BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF MISSOURI

In re: Union Electric Company's 2014	)	
Utility Resource Filing Pursuant to	)	Case No. ER-2015-0084
4 CSR 240 – Chapter 22	)	

NRDC's Comments on Ameren's 2015 IRP

Thank you for this opportunity to comment on Ameren's 2015 IRP. It has been heartening to have witnessed the recent success of Ameren's demand-side resource programs. In 2013-2014, the first two years of the first MEEIA cycle, Ameren Missouri's energy programs will have resulted in net benefits of nearly $326 million for Missouri residents, and lowered the utility's electric load by 1.9%[1]. NRDC is grateful for the hard work of Ameren and all stakeholders that have made these programs an indisputable success and looks forward to continuing to work toward the expansion of demand-side efficiency programs as a core component of Ameren's service. These comments are meant to support and assist Ameren in strengthening the IRP and its next MEEIA Plan.

In addition to the following, NRDC wishes to advise that it has read the comments of Renew Missouri and the Sierra Club in this matter and fully affirms and adopts these parties' positions.

Introduction

NRDC understands the purpose of the IRP process to be ensuring that utilities objectively and systematically analyze all potential resources to meet future customer electricity needs and determine the optimal mix of resources that would result in the lowest present value of revenue requirements (PVRR) over the next 20 years.[2] These potential resources include both supply-side and demand-side resources, which should be analyzed and treated on an equal footing.[3] Ultimately, the intent of the IRP process is to determine the optimal resource mix and a preferred plan designed to attain that mix. NRDC submits that Ameren's IRP sub-optimally analyzes and recognizes demand-side resources. Specifically, it appears that Ameren first created a limited portfolio of efficiency programs it was inclined to implement, and focused the analysis to justify the predetermined portfolio as the "preferred plan." This is evidenced by Ameren having modeled the realistically achievable and maximum achievable potential (RAP and MAP) scenarios at significantly reduced levels than those found by its potential study performed by EnerNOC.[4] As a result, from 2016 – 2018, the RAP scenario that Ameren modeled achieves lower average annual savings as a percent of its total electric load than 35 of the 50 states. Ameren fails to convincingly explain the reasons for these significant reductions.

[1] Total GWh sales based on Ameren Missouri 2014 Annual Report. Number does not include opt-outs, so actual savings as a percent of load will be higher than noted. See http://www.prnewswire.com/news-releases/ameren-nyse-aee-announces-2014-results-and-issues-earnings-guidance-300041140.html.
[2] 240 CSR 240-22.010.
[3] Id.
[4] NRDC believes that EnerNoc study already underestimates of the full achievable efficiency potential in Ameren's territory

Ameren also models a MAP scenario, but this appears to contain the same inappropriate downward reductions as the RAP scenario, and uses a biased risk analysis and uncertainty factors. Nonetheless, the MAP scenario has the lowest present value of revenue requirement (PVRR) and should therefore be the preferred plan. The level of efficiency savings in the preferred plan is based on a series of conservative assumptions and underestimates that, in the aggregate, result in a level of demand-side resources that is far lower than the amount available at a cost lower than supply-side resource alternatives. These underestimates include:

1. The total measure level RAP and MAP potential found in the potential study is significantly lower than the amount available and currently being captured by numerous jurisdictions.
2. The adjustments made in the potential study to go from measure level potential to program potential are inappropriate.
3. The unwarranted adjustments from the program potential found in the EnerNOC potential study to the amount of potential pursued in the preferred plan.

The table below shows how MAP and RAP have changed from one step to another for the 2016-2018 MEEIA planning cycle. As seen, the scenario called RAP goes from 0.9% of load per year in the measure-level estimate made by EnerNOC to 0.2% per year in the IRP preferred plan that Ameren recommends. As noted above, Ameren has already exceeded even the original measure level RAP estimate of 0.9% of load per year in the past two years. Ameren's new preferred plan only represents about a fifth of the savings per year that Ameren captured in 2013 and 2014.

	RAP	**MAP**
measure level potential	0.9%	1.3%
program potential	0.6%	0.8%
Preferred plan	0.2%	Unclear

In its IRP analysis Ameren used unrealistic and asymmetric uncertainty factors to discount MAP, but still found that it resulted in the lowest PVRR. Despite this result, Ameren chose its reduced RAP scenario due to an unquantified "increased level of risk," presumably in addition to the risk factors already factored into quantitative analysis.[5] Ameren's risk analysis, which included this unquantified "increased level of risk" on top of other risk factors already factored in, is inappropriate.

Finally, the IRP rules mandate that Ameren examine the impact of rate structures designed to produce energy or demand savings. While Ameren commissioned The Brattle Group to perform a study to estimate the potential savings from rates and the study produced promising results, Ameren explicitly rejected consideration of these results in its integrated resource plan analysis. The inclusion of the estimated potential from just a single inclining block rate that Brattle modeled for residential customers alone would dramatically increase demand-side resources above what Ameren has modeled as realistic and achievable.

The rest of the comments will explore these concerns in greater detail and outline specific ways to potentially change the proposed efficiency portfolio to increase savings.

The EnerNOC Potential Estimate is Significantly Lower Than What is Being Achieved in Other Jurisdictions

The EnerNOC potential study found the program level realistically achievable potential (RAP) to be approximately 0.6% of total sales per year, and the program level maximum achievable potential (MAP) to be approximately 0.8% per year.[6] In the RAP scenario modeled in the IRP, Ameren further reduces

[5] Ameren 2014 IRP Chapter 10, page 11

[6] Ameren 2014 IRP. Chapter 8, Appendix B, Volume 1, page 13.

this potential to an average of 0.2% of load from 2016-2018.[7] The table below shows the savings as a percent of load for the states that have achieved 2011 savings of higher than 0.2% of load. As seen, 23 of the 50 states achieved higher savings than 0.6% of load, and 35 of 50 (including Missouri) achieved higher than Ameren's 0.2%. Please note further that because these are statewide averages, and many states have public or cooperative utilities that do little or no DSM, these figures are generally significantly lower than the best performing utilities within each state.

	State	**Savings as a % of load**
1	Vermont	2.12%
2	Massachusetts	1.43%
3	Arizona	1.38%
4	California	1.35%
5	Connecticut	1.32%
6	Hawaii	1.31%
7	New York	1.25%
8	Rhode Island	1.25%
9	Ohio	1.22%
10	Minnesota	1.21%
11	Maine	1.05%
12	Iowa	1.04%
13	Pennsylvania	1.04%
14	Michigan	1.00%
15	Oregon	0.99%
16	Washington	0.92%
17	Utah	0.85%
18	Idaho	0.82%
19	Nevada	0.74%
20	New Jersey	0.69%
21	Illinois	0.67%
22	Colorado	0.65%
23	New Hampshire	0.64%
24	Indiana	0.58%
25	Maryland	0.58%
26	Montana	0.58%
27	Wisconsin	0.57%
28	New Mexico	0.47%
29	Missouri	0.44%
30	North Carolina	0.39%
31	Tennessee	0.33%
32	South Carolina	0.32%
33	Nebraska	0.27%

[7] *Id. a*t

34	Florida	0.26%
35	Kentucky	0.25%

The claim that 0.2% of load represents the total "realistically achievable potential" is dispelled by the fact that the majority of states from all over the country are currently achieving up to 10 times that amount of savings. Further, many states have significantly increased savings between 2011 and 2014. For example, in 2014, Massachusetts and Rhode Island saved 2.6% and 3.4% of load, respectively.[8][9] Both of these states plan to continue aggressive efficiency efforts in the short term, with Rhode Island planning to save 2.55% in 2016, despite facing similar constraints imposed by stringent codes and standards as Missouri.[10] Further, these states have a longer and deeper history of efficiency programs than Missouri and, therefore, are more likely to run into problems with diminishing returns. It is also worth noting that even Missouri, prior to the first MEEIA plan and ramp up in DSM efforts, achieved more than double the savings as a percent of load statewide in 2011 than Ameren's claim as to realistically achievable potential in 2016-18. Finally and as noted above, Ameren achieved 1.9% savings in the last two years.[11]

The EnerNOC Potential is Significantly Lower Than Other Potential Studies

In addition to producing savings estimates significantly lower than results actually achieved in other states, the EnerNOC study finds significantly lower potential than other recent studies performed in the Midwest. In Table 6.2 of Volume 3, Ameren Missouri's study estimates that the cumulative program level "maximum" achievable savings (MAP) by 2030 is 8.6% and that a more "realistic" level of savings by 2030 is 6.3%. For the RAP scenario, this represents an annual additional savings of approximately 0.4% of baseline consumption. For MAP, the study assumes 0.5% annual savings.

For purposes of comparison, the results of recent similar potential studies are in the charts below. These charts provide a comparison of recent potential study estimates in nearby jurisdictions. As the chart suggests, Ameren Missouri's estimates of annual savings are less than other recent potential studies. In comparing these studies, high end assessments found cumulative savings potentials between 166% to 371% of EnerNOC's estimated potential. On average, the EnerNOC study found a potential of only 65% of other state studies. Comparing only Ameren Missouri's 2016-2018 MEEIA plan cycle with other states' studies, the EnerNOC study estimates potential of 37% to 62% of the levels found by the high-end estimates of its peers and 55% to 79% of the average levels.

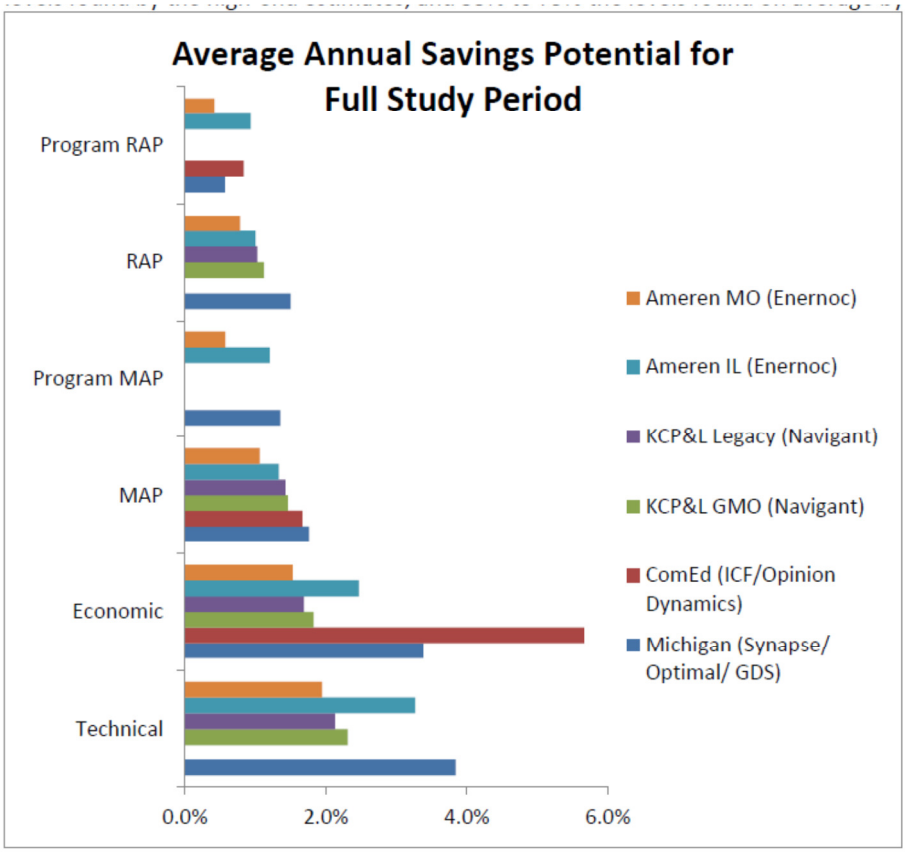
Combined with the clear evidence that the majority of states are already capturing savings well in excess of Ameren's purported "realistically achievable potential" and Ameren's own analysis found that the much higher MAP levels offer additional cost-effective potential that would reduce PVRR, it is not credible to conclude the very low estimates of demand-side resources Ameren modeled are anything close to the full achievable potential.

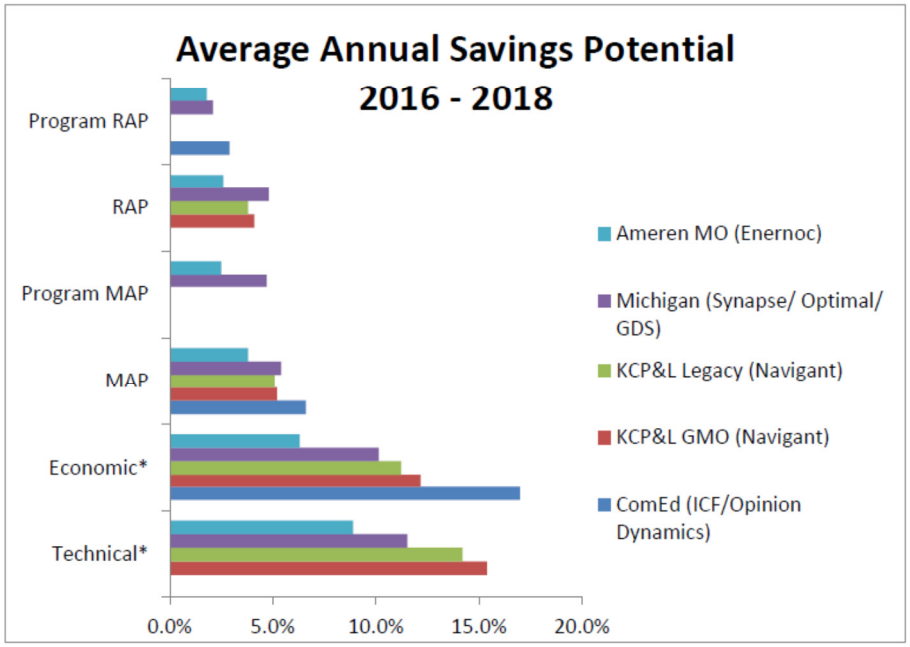
[8] MA 4th Quarter 2014 Program Administrator's Data

[9] RI 2014 4th Quarter Report

[10] In fact state energy codes in MA are more stringent than in MO, which has no statewide energy code in place.

[11] Adjusting for opt out load would result in this number being even higher.

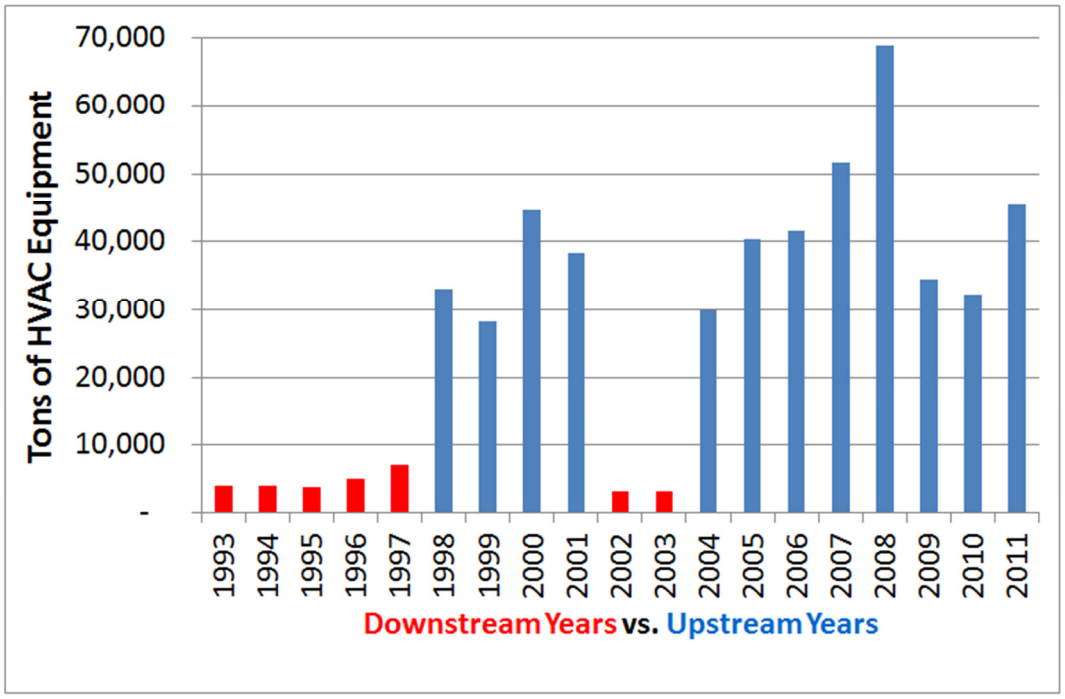

Average Annual Savings Potential for Full Study Period
Program RAP
RAP
Program MAP
MAP
Economic
Technical
0.0%
2.0%
4.0%
6.0%
Ameren MO (Enernoc)
Ameren IL (Enernoc)
KCP&L Legacy (Navigant)
KCP&L GMO (Navigant)
ComEd (ICF/Opinion Dynamics)
Michigan (Synapse/ Optimal/ GDS)


Average Annual Savings Potential 2016 - 2018
Program RAP
RAP
Program MAP
MAP
Economic*
Technical*
0.0%
5.0%
10.0%
15.0%
20.0%
Ameren MO (Enernoc)
Michigan (Synapse/ Optimal/ GDS)
KCP&L Legacy (Navigant)
KCP&L GMO (Navigant)
ComEd (ICF/Opinion Dynamics)

The Maximum Take Rates in the EnerNOC Study Are Lower Than What is Currently Being Achieved

In the potential study, EnerNOC estimated take rates for the RAP scenario are between 29% and 39% for the residential sector and between 38% and 49% for the commercial sector.[12] These numbers are well below a recent ACEEE study which examines take rates of actual programs throughout the country.[13] This study has found that efficiency programs have increased market share of Energy Star products to nearly 90%, small business direct install programs can achieve 60-80% participation in the absence of budget caps, and that commercial custom programs targeting larger customers have achieved nearly 90% participation over 3-4 years. These numbers are significantly higher than the rates used for the potential study and provide a possible explanation of why the EnerNOC potential is lower than what is already being achieved elsewhere.

Further, it does not appear that the potential study looked at alternate ways to increase take rates. For example, experience in other jurisdictions indicates that upstream programs significantly increase program participation. The graph below plots a Southern California HVAC program as it moved from downstream to upstream, back to downstream, and then back to upstream.[14]



As seen, participation is an order of magnitude higher during upstream years. By not taking into account various program design ideas to increase take rates, such as upstream programs, EnerNOC is significantly underestimating the true potential.

[12] Ameren 2014 IRP. Chapter 8, Appendix B, Volume 1, page 8.

[13] York, Dan, Neubauer, Max, et al. Expanding The Energy Efficiency Pie: Serving More Customers, Saving More Energy Through High Program Participation. January 2015.

[14] Presentation on upstream programs made to the Illinois Stakeholder Advisory Group, Philip Mosenthal, Optimal Energy, March 19, 2013.

The Reductions to Measure Efficiency Potential to Reflect "Program Potential" in the IRP are Inappropriate

The EnerNOC potential study decreases the cumulative 2016-2018 measure level efficiency potential from the above estimates by more than 30% to arrive at the "program potential." The "program potential" includes:

- a 25% reduction in the business sector potential for offices and schools to represent an assumed lower potential associated with the public sector;
- a removal of some of the more expensive, but still cost-effective, measures to account for the added administrative costs from operating actual utility programs; and
- a change in the measure mix due to vaguely defined "program delivery factors."

First, in going from measure level potential to program potential, EnerNOC removed "twenty-five percent of measure-level potential from offices and schools to represent the potential that is associated with the public sector."[15] EnerNoc purportedly removed this potential because "Ameren programs do not target public sector buildings."[16] However, the IRP process is designed to examine all cost-effective energy efficiency, regardless of whether it occurs in sectors targeted by current Ameren programs. The public sector is an important customer segment for energy efficiency programs and should be pursued by Ameren's programs. Including this sector would cause a significant increase in the savings from the program level potential estimates in the EnerNOC study. Numerous jurisdictions have achieved high program participation among public sector buildings.

More generally, since the IRP rules demand that Ameren consider all cost-effective potential, it is inappropriate to reduce the measure level potential based on the specific program mix Ameren prefers to implement. The argument that more expensive measures had to be removed to make up for the administrative costs not included in the measure-level RAP is not credible. First, administrative costs for a program are largely fixed, as adding another measure to the program rarely significantly increases administrative costs. Therefore, program administrative costs should not be applied at the measure level, which EnerNOC and Ameren appear to have done, since these costs can be borne by the program and/or portfolio as a whole. Finally, the TRC of the program portfolio for RAP is estimated at 1.45 for the 2016-2018 MEEIA Plan cycle. This level of cost effectiveness means that program costs could increase by almost 50% and the overall portfolio would still remain cost effective. Therefore, Ameren's contention that significant amounts of incrementally cost effective measures had to be removed from the measure level potential in order to design programs that pass cost-effectiveness screening is dubious.

Given these considerations, it appears that Ameren has conducted its analysis in the wrong order. Instead of first designing a portfolio of programs that Ameren would like to pursue in its next MEEIA plan and then determining how much these programs save, Ameren should first use the IRP process to determine the optimal level of efficiency based on available measure-level RAP and MAP. Only then should Ameren design a portfolio of programs that will be able to achieve this optimal level of efficiency. After designing the portfolio, the program potential modeled in the IRP will have the same level of savings as the measure level potential in the EnerNOC study, but the budgets will be somewhat higher to account for the administrative costs involved in delivering programs achieving the measure level potential. In this way, the RAP and MAP in the IRP will truly reflect the cost-effective potential available in Ameren's service territory.

Ameren's Additional Downward Adjustments to RAP are Inappropriate

As described above, Ameren takes the program RAP estimate from the EnerNOC potential study and reduces these estimates by another 66% for the RAP scenario actually modeled in the IRP. The main reasons given for these adjustments are:

[15] Ameren 2014 IRP. Chapter 8 Appendix B3, page 6-2

[16] Ibid

1. Evaluation, Measurement, & Verification results from the 2014 programs have caused a net decrease in the amount of savings able to be claimed per measure;
2. Avoided costs have decreased, causing some marginally cost effective measures to no longer be cost-effective; and
3. New codes and standards are going into effect that will decrease the savings available from efficiency.

None of these arguments are convincing as justifications for the dramatic reduction in estimated potential. Ameren's current programs are not currently experiencing diminishing returns. Ameren achieved the highest savings ever in the latest program year.[17] As programs establish themselves in the marketplace and gain momentum, they are typically able to achieve more savings. Further, these adjustments are asymmetric in that Ameren appears to only make downward adjustments and ignores potential increases in savings opportunity. We see no reason that Ameren cannot continue to achieve the level of savings achieved in 2014 in the 2016-2018 time period. These levels represent 0.98% of load at a cost per first year kWh saved of $0.11. In contrast, Ameren's new IRP preferred plan only anticipates capturing 0.35% of load in 2016 at a cost of $0.35/kWh.[18] In other words, Ameren plans to spend approximately the same amount of ratepayer funds to achieve only 29% of what they have already proven possible.

EM&V results

Ameren cites the recent EM&V results as a major reason for the dramatic drop in potential from the EnerNOC study to the preferred plan. Specifically, the table below shows the impacts of EM&V on the 2016 measure level RAP.

Cumulative Savings (% of Baseline)	2016	2017	2018
Measure-Level RAP, Pre EM&V[19]	1.10%	1.80%	2.60%
Measure-Level RAP, Post EM&V[20]	1.04%	1.73%	2.47%
Preferred Plan[21]	0.35%	0.45%	0.60%

As seen, the cumulative savings after accounting for new EM&V results are 2.47% of load, compared to 2.6% of load in the EnerNOC study. These results clearly do not make a significant contribution to the downward reductions Ameren made to RAP for its preferred plan. Further, these results have been applied at the measure level - the total potential is still well above the program potential found and even farther above the final RAP scenario Ameren modeled. Since the EM&V results lowered savings for some measures and increased savings for others, the proper reaction is to modify the EE programs to more aggressively promote measures with increased savings or to add measures or program services. The proper reaction is not to simply lower the savings goals leaving the programs unchanged. Even after the EM&V results are applied, the measure level potential is well above program potential. This means Ameren should be able to change measure mix assumptions in order to achieve the same or higher program level savings as found by the original EnerNOC study.

Avoided Costs

[17] According to the Ameren 2014 Demand Side Annual Report, Ameren saved 362 GWh in 2014. This is almost 3.5 times higher than the 105 GWh in Ameren's preferred plan for 2016.
[18] Although Ameren's plan captures 0.35% in 2016, it only captures an additional 0.1% in 2017 and 0.15% in 2018, making an average annual savings of 0.2% of load.
[19] Ameren 2014 IRP. Chapter 8, page 9.
[20] Ameren 2014 IRP. Chapter 8, page 11.
[21] Ameren 2014 IRP. Chapter 8, page 17.

The second argument Ameren advances to explain its dramatic reduction to RAP is that lower avoided costs for the 2016-2018 result in significantly lower savings, as they are no longer able to promote marginally cost effective measures. However, in their January 16, 2015 stakeholder presentation, Ameren states that only 12 out of 194 measures that passed in 2012-2015 now fail with the updated avoided costs. By definition these 12 measures were the most expensive (least cost-effective) measures being promoted and, therefore, were unlikely to have any significant penetration or contribution to Ameren's overall portfolio. It is infeasible that removing the 6% of measures that were most expensive in 2012-2015 would noticeably contribute to a 66% drop in savings in the preferred plan. Further, these adjustments are asymmetric because Ameren eliminated measures that no longer pass the TRC due to lower avoided costs but did not evaluate any new measures that may now be cost-effective or for which costs have declined.

Codes and Standards

Finally, Ameren claims that increased codes and standards have a major role in the reduction of the RAP and MAP estimates from the EnerNOC study to the scenarios used in the IRP. As an illustration, Ameren shows the following table in the IRP.

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 efficient (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)										

However, this same table is also in the original EnerNOC potential study, and the study states "we implemented assumptions for known future equipment standards as of June 13."[22] There have been no new equipment standards since June 2013. Therefore, the RAP and MAP estimates in the potential study already accounted for all the future standards. By further reducing EnerNOC's RAP and MAP estimates based on these standards, Ameren is double counting their impact on the achievable cost effective efficiency available in their service territory.

In addition, Ameren seems to imply that much of the savings reduction from the potential study to the IRP is due to the 2007 federal Energy Independence and Security Act's (EISA) effect on residential lighting. However, the potential study already takes this into account, noting that "savings from general purpose lamps decrease over time due to the EISA standards, which increase the efficiency of the baseline technology[23]…" In addition, the new EISA standards are having less of an impact than was originally thought. A recent NEEP study on lighting in the northeast finds that "the A-line lighting market has not been transformed and many inefficient options still exist for customers."[24] Specifically, the study

[22] Ameren 2014 IRP. Chapter 8, Appendix B, Volume 3, page 2-15.
[23] Ameren 2014 IRP. Chapter 8, Appendix B, Volume 3, page 6-2.
[24] Northeast Residential Lighting Strategy: 2014-2015 Update. December 2014. Page 4.

finds that incandescents still had a 34.7% market share, with halogens claiming an additional 26%. The market share would likely be even higher in the Midwest, which does not have as long a history of energy efficiency programs. This implies that the residential baseline in the 2016-2018 period will most likely consist of a mixture of halogens and incandescents, rather than only halogens. The lower baseline, then, will increase the cost-effectiveness of CFLs and LEDs and the efficiency potential from lighting programs. Further, the study projects significant continued price declines for LEDs. The price of an A19 60W equivalent, for example, fell from $13.16 at the start of 2014 to $9.12 by the end of August, and is expected to fall further to $6.81 by the end of 2015. As a result of the price decline, NEEP projects that LEDs will become more cost-effective than CFLs in 2016. Neither the EnerNOC potential study nor Ameren's subsequent adjustments took into account this precipitous decline in LED cost. The LED cost decline combined with a higher baseline means that there will be significantly more lighting savings available for significantly less money than either EnerNOC or Ameren has predicted.

Other Comments on Ameren's Program Potential Adjustments

In the IRP, Ameren states:

> "Ameren Missouri did not update the EnerNOC program potential, at least as EnerNOC designed programs for the potential study, to reflect 2013 EM&V results. Rather, Ameren proceeded independently with its own program design parameters, using post 2013 EM&V results, to design the DSM programs for the 2015 IRP and MEEIA Cycle 2016-2018 filings."[25]

In other words, the preferred plan and the RAP and MAP scenarios Ameren modeled in the IRP are not consistent with the EnerNOC potential study. As discussed, the reasons Ameren gives for the significantly reducing RAP and MAP for the IRP are inappropriate, double-adjusted, or dramatically overstated. It appears that Ameren's IRP scenarios represent a much more limited set of demand-side resources driven by external decisions, rather than a full accounting of the optimal mix of supply and demand-side resources that would result in the lowest PVRR. As discussed, EnerNOC's estimated potential is already an underestimate. As such, even use of the higher EnerNOC estimates, without further reductions, should be viewed as a conservative estimate of the entire available demand-side resources.

Despite Ameren's Underestimate of the Risk-Weighted value of MAP, MAP Still Achieves the Lowest PVRR

Ameren made several unfair assumptions in modeling the MAP and the midpoint between RAP and MAP scenarios that all serve to lower the attractiveness of MAP and the midpoint scenario. For example, the table below shows how Ameren modeled risk and uncertainty in the IRP.[26]

Scenario	Scalar
MAP High	0%
MAP Low	-18%
RAP High	+9%
RAP Low	-9%

As seen, the RAP scenario was modeled with a plus or minus 9% uncertainty under the theory that there is uncertainty involved in the realistically achievable potential found by the potential study. This symmetric treatment of risk is appropriate because EnerNOC made its best estimate of RAP, and there is

[25] Ameren 2014 IRP. Chapter 8, page 11.
[26] Ameren 2014 IRP. Chapter 8, page 86.

no reason to assume that it is biased either on the high or low side. However, the MAP scenario was modeled with only a downside uncertainty since "MAP is the hypothetical upper limit or ceiling for potential…"[27] However, this reasoning is flawed. In reality, the MAP estimate has just as much uncertainty – up and down – as RAP because assumptions that are inputs to MAP are all similarly uncertain. These assumptions include measure costs and savings, uptake rates, feasibility rates, and applicability estimates. More importantly, while MAP is intended to estimate "maximum" achievable potential, it still represents a "best estimate," as opposed to a high estimate. Therefore, MAP should have even probability of being either high or low. Accordingly, the uncertainty should be related to estimation error which should still be symmetric even though MAP represents a maximum. The fact that evidence presented above indicates that, if anything, the EnerNOC potential study estimates are conservative, further compounds this asymmetric treatment when it is likely that actual potential is higher.

Further, the table above shows that the uncertainty of MAP and RAP is 18% and 9%, respectively. The 9% RAP uncertainty factor is determined from the 2013 realization rate, which is about 91%. This realization rate was largely determined by changes in TRM estimates of savings from the top 20 measures in the program. As Ameren states, "since there is more EM&V risk around MAP levels and because customers are harder to reach, the RAP scalar was doubled for the MAP low scenario."[28] However, the logic of doubling the uncertainty due to increased EM&V risk from MAP to RAP does not make sense. If EM&V reduces the savings by measures 9%, it will reduce the savings 9% no matter how many of those measures are installed. The EM&V risk does not increase simply because there are higher incentives and, as such, more measures are installed. Rather, the EM&V risk acts at a measure level and, therefore, is independent of how many total measures are installed.

In summary, Ameren inappropriately doubled the downward uncertainty factor for the MAP scenario and unfairly assumed only a downside to the estimate. This creates a significant disadvantage for MAP during the scenario modeling analysis. However, even despite this disadvantage, MAP was still shown to result in the lowest PVRR for Ameren. In chapter 10 of the IRP, Ameren dismisses this lowest PVRR scenario, citing "an increased level of risk in achieving RAP relative to MAP," despite already handicapping MAP with highly inflated quantitative estimates of risk. In short, Ameren overestimates the risk associated with achieving MAP, still finds MAP to have the lowest PVRR, and still rejects the scenario due to additional undefined concerns about risk. Effectively, Ameren is both overestimating risk and then double counting the risk as a reason to still reject the least cost resource solution. We believe that Ameren should run the MAP scenario using appropriate measures of risk and choose the scenario which results in the lowest PVRR.

The Cost and Savings Assumptions for the Mid DSM Scenario are Inappropriate

In the IRP, Ameren makes the point that program costs rise significantly more than savings between RAP and MAP. This is because in order to truly capture all cost-effective savings, incentives need to be raised for everyone, including people who would have participated under the lower incentive amount. For this reason, program costs per kWh saved are significantly higher in MAP than they are in RAP. However, Ameren estimated the mid-DSM scenario by simply "interpolating between the costs and savings associated with the MAP and RAP portfolios." By using a simple interpolation for the costs in the mid-DSM scenario, Ameren misses the above effect where costs for all measures in the portfolio decrease as 100% of the cost need not be paid. Accordingly, the costs to achieve a level of savings midway between RAP and MAP will be significantly lower than half the additional costs associated with the full MAP scenario. NRDC urges Ameren to review the mid-DSM scenario using more appropriate cost assumptions.

[27] Ameren 2014 IRP. Chapter 8, page 87.
[28] Ibid.

The IRP did not Include the Demand-Side Rate resources as Analyzed by The Brattle Group

In addition to the analysis of the efficiency potential from programs that directly promote efficient equipment or practices, the IRP rules call for analysis and modelling of the potential of demand side rates to provide cost-effective efficiency and demand reduction.[29] In the IRP, Ameren acknowledged this requirement and hired The Brattle Group to conduct a detailed analysis of the efficiency potential from demand side rates. From this study, Ameren states in the IRP that "Ameren Missouri studies to date, specifically rates with inclining block structures, would likely reduce energy consumption by up to 1.8% per year."[30] In other words, this one approach alone would provide three times more savings by 2018 than the full amount of efficiency that Ameren includes in its preferred plan. Further, rates can be designed to be revenue neutral (i.e. by definition be cost-effective) and potentially avoid any throughput disincentive or need for program cost recovery. However, despite these exciting findings, Ameren does not include any demand side energy savings from inclining block rates in any of its modeled scenarios, does not analyze whether this would help Ameren meet the EPA 111(d) requirements as currently proposed without spending the additional $4 billion,[31] and does not indicate that it has any plans to further investigate implementing these potential demand side rates. Instead, Ameren simply states that it is in the process of "taking an in-depth look at a Pre-Pay or pay-as-you-go rate delivery option..." A pay-as-you-go rate was not one of the options analyzed by the Brattle Group. It is unclear why Ameren is only considering an unstudied rate option with uncertain energy savings when its own studies have indicated that inclining block rates have significant promise for large demand side reductions. We believe that the IRP rules require Ameren to not only design rates that reduce the net consumption of electricity, but also to include the potential for rates to result in demand-side savings in the IRP scenario modeling. Finally, The Brattle Group only looked at inclining block rates for the residential sector, and the 1.8% savings of the full load equates to 4.4% savings in the residential sector.[32] It is very likely that this approach would also result in significant savings in the commercial and industrial sectors as well, making total savings well higher than the 1.8% available from the residential sector only. Inclining block rates alone would dramatically increase cost-effective demand-side savings and result in a significantly lower PVRR for Ameren than its preferred plan.

The IRP did not Include a Comprehensive Treatment of Targeted DSM

IRP rules also call for Ameren to evaluate targeted DSM as an alternative to substation upgrades and other supply side solutions to load constraints. In the IRP, Ameren identifies two potential candidates for targeted DSM. For the Barrett Substation, Ameren states that "[s]ince there is no capital budget currently in place to upgrade Barrett Station, no financial analysis was performed to determine the magnitude of benefits, if any, relative to a targeted DSM solution." This is essentially saying that since they have not yet budgeted the upgrade, costs are effectively zero, and any DSM solution would not be cost effective. However, if Ameren has identified the need for an upgrade to the Barrett Substation, it has a responsibility to estimate the cost of this upgrade and the potential cost-effective demand-side alternatives.

For the second candidate, the Spring Forest feeder, Ameren estimated the cost of targeted DSM by getting a turnkey bid from a single bidder who quoted the price for "a fully automated switch" to be installed at C&I facilities that "intelligently tap embedded responsive load from customers." Since this quote was much higher than the budget for the feeder upgrade, Ameren concluded that targeted DSM was not appropriate and there was no potential for a cost-effective DSM solution. However, this analysis

[29] 4 CSR 240-22.050(4)

[30] Ameren 2014 IRP. Chapter 8, page 76.

[31] Ameren 2014 IRP. Chapter 1, page 18.

[32] The Brattle Group, *The Potential Impact of Demand-Side Rates for Ameren Missouri,* Slide 23 of Stakeholder webinar presentation, May 24, 2013.

is cursory and insufficient. Ameren only looked at one technology from one bidder. In reality, there are many different ways to implement targeted DSM, most of which are likely cheaper than the fully automated switch quoted by Ameren's turnkey vendor. For example, Ameren could more aggressively pursue the types of efficiency measures promoted under RAP and MAP in the targeted areas. Since we know these measures are cost-effective, aggressive targeting of them to the Spring Forest feeder area would most likely result in a cheaper alternative than a distribution upgrade.

Program Design Guidance

Throughout this document, we argue that the efficiency potential modeled as RAP and MAP in Ameren's IRP is in fact a significant underestimate of the true cost-effective potential available. In this section, we provide specific examples of how Ameren's proposed portfolio of programs fail to capture significant portions of the efficiency potential, and how Ameren could modify the portfolio to increase savings.

Small Business Direct Install

In the IRP, Ameren states that it is investigating a Small Business Direct Install (SBDI) Program, but that it is not currently planned for implementation due, in part, to cost effectiveness concerns. However, many SBDI programs focus largely on lighting, which are typically highly cost effective, despite recent regulations that lower savings for certain linear fluorescent measures. Cost effective SBDI programs are being run all over the country, including by Ameren in Illinois, where the program was oversubscribed in program year 7 with 29 GWh of savings.[33] Furthermore, SBDI programs can be contracted out to turnkey implementation vendors who already have experience implementing SBDI programs and are therefore easy to launch and manage. In the IRP, Ameren states that it is considering ways to lower the cost of the SBDI program, including only installing "on the spot components" or looking at no/low cost measures such as changing HVAC settings, reprogramming EMS and buildings schedules, and installing faucet aerators. We strongly discourage limiting the SBDI program in this manner. SBDI vendors should be encouraged to look for opportunities to cost-effectively install lighting and other major measures as they have successfully done elsewhere in the Midwest and across the country. Small businesses have unique and strong market barriers to efficiency, and well-designed SBDI programs are necessary to achieve significant participation in this important customer segment. We note that KCP&L is proposing to offer this type of program in its draft 2015 IRP. Clearly, small business customers offer additional potential savings. Therefore, Ameren's omission of this market potential fails to consider all cost-effective resources.

New Homes and Home Energy Analysis

The 2013 evaluations found that the residential new construction and home energy analysis programs fail the cost effectiveness test. However, these evaluations appear to have counted costs associated with natural gas measures, but only included electric benefits. The home energy analysis program, for example, provides direct-install energy efficiency measures at no cost to participants and offers rebates for other measures. The PY14 portfolio summary report states that the intent of the home energy analysis is to make "improvements to the following: weatherization, lighting, HVAC, and water heating appliances fueled by natural gas." It also states that all single family homes receiving both electricity and natural gas from Ameren are eligible to participate. This measure list clearly indicates that the program is aimed at saving natural gas in addition to electricity. However, when the evaluation report examines the benefits in detail, it only includes avoided electric production, avoided electric capacity, and avoided electric T&D. This indicates that there may be a mismatch in the program's costs, which may include costs for natural gas measures, and the benefits, which only include electric benefits. If this is indeed the case, the TRC should be expanded to include the total resource benefits of all the measures and not just the electric benefits. This allows the program to continue to expand and generate significant savings for

[33] Ameren Illinois Program webpage. http://www.actonenergy.com/for-my-business/explore-incentives/small-business-program

Ameren customers. Alternatively, if gas benefits are not allowed to continue, the program eligibility requirements should be altered to only include customers with heat pumps or electric resistance heat. This will allow the programs to continue in a cost-effective manner. In general, when programs are found to fail cost-effectiveness screening, Ameren should attempt to modify the programs' structure, measure mix, and/or eligibility requirements to increase cost-effectiveness rather than just eliminate the program.

Low-Income

Ameren can significantly expand its low-income program. Due to ARRA funding, Ameren's low-income programs have focused on multifamily buildings. However, by 2016, the ARRA money will be extinguished, giving Ameren an opportunity to expand the low-income program's focus on single family buildings. Further, Ameren's preliminary market assessment determined that there are 29,000 potential multifamily units in buildings with 3 or more units. However, this appears to be a significant underestimate. An estimate using census data put together by NRDC and the National Housing Trust determined that the Ameren Missouri service territory has more than 90,000 affordable units in buildings with 5 or more units.[34]

Combined Heat and Power

In the IRP, Ameren discusses two case studies of combined heat and power.[35] Even though both of these case studies showed cost-effective installations and Ameren's sensitivity analysis determined that the systems would still be cost-effective in an extreme drought worst case scenario, Ameren does not investigate additional CHP as a demand side resource in the integrated resource planning process, and Ameren appears reluctant to negotiate over the standby charge for CHP customers. As a result, the IRP scenarios include no potential from CHP until 2026 and only a negligible amount afterwards. Ameren's assessment that its territory does not have any cost-effective CHP potential between now and 2026 is unreasonable. The US currently generates over 12% of its electricity from CHP installations, and several European countries get over 20% of their electric needs from CHP.[36] While Ameren may not want to modify its standby charge or interconnection policies, the IRP is not the place to make this argument. The IRP is meant as a place to analyze all resource options on an equal footing, regardless of policy preferences, and so should include CHP as an option.

LED Streetlighting

In section 8.13.4 of the IRP, Ameren states that there is savings potential available from LED streetlighting. However, this potential is not included in the RAP or MAP scenarios, since the streetlights are primarily utility-owned, and Ameren is concerned about a potential lag in cost recovery. NRDC agrees that this is an important program and wants to work with the company to ensure that this is in place for the 2016-2018 timeframe. However, the treatment of cost recovery for DSM programs is an issue that should be addressed in MEEIA filings. The IRP is meant to examine the full potential of various resources. Simply asserting that a potentially cost-effective resource is off the table because of regulatory policy concerns is unacceptable. The cost-effective achievable savings from an LED streetlighting program should be reflected in the RAP and MAP scenarios.

Conclusion

NRDC is concerned that Ameren's IRP process does not allow the full cost-effective achievable demand-side resource potential to effectively compete on an equal footing with supply-side resources. This lack of competition is evidenced by a recitation of the steps Ameren took in arriving at its preferred plan:

[34] Optimal Energy. Potential for Energy Savings in Multifamily Affordable Housing. February 19, 2015. Prepared for NRDC. Table C-1.

[35] Ameren 2014 IRP. Chapter 8, pages 67-68

[36] http://info.ornl.gov/sites/publications/files/Pub13655.pdf

1) Ameren took levels of RAP and MAP from the EnerNOC potential study, which were already underestimates.
2) Ameren improperly used the program potential rather than the measure level potential.
3) Ameren inappropriately and significantly reduced the EnerNOC program potential to arrive at significantly reduced RAP and MAP DSM potentials.
4) Ameren burdened the MAP scenario with biased and unrealistic uncertainty factors.
5) Though MAP still resulted in the lowest PVRR, Ameren arbitrarily rejected the MAP plan and chose the reduced RAP potential as its preferred plan.

To correct these missteps, NRDC urges Ameren to:

1) Model the full RAP and MAP in the IRP using the full costs of programs that are designed to reach the full cost-effective savings available in Missouri as found by the measure-level potential from the EnerNOC potential study.
2) Change the uncertainty factors used for MAP so that the scenario has equal upside and downside risks.
3) Modify the mid-DSM scenario to reflect the appropriate costs.
4) Include the impact of implementing inclining block rates, as analyzed by the Brattle Group, on the PVRR, as well as the potential from CHP and targeted DSM to address T&D constraints.
5) Evaluate the impact of these higher levels of RAP and MAP and the inclining block rate on Ameren's EPA 111(d) compliance as currently proposed.