and $10-$20/kW saved.
- Oklahoma allows an incentive of 25% of net savings and 15% of program costs where net savings are not quantified.
- South Carolina approved an incentive mechanism that permits 13% of the NPV of benefits from EE programs.

Performance Incentive Award Specifics

In Ameren Missouri's first MEEIA application, it requested the sharing percentage applicable to its performance award for achieving the savings target (100% of goal) be based on the analysis grounded in the IRP and the foregone earnings associated with deferred supply side investment. That amounted to $10 million per program year in incentive based on expected net benefits (again at 100% of goal achievement). Through settlement negotiations, the Company and its stakeholders agreed on that $10 million as the basis for the high end of its incentive range, which was 130% of goal achievement. As described above, the update to that analysis indicates that the same methodology would suggest an incentive opportunity to replace the earnings associated with supply side investment of $23.3 million per program year.

However, Ameren Missouri recognizes that a request of $23.3 million would amount to a material increase over the incentive approved for MEEIA 2013-15. While the IRP analysis indicates this level is ultimately the value most certain to allow utility executives to value demand side options equivalent to supply side, it is also clear that that analysis is very sensitive to changing conditions. In recognition of the customer rate impacts that would result from such an increase in incentive, the performance award reflected in

Rider EEIC 1618 uses that reference point in conjunction with many of the other benchmarks Ameren Missouri has identified to determine a more moderate incentive proposal.

Based on a review of all of the data points discussed above, the performance award in this plan sets the target incentive level at 100% of goal with an opportunity to earn $8.33 million per program year, or a three year total of $25 million. Keeping the same sharing curve relationship as is used in MEEIA 2013-15, this would amount to an annual incentive at 130% of goal at the $13.33 million level, or $40 million for the three-year program cycle. At the 70% threshold for achieving an incentive, the annual incentive would be $5.33 million or $16 million for the three-year cycle. The incentive would be collected over a two year period. These incentive levels are translated into a 2016 NPV[13] in order to be expressed as a share of the NPV of expected net benefits and a share of expected NPV of program costs. The nominal annual incentive is expressed as expected basis points of ROE in Table 3.4 below:

Table 3.4: Financial Performance Incentive Award

% of Goal Achieved	70	100	130
Incentive per Program Year	$5.3	$8.3	$13.3
3-Year Total Incentive	$16.0	$25.0	$40.0
2016 NPV of Incentive	$12.1	$18.9	$30.2
% of Net Benefits	12.8%	14.0%	17.2%
% of Program Costs	9.6%	15.0%	23.9%
$/kWh Achieved Incentive	$0.054	$0.059	$0.072
ROE Basis Points	9	14	23

The 15% of program costs at the 100% of goal level in the request is an incentive level found fairly commonly in other states, with values at or exceeding that level in Michigan, Texas, Minnesota, and Oklahoma. Even at 130% of goal, the 23.9% of program cost incentive is near the level allowed in Texas and the 7.2 cents/kWh is well below the 9 cents available in Minnesota.

The 14 basis points of earnings at 100% of goal is a reasonable level to provide a meaningful incentive to the utility in context of prevailing authorized ROE's although it is lower than the basis points of earnings proposed in Ameren Missouri's MEEIA 2013-15 filing.

[13] The present value assumes that the performance incentive will be collected over 2020 and 2021 using a discount rate of 6.46%. The ultimate timing of collection is subject to change and could result in adjustments to this calculation.

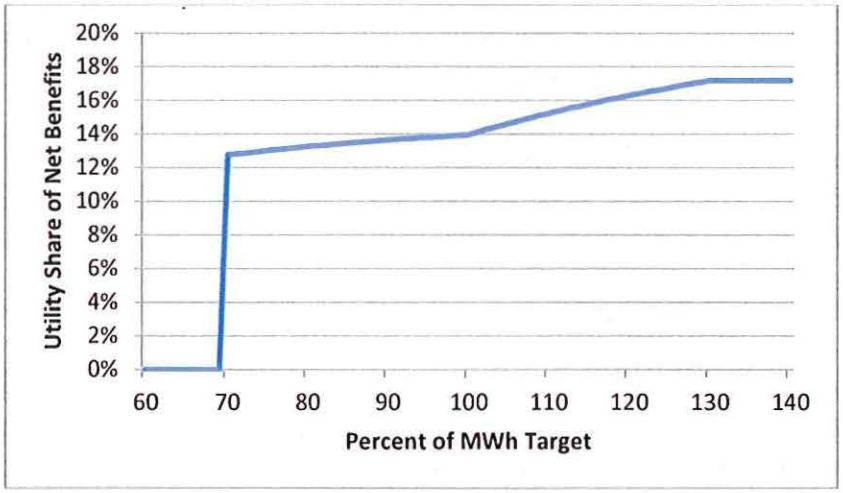
The share of net benefits at 100% of goal achievement of 14.0% is in the same general range as the amounts available in Colorado and South Carolina. While the share of net benefits at 130% of goal at 17.2% is on the higher side of that metric as compared to a number of states, it is still below that offered in Oklahoma. It is also important to note that the marked decline in avoided costs based on today's market conditions relative to a few years ago contribute significantly to this condition. Since the IEE report is summarizing regulatory mechanisms approved in years past, it is probable that agreements designed to produce similar earnings in the future will have noticeably higher shares of net benefits associated with them.

The critical outcome of the determination of the sharing percentage used for purposes of the financial performance award to the utility is that it creates the conditions where utility decision makers value the demand side resource equally to supply side. The ultimate test of that is the analysis grounded in the IRP. Of course Ameren Missouri is cognizant of the context of its MEEIA programs and DSIM. The benchmarking from other states and the customer rate impacts associated with the incentive are relevant considerations that have been given significant weight in determining the award levels for this DSIM. Ameren Missouri is also sensitive to the fact that the savings for the 2016-18 programs are lower than they were in 2013-15 and the increase in incentive request may stand out in that context. However, the facts demonstrate that the reduced savings are a function of maturing programs and evolving market potential, not a reduced commitment from Ameren Missouri to deliver high quality programs. The management of programs in order to successfully deliver the potential savings is every bit the complex task it was previously, and has even greater value to customers in the supply side investment that it avoids. For all of these reasons, Ameren Missouri submits that the financial performance incentive share of net benefits of 14.0% at 100% is a reasonable level that provides proper financial alignment to support aggressive utility pursuit of energy efficiency savings.

Sharing Curve Parameters and Incentive Calculations

The annual and three-year cycle incentive opportunities outlined in the section above are expressed as a share of net benefits curve, as it was in MEEIA 2013-15, with the performance level achieved expressed as a percent of the three-year sharing goal, establishing the share of net benefits that the Company will retain for its incentive. The proposed curve is illustrated in Figure 3.3 below:

Figure 3.3: Financial Performance Incentive – Share of Net Benefits



It should be noted that when comparing this curve to the sharing curve from Ameren Missouri's MEEIA 2013-15, the overriding factor driving higher sharing percentages is the reduction in the avoided energy and capacity costs that establish the value of the benefits of programs. Ameren Missouri is still pursuing the RAP portfolio with a similar budget and, as described above, a similarly complex management challenge. Only a small portion of the increase in sharing percentage is driven by the requested increase in the total incentive dollar level.

The operation of the performance award opportunity is delineated in detail in the Rider EEIC 1618 included with this filing.

3.4 Customer Impacts

The benefits of energy efficiency programs incorporated in the standard cost effectiveness tests (TRC, UCT) reported in the portfolio overview section of this report are estimated only using the utility's avoided costs. The financial impacts of the DSIM mechanism to the customer are incremental costs that will ultimately impact customer bills. However, a balanced assessment of the DSIM proposal must also recognize that the financial impacts of the throughput disincentive are a manifestation of a customer benefit, namely participant fixed cost bill savings, which are also not accounted for in the cost effectiveness ratios.

It is critical to understand what costs and benefits are represented by cost effectiveness tests such as the TRC and UCT. The benefits for both of these tests include the following categories: avoided energy, avoided capacity and avoided transmission and distribution investment.

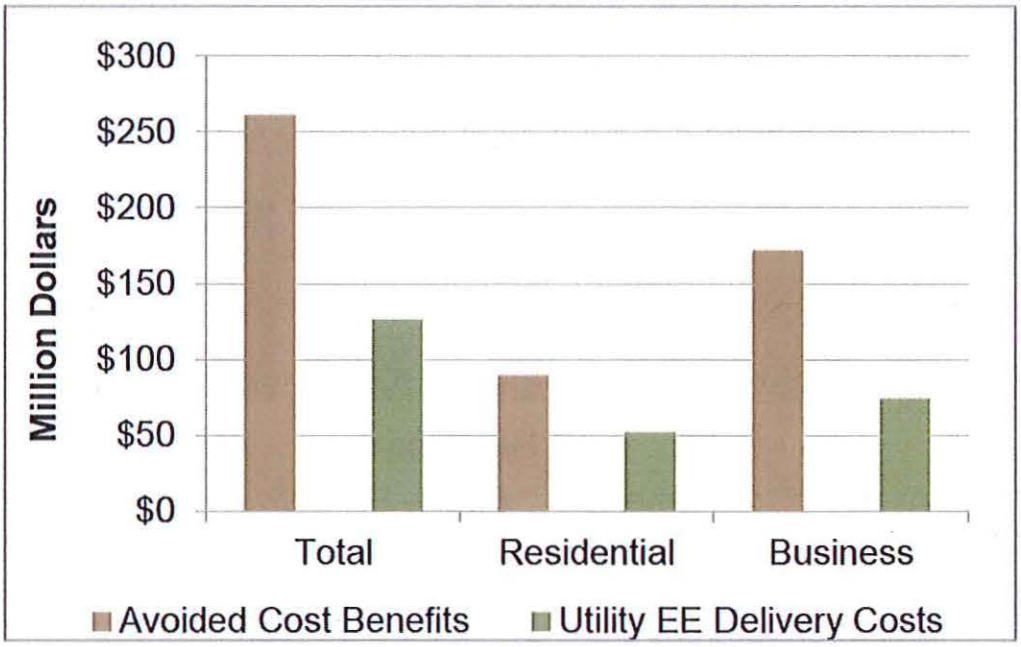
Avoided energy is the most intuitive benefit. The primary goal of energy efficiency programs is to reduce customer energy consumption. The energy not consumed is relatively easy to value. While it might seem intuitive to try to trace the electricity back to a generation source and figure out how much fuel was not burned, it is actually much simpler to value than that, since electric energy sells in a wholesale commodity market. The energy not used by customers either creates additional electric sales into the market or reduces purchases from the market. In either case the avoided energy's value to the utility is the market price of electricity.

Avoided capacity costs result from the fact that, as less energy is used by customers, some of that energy is avoided during times of peak system demand. As peak demand is lowered over time through the implementation of energy efficiency, less generating capacity may need to be built and maintained to serve those peak conditions. The reduction in required capacity can produce significant cost savings. Fortunately, generating capability is required for reliability purposes, and excess capacity trades on an observable market. The reductions to peak demand, including planning reserves and line losses, are priced at the market price for regulatory capacity.

The final avoided cost is investment in transmission and distribution (T&D) infrastructure. Similar to the generating capacity that must be built to meet peak demand conditions, T&D infrastructure is driven by the need to reliably serve demand under peak load conditions. Over time, the system may require less investment in T&D upgrades and additions as broad adoption of energy efficient measures reduces peak demand conditions. The capital investment associated with that T&D is reduced, and customer rates are lowered. Unfortunately, the avoided T&D value is not as easy to determine, as there is no market price to look to. Instead, generic estimates are used to value the reduction in rates over time as load savings occur.

When viewing the UCT ratio of cost effectiveness, those three benefit categories are the only benefits included. The costs that are compared to those benefits are the costs incurred by the utility in order to administer the programs: general administration, incentives paid to customers, EM&V expense, and potential studies for planning and improving future programs. See the comparison below in Figure 3.4 of the benefits and costs used to construct the UCT.

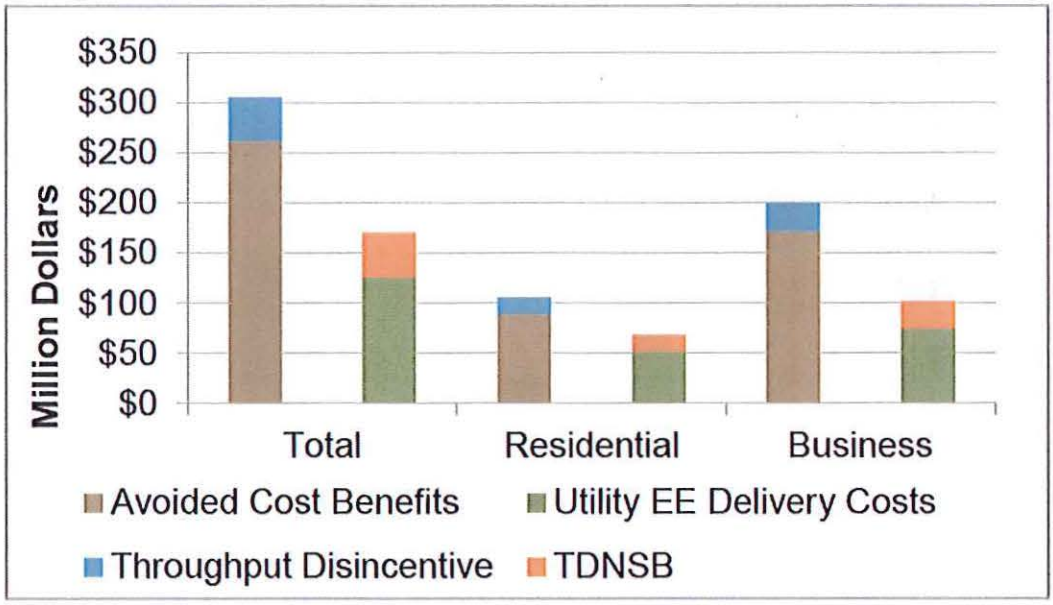
Figure 3.4: UCT Cost Effectiveness Breakdown



A good way to think about the UCT benefits is that they are manifested as reductions in the utility revenue requirement. As energy efficiency reduces customers' usage, the costs incurred by the utility to serve customers decline and that cost decline subsequently benefits customers through lower bills in the future. However, when a customer implements an energy efficient measure, they immediately reduce their consumption and their bill declines immediately irrespective of whether the cost savings have materialized. The original (pre-savings) level of that bill is based on rates designed in a rate case to give the utility a reasonable opportunity of collecting its costs and earning a return on its investments used to serve customers. The fact that they are now paying something less than that is not tied to avoided energy, capacity, or T&D. It is simply tied to rates designed to collect the Company's fixed costs. That fixed cost bill savings, however, is clearly a benefit to the customer that would otherwise be paying a higher bill; a benefit that has not been captured anywhere in the chart above or in the UCT.

Customers therefore receive an additional benefit that is not contemplated by the UCT. The TD-NSB claimed by the utility is by its very design exactly equal on an NPV basis to that incremental customer benefit of participant fixed cost bill savings. In order to update Figure 3.4 above to incorporate the throughput disincentive bill savings as an additional benefit to customers and the TD-NSB as an additional cost to customers, we end up with Figure 3.5 below.

Figure 3.5: UCT Cost Effectiveness Plus Fixed Cost Bill Savings and TDNSB

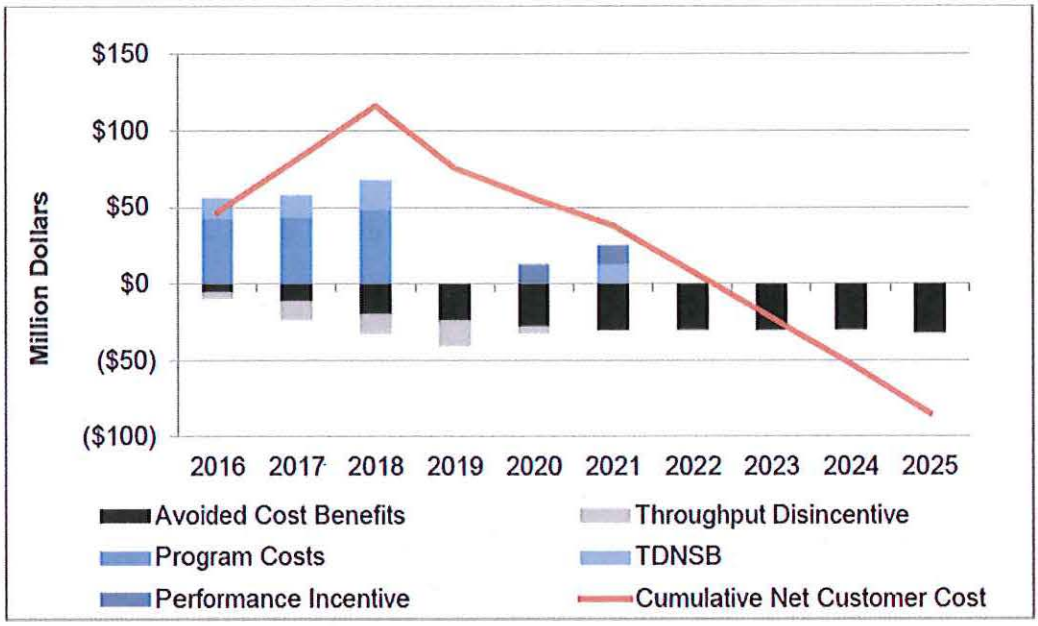


The difference between Figure 3.4 and Figure 3.5 is the difference between the net benefits using the UCT view of the MEEIA 2016-18 programs and the UCT view plus *both sides* of the throughput disincentive reality; the customer benefits associated with participant fixed cost bill savings and the customer costs that arise from the TD-NSB. The net benefits expressed in dollars in Figure 3.4 and Figure 3.5 are *exactly the same*. The message is this - although the mechanism used to offset the throughput disincentive to the Company is to provide a share of the avoided cost benefits to the Company, it is really offsetting an additional customer benefit not previously contemplated in the cost effectiveness testing. Once one recognizes participant fixed cost bill savings for what they are, an additional customer benefit of not paying the fixed costs associated with their saved kWh's, the net impact to customers of the participant bill savings and TD-NSB leaves them, as a group, in the same place that the original UCT analysis left them. In essence, even though the Company is requesting an increase in the TD-NSB share from 26.34% in the 2013-15 DSIM to 32.57% in the 2016-18 DSIM, in both cycles of energy efficiency, until the Company realizes a performance incentive, customers as a whole recognize 100% of the net benefits generated by the programs.

As implied in the above paragraph, customer benefits in total are in fact reduced when the Company achieves a performance incentive. That is not to say they do not receive value for the performance incentive in the form of the delivery of high quality programs, it just means that the total benefits realized by customers is something less than the $135.1 million in UCT benefits that the programs are expected to generate. If the Company meets 100% of its goal for the 2016-18 program years and net benefits come

in as expected, the Company would retain 14.0% of net benefits under its proposal. Under this scenario, this still leaves customers with 86% of benefits. Factoring this additional customer impact of paying for the incentive out of the pool of net benefits, the total customer impact of the program over time is shown below in Figure 3.6[14]. Note that the throughput disincentive and the offsetting TD-NSB are also shown, but with magnitudes that perfectly offset each other on an NPV basis.

Figure 3.6: Total Annual and Cumulative Impact of 2016-18 Portfolio + DSIM

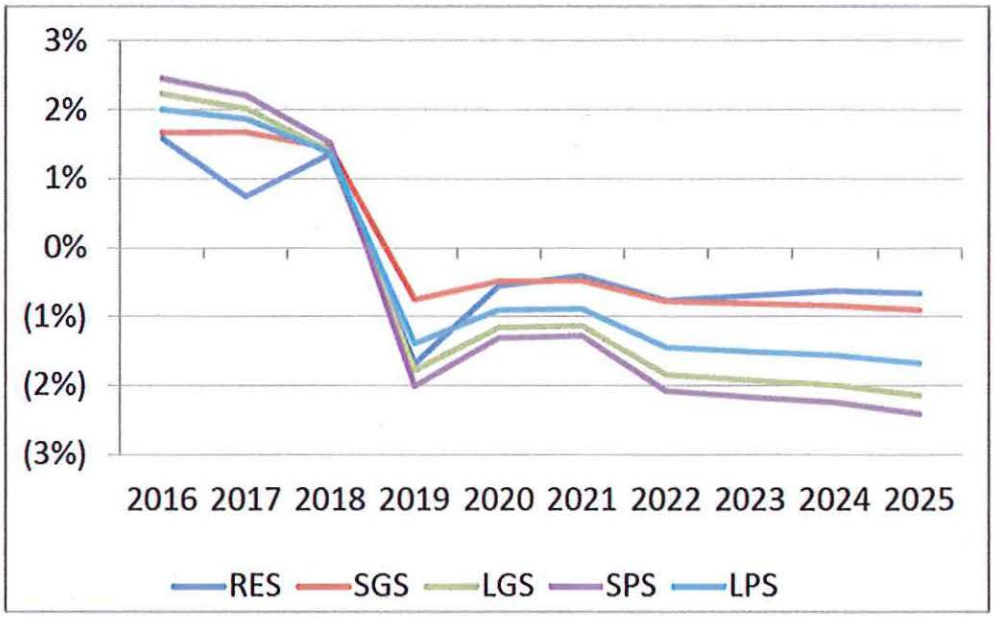


As is apparent from Figure 3.6, the costs of the program are borne by customers up front, consistent with MEEIA's requirement for timely cost recovery of program costs and the throughput disincentive, but benefits continue to accrue for a long period of time following the end of the program implementation. The benefits surpass the costs in total magnitude in 2023, and continue to grow for as long as the measures stay in use beyond the end of the chart shown above, generating more and more customer benefits.

The impact of those cumulative costs and benefits are recognized as bill impacts. Expected bill impacts by rate class associated with the MEEIA 2016-18 programs are shown in Figure 3.7 below.

[14] The total customer impact in Figure 3.6 assumes collection of the performance incentive in 2020 and 2021. The ultimate timing of collection is subject to change and could result in differences from the above illustration.

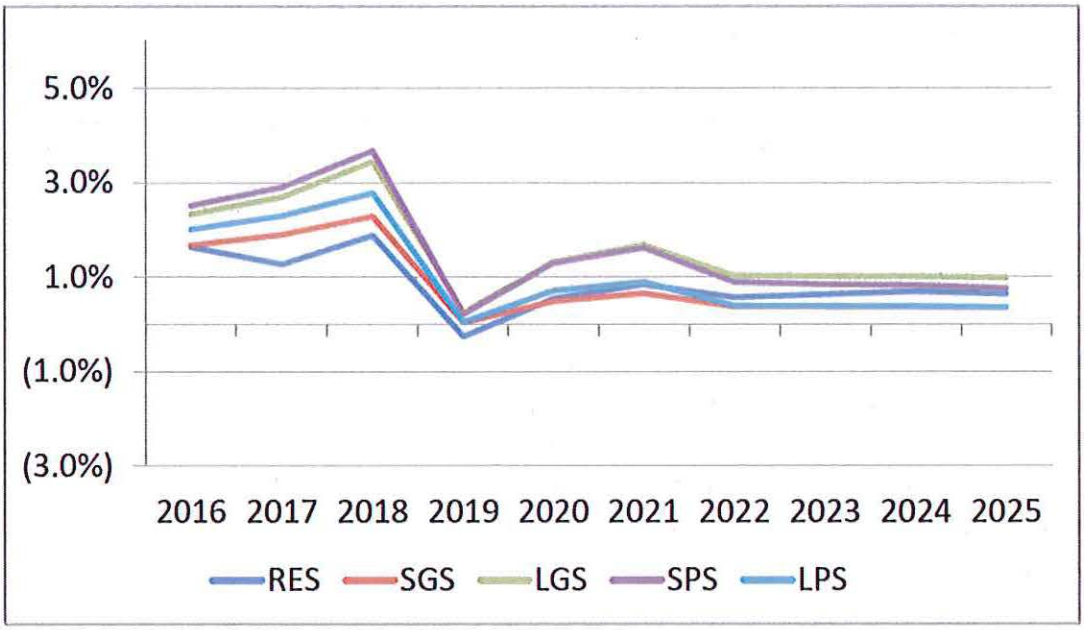
Figure 3.7: 2016-18 Portfolio and DSIM Bill Impacts



Note that like the cumulative cost curve, the bill impacts cause an increase in total bills at first, as the program costs and throughput disincentive are paid up front. As soon as the three-year program cycle concludes and the costs are paid, bills are immediately lower beginning in 2019 than they would otherwise have been absent the programs, and remain lower in 2020 and 2021 despite the assumption that the Company will receive a performance incentive at that time. Depending on the rate class, by the time the performance incentive is paid in full two years later, customers begin recognizing annual bill reductions of up to or exceeding 2% per year for the balance of the life of the measures.

While bills trend lower over time, the same is not necessarily the case with average rates paid by customers. Keep in mind that, over time, customers receive bill savings even in the face of higher rates because the volumes of energy that they are purchasing at those rates are lower than they otherwise would have been. The rate impacts are still worth noting and are shown in Figure 3.8 below.

Figure 3.8: 2016-18 Portfolio and DSIM Rate Impacts



The rate impacts also peak during the program years of 2016-18 while costs are reflected in rates. After the end of the programs, rates are higher because the fixed costs of the utility revenue requirement end up being spread over fewer kWh of usage due to the energy savings customers are recognizing. It is imperative to recognize that despite higher rates, the total customer outlays for energy are fully expected to be lower with the implementation the MEEIA 2016-18 programs, as shown previously on the bill impacts in Figure 3.7. Of the $135.1 million of UCT net benefits expected to be generated, 100% of that amount will flow to customers until the time that a performance incentive is awarded to the customers. Then, even if the Company were to achieve its target and realize a $25 million incentive, over $110 million in benefits would still flow to customers.

3.5 DSIM Cost Allocations

With the exception of the costs of the low-income program, which will be allocated and trued-up as provided for below, the costs of the MEEIA 2016-18 residential programs will be assigned to the residential class and trued-up. The MEEIA 2016-18 non-residential (rate classes SGS, LGS, SPS, LPS and LTS) program costs will be allocated to each affected non-residential rate class based upon the forecasted kWhs of usage of the respective classes during the effective period of the applicable rate, after excluding the kWhs of the opt-out customers. General and common costs associated with MEEIA 2016-18 programs will be allocated to residential and non–residential customer classes based upon forecasted kWh, excluding opt-out customers.

With the exception of Ameren Missouri's TD-NSB Share and Performance Incentive Award associated with the low-income program, which will be allocated and trued-up as provided for below, the annual revenue requirement associated with Ameren Missouri's TD-NSB Share and Performance Incentive Award associated with residential MEEIA 2016-18 programs shall be allocated to the residential class and trued-up. The allocation to affected non-residential rate classes of the annual revenue requirement associated with Ameren Missouri's TD-NSB Share associated with the cumulative energy savings from its non-residential MEEIA 2016-18 programs will be based upon the cumulative energy reductions of Ameren Missouri's non-residential MEEIA 2016-18 programs by rate class. For initial cost allocations for the first year of MEEIA 2016-18, cumulative energy reductions by rate class from the MEEIA 2013-15 programs will be used to perform such allocations. The annual revenue requirement for Ameren Missouri's Performance Incentive Award associated with the cumulative energy savings from its non-residential MEEIA Programs will be allocated among the affected non-residential classes based on the total energy usage reductions of each class associated with the MEEIA 2016-18 programs.

Ameren Missouri will track, by rate class, its non-residential program expenditures and energy savings arising from such programs that are approved and implemented as a result of this case.

All costs for the Low-Income program, including program costs, the annual revenue requirement of Ameren Missouri's TD-NSB Share and the annual revenue requirement of Ameren Missouri's Performance Incentive Award, shall be allocated to the residential and non-residential rate classes for each effective period based upon the ratio of the forecasted kWhs of the rate class to the total kWhs of all the rate classes for such period, except for the kWhs of customers who have opted-out.

3.6 DSIM Impact on Company Financials and Revenue Requirements

In order to find that the Company's incentives are aligned with helping customers use energy more efficiently, the Commission should assess the financial impact of the proposed programs and DSIM on the Company's projected financial results. There are two criteria that the Commission should use to establish a finding that it has discharged its obligations under MEEIA. The first is the very objective finding that program costs are being recovered on a timely basis and the negative impacts of the throughput disincentive are also remedied on a timely basis. The second criteria is that there is a timely earnings opportunity to replicate the earnings opportunity associated with supply side investments that the Company foregoes when implementing energy efficiency. The Company has presented a number of analyses and benchmarks in this chapter, so that the Commission has sufficient basis to find that the earnings opportunity aligns the Company's incentives with its customers' interest in using energy more efficiently.

Table 3.5 below presents the income statement impacts anticipated from the Company's plan assuming achievement of 100% of the savings goal.

Table 3.5: MEEIA 2016-18 Plan Impacts on Net Income

Revenue	NPV	2016	2017	2018	2019	2020	2021
Program Cost Recovery	$126.2	$42.8	$43.5	$48.1	$0.0	$0.0	$0.0
Throughput Disincentive	-$44.0	-$4.2	-$12.0	-$12.7	-$16.7	-$4.5	$0.0
Incentive - TD-NSB	$44.0	$13.2	$14.3	$19.6	$0.0	$0.0	$0.0
Incentive - Performance Net Shared Benefits	$20.7	$0.0	$0.0	$0.0	$25.0	$0.0	$0.0
Total Revenues	$146.9	$51.9	$45.9	$55.1	$8.3	-$4.5	$0.0
Costs							
Program Costs	$126.2	$42.8	$43.5	$48.1	$0.0	$0.0	$0.0
Total Costs	$126.2	$42.8	$43.5	$48.1	$0.0	$0.0	$0.0
Gross Margin	$20.7	$9.0	$2.4	$6.9	$8.3	-$4.5	$0.0
Income Taxes	$8.0	$3.5	$0.9	$2.7	$3.2	-$1.7	$0.0
Net Income	$12.8	$5.6	$1.5	$4.3	$5.1	-$2.8	$0.0

There are a few items worth observing in Table 3.5. First, due to timing of the collection associated with the throughput disincentive and the collection of the Company's TD-NSB revenues, there are some years with positive and other years with negative earnings impacts. It is important to note that in the NPV column, though, these impacts are exactly equal; meaning that overall, the TD-NSB adequately addresses the impact of the throughput disincentive. Secondly, despite the fact that the performance incentive is collected over two years, the accounting treatment of the incentive as discussed in Chapter 4 affords the Company the ability to record the associated revenues in the year in which the award is earned. For purposes of this analysis it is assumed that the award would be recorded as earnings in 2019, as the total 3 year cycle would be complete and the final net benefits and achievement with respect to the goals would be established at that time.

Table 3.6 below looks at Ameren Missouri's current five year business planning period and translates the financial impacts of MEEIA 2016-18 into the impacts on key credit metrics: FFO[15]/Debt and FFO/Interest.

Table 3.6: MEEIA 2016-18 Plan Impact on Key Credit Metrics **HC**

	Metric	2015	2016	2017	2018	2019
Baseline Credit Metrics	FFO/Debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	FFO/Interest	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
MEEIA 2016-18 Plan Impacts	FFO/Debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	FFO/Interest	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Credit Metrics w/ MEEIA 2016-8 Plan	FFO/Debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
	FFO/Interest	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

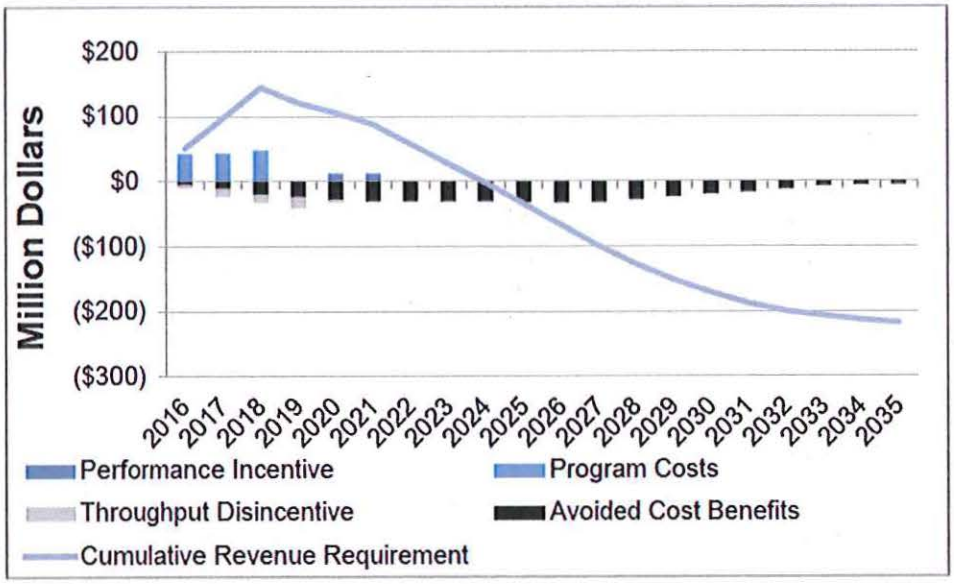
Table 3.6 demonstrates that overall impacts of the MEEIA 2016-18 plan and DSIM on credit metrics are small, but generally slightly supportive of credit quality. One year of the five has a negative impact, which again results from some timing differences between the fixed cost recovery issues from the throughput disincentive relative to when the TD-NSB is collected through the DSIM. The credit metrics analysis provides support for the conclusion that the DSIM aligns the Company's incentives. Additionally, the relatively small movement of the metrics in context with their baseline levels suggests little impact on the financial risk of the Company. Overall business risk is also relatively not impacted by the plan.

Figure 3.6 in the previous section showed the overall impact of the MEEIA 2016-18 plan and DSIM on customer costs. All of the categories of costs and benefits shown on that graph are also manifest as changes in the Company revenue requirement with the exception of the throughput disincentive. The throughput disincentive is an artifact of regulatory lag and is never recognized in any calculation of revenue requirements. It can be thought of as the failure to pay fixed costs associated with the existing revenue requirement due to the impacts of energy efficiency programs. The TD-NSB, which is the DSIM's tool to offset the throughput disincentive, is a part of the revenue requirement because it is included in the calculation of rates to be charged associated with the Rider used to implement MEEIA 2016-18. By removing the throughput disincentive category from Figure 3.6, the result is revenue requirement impacts associated with MEEIA 2016-18. Figure 3.9 below shows those impacts for a 20 year period. The net present value of revenue requirement impacts from all costs and benefits associated with MEEIA 2016-18 is a reduction of $72 million.

[15] FFO stands for Funds From Operations and is a key metric associated with operating cash flows

NP

Figure 3.9: 20 Year Revenue Requirement Impact of MEEIA 2016-18



Ameren Missouri Expert/Witness: Steven M. Wills

Chapter 4 – Implementation

This Chapter focuses on various issues that influence the implementation of the MEEIA 2016-18 programs and the DSIM previously described in this report. These are critical topics that cover how savings will be measured, how programs will be evaluated, how tariffs will be administered, and various other items. Topics covered include the MEEIA 2016-18 Technical Resource Manual, Net to Gross policy, Evaluation, Measurement and Verification plans, treatment of customers that opt out of programs, tariff provisions to provide continuity between the 2013-15 programs and 2016-18 programs, and operation of the rider that implements the DSIM.

4.1 MEEIA 2016-18 Implementation Processes

The pleading accompanying this filing includes a list of requested waivers from the Commission's MEEIA rules needed to implement the plan along with the rationale for the requests. Attached to this Report are several appendices, including Appendix D, which consists of the Program Tariff sheets, Appendix B which as mentioned in Chapter 3 includes the Rider EEIC 1618 Tariff sheets, and Appendix E, which is a list of incentive ranges for measures in the MEEIA 2016-18 programs for which the Company requests Commission approval. Consistent with how Ameren Missouri's MEEIA 2013-15 programs were executed, the incentive ranges shown in Appendix E represent the ranges within which the Company can establish the value of customer incentives without seeking further Commission approval.

In order to implement the MEEIA 2016-18 plan the following activities will be completed with the goal of program initiation on January 1, 2016:

- Following a Commission order approving the plan, implementation contractors and EM&V contractors will be hired as soon as reasonably practicable with the goal of having them hired prior to the start of programs.
- EM&V contractors will develop annual work plans detailing the EM&V activities or each program year of MEEIA 2016-18. Stakeholders will be invited to provide input to the workplans. Such input will be considered in the development of the final EM&V work plans, which will be shared with Stakeholders prior to the end of the 1st quarter of 2016.
- 2014 EM&V, as a part of MEEIA 2013-15, will be completed per its planned schedule. Measure savings established through the 2014 EM&V reports, as modified by any Commission approved Change Request, will be used to update the measure savings values included in the 2016-18 TRM by the first business day on or after October 1, 2015. A notice will be provided to Stakeholders that the updated TRM is published and they can access it through the iTRL tool described later in this chapter. Should the EM&V values from the study of the

2014 program year not be established by September 1, 2015, for any reason (for example, a Change Request which is not resolved), the previous TRM, an extract from which has been filed as Appendix F to this report, will be used for the 2016 program year.

- By the first business day on or after December 1, 2015, Ameren Missouri will provide an informational filing in this docket to update the MEEIA 2016-18 MWh savings goals for any impacts of the TRM changes, added or discontinued programs, and customer opt- out changes as described further in this chapter.
- The first filing to establish a rate to be charged under Rider EEIC 1618 will be made in November 2015. The rate reflected in that filing will be charged to all applicable customers beginning with the February 2016 billing month. The rate will be calculated using the Company's forecast of expected actual program costs[16] for the 2016 year, the forecasted TD-NSB Share, and the Company's forecast of customer usage for the coming year, as set forth in more detail in the Rider included in Appendix B.

Ongoing annual implementation activities associated with the plan will include:

- EM&V – As detailed later in this chapter, EM&V activities will be carried out to perform Impact and Process Evaluations. The Impact Evaluation will verify measure counts and apply savings algorithms from the TRM version applicable to the plan year in order to confirm recorded MEEIA MWh savings results. Additionally, the EM&V report will provide ex-ante (consistent with the then-applicable TRM) measure level savings estimates and ex-post estimates, which will update future TRMs as described in this chapter. The schedule for EM&V reporting, Stakeholder feedback and Commission approval is as follows:
    - 45 days after the end of each program year, the EM&V Contractor will circulate a draft EM&V report to all stakeholders participating in the stakeholder group and the Commission's Independent EM&V Auditor ("Auditor").
    - 15 days after circulation of the EM&V draft report, Ameren Missouri will circulate its cost effectiveness analysis based on that report to the stakeholder group and the Auditor.
    - 30 days after circulation of the draft EM&V report, the Auditor and each stakeholder group participant will provide any comments and

[16] MEEIA Programs' costs include expenditures on items such as program design, administration, delivery, end-use measures and customer incentive payments, evaluation, measurement and verification, market potential studies and work on the technical resource manual.

recommendations for report changes to the EM&V Contractor and to all other stakeholder group participants and the Auditor[17].

- Prior to issuing the Final EM&V Report, the EM&V Contractor will host at least one meeting with the Auditor and the stakeholder group participants to discuss the comments and recommendations for report changes. The EM&V Contractor will determine what comments and/or changes are incorporated into the Final EM&V Report. 30 days after the deadline for comments and recommendations for report changes, the Final EM&V report will be provided to all stakeholder group participants by the EM&V Contractor.

- 7 days after circulation of the EM&V Final Report, Ameren Missouri will circulate its cost effectiveness analysis based on the Final EM&V Report to the stakeholder group and the Auditor.

- 14 days after the Final EM&V Report is submitted simultaneously to all stakeholders, the Auditor will provide a report on its findings with respect to the Final EM&V Report.

- Any stakeholder group participant who wants a change to the impact evaluation portion of a Final EM&V Report will have 7 days from the issuance of the Commission hired EM&V Auditor's report addressing the Final EM&V Report to file a request with the Commission to make such a change ("Change Request"). Because final savings in the report are deemed by application of the TRM and because NTG has been deemed to be 1, Change Requests will be limited to correction of any errors in calculation of savings or net benefits and ex-post measure savings to be utilized for purposes of future TRM updates. Any stakeholder group participant filing a Change Request will set forth all reasons and provide support for the requested change in its initial Change Request filing. Responses to a Change Request may be filed by any stakeholder group participant and are due 14 days after the Change Request is filed. The response should set forth all reasons and provide support for opposing or agreeing with the Change Request. Within two business days after the deadline for filing a Change Request (if a Change Request is filed), the stakeholder group participants will hold a conference call/meeting to agree upon a proposed procedural schedule for resolution of any Change Requests including any evidentiary hearing that is necessary to resolve the Change Request. If any change request is outstanding and unresolved either by stakeholder agreement or Commission order as of September 1st, any TRM and subsequent portfolio goal changes for the

[17] This 30 day period is shorter than the 60 day review period associated with MEEIA 2013-15 in recognition of the reduced complexity of EM&V based on deeming NTG = 1 for all programs and program years discussed further in this Chapter.

coming program year as described in this Chapter will not be made. The coming program year will utilize the then current TRM version for determination of goals and deemed savings.

- By the first business day on or after December 1st prior to each program year, Ameren Missouri will provide an informational filing to the Commission that updates the MEEIA 2016-18 MWh savings goals for any impacts of the EM&V measure savings updates made to the TRM, added or discontinued programs, and customer opt out changes as described further in this chapter.
- Rider EEIC 1618, including the rate to be charged to all applicable customers beginning with the subsequent February billing month, will be filed in the November prior to the start of each program year. The rate will be calculated using the Company's forecast of expected actual program costs for the coming program year, 100% of the forecasted TD-NSB Share, a true-up of any over- or under-recoveries from the current program year including any accrued interest at the Company's short-term borrowing rate, and the Company's forecast of customer usage for the coming year, as set forth specifically in Rider EEIC 1618 including in Appendix B hereto.
- Ameren Missouri will meet quarterly with its stakeholder group. The stakeholder group will: (a) receive program updates from Ameren Missouri and EM&V updates; (b) consult with and advise Ameren Missouri on the possible expansion of energy efficiency and demand response programs, and the design of such programs (possibly including co-delivery of programs with gas/water utilities); and (c) consult with and advise Ameren Missouri on issues related to EM&V (including Ameren Missouri's proposed EM&V Requests for Proposals, the scope of work for future EM&V projects, and issues relating to NTG ratios that may be used in future MEEIA plans), and the TRM. Ameren Missouri will circulate a draft agenda for each stakeholder group meeting approximately one week prior to the scheduled meeting date. Any stakeholder group member can suggest items for the agenda for a stakeholder group meeting.

Additional implementation activities completed during the term of the MEEIA 2016-18 programs will include:

- During calendar year 2016, Ameren Missouri will design and conduct market assessments associated with each program for purposes of establishing deemed NTG values for future programs that will be utilized in upcoming market potential study work and program design for any MEEIA programs implemented subsequent to the 2016-18 timeframe.
- Ameren Missouri will perform a new market potential study meeting the requirements of 4 CSR 240-3.164(2)(A), and will use the same to inform the

preparation of its anticipated 2017 IRP filing. This study will include a comprehensive analysis of demand response programs.

- Upon completion of the final EM&V for the 2018 program year, the performance incentive award will be calculated using the sum of the annual goals for each program year as established by the annual December 1st informational filings and the total MWh savings and UCT net benefits established through EM&V as described fully later in this chapter. Should the results of EM&V indicate that the Company has met the threshold for a performance incentive award prior to the last program year, a partial award based on achievements to date may be calculated and included in Rider EEIC 1618 at the next planned filing. Should this occur, the performance incentive award at the end of program 2018 will be calculated for the full cycle, any amount collected previously will be deducted, and the balance will be incorporated into Rider EEIC 1618.
- Annual Rider EEIC 1618 filings to adjust the rate to be charged thereunder will be made each November, applicable to service beginning the following February, until the two year collection of the final performance incentive and any true-ups associated with program costs and TD-NSB costs for MEEIA 2016-18 have been completed, with the intent that all costs and performance incentive awards are collected as close to exactly as is reasonably practicable.

Ameren Missouri Expert/Witness: Steven M. Wills

4.2 Technical Resource Manual

A TRM is defined as a collection of measure characterizations that provide all necessary variables and definitions to allow utility energy efficiency program administrators to calculate and record savings associated with those measures, and screen them for cost effectiveness. The TRM is the cornerstone of the regulatory framework that provides Ameren Missouri the opportunity to pursue the policy goals of MEEIA.

As discussed in the DSIM chapter, the throughput disincentive occurs when the reduction in sales associated with energy efficiency causes negative impacts on utility earnings due to the Company's use of volumetric rates. The throughput disincentive starts impacting the utility the moment an energy efficient measure is installed, so absent an appropriate solution, the negative earnings impact is immediate and continuous throughout the implementation period. In order to align utility incentives with helping customers use energy more efficiently, the TD-NSB share retained by the utility to offset the throughput disincentive must also be recognized on the utility's accounting books immediately and continuously throughout the program implementation period to avoid the negative impact on the utility's earnings. However, according to accounting

rules that govern the types of revenues that come from Ameren Missouri's DSIM, in order to recognize the additional revenues to be billed in the future and to avoid a reduction in Company earnings, all of the following conditions must be satisfied: 1) The DSM program is established by an order from the utility's regulatory commission that allows for automatic adjustment of future rates. (Verification of the accuracy of the adjustment to future rates by the regulator would not preclude the adjustment from being considered automatic); 2) The amount of additional revenues for the period is objectively determinable and is probable of recovery; and 3) The additional revenues will be collected within 24 months following the end of the annual period in which they are recognized.

The key item in the accounting rule cited above, as it pertains to the TRM, is the requirement that revenues be objectively determinable. The TRM sets up an objective method for determining savings. Using the information in the TRM, the Company need only count the energy efficient measures that were delivered through the program and apply the savings algorithms from the TRM. By employing deemed savings that are objectively determined through application of a TRM, the Company has the foundation to record the revenues that ultimately achieve alignment of the utility incentives with helping customers use energy more efficiently. Said another way, the accounting rules require the development and use of a TRM and deemed energy and demand savings values that cannot be retroactively changed in order to record the throughput disincentive as revenue. As such, the importance of the Ameren Missouri TRM to the MEEIA 2016-2018 filing cannot be overstated.

Background

Ameren Missouri developed its original TRM to support its MEEIA 2013-15 plan. The first version of the TRM was a Microsoft Word document supported by voluminous work papers in multiple formats and file locations. Ameren Missouri leveraged previous evaluation reports from its 2009 through 2011 energy efficiency programs, Ameren Missouri specific data from its DSM Potential Study, its internal database of measures, and other states' TRMs (where applicable) to develop the original TRM.

The Ameren Missouri MEEIA 2016-18 TRM is based almost entirely on Ameren Missouri's 2013 Potential Study and 2013 energy efficiency program evaluation results. That represents an improvement over the previous TRM, as the energy savings estimates are based on Ameren Missouri specific primary data rather than on a variety of sources, including secondary data.

New Transparent Web Based TRM

Ameren Missouri recently purchased a new TRM development software package and populated it with Ameren Missouri's latest results from EM&V of its 2013 DSM programs

and information from the 2013 Market Potential Study to provide the basis for the MEEIA 2016-18 TRM.

Ameren Missouri's primary objective in improving its TRM development process was to acquire a transparent TRM software tool to document measure level savings values and algorithms. The new TRM software tool is able to attach all supporting documentation and work papers electronically to each measure. The software allows Ameren Missouri stakeholders to view the TRM, supporting documentation and work papers.

As already discussed in detail, it is critical that the TRM measure values are agreed to at the beginning of program implementation and applied prospectively. The MEEIA 2016-18 TRM will provide improved transparency and will be used by Ameren Missouri to maintain and update measure data throughout the implementation period. This is another key improvement relative to the MEEIA 2013-15 TRM. The MEEIA 2013-15 TRM is a static document for the entire three-year program cycle. That means the savings estimates for all measures were determined prior to the beginning of the program activity in 2013 and those same savings estimates are used to deem savings associated with all measures delivered during the three years. To the extent that EM&V work identifies new primary data that could update and improve the TRM savings estimates, it is not incorporated in the TRM due to its static nature. Using the new TRM software, updating the TRM will be much easier and more transparent. Updated and prior versions of the TRM will be readily available to users through software interfaces. This means that while TRM savings estimates will still be used prospectively as accounting rules require, the document itself can be more of a dynamic or living document that incorporates the latest and best measure savings information on a timely basis.

As an example, the TRM that accompanies this filing, by necessity, is based largely on EM&V work performed for the 2013 program year. However, programs using this TRM will not begin to deliver measures until 2016. In the interim, sometime during 2015, EM&V work on the 2014 program year will be complete. Some of that work may produce measure savings estimates that differ from the estimates in the TRM that is based on older information. A new TRM version would be created that incorporates these estimates for application to the 2016 program year and beyond. Those savings estimates would again be applied to measures delivered prospectively. Subsequent to this update, another round of EM&V will occur, reviewing 2015 programs. The information from that EM&V study will be available sometime in 2016. Again, a new version of the TRM would be created incorporating the latest information from EM&V. However, because this information was not available before the start of the 2016 program year and all TRM values must be employed prospectively, the updated TRM would not be used to deem 2016 savings. Instead, it would be used for program years

2017 and beyond. In this fashion, the TRM will be continually updated with the latest and best information, but only used for future program years. The TRM is "locked down" with its current values and algorithms for any program year once that year begins.

There is one additional note to provide regarding the process for updating the TRM. The updates are anticipated to capture meaningful changes that represent real evolution of the energy efficiency market place or significant new studies that truly recast the savings of measures in a new light. To the extent that measure savings in one year of EM&V work move up or down by a small amount, perhaps simply due to the statistical uncertainty of estimates from one year to the next or other relatively trivial changes, it is really unnecessary to swing TRM values around with little impact. In order to avoid broad scale updates to the TRM document from year to year that really will not meaningfully change the program impact estimates in a significant way, the measure savings will only be updated if the change is more than 10% in either direction from the then current TRM estimates.

In addition to the benefits of making savings estimates more responsive to EM&V through creation of a dynamic TRM, customers, Ameren Missouri, the Commission, and stakeholders will realize the following benefits of the state-of-the art TRM system:

- Consolidation and organization of efficiency measures, measure attributes, and supporting data, including all savings values, costs, assumptions, equations, savings estimation protocols and source documentation. An easy-to-use, web-based interface will facilitate access to measure parameters, savings calculation algorithms, effective useful life, and incremental measure costs.

- Automated version control, including logging, retention, and archiving of all measure versions and interim measure updates. Greater transparency into measure assumptions due to the fact that source documentation can be directly linked to a measure and the relevant attributes and parameters.

- Ability to create customized measure specific reports and/or export files in various file formats. This can be used to develop customized files for program reporting.

- Maintenance of accurate records of TRM savings based on versions for tracking and reporting, using the online TRM tool.

Appendix F contains a report from the web-based TRM that lists the attributes of each measure by program in the MEEIA 2016-18 TRM. The TRM itself will be accessible through the web-based system described above. Access to the system will be provided to stakeholders by Ameren Missouri.

4.3 Net-To-Gross

The TRM described above governs the estimation of the gross impacts of the measures delivered by Ameren Missouri's programs. Gross savings simply are the difference in electric energy consumption between the "old" end use appliance (or in some cases the less efficient baseline) and the energy efficient version delivered through the program. Prospective application of the TRM is one piece of the puzzle in terms of deeming savings in a manner that is sufficient to meet the accounting requirements that allow the recordation of TD-NSB revenues under MEEIA, which is necessary to prevent a negative impact on utility earnings due to the energy efficiency programs. However, a second and equally important part of the savings equation is the estimation of net savings based on application of a NTG ratio. For all of the reasons that the TRM must be prospectively applied in order to book the Company's TD-NSB share on a timely basis, the NTG must also be deemed prospectively. The NTG ratio is what establishes the amount of those savings that are appropriately attributable to utility programs.

The equation for estimating NTG for energy efficiency programs is:

$$NTG = 1 - Freeridership + Participant\ Spillover + Nonparticipant\ Spillover + Market\ Effects$$

A free rider is a program participant who would have implemented the program's measure(s) or practice(s) in the absence of the program. Free riders can be:

(1) Total - in which the participant's activity would have completely replicated the program's intended actions;

(2) Partial - in which the participant's activity would have partially replicated the program's actions; or

(3) Deferred - in which the participant's activity would have partially or completely replicated the program's actions, but at a future time beyond the program's time frame.

Spillover (participant and non-participant) is the reduction in energy consumption and/or demand caused by the presence of an energy efficiency program beyond the program-related gross savings of the participants and without financial or technical assistance from the program. There can be participant and/or non-participant spillover. *Participant spillover* is the additional energy savings that occur when a program participant independently installs incremental energy efficiency measures or applies energy-saving practices after having participated in the efficiency program as a result of the program's influence. *Non-participant spillover* refers to energy savings that occur

when a program non-participant installs energy efficiency measures or applies energy savings practices as a result of a program's influence.

Market effects are a change in the structure of a market or the behavior of participants in a market that is reflective of an increase (or decrease) in the adoption of energy-efficient products, services, or practices and is causally related to market intervention(s) (e.g., programs). Examples of market effects include increased levels of awareness of energy-efficient technologies among customers and suppliers, increased availability of efficient technologies through retail channels, reduced prices for efficient models, build-out of efficient model lines, and the end goal-increased market share for efficient goods, services, and design practices.

Actual 2013 Individual Program NTG Results from EM&V Assessments

The NTG results, as evaluated by independent third party EM&V contractors for each energy efficiency program in the Ameren Missouri 2013 portfolio of energy efficiency programs, is shown in Table 4.1.

Table 4.1: 2013 Evaluation Reports NTG by Program

Program	NTG
Residential Portfolio	
Light Savers	123%
Rebate Savers	93%
Cool Savers	95%
Appliance Savers	74%
Performance Savers	90%
Construction Savers	28%
Community Savers	96%
Residential Total	117%
Business Portfolio	
Retro-Commissioning	67%
New Construction	94%
Custom	93%
Standard	95%
Business Total	93%
Portfolio Total	115%

The weighted average NTG based on the evaluation contractors' reports for the entire portfolio of DSM programs was 1.15 in 2013. It should be noted that the NTG = 1.15 for the portfolio is a conservative, i.e. low, estimate of NTG. Business program non-participant spillover and market effects were not quantified in the EM&V done for Ameren Missouri's 2013 MEEIA programs, which if done would have served to increase the NTG ratio for those programs. It is also worth noting that even with multiple Change Requests filed in the 2013 EM&V process, every estimate of NTG supported by any party filing a timely change request fell within a range of 0.89 to 1.16. NTG = 1.0 falls squarely in the middle of this range.

Portfolio Considerations Impact NTG for 2016-18 Energy Efficiency Programs
Energy efficiency savings from business programs are anticipated to account for approximately 61% of the MEEIA 2016-18 implementation plan load reductions. Energy efficiency savings from the 2013 MEEIA residential programs accounted for approximately 80% of savings. The fact that energy efficiency savings from business programs are expected to dominate the portfolio in MEEIA 2016-18 programs is an important point in considering a NTG policy. Business programs, since 2009, have consistently achieved portfolio NTG estimates averaging 0.93. These NTG estimates have been achieved by quantifying free ridership, which lowers NTG, but without quantifying non-participant spillover and market effects, which would increase NTG. Consequently, a NTG of 0.93 for the business portfolio of programs is conservative. Application of a balanced NTG approach that values all components, including non-participant spillover and market effects, likely would have pushed historic NTG ratios up to levels very close to or even exceeding 1.0.

Conversely, energy efficiency savings from residential programs are anticipated to account for approximately 39% of the MEEIA 2016-18 implementation plans. In 2013, the NTG ratio for the residential portfolio was 1.17. The key driver was the residential lighting program that accounted for approximately 80% of the residential portfolio energy savings with a NTG = 1.23. The New Construction program, the smallest residential program, had a NTG = 0.28 and was subsequently removed from the portfolio due to that program not being cost effective.

The 2016-18 implementation plans for the residential portfolio have the following program elements relative to the 2013-15 plans:

Table 4.2: Portfolio Composition – 2013-15 vs. 2016-18

	Net Incremental Energy Savings @ Meter (MWh)			
	2013-15		2016-18	
Residential EE Portfolio	MWh	% of Res Portfolio	MWh	% of Res Portfolio
Lighting	280,466	55%	61,507	37%
Efficient Products	48,367	10%	14,280	9%
HVAC	117,247	23%	50,958	31%
Appliance Recycling	37,577	7%	9,743	6%
HEP	3,211	1%	0	0%
New Homes	4,935	1%	0	0%
MFIQ / Low Income	13,666	3%	10,543	6%
EE Kits	0	0%	18,636	11%
Residential EE Portfolio Total	505,469	100%	165,667	100%

Residential energy savings for MEEIA 2016-18 are 165,667/505,469 = 33% of the filed 2013-15 residential savings. The MEEIA 2016-18 residential lighting program savings are 61,507/280,466 = 22% of the filed MEEIA 2013-15 residential lighting savings. Even more significantly, the residential lighting technologies to be offered for standard A base bulbs in 2016-18 are solely LED technologies. There are no standard A base CFLs, with the exception of high wattage bulbs, included in the MEEIA 2016-18 plan due to most CFLs no longer being cost effective. With LEDs being an emerging technology with relatively low market shares, it is reasonable to assume that the NTG ratio for LEDs should be close to 1.0. This low market share indicates that customers are not independently choosing this technology with any frequency in the absence of programs, so there should be little question of attribution when measures are sold in the program.

NTG Policy Considerations

The issue of attribution for energy efficiency programs from utility sponsored energy efficiency programs is necessarily an argument of a qualitative nature. There is no formulaic approach whereby the individual inputs into a NTG formula can be computed with quantified accuracy and precision. The inability to quantify NTG with objective calculations for all forms of free ridership, spillover, and market effects makes NTG the single most significant risk factor in the implementation of energy efficiency programs. In the March 2012 issue of Public Utilities Fortnightly, the paper titled "The Trouble With Freeriders", authored by The Cadmus Group, states: *"Disentangling what might have occurred in the absence of a program from the program's spillover effects is practically impossible in most cases. The longer a program operates, the more biased the estimates of freeridership are likely to be."*

It should be no surprise that NTG is the single most contentious issue in the evaluation, measurement and verification of the impacts of utility energy efficiency programs. The December 2012 SEEAction – Energy Efficiency Program Impact Evaluation Guide states "*the actual calculation of net energy and demand savings can be more of an art than a science. Essentially, one is attempting to separate out the influence of a particular energy efficiency program (or portfolio) from all the other influences—such as self-motivation, energy prices, and other efficiency programs—that determine participant and non-participant behavior and decisions.*"

The EM&V report on Ameren Missouri's 2013 MEEIA programs and the ensuing Change Requests (not resolved as of the date of this filing) to address NTG issues illustrates the contentiousness of the NTG calculations. It is fair to assert that the assessment of all forms of free ridership, spillover and market effects has been a regulatory dilemma.

For the evaluation of the MEEIA 2016-18 portfolio, there are two fundamentally different approaches that could be undertaken to address the issue of NTG. The first approach would be the resource intensive effort to require EM&V contractors to attempt to calculate all forms of freeridership, spillover and market effects for every program – despite the inability to quantify accuracy and precision of the estimates. Failure to quantify any one of NTG inputs will bias the results of energy savings achieved by the programs. The second approach is to prospectively deem the NTG estimates for each program – thereby reducing the resource intensive nature required to ascribe imprecise NTG results to programs. This second approach is currently being used in many states including Arizona, Iowa, Michigan, Pennsylvania and New Jersey among many others. This approach resolves the contentious NTG issue up front, thereby avoiding the extended battle such is currently occurring with Ameren Missouri's program year 2013 EM&V results.

NTG Policy Reflected in MEEIA 2016-18

Ameren Missouri believes it is in all parties' best interests to develop a policy toward deeming NTG estimates for all programs in the 2016-18 plan. Accordingly, the MEEIA 2016-18 plan deems NTG values on a prospective basis for purposes of both calculating the throughput disincentive as well as the financial performance incentive. This is consistent with the NTG policy utilized in MEEIA 2013-15 with respect to calculation of Ameren Missouri's TD-NSB share. Where this deviates from MEEIA 2013-15 is in utilizing that deemed NTG ratio for purposes of calculating any potential performance incentive earned.

Based on the evaluation reports from 2013 (indicating NTG = 1.15) as well as on the qualitative features of the 2016-18 portfolio discussed previously, it is reasonable to

deem NTG = 1.0 for MEEIA 2016-18 (for all programs and all program years) for purposes of calculating the performance incentive as well.

Ameren Missouri proposes to perform a study to inform the deemed value of NTG for future programs prior to the start of any subsequent energy efficiency program cycle, presumably MEEIA 2019-21. That study would update NTG for future energy efficiency program cycles and would include adding a market assessment study, as is discussed in Section 4.4 below.

Ameren Missouri Expert/Witness: Richard A. Voytas

4.4 Evaluation, Measurement and Verification

The fact that all savings are deemed (using TRM values and NTG = 1.0) on a prospective basis for both the TD-NSB and the performance incentive determinations does not mean that EM&V will no longer play a crucial role in MEEIA 2016-18. In fact, the more dynamic TRM reflected in MEEIA 2016-18, as discussed in Section 4.2 above, depends on robust EM&V activities to keep the savings estimates in sync with the actual conditions in the marketplace. Additionally, process evaluations are still needed to ensure effective and efficient delivery of programs and to continually improve the design of future programs.

The EM&V Process

A robust EM&V program is comprised of, at least, an Impact Evaluation and a Process Evaluation. The Impact Evaluation answers whether the program works by taking a systematic assessment of the relevant data relating to the operational outcomes of a program, for example, the MWh saved. A Process Evaluation provides answers on how the program can be improved through careful examination of program implementation by reviewing existing procedures, and by interviewing program participants and program staff. This review attempts to determine whether procedures are being followed and how well the procedures are working.

In theory, Impact Evaluation is purely quantitative and Process Evaluation is highly qualitative. However, in reality there are overlapping elements of each in these evaluations. Thus, effective EM&V often cover Impact and Process issues in one report. The success of an EM&V program is highly dependent on the evaluator's ability to properly design and implement both the qualitative and quantitative aspects of evaluation. EM&V is often described as "part art, part science" and the evaluator needs to be objective and skillful in interpreting data. Evaluator knowledge and experience can also be drawn on for program design and process improvement during the implementation cycle. Additionally, for evaluation results to be credible, the process

should be transparent and follow an evaluation plan that conforms to industry best practices.

Recognizing the importance of EM&V, Ameren Missouri subscribes to an independent third party contractor model to provide an objective assessment of the performance of the energy efficiency portfolio. Overall, the EM&V results will help document customers' benefits from the programs and ensure the programs are providing customers with value for the dollars invested in them. Equally important is that EM&V will help drive continuous improvement in the design and delivery of Ameren Missouri energy efficiency programs.

For Ameren Missouri's MEEIA 2013-15 programs, different evaluators are used for the Residential and Business portfolios. The evaluators provide an annual independent review of the gross and net program impacts using a balanced NTG ratio approach and, to the extent practical, provide input regarding the adjustment of measure savings attributes and implementation processes as a result of the evaluations. They also provide process evaluations, including reviews of databases and marketing materials, implementer interviews, and measurements of customer satisfaction with programs.

These evaluators are reputable national firms with strong track records as leaders in the industry. The evaluations they perform are in accordance with EM&V best practices and International Performance Measurement and Verification Protocols.

The Commission has hired an Auditor to audit and report on the work of Ameren Missouri's independent EM&V contractors. For the MEEIA 2013-15 programs, the Auditor (a) monitors the planning, implementation and analysis activities of the EM&V contractors (b) provides on-going feedback to Ameren Missouri's stakeholders on EM&V issues and (c) provide stakeholders with a copy of its final annual report in a timely manner.

The evaluation contractors provide feedback that allows for monitoring and managing EM&V activities and assists the implementation team in identifying areas that could potentially affect program performance. The progress of evaluation activities are shared with the stakeholders during quarterly update meetings.

The process has worked well in obtaining stakeholder perspectives on the EM&V results. To date, the major concerns raised by the stakeholders have been associated with the art of determining the NTG estimates. This ambiguity and regulatory disagreement around NTG estimation are the primary reasons why making the rational assumption that net savings equal gross savings up front will ultimately reduce confusion between the parties involved in Ameren Missouri's energy efficiency programs and ultimately save resources that can be rededicated to more productive ends.

A budget of 5% of the program costs for EM&V during MEEIA 2013-15 has allowed programs to be evaluated at a 10% precision level with 90% confidence. Looking forward to MEEIA 2016-18, with the plan to deem NTG and forego the study of the complicated topics of freeridership, spillover, and market effects, similarly effective EM&V should be able to be completed with a budget of 3% of program costs. The 2% saved relative to MEEIA 2013-15 will be rededicated to the efforts of market assessments described below and any other related work that may come up, such as contribution to statewide TRM efforts.

EM&V Model for MEEIA 2016-18

While the existing EM&V model from MEEIA 2013-15 has been successful in providing robust program impact data and valuable process feedback, the 2013 EM&V provides experience from which to make improvements going forward. MEEIA 2016-18 EM&V will operate as outlined below.

Evaluation Contractor Role

For MEEIA 2016–18, Ameren Missouri will build on the EM&V framework established in MEEIA 2013–15. A competitive procurement process will again take place to ensure the most qualified evaluation contractor(s) is hired prior to the start of the programs. The selected contractor will be brought on board at this time in order to understand the program details and ensure adequate data requirements are identified and data gathering methods implemented.

Evaluation Contractors will aid implementation efforts in several ways. Evaluators can provide valuable training for Ameren Missouri staff, implementers, and regulatory stakeholders on savings estimation methodologies and share experiences from other utility energy efficiency programs. Evaluators can contribute meaningfully to operational efforts, for measure consideration discussions, design of customer forms and materials, data tracking system setup, and program delivery modifications.

The development of a statewide TRM is an effort that might occur during the implementation of Ameren Missouri's MEEIA 2016–18 programs. EM&V contractors could make meaningful contributions to the collaborative development of the specific protocols, algorithms, and inputs for each measure included in a statewide TRM. If Missouri develops a statewide TRM, an additional Scope of Work and funding will need to be incorporated into the existing evaluation plan to cover the evaluator's incremental efforts to support this development.

Evaluation Plan

The Evaluation Plans are detailed work plans developed at the beginning of the program that fulfill the evaluation objectives and identify the planned activities undertaken in each program year with step-by-step action plans.

The evaluation plans for each DSM program will be developed by the end of the first quarter of 2016. Each evaluation plan will be composed of three one-year work plans that support the overall three-year program cycle. As programs and markets evolve each year, the evaluation methods may need to change to ensure the evaluation method(s) being used continue to be appropriate. Findings from process evaluations and market assessments can help identify when to reassess impact evaluation methods. This will give the evaluation team the same type of flexibility as the implementation team to make appropriate modifications for response to program and market condition changes. As described above, the regulatory stakeholders will be engaged with the development and review of the overall three-year EM&V plan prior to its implementation and informed as modifications are made throughout the program cycle.

One of the most important aspects of evaluation is the measurement of savings achieved by implemented energy efficiency measures. The impact evaluation estimates of gross measure savings may include engineering analysis and formulas, building simulation models, meter data, statistical models and billing analysis implemented through the TRM.

For MEEIA 2016-18, EM&V is generally following the same process as MEEIA 2013-15, with two substantive additions. First Ameren Missouri proposes to have market assessments completed (by an evaluator or another qualified entity) by the end of 2016. Market assessments are evaluations of the structure or functioning of a market, the behavior of market participants, and/or market changes that result from one or more program efforts. Market assessment studies may include estimates of the current market role of energy efficiency (market baselines), as well as the potential role of efficiency in a local, state, regional, or national market (potential studies). A market assessment study evaluates the following:

1. Whether market assessments can be used as a substitute for the specific quantification of all forms of free ridership, spillover and market effects;
2. The threshold market shares above which a market will be assumed transformed for a given energy efficiency program (at that point, the Company will either discontinue offering the program or modify the program to only include measures which have not been transformed); and

3. Monitor incentive levels for programs where incentives are critical to customer participation (if customer participation in programs can be maintained at existing levels at lower incentive levels, at that point the Company will either discontinue offering the program or modify the program to only include measures that require robust incentives to encourage customer participation.)

Conceptually, the key deliverable in terms of deeming future NTG values for programs from the market assessment work may be a table with the following type of elements and quantification. The values in the table are illustrative only:

Table 4.3: Illustrative Deliverable for Market Assessments

Program	Market Share	NTG Equivalent
W	<10%	100%
X	>10%, <30%	80%
Y	>30%<50%	60%
Z	>50%	Discontinue or modify program

The second substantive addition was prompted by the EPA's proposed GHG emission rules under Section 111(d) of the Clean Air Act. The EM&V plan will lay the foundation for how these new rules impact Ameren Missouri's compliance efforts and the costs of those efforts. The EPA should provide guidance to states as soon as practical setting forth a non-exhaustive list of approvable approaches/provisions that may be included in state compliance plans. While it is not possible to know what form the final requirements will take, it appears energy efficiency programs are likely to be a viable method of compliance. Thus quantifying CO_2 savings is likely to play an important role for Ameren Missouri's compliance planning.

Translating electricity energy efficiency savings into avoided emissions has not been part of previous EM&V plans. However, Ameren Missouri may need to calculate the magnitude of CO_2 savings by measure for GHG rule compliance just as it calculates kWh savings for individual measures. Going forward, the significant benefit of energy efficiency programs may well come from CO_2 savings. Consequently, the measure mix of the program may change to emphasize measures with the most CO_2 savings. Ameren Missouri does not anticipate a change to its MEEIA 2016-18 programs as a result of the CO_2 savings until the EPA rules are final, but believes it may undertake future program design with the objective of maximizing CO_2 reductions. Adding this calculation to the EM&V process will provide better transparency to all parties about how that savings is calculated and at what cost. This quantification will be done annually by the EM&V contractor or another qualified entity.

Data Collection

Ameren Missouri will engage with the EM&V contractors to develop and implement the necessary protocols, methodologies, and technology to gather the appropriate data necessary to facilitate effective evaluation. As programs mature and the market begins to transform, it is important for Ameren Missouri to continue to have open lines of communication with both the evaluation contractors and the implementation contractors. The implementation contractors will use a centralized data tracking system to track program metrics for use by the evaluators in the EM&V process.

Internal Verification and Quality Control

For purposes of independent evaluation, the evaluation contractor has the responsibility of installation verification and estimation of energy savings. Besides coordinating independent EM&V, Ameren Missouri requires implementation contractors to develop and implement internal Quality Assurance and Quality Control ("QA/QC"), inspection, and due diligence procedures. These procedures will vary by program and are in place to assure customer eligibility, completion of installations, and the reasonableness and accuracy of savings upon which incentives are based. Evaluators will review these QA/QC procedures.

Impact Evaluation

Ameren Missouri plans to use an on-line TRM for its MEEIA 2016-18 programs, as is described in Section 4.2 of this chapter. The TRM contains deemed savings values for measures. The Evaluator's role in the impact evaluation will be to verify the installation of measures. This verified number of measures will be multiplied by the deemed savings values from the TRM to determine the measure savings.

The Evaluator is expected to complete a full impact evaluation of all programs. This will include any necessary measurement to recommend adjustments to future deemed savings values for each measure.

New to MEEIA 2016-18 is the practice whereby the attributes of the measures in the TRM will be updated annually to better reflect the savings associated with the participation and will be the basis for the following year's goals. As can be seen in Tables 4.4 and 4.5, results from recent evaluations show that ex-ante and ex-post savings values have been very similar, so the Company does not anticipate that this will result in major changes.

Table 4.4: 2013 Residential Ex-ante and Ex-post Savings Comparison

Program	Ex Ante Gross Savings Utility Reported (Prior to Evaluation)	Ex Post Gross Savings Determined by EM&V
ApplianceSavers	9,897	6,963
CommunitySavers	7,472	6,149
ConstructionSavers	435	238
CoolSavers	27,876	25,098
LightSavers	198,735	227,132
PerformanceSavers	428	316
RebateSavers	21,473	8,409
Residential Total	266,315	274,305

Table 4.5: 2013 Business Ex-ante and Ex-post Savings Comparisons

Program	Ex Ante Gross Savings Utility Reported (Prior to Evaluation)	Ex Post Gross Savings Determined by EM&V
Standard	23,793,935	25,081,134
Custom	51,535,015	47,420,812
New Construction	168,063	217,614
Retro Commissioning	316,031	335,638
Business Total	75,813,044	73,055,198

Process Evaluations

Ameren Missouri will again collaborate with its evaluators to identify appropriate process evaluation goals, procedures, and practices. These evaluations focus more on program design and delivery, market segments, and other societal factors that affect the program's performance and in addition will address the requirements of 4 CSR 240-22.070(8).

Annual EM&V Reporting

As is required by the Commission's MEEIA regulations, Ameren Missouri will require its Evaluators to provide the regulatory stakeholders with a copy of the draft and the final EM&V report at the same time as they are provided to Ameren Missouri.

The reports will include energy savings and demand reductions for each of the programs and each of the residential and non-residential portfolios. The reports will also summarize ex-ante and ex-post measure level savings on which the prospective updates for the TRM will be based. Finally, the reports will include a summary of the process evaluation and will identify specific details regarding the impact methodologies and results as well as key findings, conclusions, and recommendations. Based on the annual report results, Ameren Missouri will complete the cost effectiveness analysis at the program and portfolio level and calculate the net lifetime benefits of the programs. The schedule of reporting activities was described in detail in Section 4.1 of this chapter.

Ameren Missouri Expert/Witness: Richard A. Voytas

4.5 Portfolio Implementation and Annual Goal Flexibility

Ameren Missouri first addressed the need for implementation flexibility in its MEEIA 2013-15 filing. Key elements of implementation flexibility included:

- Reallocation of funds among program elements
- Tariff flexibility that allowed greater latitude for changes not requiring Commission approval
- Program delivery flexibility based on expert implementation contractor input
- Portfolio flexibility to adjust program costs, targets, and incentives in addition to starting and stopping programs
- Adjust annual kWh load reduction targets to reflect the number of customers who elect to opt out of participation in Ameren Missouri DSM programs

In MEEIA 2013-15, an agreed upon 11-step process (detailed in its MEEIA tariffs) allowed the Company the flexibility to encourage participation during changing market conditions while maintaining the overall program cost-effectiveness. Sometimes factors outside of Ameren Missouri's control, such as the economy, impact the participation in a particular program and warrant swift changes to measures, incentive amounts or program economics. Ameren Missouri reiterates its commitment to notify Staff, OPC and Division of Energy of changes prior to implementation by retaining the 11-step process reflected in the MEEIA program tariffs provided with this filing.

It is important to continue the implementation flexibility that was provided for MEEIA 2013-15. However, lessons learned in MEEIA 2013-15 demonstrate a need for additional flexibility as it relates to MEEIA 2016-18.

Additional Flexibility for MEEIA 2016-2018

In addition to the tariff, budget and program flexibility included in the 2013-15 program cycle, additional flexibility in terms of the operation of the TRM, DSIM, and portfolio

goals will enhance the ability of Ameren Missouri's MEEIA programs to achieve the policy objectives of MEEIA. The TRM for MEEIA 2016-18 is more dynamic as discussed at length in the TRM section of this chapter. Those updates to the TRM, in addition to prospectively impacting evaluated savings of measures, logically should cause program goals to update prospectively as well. Specifically, this filing seeks additional flexibility to:

(A) Adjust MEEIA 2016-18 program designs between the time the MEEIA 2016-18 filing is submitted in the 4th Quarter of 2014 and the start of program implementation in January 2016, and again annually prior to the start of each program year. Those changes may reflect any one or any combination of the following:

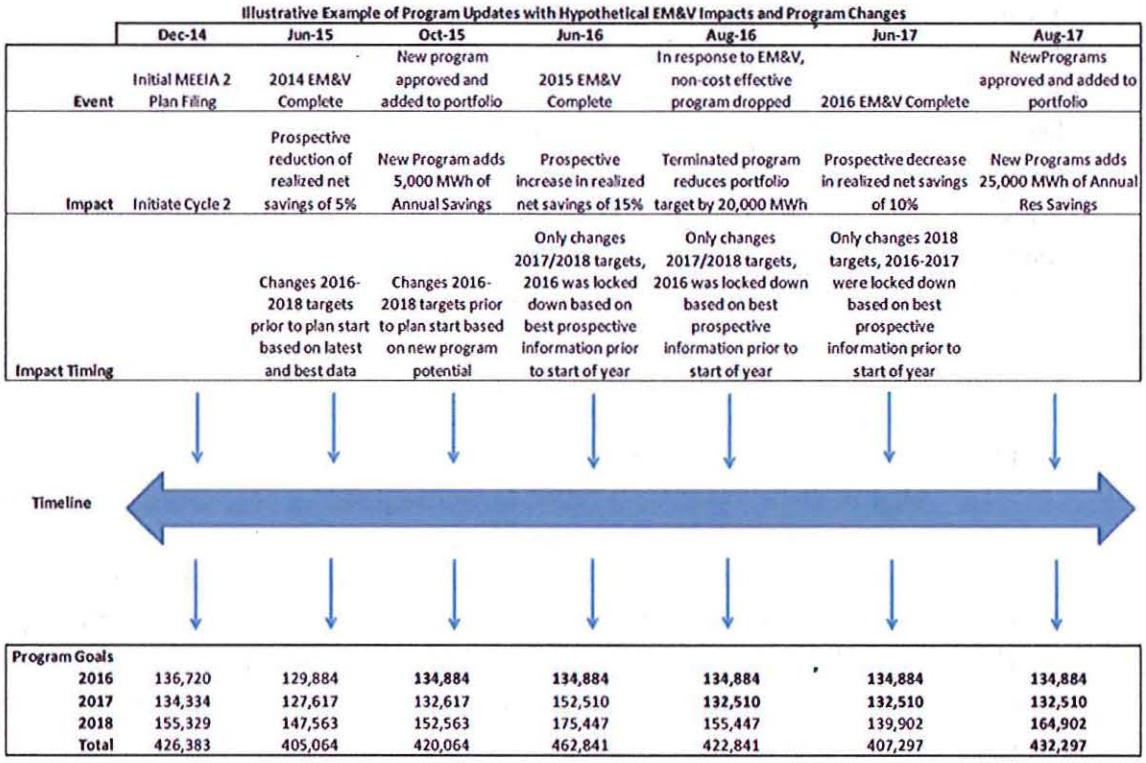
1. Incorporate new information from the most recent EM&V impact analyses including:
   - Incremental measure energy savings and costs
   - Efficient measure baseline changes
2. New program design proposals
   - May include input from DSM Implementation contractors engaged to manage MEEIA 2016-18 programs
   - May include proposals from Ameren Missouri regulatory stakeholders
3. Modifications to proposed MEEIA 2016-18 program designs to reflect changes in the constructs of proposed delivery mechanisms, marketing campaigns, EM&V approaches, cutting edge cost effective technologies and customer behavioral change programs
4. Unforeseen but significant changes in DSM program cost effectiveness modeling inputs
5. Lessons learned from MEEIA 2013-15 program implementation and evaluation

(B) Adjust annually both the TRM as well as annual load reduction targets during the 2016-18 implementation period to reflect the best available individual measure energy savings estimates from the most recent EM&V impact analyses of all programs.

Measures' energy savings characteristics are a foundational input to the Market Potential Study in which the Company's MEEIA savings goals are grounded. When EM&V work reveals that the measure savings characteristics have or should change for whatever reason, the analysis from the Market Potential Study is no longer in sync with current market conditions. The MEEIA savings goals, therefore, are grounded in different assumptions than will be used to evaluate program results. The simple exercise of rerunning the analysis of potential with the updated measure savings assumptions will keep the goals in alignment with current market conditions. The proposed process to make adjustments was set forth in Section 4.1 of this chapter. An

illustrative timeline of annual program updates with hypothetical EM&V impacts and program changes is shown in Figure 4.1 as follows:

Figure 4.1: Illustrative Timeline for Updates of 2016-18 Programs and Goals



The Need for Increased Flexibility for MEEIA 2016-18

Portfolio flexibility is fundamental to Ameren Missouri's ability to offer its customer the most effective energy efficiency programs possible while managing the risk and uncertainty associated with the MEEIA 2016-18 portfolio. Consider:

- MEEIA 2016-18 programs were designed in 2013 due to regulatory filing timeline requirements – in the absence of critical inputs including:

    1. MEEIA 2013-15 EM&V reports were not available
    2. Limited MEEIA 2013-15 field implementation experience to draw on
    3. Rapidly changing markets for energy efficiency products and services, i.e., LED light bulbs, make it difficult to forecast optimal programs designs in 2013 for programs starting in 2016
    4. Equipment efficiency baseline changes are in a state of flux
    5. Degrees of program ally participation may change over time
    6. Customer interests change over time
    7. Qualitative nature of EM&V, i.e. attempting to measure that which is not used, make assumptions as to energy savings from programs more

uncertain the longer the gap between program design and program implementation

Whenever a measure or program requires revisions for any one or more of the reasons described above, Ameren Missouri needs the flexibility to re-direct its resources to those measures and programs that are more successful in order to maximize net benefits to customers. For example, when equipment standards change, this causes the amount of savings for that measure to change resulting in necessary changes to the incentives being provided for that measure. This also may result in the need to change the volume in which the measure is offered within the portfolio. In addition, new measures or programs may be developed or discovered which should be added to the portfolio which might result in a re-direction of portfolio resources.

Ameren Missouri Expert/Witness: Richard A. Voytas

4.6 Business Customer Opt-out

MEEIA allows eligible customers to opt-out of paying the costs of utility energy efficiency programs. Three categories of customers can opt-out. Customers with a single facility exceeding 5,000 kW of peak demand and companies with an interstate pipeline pumping station can opt-out without restriction. Customers that can aggregate accounts to greater than 2,500 kW of coincident demand can opt-out provided the customer has a comprehensive demand-side or energy efficiency program and can demonstrate an achievement of savings at least equal to those expected from utility-provided programs.

Ameren Missouri estimated in its 2014 IRP that 9% of the available DSM potential from Commercial and Industrial (C&I) customers will opt-out[18]. The 9% opt-out estimate is based on the preliminary 2013 estimate for the MEEIA 2013-15 DSM Business programs. The actual opt-out for 2013 ended up being 8.93%. Ameren Missouri's total cumulative targeted savings for MEEIA 2016-18 of 426,382 MWh is based on an assumed continuation of the 9% opt-out rate. Each year, the targeted energy savings shall be adjusted based on the calculation of the percent of load that has opted out for the coming year based on the usage from most recent 12 billing months for the opted out accounts taken as a percentage of the billed sales to the SGS (2M), LGS (3M), SPS (4M), and LPS (11M) rate classes over those same billing months. Table 4.6 lists the 2013 actual opt-out customers.

[18] The C&I load considered for this opt-out analysis excluded the load of the Noranda aluminum smelter. Noranda has also opted out of the Company's energy efficiency programs, but is treated as its own customer class, 100% of which is not participating in programs.

Table 4.6: 2013 Customers Opted Out of MEEIA **HC**

2013 Opt-Out Customers	2013 Billed kWh Consumption
Anheuser Busch	[redacted]
Biokyowa	[redacted]
Doe Run	[redacted]
Boeing	[redacted]
Enbridge	[redacted]
Explorer Pipeline	[redacted]
General Motors	[redacted]
GKN Aerospace	[redacted]
Hussman	[redacted]
JW Aluminum	[redacted]
Maritz	[redacted]
MEMC	[redacted]
Monsanto	[redacted]
Walmart	[redacted]
Total Opt-Out kWh	1,703,602,485
Total C&I kWh	19,067,503,162
Actual 2013 Opt-Out	8.93%

Because the potential study assumed a level of opt out at 9%, should additional customers opt out, there is clearly a smaller pool of customers to target with programs and hence a reduction in total potential. Business opt out was the only element of program goal flexibility that was incorporated into the 2013-15 cycle. In conjunction with the rest of the items identified previously associated with new or terminated programs and TRM updates, Ameren Missouri plans to continue updating program goals based on the actual mix of customers that choose to opt out.

Ameren Missouri Expert/Witness: Steven M. Wills

4.7 Continuity

Ameren Missouri has identified a need to provide for program continuation between MEEIA cycles for its business energy efficiency programs (continuity). The tariffs that currently implement Ameren Missouri's MEEIA 2013-15 business programs require all projects to be complete by the end of 2015, consistent with the three-year cycle period approved with the existing programs and DSIM. However, many business energy efficiency projects that utilize the Company's incentives have long lead times. In fact, fifty-one percent (see table 4.7 below) of the business custom projects take six months or longer to complete from the time they are initiated, with some program projects extending to nearly two years. To the extent that an Ameren Missouri business

NP

customer has a project of interest comes up in mid to late 2015, for example,[19] it simply may not be able see it through to completion in time to receive the incentive payment before the program ends. The current structure, which does not include continuity across cycles, causes a stop and start to the acceptance of applications. This results in an undue barrier for Ameren Missouri customers, implementation contractors, and trade allies. Customers that identify a longer term project late into the MEEIA cycle currently have limited ability to participate in Ameren Missouri's business programs. Provisions are needed for continuity so that a customer can apply for a project during MEEIA 2013-15 and complete it during MEEIA 2016-18.

Table 4.7: Business Custom Project Time to Completion

Months to Complete project	% kWh Complete	Cumulative % kWh Complete
1	2%	2%
2	9%	11%
3	12%	23%
4	13%	36%
5	13%	49%
6	15%	64%
7	6%	70%
8	5%	75%
9	3%	78%
10	3%	81%
11	5%	86%
12	4%	90%
13	3%	93%
14	2%	95%
15	1%	96%
16	2%	98%
17	2%	100%

The following issues exist without a program continuity structure:

Stop/start of programs causes confusion and discourages customers from participating due to project timing and uncertainty around project completion dates and potential incentives.

[19] With some projects exceeding two years of lead time, this issue is already impacting potential projects.

Customers may not be able to take advantage of programs for which they are paying. A reduction in the intake of Retro-Commissioning, New Construction, and other large Custom type projects will be seen.

Market outreach will decrease in 2015 due to program uncertainty.

Trade Allies and the business implementer will face volatility and a reduction in Business program activity in 2015, potentially affecting jobs.

Lost opportunities for long term projects that start during MEEIA 2013-15, but cannot be completed until after 2015. With uncertainty in the marketplace, customers may continue the project without considering more efficient alternatives.

The mix of measures will trend toward lighting projects as they are typically shorter duration projects.

Customer Impact

Below are examples of actual Ameren Missouri customers (with identifying information removed) that have applied for an Energy Efficiency project, but may not be able to utilize the program due to the projected completion of their project. Most current examples are for New Construction projects that have long lead times. Retro Commissioning and larger Custom projects will also have completion dates beyond 2015.

Community A is planning to build a new Recreational center and applied to the Business New Construction program. Ameren Missouri determined that if Community A upgraded their design for the HVAC system they could save nearly 650,000 kWh annually and be eligible for an Ameren Missouri incentive of almost $45,000. Community A has applied, but the scheduled completion of their project is not until 2016. Due to the lack of program cycle continuity, higher cost, and no Ameren Missouri incentive, Community A may revert to the less efficient HVAC system.

University B is planning to build an Athletics facility and applied to the Business New Construction program. Ameren Missouri determined that if University B upgraded their chiller technology, they could save over 85,000 kWh annually and be eligible for an Ameren Missouri incentive for almost $6,000. The completion date for the athletics facility is scheduled for 2016. Due to the lack of program cycle continuity, the higher cost, and no incentive from Ameren Missouri, University B may not upgrade the chiller technology and will install standard, less efficient, technology.

These are actual concrete examples of good projects that benefit Ameren Missouri customers but may become lost opportunities for improved efficiency in the absence of program continuity. However, as time passes and we move closer to the end of 2015, there will be more and more projects in this precarious situation that may result in the choice of inefficient solutions.

For continuity to have the best chance of positively impacting situations such as those described above, a resolution of this particular issue should be implemented as soon as possible during the review of the MEEIA 2016-18 plan and may require a change to the Company's tariffs for the MEEIA 2013-15 programs. Ameren Missouri may make an additional filing or engage Stakeholders during technical conferences in order to recommend ways of implementing continuity prior to a final order on the entire MEEIA 2016-18 plan.

Budget Impact

HC

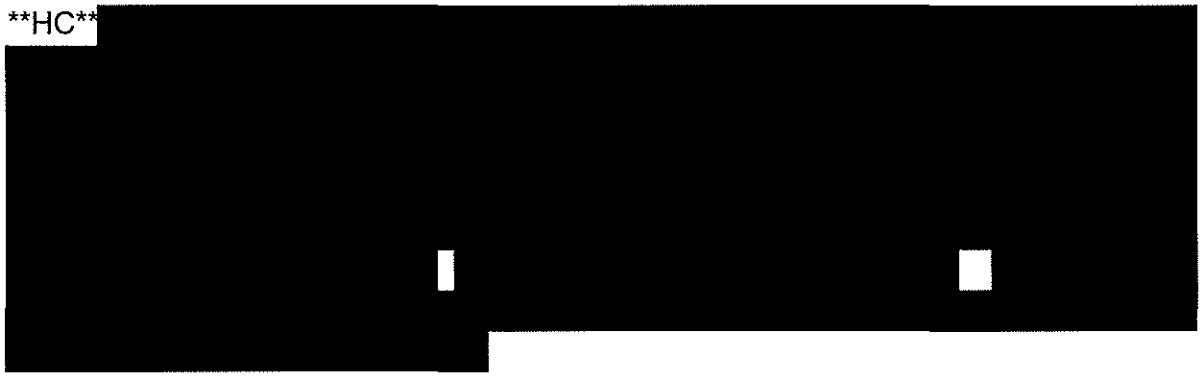
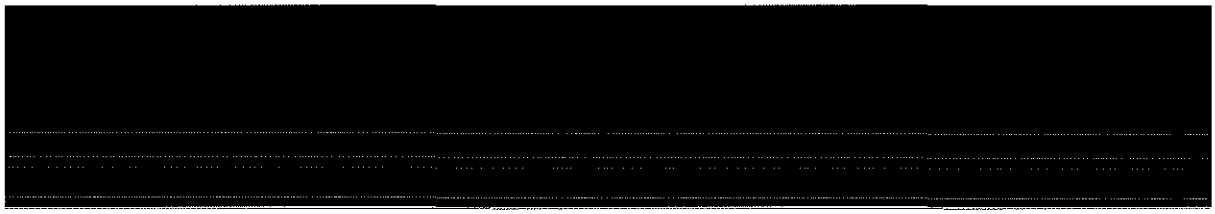


Table 4.8: Projected Commitment Payments in 2015 for 2016-18 Completed Projects

HC



In order to solve the continuity problem, projects committed to in MEEIA 2013-15 but completed in MEEIA 2016-18 will be paid based on the time of commitment and at the incentive levels utilized in MEEIA 2013-15. Only projects that commit during MEEIA 2016-18 will be paid at MEEIA 2016-18 incentive levels. However, the costs, energy savings and benefits associated with these projects will be accounted for in the program years during which the projects are completed.

NP

Continuity Reflected in MEEIA 2016-18

In order to achieve the positive customer and program outcomes identified above, Ameren Missouri's continuity proposal:

Allows customers to commit to Business projects during MEEIA 2013-15 that are estimated to complete after the end of MEEIA 2013-15.

Allows Ameren Missouri to commit to paying a customer an incentive, based on MEEIA 2013-15 incentive levels, for a project committed to in MEEIA 2013-15 but completed after the end of MEEIA 2013-15.

Allows Ameren Missouri to track all program costs for projects committed to in MEEIA 2013-15 that will not finish until after 2015 and apply those dollars to the MEEIA 2016-18 program budget.

Allows Ameren Missouri to track all program costs for projects committed to in MEEIA 2013-15 that will not finish until after 2015 and recover those dollars through the MEEIA Rider EEIC 1618 during MEEIA 2016-18.

Allows Ameren Missouri to count all kWh savings for projects committed to in MEEIA 2013-15, but not completed until after 2015, toward the MEEIA 2016-18 goals.

Allows Ameren Missouri to count all Benefits attained for projects committed to in MEEIA 2013-15, but not completed until after 2015, toward all calculations for Throughput Disincentive and Performance Incentive for MEEIA 2016-18.

The Continuity process has the following components:

1. The actual completion date of an individual company's energy efficiency project will determine in which cycle the project will be reflected.
    a. Projects that complete in 2015 will be reflected in MEEIA 2013-15 programs.
    b. Projects committed to in MEEIA 2013-15 that do not complete until the MEEIA 2016-18 cycle will be reflected in MEEIA 2016-18 programs.
2. All Program Costs, kWh savings, Benefits, and Throughput Disincentive will be reflected in the cycle of completion.
3. Rider EEIC will be used to recover Program Costs, Throughput Disincentive, and Performance Incentive related to projects for MEEIA 2013-15 and MEEIA 2016-18.

4. The Business Energy Efficiency Program Tariff for MEEIA 2016-18 will allow for individual company's energy efficiency projects to complete in MEEIA 2016-18 that were initiated in MEEIA 2013-15.

As described in the Portfolio Overview Chapter of the report, the pattern of business program savings included in Ameren Missouri's 2014 IRP did not assume this continuity. Due to this issue, it was assumed that first year savings would be lower than average as the projects deferred would fill the pipeline and more of them would close in future program years. The final program year was assumed to have above average savings due to the completion of many projects that had been under development throughout the 2016-18 timeframe. Due to the addition of continuity, the annual portfolio targets for MEEIA 2016-18 have been "smoothed" to reflect a more continuous stream of projects entering the pipeline and completing. Please note that the three-year savings targets are the same as the RAP estimates included in the preferred plan of the 2014 IRP despite the differences in annual targets.

Ameren Missouri Expert/Witness: Steven M. Wills

4.8 DSIM Mechanics

The operation of the DSIM will occur primarily through annual filings of updates to Rider EEIC 1618 (with the option of making an additional filing if needed during the year) in much the same manner as the 2013-15 DSIM is handled, with exceptions for the minor modifications reflected in this filing.

Program Costs

The program costs to be collected with each annual Rider EEIC 1618 filing are based on forecasted expenses for the upcoming year. Any differences between the actual program costs incurred and the program costs collected pursuant to the Rider will be included in the subsequent years' Rider as an increase or decrease to the costs to be collected, along with interest charged at the Company's monthly short-term borrowing rate.

Net Shared Benefits for Throughput Disincentive and Performance Incentive

The TD-NSB revenues will be incorporated in the Rider charge based on inclusion of 100% of the forecasted value. As described in the DSIM chapter of this report, the forecast will be based on the forecast of UCT net benefits, multiplied by the 32.57% share of benefits modeled by the Company and further adjusted by the time value factor to translate the TD-NSB from 2016 dollars to the effective period dollars using the weighted average cost of capital of 6.46%. Similar to the mechanism described for program costs, the difference between the actual TD-NSB incurred and the amount

billed will be subject to true-up in the following year, with interest at the Company's short term interest expense rate.

There are two significant differences relative to the current Rider with respect to TD-NSB. First, the Rider for MEEIA 2016-18 will include 100% of the forecasted TD-NSB for each year. During MEEIA 2013-15, only 90% of the TD-NSB was built into the Rider on a forecasted basis. This treatment, however, was largely an artifact of the initial implementation of the 2013-15 DSIM as a tracker, instead of a rider. At that time, all of the DSIM charges were embedded in base rates and tracked differences between actual costs and TD-NSB incurred, and those billed might be subject to long periods of time in between rate cases. Due to the potential for large balances to build up in the tracker, it was reasonable to protect customers from potentially bearing the cost of over-recoveries for periods of many months or years. Upon conversion to a Rider that incorporates annual true-ups, the risk of significant balances being tied up without an opportunity to flow them back to customers (or vice versa) is minimized. In order to have the DSIM operate as efficiently as possible and minimize the size of likely true-ups, it simply makes sense to use a forecast of 100% of the TD-NSB that is expected to be incurred.

The second change to the TD-NSB treatment in the DSIM was alluded to briefly in the DSIM chapter of this report. Ameren Missouri recognizes, based on the sensitivity analysis performed to various assumptions used to calculate the TD-NSB percentage, that the ability of this mechanism to adequately and fairly address the throughput disincentive is largely dictated by the timing of rate cases. Because the Company expects to strive to extend the time period it can operate without rate cases, we have chosen to file with an expected 30 month rate case cycle. At the same time, we recognize that it is entirely possible that some unexpected condition may dictate an earlier rate case during the 2016-18 energy efficiency cycle. To the extent that a rate case is filed sooner than 30 months after programs start, Ameren Missouri will rerun the TD-NSB model with the same inputs used in development of the 32.57%, except incorporating the actual rate case timing, and use the resultant share prospectively for any remaining full years that the DSIM will remain in operation. The only change required to implement this would be a forward looking change to the Rider EEIC 1618 tariff and supporting calculations to rely on the newly calculated TD-NSB share. This helps mitigate the risk of the Company over-collecting the throughput disincentive due to a rate case that was not anticipated.

Any financial performance incentive earned by the Company will be included in the charges collected through the Rider. When final results are available with respect to savings and net benefits, the three-year total savings will be utilized in conjunction with the final savings goals (as discussed further below) and the performance incentive

sharing grid to determine the appropriate share of UCT net benefits that will be awarded to the Company. The sharing grid is shown in Table 4.9.

Table 4.9: Share of Net Benefits for Performance Incentive Based on Achievement of 3 Year Savings Goal

% of Goal Achieved	Share of Net Benefits
<70	0.00%
70	12.77%
80	13.27%
90	13.65%
100	13.96%
110	15.23%
120	16.29%
>=130	17.19%

The percent of goal achieved will first be calculated and then the share is determined by looking up the appropriate value from the table above, interpolating between entries where necessary. As an example, if the final achievement were 83% or 105% of goal respectively, the sharing percentage would be calculated as shown in example 1 and 2 below:

Example 1 (83%): Performance Incentive-NSB = (.1365 - .1327) / (0.9 - 0.8) * (0.83 - 0.8) + .1327 = .1338

Example 2 (105%): Performance Incentive-NSB = (.1523 - .1396) / (1.1 - 1.0)*(1.05 - 1.0) + .1396 = .1460

That percentage is then multiplied by the actual UCT net benefits as discussed further below to come up with the 2016 NPV of the performance award. The final step is to use the time value adjustment factor, which is the Company's weighted average cost of capital of 6.46% to translate the 2016 NPV into a two-year nominal annuity, payable over the next two years. For an example case where Ameren Missouri achieved 100% of its savings goal after the completion of program year 2018 and also created UCT net benefits equal to the planned $135.1 million, the calculation is demonstrated in the following example.

Example: 2016 NPV of Award = $135.1 M * .1396 = $18.87 M

Nominal 2 Year Annuity Value = ($18.87 M * 1.0646^3) / ((1-(1.0646^-2))/.0646) = $12.5 M

In this example, the two-year annuity payable in 2020-2021 is valued at $12.5 million per year, for a total award of $25 million, which is the amount the performance incentive was designed to produce at an achievement level equal to 100% of goal.

Should the Company achieve the 70% threshold of savings prior to the final year, this incentive award calculation may be performed in order to collect the portion of the performance incentive already earned at that time. The final calculation would be made after the 2018 results are available and any incentive recognized early would be deducted from the final award prior to its collection.

Calculation of UCT Net Benefits and Final Goal

Critical to the process is an accurate and detailed description of how the final goal (as adjusted for the portfolio flexibility discussed earlier) and UCT net benefits that are the basis of the TD-NSB and performance incentive will be calculated. The calculations of the final savings goal will be made by updating the analysis from the Market Potential Study and the actual UCT net benefits will be made using a software program called DSMore. The analyses used to make the calculations are being provided as work papers with this filing. The inputs to those files will be "locked down", meaning those inputs will not be updated, except to the extent that the input is required to change per this discussion. For the calculation of the final goals, the measure attributes from the TRM will be updated prospectively prior to each plan year. Any new program that may have been proposed and approved by the Commission will be added to the potential study analysis consistent with the program parameters approved, and any program terminated due to cost effectiveness or other concerns will be removed from the analysis. Finally, the amount of load subject to the business customer opt out will be updated prior to the program year based on the most recent list of accounts that have exercised their opt-out rights. The results of the potential study analysis that establishes the goal going into the program year, based on the current mix of programs offered, updated opt-out totals, and updated TRM values will be included in an informational filing made with the Commission by the first business day of December, prior to the plan year.

For purposes of final UCT net benefits determination, the DSMore software runs (including elements associated with any new programs added and excluding any discontinued programs) utilized to prepare this filing and provided as work papers will be used as updated with the actual measure counts delivered through the program year, the actual program costs associated with administration and customer rebates, and updated measure savings from the applicable version of the TRM. At no time will any performance incentive associated with the TD-NSB or the financial performance mechanism be included as a cost for purposes of calculating the UCT net benefits, which is the basis for those subsequent shared net benefit mechanisms.

The categories of inputs to the potential study analysis and DSMore runs that will not change and those that will be modified for purposes of updating annual program goals and evaluating the UCT net benefits from programs for the DSIM calculations that are used to establish the tariff charges are summarized in Table 4.10 below:

Table 4.10: Update Status of Inputs to DSMore Runs to Establish Final Goals and UCT Net Benefits

Category	**Update prospectively (before plan year) for establishment of goal?**	**Update after the plan year for establishment of UCT net benefits?**	**Description**
Avoided Costs	✗	✗	The avoided energy, capacity, and T&D values are deemed
Measure Attributes	✓	✗	The TRM provides the deemed values or protocols for all measures on a prospective basis
DSMore Software/ Market Potential file structure	✗	✗	Use exact file structures and software versions as used to create filed work papers
Number of Measures	✗	✓	The number of measures will be measured as part of the evaluation process
Program Admin. Costs	✗	✓	The direct program costs will be tracked
Measure Rebate Costs	✗	✓	Measure rebates are included in the direct program costs
Net-to-Gross Factors	✗	✗	NTG = 1 at all times
Customer Opt-Out	✓	✗	The final performance goals shall be adjusted based on final opt-out estimates
Program Additions/ Terminations	✓	✓	Any new programs approved or existing programs terminated will update goals prospectively
Discount Rate	✗	✗	The discount rate shall remain 6.46%

Ameren Missouri Expert/Witness: Steven M. Wills

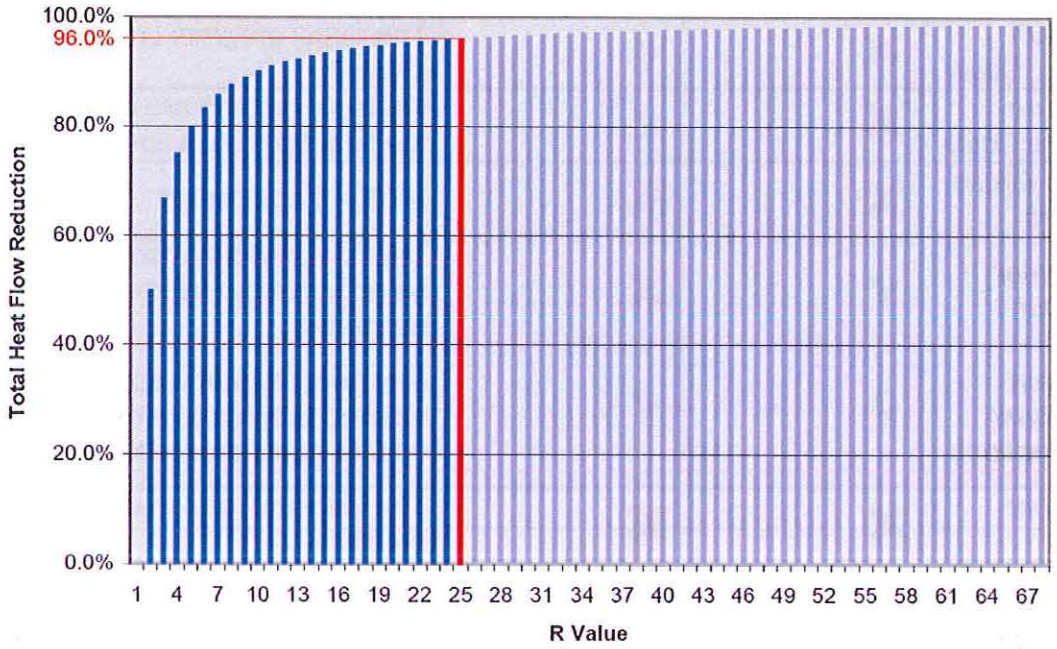
Chapter 5 – Future Considerations

As the energy efficiency programs mature and federal and state appliance efficiency and building code standards specify ever increasing levels of efficiency as the minimum standards of compliance, the incremental energy savings from electric utility sponsored programs to encourage customers to invest in even higher levels of energy efficiency become smaller. In economics, it is known as the law of diminishing returns, the shrinking benefit you get when you pour ever-increasing resources toward achieving a singular goal.

An illustrative graphic example of the law of diminishing returns, as it applies to a common household energy efficiency measure, is ceiling insulation; see Figure 5.1 below.

Most people imagine that the value of insulation is linear so that, for example, doubling the R-value will double the amount of energy saved. The physics of the situation is quite different. The heat flow reduction achieved by adding insulation to the attic in a home increases at a decreasing rate. Yet, the cost to add higher levels of insulation increases at a linear rate. The net effect is that the cost effectiveness or the benefit/cost ratio of adding attic insulation quickly becomes less than 1.0 above a certain baseline of insulation.

Figure 5.1: Ceiling Insulation Effectiveness



In the analysis of cost effective energy efficiency programs for MEEIA 2016-18, the law of diminishing returns has manifested itself relative to the MEEIA 2013-15 programs. For example, new efficiency standards reduced energy savings from CFLs to the point where most CFLs will not be cost effective in the MEEIA 2016-18 programs. Similarly, energy savings for efficient air source heat pumps, electric hot water heaters and many other key measures are meaningfully lower in the MEEIA 2016-18 portfolio relative to the MEEIA 2013-15 portfolio.

Building on the illustrative example of how increasing insulation thickness suffers diminishing returns of performance at higher values, there is a point at which the economic choice is to redirect resources toward other systems where greater gains can be realized. Similarly, there is a point where the regulatory policy encouraging energy efficiency investment in Missouri may need to be re-visited so that the trend toward decreasing cost effective energy efficiency equipment potential can be mitigated if not reversed.

Such mitigation of the diminishing returns trend takes on even greater significance in the context of greenhouse gas regulations that have been proposed. On June 2, 2014, the United States Environmental Protection Agency (EPA) issued its Clean Power Plan proposed rule to regulate greenhouse gas emissions from existing power plant sources. As a part of that regulation, EPA used four building blocks to determine the amount of greenhouse gas emissions reductions that it estimates states should be capable of achieving by 2030. One of those four key building blocks is energy efficiency. The EPA's analysis supporting the Clean Power Plan was based on the assumption that across the country, energy efficiency savings of 11% of load would be achievable, and in Missouri 10% energy savings would be delivered through energy efficiency programs. While there is continuing uncertainty regarding whether, when, and with what modifications this regulation will become the law of the land, it is certainly worthy of considering the implications of such a sweeping regulation in the context of MEEIA. Should the rule or a similar regulation become binding, states will have an added incentive to maximize the energy efficiency savings of the programs run by their utilities.

The purpose of this Chapter is to initiate the discussion on potential Missouri legislative and regulatory policy changes to put future energy efficiency potential on an upward trajectory. The discussion comprises the following categories:

- MEEIA Legislative Changes
- MEEIA Rule Changes
- Decoupling and Rate Design
- Missouri Statewide DSM Initiatives

5.1 MEEIA Legislative Changes

The MEEIA statute and the Commission's implementing rules share a common definition of a demand-side program. The term is defined as follows:

> *"Demand-side program", any program conducted by the utility to modify the net consumption of electricity on the retail customer's side of the electric meter, including, but not limited to energy efficiency measures, load management, demand response, and interruptible or curtailable load.*

While this definition covers all existing Ameren Missouri energy efficiency programs, it does not cover all opportunities to generate energy savings. A limiting factor is the use of the phrase "on the retail customer's side of the electric meter". There are efficiency opportunities with direct customer benefits that are not on the retail customer's side of the meter that could be achieved utilizing the MEEIA framework. For example, there is a potential for savings available by transitioning company-owned street lighting to LED technology from high pressure sodium lighting technology. However, company-owned lighting, while paid for by and providing service to customers, is not on the customer's side of the meter. There are still significant up-front costs associated with any type of transition, which would mitigate for some time the savings advantage from decreased energy usage. Additionally, absent treatment under MEEIA, LED street lighting has to compete for capital with all other projects that the Company needs to or would like to undertake. Under MEEIA, the program could potentially be prioritized and carved out of the queue of capital projects awaiting funding and implemented to immediately bring the attendant energy savings to customers.

5.2 MEEIA Rule Changes

The rule's definition of the benefits of a demand side program is also limiting to programs that could produce meaningful emissions reductions that could potentially contribute to meeting the goals of the CPP or any other future greenhouse gas regulation that might be enacted.

All MEEIA programs[20] must be cost effective based on the TRC test, and the benefits associated with the TRC test are utility avoided costs. If costs, or even emissions, can be avoided across the energy supply chain, but not specifically in the electric grid, MEEIA does not permit inclusion of the enabling program in the DSIM.

A prime example of this issue is electric vehicles (EVs). EVs produce no direct emissions of greenhouse gases, and the indirect emissions (emissions associated with the power plants that charge the batteries) are lower than the emissions associated with gasoline powered internal combustion engines. This is true even when the electricity

[20] An exception exists for low income or general education campaigns

that charges the battery is generated using coal, the most carbon-intense fuel used for large-scale electricity production, and becomes even more advantageous on an emissions basis the more the generating fleet evolves to cleaner sources of energy. However, a program that incented customers to use EVs when measured by the TRC would not be cost effective, since it would actually increase electric consumption and add utility costs. If such a program creates real benefits to total energy use (including in this example, oil savings), it could be incorporated as a utility program and generate emissions reductions that could count toward compliance targets. EVs are just one example of fuel switching that could produce overall economic and emissions benefits with such a change, but anything that reduces costs or emissions across the energy system in total could be included. Another example would be Combined Heat and Power projects.

5.3 Decoupling and Rate Design

The throughput disincentive has been discussed at length in this report and the success of Ameren Missouri's first DSIM was in no small part attributable to the solution to this problem. However, there are alternative solutions to the problem of recovering fixed costs through variable charges that are used in place in many states across the country: decoupling. Decoupling can be thought of as any rate or regulatory mechanism that removes the link between volume of energy sold an utility revenues. There are many different ways decoupling has been implemented across the country, and any particular method needs to be considered carefully for all of the impacts it has on utilities and customers. That said, having discussions around decoupling as a solution to the throughput disincentive is something that may warrant consideration if pressure on the shared net benefits model continues to increase due to declining avoided costs. .

Demand Side Rates

Decoupling also can provide opportunities to consider an additional source of savings: demand side rates. In Ameren Missouri's 2013 DSM Potential Study, there was significant potential identified associated with demand side rates (specifically Inclining Block Rates and/or Time of Use Rates). Such rates however, particularly the Inclining Block Rate, can actually exacerbate the throughput disincentive quite severely. This is a significant impediment to implementation of such rate design changes.

5.4 Missouri Statewide DSM Initiatives

Best EM&V Practices

The Company will continue its best practice EM&V approaches in its MEEIA 2016-18 implementation plan. Two of the most important best practices are:

1. Engage EM&V contractors simultaneous with the engagement of the Ameren Missouri DSM portfolio implementation contractors. This best practice assures that implementation and evaluation are in sync in terms of expectations of how energy efficiency programs are delivered, how data collection and tracking are handled, and how impact and process evaluations are performed for each individual energy efficiency program. This best practice also allows Ameren Missouri, implementation contractors and evaluation contractors to exchange real time information to make real time improvements in program delivery.

2. Industry best practices dictate that the evaluator prepare an initial evaluation plan, submit the plan to stakeholders for their review, revise and finalize the evaluation plan based on stakeholder input, and then implement the final evaluation plan. The Company will continue this best practice to develop EM&V work plans for each energy efficiency program in the 2016-18 portfolio of programs.

Advancing EM&V in 2016-18

Based on discussions at the October 21, 2014 Missouri Statewide DSM Collaborative, the Commission expressed a preference for the development of a statewide TRM. Although a definite schedule for the development of a Missouri statewide TRM was not established at the October 21st meeting, a sense of urgency to begin the TRM development work was expressed.

Ameren Missouri accepts the challenge to collaborate with stakeholders to develop a Missouri Statewide TRM, with a preference that the work to begin as early in 2015 as possible. To that end, Ameren Missouri offers the following path toward the development of a Missouri Statewide TRM.

Purpose for the Development of a Missouri Statewide TRM

The TRM should be used by the Commission, Stakeholders, and all electric utilities in the state for the following:

1. Prospectively deem measure attributes for purposes of program design and program reporting including evaluation, measurement and verification of annual energy and demand savings from DSM programs; calculating throughput disincentives; calculating financial performance incentives; and conducting DSM Market Potential studies,
2. Prospectively deem NTG on a prospective basis for programs and measures, as applicable, and
3. Prospectively deem individual incremental measure costs

The value proposition to customers, the Commission, and Missouri electric utilities in developing a statewide TRM is to eliminate the risk and uncertainty associated with estimating energy efficiency savings thereby eliminating the contentiousness in adjudicating differences in opinion on annual EM&V results. The TRM will reduce the cost of EM&V work going forward due to the deeming of most energy efficiency measures and costs and NTG ratios.

The Challenge of the Development of a Missouri Statewide TRM

There are at least three formidable challenges associated with the development of a Missouri Statewide TRM. Each challenge is discussed below.

Deeming Individual Measure Savings

It would appear to be a relatively simple task to deem individual measure savings. For example, if a 60 watt incandescent light bulb is replaced by a 13 watt equivalent CFL it would appear that the incremental energy savings associated with this measure is determined by the simple equation: 60 watts – 13 watts = 47 watts. However, the determination of the annual energy savings associated with the CFL in this example involves many more estimates of many more parameters. Figure 5.1 depicts the parameters that go into the calculation of annual savings for a simple CFL. The graphic also includes a side by side comparison of CFL parameters used in the evaluations of the 2013 Ameren Missouri CFL measure(s) and the 2013 KCPL/GMO CFL measure(s).

Figure 5.1: Calculation of CFL Savings – Ameren Missouri - KCPL/GMO

$$\Delta kWh = \left[\frac{(Watts_{Base} - WattsEE) \times HOU_{Res} \times 365}{1000} \times ISR \times (1 - LKG) \times WHF_{Res}\right] \times \%\ RES + \left[\frac{(Watts_{Base} - WattsEE) \times HOUNRes \times 365}{1000} \times ISR \times (1 - LKG) \times WHF_{NRes}\right] \times (1 - \%\ RES)$$

Measure Savings Input	Ameren Missouri 2013 EM&V Inputs	KCP&L GMO 2013 EM&V Inputs
$Watts_{EE\ (13\ W)}$	13.3	13
$Watts_{EE\ (18\ W\ Pre\text{-}EISA)}$	18.6	18
$Watts_{EE\ (18\ W\ Post\text{-}EISA)}$	19.1	18
$Watts_{EE\ (23\ W)}$	23.4	23
$Watts_{Base\ (13W)}$	59.3	62.4 avg
$Watts_{Base\ (18W\ Pre\text{-}EISA)}$	75	62.4 avg
$Watts_{Base\ (18W\ Post\text{-}EISA)}$	53	62.4 avg
$Watts_{Base\ (23W)}$	72	62.4 avg
WHF_{Res}	1	1.06
WHF_{NRes}	1.3	N/A
%RES	0.9	N/A
ISR	0.9	0.98
LKG	0	N/A
HOU_{RES}	2.9	2.7
HOU_{NRes}	8.8	N/A
Efficient kWh Source	Program wattage based on actual sales	Ameren Missouri TRM
ISR Source	PY 2013 Home Inventory Study	Illinois Statewide TRM
WHF Source	PY 2013 Engineering Simulation Modeling	Illinois Statewide TRM
HOU Source	PY 2010 Metering Study	Ameren Missouri TRM
Baseline kWh	EISA max watts or assumed existing watts weighted by # of program bulbs	EPA report on Next Generation Lighting Programs

- Ameren offered store discounts and coupons for CFL bulbs by wattage
- Ameren offered free CFL bulbs to community organizations to distribute to income-eligible customers
- GMO offered a free 2-pack of CFL bulbs for all customers participating in the Lighting & Appliance program
- GMO offered a free 6-pack (2-13W, 2-18W, 2-23W) of CFL bulbs for all customers participating in the Cool Homes (HVAC ER of SEER 8 or less) program

The takeaway from the preceding graphic is that the annual savings associated with a CFL is a function of the following parameters:

1. Baseline against which incremental energy savings are estimated.

2. Hours of use ("HOU") or the average number of hours in a day that a light is turned on.

3. In service rate ("ISR"): ISR pertains to the situation where customers purchase CFLs in multi-packs of perhaps six but actually install only a portion of the CFLs from the multi-pack in the year in which the multi-pack of CFLs was purchased.

4. Waste Heat Factor ("WHF"): WHF is also referred to as "interactive factor". WHF is recognition that a CFL emits less heat than an incandescent light. Less heat implies lower air conditioning load which implies even more energy savings

for CFLs. Conversely, in the heating season there is less heat from CFLs which implies more heating load and, therefore, less energy savings for CFLs.

5. Leakage ("LKG"): LKG is a factor that attempts to account for CFLs incented by the program that may be purchased by customers who live outside the service territory of the utility that provided incentives to the retail store where the customer purchased the CFLs.

6. CFLs purchased by residential customers vs. CFLs purchased by business customers (% RES and 1-%RES: The CFL usage parameters for business customers are different than they are for residential customers.

Each of the preceding six factors is different for each electric utility in Missouri, based on such parameters as the market share for CFLs which impacts the HOU calculation; the split between homes heated by natural gas versus electricity as well as heating and cooling degree day differences which impact the WHF calculation; geography which impacts the LKG calculation; the delivery mechanism (i.e., upstream vs. direct delivery) which impacts ISR. As the comparison for this simple CFL measure for Ameren Missouri and KCPL/GMO illustrates, there are meaningful differences for each of these six factors for Ameren Missouri and KCPL/GMO.

The challenge is to resolve the differences in EM&V approaches and protocols such that all the electric utilities in Missouri can reach consensus on a standard approach for a Missouri Statewide TRM. A common but explicit approach in the Missouri Statewide TRM is necessary in order for all electric utilities in Missouri to design and report energy savings for any measure on an equivalent basis.

The work involves the close collaboration of the Missouri electric utilities' EM&V contractors facilitated by a Missouri Statewide TRM contractor and informed by stakeholders.

There are up to a 1,000 measures or permutations of measures for which to deem savings in the Missouri Statewide TRM.

Deeming NTG

If Change Requests for the evaluation of the Ameren Missouri 2013 portfolio of DSM programs is an indication, there are no significant issues with evaluated measure savings estimates. However, there are significant issues with all components of the NTG calculation. These components cover free ridership, spillover and market effects in all the various permutations in each of these three parameters.

The estimation of NTG, unlike the estimation of measure energy savings, is based on qualitative information that in many cases cannot be determined objectively with any definable accuracy or precision. Since the value of NTG, usually expressed as a number either greater than 1.0 or less than 1.0, is multiplied directly by the energy savings of a program, the application of NTG has a direct impact on the net energy savings for a program. The net savings for a program has a direct impact on the opportunity for an electric utility to earn a financial performance incentive. Net savings also have a direct impact on compliance with the proposed EPA greenhouse gas rules.

For example, if the estimate of NTG is biased in the downward direction, this will result in lower greenhouse gas emission reductions attributable to energy efficiency. In order to meet fixed greenhouse gas reduction targets, electric utilities must procure those reductions from other more expensive greenhouse gas mitigation technologies such as renewable energy. If so, greenhouse compliance costs will increase.

Due to the significance and the high degree of risk and uncertainty around the estimation of NTG in the evaluation of energy savings from electric utility DSM programs, it is imperative that the Missouri Statewide TRM prospectively deem NTG.

Since the deeming of NTG is a qualitative exercise in judgment, the collaborative development of deemed NTG values may be orders of magnitude more difficult than deeming energy efficiency measure savings.

Ameren Missouri has a specific proposal to address the NTG issue in the context of the development of a Missouri Statewide TRM, similar to the approach incorporated in the MEEIA 2016-18 plan.

Ameren Missouri proposes a "common sense" approach to estimate the magnitude of the attribution issue which is what NTG attempts to quantify. The common sense approach does not require that the individual NTG elements of free ridership, spillover and market effects continue to be quantified. The common sense approach recognizes that there is no objective, formulaic approach available with absolute quantifiable accuracy and precision to measure attribution. Rather, the common sense approach focuses on EM&V contractors doing a market assessment of how the market shares of efficient equipment and services in markets where Missouri electric utilities implement energy efficiency programs change over time. The market shares would then be used as a proxy for NTG values for each program. The methods for assessing market transformation and NTG implications are described in Chapter 4 of this report.

Deeming Incremental Measure Costs

Cost effectiveness for energy efficiency measures is measured in terms of a ratio of benefits to costs. The magnitude of benefits is a function of the incremental energy and

demand savings associated with the measure. The magnitude of costs is a function of the incremental costs associated with the measure. Consequently, deeming incremental measure costs in a Missouri Statewide TRM is as essential as deeming incremental measure energy savings.

The challenge is that there are very few deemed measure cost databases in the nation. There are no up to date deemed incremental measure costs for Missouri.

The challenge to develop deemed incremental measure costs for Missouri is daunting. For example, Ameren Missouri is aware of only three statewide TRMs that include incremental measure costs. California embarked upon the process to update its incremental measure costs in March 2011 and completed the project in May 2014. The total cost of the project was $2 million.

Missouri has multiple options to consider to develop deemed incremental measure costs. At the resource intensive end of the spectrum is the California approach of going it alone. At the other end of the spectrum may be the adoption of the California deemed incremental costs and engaging a contractor to apply appropriate factors to make them Missouri specific.

Missouri Statewide TRM Scope, Schedule and Development

Based on Ameren's involvement in the development of the Illinois TRM, a reasonable range of time to develop a Missouri Statewide TRM is 18-24 months. The budget should be expected to include the following components:

1. Contract with an expert TRM facilitator to coordinate the development of the statewide TRM
2. Expand the scope of work and associated budgets for electric utility EM&V contractors to support the development of the myriad of assumptions, inputs and algorithms associated with each measure in the TRM
3. Address the requirement to update individual measure incremental costs
4. Address the requirement to deem NTG for individual measures and/or programs
5. Contract with an independent third-party contractor to develop protocols and procedures to maintain the TRM on an on-going, annual basis

Paradigm Shift in Approach to EM&V for MEEIA 2016-18

The development of a Missouri statewide TRM will be a massive undertaking – the development of which will take most of Ameren Missouri's MEEIA 2016-18 implementation planning period. That being said, the to-be-developed Missouri statewide TRM should be expected to be used for Ameren Missouri's MEEIA 2019-21 program design, implementation, and evaluation.

Ameren Missouri's plan is to use the Ameren Missouri MEEIA 2016-18 TRM as the basis for all 2016-18 program design, implementation and evaluation. As stated in the discussion on program flexibility, Ameren Missouri will update the 2016-18 TRM annually to reflect the latest EM&V individual measure impact analyses.

The evolution to the use of a Missouri Statewide TRM that prospectively deems all parameters associated with energy efficiency savings represents a paradigm shift in the EM&V work plans for individual programs for MEEIA 2019-21 relative to MEEIA 2013-15 and 2016-18.

Traditional methods to estimate NTG are expected to be replaced by methods to measure market shares for energy efficiency products and services.

Annual efforts to measure the impacts of installed energy efficiency measures may morph into longer than annual intervals to measure the impacts for purposes of updating the TRM values.

Most importantly, the contentiousness associated with accepting and approving the annual EM&V reports for each energy efficiency program should be mitigated to the point of being eliminated since there will be an upfront agreement by all Stakeholders as to the measure and program savings estimates in the EM&V reports.

Ameren Missouri Expert/Witness: Richard A. Voytas

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's 2nd Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as allowed by MEEIA.	)))	File No. EO-2015-0055

AFFIDAVIT OF RICHARD A. VOYTAS

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

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

1. My name is Richard A. Voytas. I work in the City of St. Louis, Missouri and I am employed by Ameren Services Company as Director of Energy Efficiency/Demand Response.

2. That I have participated in the preparation of Ameren Missouri's 2014 Missouri Energy Efficiency Investment Act Filing Report and that I have knowledge of the following chapters/sections set forth in such Report:

Chapter	Section	Topic
1	3	2016-18 Plan
1	5	Key Aspects of the Plan (i.e. Flexibility, etc.)
1	6	Future Considerations
2	all	Portfolio Overview
4	2	TRM
4	3	NTG
4	4	EM&V
4	5	Flexibility
5	all	Future Considerations

3. That such matters are true to the best of my knowledge and belief.

Richard A. Voytas

Subscribed and sworn to before me this 18th day of December, 2014.

Julie Irby - Notary Public
Notary Seal, State of
Missouri - St. Louis County
Commission #13753418
My Commission Expires 1/15/2017

Notary Public

BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In the Matter of Union Electric Company d/b/a Ameren Missouri's 2nd Filing to Implement Regulatory Changes in Furtherance of Energy Efficiency as allowed by MEEIA.	)))	File No. EO-2015-0055

AFFIDAVIT OF STEVEN M. WILLS

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

Steven M. Wills, being first duly sworn on his oath, states:

1. My name is Steven M. Wills. I work in the City of St. Louis, Missouri and I am employed by Ameren Services Company as Manager of Quantitative Analytics.

2. That I have participated in the preparation of Ameren Missouri's 2014 Missouri Energy Efficiency Investment Act Filing Report and that I have knowledge of the following chapters/sections set forth in such Report:

Chapter	Section	Topic
1	1	Policy Context
1	2	Past and Current Achievements
1	4	Demand Side Investment Mechanism
3	all	Demand Side Investment Mechanism
4	1	Implementation Processes
4	6	Opt-Out
4	7	Continuity
4	8	DSIM Mechanics

3. That such matters are true to the best of my knowledge and belief.

Steven M. Wills

Subscribed and sworn to before me this 18th day of December, 2014.

Julie Irby - Notary Public
Notary Seal, State of
Missouri - St. Louis County
Commission #13753418
My Commission Expires 1/15/2017

Notary Public

VERIFICATION

I, Warren Wood, of lawful age, being duly sworn, depose and say that I am the Vice President of External Affairs & Communications for Union Electric Company d/b/a Ameren Missouri; that I have knowledge of the facts stated in the foregoing Application; that I certify that the requested action is substantially consistent with the preferred resource plan specified in Union Electric Company d/b/a Ameren Missouri's most recent triennial compliance filing or annual update report; and that said facts are true to the best of my knowledge, information and belief.

Warren Wood

Subscribed and sworn to before me this 19 day of December 2014.

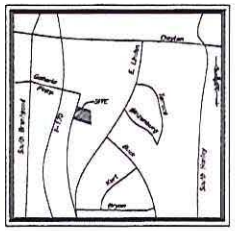
Notary Public

Julie Irby - Notary Public
Notary Seal, State of
Missouri - St. Louis County
Commission #13753418
My Commission Expires 1/15/2017

CONCEPTUAL DEVELOPMENT PLAN

Proposed Access Drive

LOT 18 OF LAVINIA TERRACE, A SUBDIVISION IN U.S. SURVEY 2485, TOWNSHIP 45 NORTH, RANGE 6 EAST, PER PLAT BOOK 3 PAGE 47 CITY OF RICHMOND HEIGHTS, ST. LOUIS COUNTY, MISSOURI



LOCATION MAP
(NOT TO SCALE)

PROPERTY DATA

OWNER	= UNION ELECTRIC COMPANY
ADDRESS	= 8007 GALLERIA PKWY RICHMOND HEIGHTS, MO 63117
LOCATOR NUMBER	= 20K540134
ZONING	= R1A, SINGLE FAMILY RESIDENTIAL WITH CONDITIONAL USE PERMIT 91-1
AREA (TOTAL)	= 16,811± s.f. or 0.438 ACRES
FIRE DISTRICT	= RICHMOND HEIGHTS
SCHOOL DISTRICT	= CLAYTON

SURVEY GENERAL NOTES

1. The basis of bearing of this survey is Plat Book 63 Page 35 of the St. Louis County Land Records.
2. The Property has an area of 16,811 square feet or 0.476± acres of land.
3. The property is designated by St. Louis County parcel # 20K540134.
4. Source of deed reference is Deed Book 9953 Page 0016.
5. This map complies with the Missouri Minimum Standards, class III.
6. R.= Record and S. = Surveyed.

LEGEND

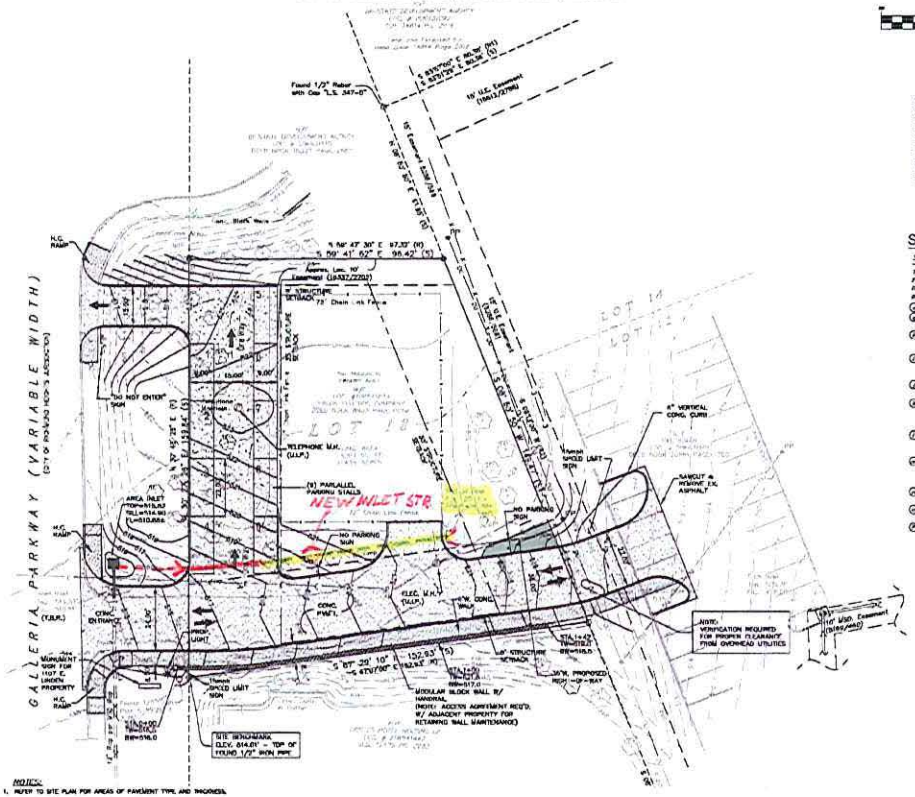
EXISTING CONTOURS
PROPOSED CONTOURS
EXISTING STORM SEWER
PROPOSED STORM SEWER
EXISTING SANITARY SEWER
PROPOSED SANITARY SEWER
RIGHT-OF-WAY
EASEMENT
CENTERLINE
EXISTING TREE
EXISTING SPOT ELEVATION
PROPOSED SPOT ELEVATION
SWALE
TO BE REMOVED
TO BE REMOVED & RELOCATED
TO BE USED IN PLACE
ADJUST TO GRADE
BACK OF CURB
FACE OF CURB
WATER MAIN
GAS MAIN
UNDERGROUND TELEPHONE
OVERHEAD WIRE
UNDERGROUND ELECTRIC
SILTATION CONTROL
FIRE HYDRANT
POWER POLE
WATER VALVE
LIGHT STANDARD

ABBREVIATIONS

N	NORTH
S	SOUTH
E	EAST
W	WEST
CONC	CONCRETE
ASPH	ASPHALT
PB	PLAT BOOK
DB	DEED BOOK
PG	PAGE
SF	SQUARE FEET
AC	ACRES
ELEV	ELEVATION
FF	FINISH FLOOR
PL	PLEASURE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
ST	STORM
SAN	SANITARY
GAV	GATE VALVE
(R)	REMOVE
(T.B.R.)	TO BE RELOCATED
(T.B.U.A.R.)	TO BE REMOVED AND REPLACED
H.G.	HYDRAULIC GRADE

INTERSTATE 170 (VARIABLE WIDTH)

GALLERIA PARKWAY (VARIABLE WIDTH)
(CITY OF RICHMOND HEIGHTS JURISDICTION)



NOTES:
1. REFER TO SITE PLAN FOR AREAS OF PAVEMENT TYPE AND THICKNESS.
2. EXPANSION MATERIAL SHALL BE INSTALLED EVERY 20' IN CURB. EXPANSION MATERIAL SHALL BE 1/2" ± TYPE EQUAL TO THE ASPHALT APPROXIMATE FIBERBOARD CONFORMING TO AASHTO C 175 FOR EXTRUDED BOARD. EXPANSION MATERIAL SHALL EXTEND FULL DEPTH OF CURB AND GUTTER, LESS 1/4" AT TOP OF CONCRETE.
3. CURBS TO BE PROVIDED WITH SAW CUT OR TOOLED JOINT AT 10' INTERVALS.
4. JOINTS AND SAW CUTS TO BE SEALED WITH LIMESTONE COLORED SEALANT.
5. TYPE 5 AGGREGATE REFERS TO ST. LOUIS COUNTY SPECIFICATION

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.

LAND DESCRIPTION

Parcel No. Two:
An irregular shaped tract of land in Lot 18 of Lavinia Terrace, a subdivision in U.S. Survey 2485, Township 45 North, Range 6 East, according to a plat thereof recorded in Plat Book 3 page 47 of the St. Louis County records, which tract is more particularly described as follows, to-wit:
Beginning at the point of intersection of the East right of way line of Waldemar Avenue (formerly Tulip Avenue) and the Northeast property line of property now or formerly owned by the School District of Clayton, as recorded in Book 4,285 page 393 of the St. Louis County records, thence along the East line of Waldemar Avenue, North 31 degrees 40 minutes 28 seconds East a distance of 206.30 feet to an iron pipe; thence South 60 degrees 47 minutes East a distance of 76.00 feet to an iron pipe; thence South 7 degrees 13 minutes East a distance of 272.60 feet to an iron pipe, said pipe being at a point also being the Northwest corner of said School District of Clayton property; thence North 57 degrees 00 minutes 00 seconds West a distance of 156.93 feet to the point of beginning and containing 20,762 square feet.

SCHEDULE 'B' TITLE EXCEPTION NOTES

SCHEDULE "B" TITLE EXCEPTION NOTES

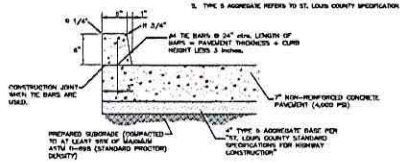
This survey is based on a title report prepared by Lafayette Title Company File No. JN2336, dated March 2, 2015 at 8:00 A.M. Items not listed below are standard exceptions and/or are not matters or issues that pertain to this survey.

1. Standard exceptions, not land survey related.
2. Building lines, easements, restrictions and conditions as shown on plat recorded in Plat Book 3 page 47. (No building lines or easements shown on the record plat.)
3. Easement to Union Electric Company recorded in Book 5256 page 369 (15' strip easement encumbers Parcel no 1 as shown on this survey), Book 15612 page 2788 and Book 15612 page 2963, (Encumbers Parcel No 1, but does not lie within the surveyed portion of said parcel)
4. Terms and conditions of Ordinance No. 2733, recorded in Book 5458 page 410, (An ordinance providing for the vacation of Melbourne Avenue (platted as Tulip Avenue) does not encumber the subject parcels, narrowly within the right of way at N=175.)
5. Right of way for Inner Belt, Expressway as established by instrument recorded in Book 6508 page 1316, (Within the current right of way line of Interstate 170 as shown on this survey)
6. Joint Parking Agreement recorded in Book 7441 page 31, (Joint parking agreement between Thiemann-Schmidt-Steinhaus Partnership and Eighty Hundred Clayton Corporation, asks for exhibits to describe the property, and a plat plan which are not attached, may or may not encumber the subject parcels)
7. Conditional Use Permit recorded in Book 8834 page 883 (Conditional use permit encumbering Parcel No. 2, not a land survey related item) and Book 15360 page 1447 (Conditional use permit encumbering Parcel No. 1, not a land survey related item)
8. Easement Agreement recorded in Book 16337 page 2981 (Easement agreement encumbering the adjoining parcel to the North, does not encumber the subject parcels) and Book 16337 page 2982 (Approximate location of 10' wide easement, encumbers Parcel No. 2 as shown on the survey).
9. Temporary Construction Easement Agreement recorded in Book 14814 page 2976, (Encumbers Parcel No. 1, but does not encumber the surveyed portion of said parcel)
10. Terms of Decree and order recorded in Book 20515 page 1660, (Does not encumber the subject parcel)
11. Deed of Trust dated September 15, 2000, from Beth Shalom Kneseth Israel to Pulaski Bank and recorded September 26, 2000, in Book 12700 page 547, securing $760,000.00. (Encumbers Parcel No. 1 and another property, not a land survey related item)

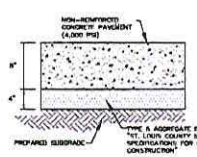
BENCHMARKS

BENCHMARK
St. Louis County Benchmark 14-374 Elev. 490.56' - "L" on the Southeast corner of concrete base for the signal control box; Northeast corner of Brentwood Boulevard and Galleria Parkway.

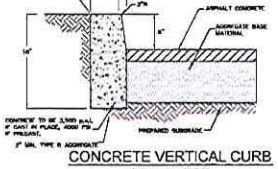
SITE BENCHMARK
Elev. 814.01' - top of found 1/2" iron pipe at the Southeast corner of the subject parcel as shown on this survey.



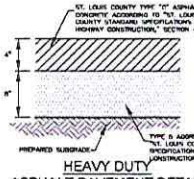
BARRIER CURBING DETAIL
(CURBING ADJACENT TO CONCRETE PAVEMENT)



CONCRETE PAVEMENT
(DRIVE AND ENTRANCE)



CONCRETE VERTICAL CURB
(CURBING ADJACENT TO ASPHALT)



HEAVY DUTY
ASPHALT PAVEMENT DETAIL
(PARKING LOT)

NOTE:
The underground utilities have been plotted from available sources and their locations must be considered approximate only. The verification of the actual locations of all underground utilities, either shown or not shown on this drawing, shall be the responsibility of the contractor and shall be located prior to grading or construction of improvements.

MISSOURI ONE CALL TICKET NUMBER #

The utilities contacted by Missouri One Call were Ameren Missouri Electric, ATT Distribution, Charter Communications, Laclede Gas Company, CTLGH – Centurylink, Missouri American Water Company, Metrolink and St. Louis Metropolitan Sewer District.

PREPARED BY:
CEDC
CIVIL ENGINEERING
DESIGN CONSULTANTS
11403 Gravois Road
Suite 100
Saint Louis, Missouri 63126
314.729.1400
Fax: 314.729.1404
www.cedc.net

PREPARED FOR:
KOL RINAH
829 NORTH HANLEY ROAD
ST. LOUIS, MO 63130
CONTACT: MITCHELL SHENKER
314.727.1747

PAUL H. HAVER, P.E. E-26358
CIVIL ENGINEER
LICENSE NO. 2003006874

CEDC
CIVIL ENGINEERING
DESIGN CONSULTANTS
11403 Gravois Road
Suite 100
St. Louis, Missouri 63126
314.729.1400
Fax 314.729.1404
www.cedc.net

Conceptual Development Plan for a
PRIVATE ACCESS DRIVE
8007 Galleria Parkway
Richmond Heights, Missouri 63117

Proj. # 1485	
No. Description	Date
For Review	04/23/15
Review comments	05/21/15

Conceptual Development Plan

C1