Stakeholder Questions – Ameren Missouri Response

I. Building Block 1 – Reduce CO_2 emissions by 6% due to heat rate improvements

a. The EPA has estimated that a 6% reduction in the CO_2 emission rate of the coal-fired EGUs in a state, on average, is a reasonable estimate of the amount of heat rate improvement that can be implemented at a reasonable cost through a combination of best practices and equipment upgrades. By plant, list (and describe) the heat rate improvements necessary to achieve a 6% improvement from most cost-effective to least cost-effective. Include the cost (both O&M and capital) for each improvement and the expected heat rate increase.

Answer: The estimates set forth by the EPA in the Clean Power plan are based on a set of assumptions that do not apply to Ameren Missouri. So as to minimize costs for its consumers, Ameren Missouri already operates its fleet in an efficient manner (including continuous 24/7 monitoring and reporting on heat rate at all of the plants) and has already implemented numerous efficiency improvements. A 6% improvement in efficiency across the Ameren Missouri fleet, on either a net or gross basis, is not achievable. The Clean Power Plan breaks the 6% improvement goal into two components. The first 4% is derived from what the EPA calls "best practices". This 4% improvement opportunity is based on EPA's analysis of 11 years of heat rate data and assumes that the difference between the times with poorer heat rate performance and the times with the best heat rate performance on a unit can be decreased. Ameren Missouri operating experience shows that these differences between high and low heat rate periods are often attributable to factors other than so-called "best practices". These factors include uncertainty in the continuous emission monitoring system (CEMs) data utilized by the EPA, efficiency improvements made over the 11 year period evaluated by the EPA, CEMs calibration technique improvements, and non-controllable factors such as weather, river temperature and load patterns. Accordingly, Ameren Missouri cannot achieve an additional 4% heat rate improvement estimated by the EPA in the area of "best practices".

In the EPA's Technical Support Document (TSD) titled GHG Abatement Measures (Docket ID No. EPA-HQ-OAR-2013-0602), the EPA discusses a Sargent & Lundy report that lists projects that could lead to heat rate reductions at coal-fired power plants (SL-009597). In the TSD (Table 2-13), the EPA breaks up the projects in the Sargent & Lundy report into two categories: "best practices" and equipment upgrades (discussed below). Ameren Missouri already performs many of the "best practices" provided in the report. In addition, several of the "best practices" projects are not applicable to any of Ameren Missouri's units. Table 1 lists the "best practices" from the Sargent & Lundy report and their applicability to the Ameren Missouri coal-fired fleet.

Table 1. Summary of Sargent & Lundy "best-practices" projects and their Applicability to Ameren Missouri coal-fired units.

"Best Practices" from Sargent & Lundy Report	Applicability to Ameren Missouri coal-fired units
Condenser Cleaning	Already performed as needed on Ameren Missouri units
Intelligent Soot Blowers (ISBs)	Already installed and running on three Labadie units, both Sioux units, and all four Meramec units. Ameren Missouri already plans to install ISBs on the remaining units.
ESP Modification	Ameren Missouri has already implemented some power optimization programs and operates our ESPs to conform to various state and federal regulations
Boiler Feed Pump Rebuild	Already performed as needed on Ameren Missouri units
Air Heater and Duct Leakage Control	This project could be applicable to several units but would require additional study
Neural Network	Already installed and running on all Labadie, Meramec, and Rush Island units
SCR System Modification	Not applicable on any Ameren Missouri unit
FGD System Modification	Improvement not applicable to new FGDs at Sioux
Cooling Tower Advanced Packing	Not applicable on any Ameren Missouri unit

The remaining 2% improvement estimate in the EPA proposal is based on making upgrades to more efficient equipment. Such measures are technically feasible and Ameren Missouri has already implemented many of the projects that typically provide the biggest and most cost-effective efficiency improvements. For example, since 1998, Ameren Missouri has upgraded at least one of the steam turbines on 9 of the 12 units in its fleet. In fact, the entire turbine train (high pressure, intermediate pressure, and low pressure turbines) has been replaced on all eight of its largest units (Rush Island 1 and 2, Labadie 1, 2, 3, and 4, and Sioux 1 and 2) in that timeframe. The total cost of the turbine replacement program was roughly $240 million.

Table 2 below lists the four equipment upgrade projects contained in the Sargent & Lundy report that EPA based their 2% improvement goal from equipment upgrades on. The table

also discusses the current status of these specific projects at the Ameren Missouri coal plants.

Table 2. Summary of Sargent & Lundy equipment upgrade projects and their Applicability to Ameren Missouri coal-fired units.

Equipment upgrades from Sargent & Lundy report	Applicability to Ameren Missouri coal-fired units
Economizer Replacement	Ameren Missouri has already replaced/upgraded the economizers on all units
Acid Dew Point Control	This project may be applicable to several units but would require additional study
Combined VFD and Fan	The potential benefit of this project is greatly reduced for Ameren Missouri units based on their fan type and configuration
Turbine Overhaul	Ameren Missouri has already replaced/upgraded the entire turbine train on all units at Labadie, Rush Island, and Sioux

Based on an analysis of the Sargent & Lundy report (SL-009597) specifically referenced in the Clean Power Plan, as well as a review of previous efficiency evaluations conducted by Ameren Missouri with an expanded list of potential efficiency-improving projects, we estimate that a fleet-based heat rate improvement of between 1.0% and 1.5% could be achieved (these efficiency improvements would be in addition to those already achieved at Ameren Missouri units). Table 3 shows the potential efficiency improvements by plant.

Table 3: Potential Efficiency Improvements

Energy Center	Potential Range of Efficiency Improvements	Potential Project Types by Site
Labadie	1.0 to 2.0%	Condenser debris filter & cleaning systems, large electric motor Variable Frequency Drives (VFDs), boiler component replacements, higher efficiency motors, plant lighting, air heater improvements, retractable hydrojets
Rush Island	1.0 to 2.0%	Condenser debris filter & cleaning systems, high energy drain temperature monitoring, large electric motor VFDs, higher efficiency motors, plant lighting, air heater improvements, intelligent sootblowing
Sioux	0.5 to 1.0%	Large electric motor VFDs, high energy drain temperature monitoring, higher efficiency motors, plant lighting, intelligent sootblowing
Fleet Total	1.0 to 1.5%	

The potential improvements provided in the above table are conceptual in nature. These potential projects have not been fully vetted by the Ameren design change process or the project management/approval process and the cost thereof is uncertain.

II. Building Block 2 – Re-dispatch generation from coal to existing natural gas combined cycle (NGCC)

a. Is the EPA's assumption of 4.8 million MWhs for NGCC dispatch in 2012 accurate?

Answer: Ameren Missouri does not own any NGCC units and thus cannot verify with Company data whether the EPA data is accurate. However, Ameren Missouri did review EPA's calculations included in the Clean Power Plan (CPP) Technical Support Documents. EPA's calculated 4.8 million MWh is consistent with 2012 historical data posted at EPA's Air Markets Program Data website for combined cycle plants operating in Missouri. Note there are slight differences between the Air Market Data totals compared to CPP values. This is due to Air Market Data being reported on a gross basis where the CPP uses net MWh's. In addition the 4.8 million MWh value agrees with the data reported in the Energy Information Administration Form 923 for 2012.

b. Are there transmission constraints (either gas in or electricity out) or operational or market constraints that make the EPA's target of 12.78 Million MWhs for NGCC problematic? Explain. If there are any constraints, what steps would be necessary to relieve them? What are the costs of those steps?

Answer: Yes. As noted above Ameren Missouri does not own any NGCC units and thus does not know if there are constraints (gas or electric transmission) associated with attempting to run the NGCC units in the state at a 70% capacity factor. If there are transmission constraints then the Regional Transmission Organization (RTO) would either need to re-dispatch the system, which would potentially preclude the EPA's desired outcome, build transmission to increase capacity, which could take years to accomplish, or as a last resort curtail load, which would be undesirable. Gas system constraints could require new infrastructure to achieve the 70% capacity factor. Substantial study of the impact of additional NGCC units (and operating existing units at higher capacity factors) would be required, both of the electric and gas transmission systems, to determine whether upgrades are needed and at what cost. Such studies could take several years to complete and if additional infrastructure was needed, it could then take several more years to build that infrastructure. In the absence of such studies, EPA's assumption that 12.78 Million MWh could be achieved is likely little more than a guess and if it could not be achieved then the assumption is very problematic. With respect to market constraints, the EPA's proposed rule has set a best system of emission reduction that includes dispatch of NGCC units at a 70% capacity factor, but does not address the fact that states do not control the dispatch of the NGCC units in RTO markets. Thus, the proposed rule imposes an obligation on the state that it is not directly able to effectuate. Furthermore, when generators are operating under an RTO dispatch mechanism, uneconomically forcing unneeded natural gas generation into a pricing zone where it may not be needed can cause unnecessary and significant cost increases and reliability impacts. In addition, in order to ensure that natural gas fired generation runs 70% of all hours, generators would need to secure expensive firm gas pipeline capacity and would need to be compensated for the additional costs as well as the uneconomic dispatch replacing cheaper coal generation. The current RTO dispatch construct does not incent uneconomic dispatch and would penalize such behavior possibly resulting in unfair uplift costs to all RTO customers to allow for "Environmental Dispatch" of natural gas generation. As a result of the concerns raised above, it is important that both FERC and NERC be involved in studying the viability of this building block prior to its implementation in order to ensure it does not jeopardize the reliability of the system and to proactively identify tariff or rule changes that must be made to accommodate the proposal.

III. Building Block 3 – Increase generation from zero- and low-emitting sources

a. Is the EPA's assumption of 1.3 million MWh of renewable generation in 2012 correct?

Answer: Energy Information Administration Form 923 reports 1,244,778 MWh of renewable generation for 2012, so the figure of 1.3 million MWh is reasonably accurate.

b. How could Missouri grow renewable generation from 1.3 million MWh to 2.8 million MWh? What would be the difference in cost of taking this path versus the business-as-usual path? What would be the difference in rate impact versus the business-as-usual path?

Answer: Currently, in the state of Missouri, there are 458 MWs of wind generation. We estimate that the addition of 500-600 MW of wind resources would be needed to achieve annual production of 2.8 million MWh. Ameren Missouri is likely to need on the order of 300-400 MW of wind resources to meet the RES, constrained by the 1% rate impact limitation, which could potentially be located in Missouri. To the extent that the combined "business-as-usual" path for all Missouri utilities would not result in 500-600 MW of wind resources, the additional cost would be determined by estimating the overall shortfall and using roughly 2,000–2,500 $/kw for construction of the additional wind resources needed. We are uncertain as to the feasibility of locating up to 600 MW of additional wind generation within the state. The cost of this additional 200 to 300 MW of wind generation above current RES requirements could range from $400 - $750 million.

c. EPA's proposed rule solicits comment on an alternative method of calculating the renewable energy target under building block 3 based on economic and technical potential of renewable energy generation in each state. Under this alternative method in the proposed rule, Missouri's RE target under building block 3 would be 12.8 TW-h of renewable energy beginning in 2020 (0.5 TW-h of Utility scale solar, 4.9 TW-h of wind generation, 0.2 TW-h of biomass, and 7.2 TW-h of hydropower) (vs. 2.7 TW-h of renewable energy generation by 2030 in the proposed method). Could Missouri achieve this alternative RE target. If so, at what cost?

Answer: It is highly unlikely that the alternative target could be achieved, especially considering the need for licensing of new facilities and the time it may take to secure them. Even if it could be achieved, the cost would be significant. The alternative method results in a target that is 10 million MWh higher than the standard target and essentially provides for the further inclusion of new and existing hydroelectric resources. If the available hydroelectric generation is greater than 10 million MWh (and is not constrained by the listed amount for the alternative target for hydro of 7.2 million MWh), then the amount needed from other renewables would be less. Ameren Missouri produces about 700,000 MWh from hydro in Missouri plus another roughly 300,000 MWh from pumped hydro resources, for a combined total of about 1 million MWh, far less than the 7.2 million MWh alternative target or the 10 million MWh total difference between the EPA Plan target and the alternative target. That amount, 10 million MWh, is nearly equivalent to annual operation of the Callaway Energy Center at a 90% capacity factor.

d. Please comment on EPA's treatment of "at risk nuclear" in computing Missouri's emissions target.

Answer: Ameren Missouri believes that the entire "at risk" category in EPA's building block approach should be eliminated from the calculation of the target rates. EPA indicated in their Technical Support Document that the basis for their consideration of "at risk" nuclear capacity was from EIA's energy outlook report. That report did not identify specific facilities which were at risk for closing. If EPA wants to incent the continued operation of "at-risk" nuclear generation, at the states discretion, they should allow 6% of unregulated nuclear generation to be used for meeting compliance (not target setting) in all states as an incentive for continued operation of emission free resources.

EPA only indicated a generic level of nuclear generation "at risk". Ameren Missouri does not believe its Callaway Energy Center is "at risk" for closure, nor are most other nuclear facilities around the United States. Thus, it is inappropriate for EPA to include that assumption in their baseline target setting effort. Moreover, the inclusion of this building block component creates a risk for Missouri compliance. Specifically, if the Callaway Energy Center does not achieve a 90% capacity factor it will create a requirement for the state to achieve additional levels of reduction from the other building blocks to make up for any shortfall.

e. Please comment on EPA's treatment of a revenue shortfall for "at risk nuclear".

Answer: This entire assessment is only relevant for deregulated jurisdictions that require recovery of capital investments through revenues from energy sales. This is not applicable in traditionally-regulated states including Missouri. Further Ameren Missouri believes that nuclear should not be included in EPA's target setting process.

f. Please comment on EPA's treatment of nuclear generation generally.

Answer: Ameren Missouri believes existing and "at risk" nuclear should not be included in EPA's development of the target rates for each state. However, if a utility would build a new nuclear unit or increase the capacity of an existing unit the utility and the state should be allowed to take credit for the zero emitting resource addition.

g. Please comment on the potential to use Callaway Energy Center or Wolf Creek Generating Station to comply with the EPA's proposal.

Answer: EPA should not include existing nuclear generation in the rate calculation for setting compliance targets. If EPA does keep the "at risk" nuclear building block in the final rule, Ameren Missouri believes it and the State of Missouri should get to include the value of

this zero emitting resource in their demonstration of compliance with that final rule as the rule proposes.

h. Please provide information regarding the remaining useful life of Callaway Energy Center and Wolf Creek Generating Station, and any upgrades that will increase their generating capacity, or extend their useful life. If part of your response is the same as information you provided in a previously submitted Integrated Resource Plan or other similar document filed with this Commission, you may state where the information can be found as part of your answer. Please specify the exact location of the information by filing, document, and page number.

Answer: Ameren Missouri has filed with the Nuclear Regulatory Commission for a 20 year license extension which would allow it to operate through 2044.

IV. Building Block 4 – Increase cumulative benefits of energy efficiency programs

a. What will it take for Missouri to achieve the demand-side EE targets in the proposed rule: Starting in 2017 ramp up incremental demand-side EE by 0.2% per year until it reaches 1.5% per year, and then continue achieving 1.5% incremental EE growth each year thereafter with cumulative demand-side EE savings of 9.92% of electricity sales in 2030? Please include in your response an analysis of the EPA's findings on energy efficiency potential in comparison to the utility's findings from its most recent potential study, and from actual results from MEEIA programs, if applicable.

Answer: The 2020-2029 targets included in EPA's calculation of the CO2 emission rate targets for Missouri are likely unattainable. We have developed a presentation (attached) that identifies the flaws associated with the DSM Potential Studies used by the EPA to establish their "reasonable 1.5% annual increase".

b. How could Missouri achieve the 8.7 million MWh of avoided generation attributable to energy efficiency used in EPA's calculation? What would be the difference in cost of taking this path versus the business-as-usual path? What would be the difference in rate impact versus the business-as-usual path?

Answer: The challenge from Ameren Missouri's perspective is that we believe that the 8.7 million MWh of avoided generation attributable to energy efficiency is unattainable such that we cannot estimate the difference in costs between the proposed rule and business as usual. From our perspective the only way to achieve the level of reductions may be through alternative reporting. These reports would include the following:

- Count building code and appliance efficiency standards energy savings
- Count energy savings from prior years programs
- Count customer self-directed energy savings
- Expand energy efficiency benefits definition to include fuel savings as well as non-energy benefits
- Count gross savings
- In short, report annual savings in a similar fashion as do the states who have legislated energy efficiency resource standards

V. General Questions

a. Do you agree with the methodology EPA used to come up with Missouri's proposed emissions reduction goal? If no, what about the proposed methodology do you disagree with?

Answer: No. Ameren Missouri disagrees with virtually every aspect of the goal setting formula. First, EPA has gone outside the fence line to include reductions from re-dispatch, renewables and energy efficiency which is beyond the scope of their jurisdiction and intrudes into matters traditionally left to the states. EPA should define and limit their targets based on reductions achievable at the source (i.e., using only building block one), and should defer to the states to make the determination as to the level of reductions that are achievable via heat rate improvements based on actions that have already been implemented so that a reasonable goal can be set.

EPA has developed four building blocks that are used to set the target emission reduction for each state and each of these building blocks contains overly aggressive assumptions regarding the level of achievable CO2 emission reductions. Ameren Missouri does not agree with the methodology EPA used to come up with Missouri's proposed emission reduction goal. Building Block 1 covers power plant efficiency improvements. Ameren Missouri believes the goal assumed by EPA for this building block is not achievable. Many Ameren Missouri facilities have already implemented projects to improve efficiency and therefore cannot economically make additional improvements amounting to even a two percent improvement, and EPA's target of six percent is simply impossible. Building Block 2 covers the re-dispatch of existing natural gas combined cycle (NGCC) units to a 70% capacity factor. While Ameren Missouri does not have any NGCC units, it has concerns about the feasibility of utilities achieving this building block. Mandating or forcing uneconomical dispatch of natural gas fired generation in an RTO can cause market distortions and significantly increase customer costs and may cause reliability issues. Also, as noted in other responses, it is simply unknown at this time if the level of natural gas fired generation EPA assumes can be supported by gas and electric transmission infrastructure. Building Block 3 cover renewable resources and "at risk" nuclear generation. The Missouri RPS

requirement only applies to investor owned utilities. The EPA assumed the Missouri RPS applied to all utilities in the state in developing this building block. The EPA assumed that 6% of all existing nuclear generation in the country was "at risk". Ameren Missouri does not believe its Callaway Energy Center is "at risk" generation. The only type of facilities where this may apply is in deregulated jurisdictions. Thus, Ameren Missouri believes "at risk" nuclear generation should not be included in setting state target CO2 emission rates. Ameren Missouri estimates of realistically achievable potential for energy efficiency are significantly lower than the EPA estimates.

b. Is the statewide goal established by EPA for Missouri achievable?

Answer: Ameren Missouri believes the statewide goals established by the EPA for Missouri may be achievable, but not on the timeline established by the EPA. States should be given much more flexibility to implement their own compliance plans. Specifically, the interim goals should be eliminated and states should be given the flexibility to establish (or not) their own interim targets/milestones. States should also be afforded the flexibility to extend the 2030 target date as necessary to allow the orderly retirement of existing coal plants consistent with their remaining useful lives so as to not cause reliability and resource adequacy concerns.

c. Should Missouri convert to a mass-based standard? Please explain.

Answer: Until EPA provides guidance on how to perform the conversion from a rate based standard to a mass based standard, Ameren Missouri cannot make a recommendation on which method should be used by Missouri.

d. Is there an advantage of implementing a rate-based standard or a mass-based standard? Please explain. Each utility should answer these questions from both a utility-specific perspective and from a statewide perspective. EPA staff indicated that EPA may be open to allowing a state to split geographically, with one part doing mass-based and one part doing rate-based, so long as the split was along an RTO seam. Are there advantages to this approach for Missouri? What would the most advantageous split be?

Answer: Without knowing the method of conversion from a rate-based standard to a mass-based standard it is not possible to take a position on which method is more advantageous, or whether a split approach may be preferable.

e. Would including the Missouri Energy Efficiency and Investment Act and/or the Renewable Energy Standard in a state compliance plan make those statutes subject to federal enforcement?

Answer: Any program used to demonstrate a state's compliance with a standard of performance must be included in the state implementation plan. Once a state receives the EPA's approval for its plan, the provisions in the plan become federally enforceable against the entity responsible for noncompliance, in the same manner as the provisions of an approved SIP under the Clean Air Act (CAA) section 110. Accordingly, if the existing state statute and implementing regulations are incorporated as part of the State's compliance plan, such statute and regulation become federally enforceable by USEPA and Citizen Groups and could form the basis of litigation under the CAA (i.e. violations of the state's compliance plan and the Clean Power Plan, if enacted). Such claims could be directed at EGUs, the State of Missouri or a third party responsible for implementing the compliance measure.

In addition, the Missouri statute contains a cap on rate increases and USEPA may **disapprove, as part of its plan approval process, the state's reliance on energy efficiency under that statute because of the cap.** In such a circumstance, Missouri may need to provide a compliance demonstration based on other components. Under the CAA, should a state submit a plan that is unacceptable to EPA, EPA can begin its disapproval process and proceed to promulgate a federal plan, known as a FIP. Should EPA "FIP" a state, the EPA plan may **choose to** focus on measures directed at CO2 emitting EGUs only, which may not be desirable. How quickly EPA may proceed to disapprove a state's plan, **whether it** will move to a FIP for that state, and the composition of any such FIP is unknown at this time.

f. Please identify projects that you have already implemented or started that should be considered toward satisfying the various EPA building blocks. Please include any calculation for determining credit toward compliance for each project identified.

Answer: Ameren Missouri has concerns about the building block method. Ameren Missouri believes that projects already implemented since 2005 and those to be implemented prior to 2020 should be credited toward compliance, yet the proposed rule only credits them for reductions occurring after 2020. This would include the O'Fallon Renewable Energy Center currently under construction and expected to be in commercial operation by the end of 2014, and any energy efficiency implemented since 2005.

g. Please identify any best practices that you have already implemented to comply with other environmental regulations, and indicate if those best practices can be considered toward satisfying the various EPA building blocks. Please include any quantification or calculation for determining credit toward compliance.

Answer: Ameren Missouri has installed FGD systems on both Sioux units and a new ESP on Labadie 2 which have reduced SO2 and particulate emissions to comply with a variety of regulatory programs such as the CAIR, CSAPR and MATS. A new ESP will go into service

on Labadie 1 later this year. However, these installations have increased station service and resulted in lower unit efficiency (higher Btu/net kWh). Ameren Missouri should be provided credit for the heat rate inefficiency caused by the installation of this equipment to comply with environmental regulations. For example, the increased auxiliary load at Sioux due to the installation of the FGDs has increased heat rate on those units by 1 to 2% depending on the number of spray levels in service. Therefore, the potential heat rate improvements are, at best, small and would not contribute in any significant way to achieving the 6% efficiency improvement targeted by the EPA for building block 1.

h. Please explain whether an Independent Operator's control over the dispatch of the generation will affect the utility's ability to control emissions and comply with EPA's proposed 111(d) requirements.

Answer: Yes. An Independent Operator's control over the dispatch of generation will affect a utility's ability to control emissions and comply with EPA's proposed 111(d) requirements. Under Building Block 2 the state, and ultimately the utility, will need to achieve a 70 percent capacity factor on NGCC units, but dispatch of the units is not controlled by either the state or the utility, and thus direct control is not possible. Rather, a utility will need to attempt to bid its units in a manner which results in the RTO dispatching its NGCC units at a 70 percent capacity factor. Whether such dispatch is achieved is based not only of the bids of the utility, but on the bids of all other market participants and thus cannot be directly controlled.

i. Does EPA's proposal give rise to any concerns about reliability? If so, what are those concerns?

Answer: Yes. EPA estimates that its rule would result in 30-50 GW of additional coal plant retirements. The loss of such a significant amount of base load capacity, in combination with the significant amount of retirements already announced due to other regulations and market conditions, can, and most likely will impact reliability of the transmission system and lead to generation capacity shortages. Moreover, some of these plants will almost certainly be needed to support the transmission system and may be designated as a system support resource unit by MISO and forced to continue operating. Thus a utility may attempt to achieve compliance via plant retirements, but not be able to do so due to the need to run the unit for reliability. In addition, forcing unneeded generation where it is not required to meet customer load or congestion relief can cause reliability issues. Lastly, to the extent compliance with meeting EPA's stringent interim targets diverts investment from distribution and transmission infrastructure into unnecessary generation infrastructure, this can cause reliability concerns as well.

j. Please explain your perspective on the effect, if any, of HB 1631 on the utility's compliance strategy with the proposed 111(d) requirements.

Answer: HB 1631 was enacted prior to the issuance of the EPA's carbon rules and consequently its regulatory structure did not contemplate either the approach or methodology proposed by EPA in its Clean Power Plan. HB1631 requires the Missouri Air Conservation Commission (MACC) to develop emissions standards for existing sources of carbon emissions based on a "unit-by-unit analysis" of each carbon emission source within the state. In this context "unit-by-unit" means consideration of each generation plant as a unit, regardless of the number of turbines at the plant.

As such, provisions of HB 1631 are contrary to the EPA proposal in how the emission standards are defined. HB 1631 does not constrain the methods that may be used for compliance with the rule. Ameren Missouri's compliance strategy does not take HB 1631 into account, and assumes changes to this statute may be necessary after EPA finalizes its rule in 2015.

k. For utilities: Describe in detail the most cost-effective way for each utility to meet the 21% reduction on its own. What would that path cost compared to a business-as-usual path?

Answer: Ameren Missouri is still evaluating the most cost-effective way for it to meet the 21% reduction on its own. However, one potential path to achieve compliance with the proposed rule as currently written is described in the following sentences. That plan would require Meramec's retirement to be accelerated to the end of 2019, 150 MW of additional wind or a comparable amount of nuclear capacity be added, and the addition of new gas-fired combined cycle generation to be accelerated from 2034 to 2020 and increased from 600 MW to 1,200 MW. The cost of this "GHG Compliance Plan" would be approximately $4 billion over the next 20 years above the cost of the "business-as-usual" plan we call the "Baseline Transition Plan". This plan would be challenging to achieve because of its requirement to add a significant amount of new NGCC capacity by 2020. Some of the challenges would be: it would require commitment to significant capital investments prior to final approval of the state compliance plans and court appeals, need for permits for construction for new natural gas fired generation and for firm gas transportation contracts for a facility of this size operating in base load mode (there are a limited number of large interstate gas lines capable of serving a large natural gas combined cycle facility like this), would require significant amounts of water for cooling purposes, and interconnection studies completed by MISO and new transmission lines constructed by 2020.

l. Describe in as much detail as possible the comments you intend to submit to EPA. If you have already submitted comments, please provide them.

Answer: Ameren Missouri is still in the process of developing its comments to the proposed rule. However, it will cover a range of legal arguments along with a discussion of the

technical merits and adequacy of assumptions underlying EPA's use of building blocks, regulatory structure and implementation. A copy of the comments filed on behalf of Ameren Corporation and its subsidiaries, including Ameren Missouri, will be provided to the MPSC. Appended hereto are copies of public statements made by Ameren officials at recent EPA stakeholder hearings in Washington, D.C., Denver and Pittsburg in July 2014. In addition, many of the answers provided here reflect positions that will appear in our comments to the rule.

m. Under a rate-based approach, how can Missouri get credit for energy efficiency improvements made by industrial customers of IOUs that have opted out of MEEIA? If regulatory or statutory changes are necessary to get credit, what are those changes?

Answer: Ameren Missouri would offer the following thoughts in response to this question:

- All electric generating entities in the state should be subject to the same rules
- Costs of compliance should apply to all electric customers in Missouri
- Statewide Evaluation, Measurement and Verification (EM&V) policies, protocols and practices required
- Process Modification for over-compliance and under-compliance

n. Under a rate-based approach, how can Missouri get credit for energy efficiency improvements made by customers of non-IOUs under programs that are not subject to rigorous evaluation, measurement and verification? If regulatory or statutory changes are necessary to get credit, what are those changes?

Answer: Ameren Missouri would offer the following thoughts in response to this question:

- All electric generating entities in the state should be subject to the same rules
    - Each entity to receive pro rata share of targets to meet
    - All entities to follow the same protocols for measuring the impacts of energy efficiency savings

o. Do any of the utilities favor the idea of Missouri partnering with another state(s) on a multi-state plan. If so, which state(s) should Missouri consider partnering with? Please explain.

Answer: Ameren Missouri has focused its analysis to date on compliance with the Missouri target emission rate as a stand-alone state and has not yet considered a multi-state compliance plan. Ameren Missouri's main concern is the cost of the program to our customers. If analysis shows that a properly constructed multi-state plan is less costly to our customers, then Ameren Missouri would support that approach.

p. EPA's proposed rule established the state goals by crediting renewable energy generation in the state where it is generated. EPA is soliciting comment on how credit for renewable energy generation under 111(d) could be traded across state lines (similar to RECs) without double counting the RE credit. Do utilities have any thoughts about the appropriate method of crediting renewable energy generation and whether the credit could be traded across state lines without double counting?

Answer: Ameren Missouri agrees that credit for renewable generation should be allowed to be traded across states for compliance.

q. EPA's proposed rule established the state goals by crediting RE and demand-side EE targets under building blocks 3 and 4 by adding RE generation and avoided generation from demand-side EE to the denominator. If the state elects to go with a rate-based approach, EPA is soliciting comment on the appropriate method of crediting EE/RE programs under state plans (i.e. add RE generation and avoided generation from EE to denominator, or determine emissions avoided and subtract the avoided emissions from the numerator). Do utilities have a preference on the appropriate method of crediting EE/RE programs under a rate-based approach. If so, why is one method preferred over another?

Answer: In general the result is similar if you use a reduction in CO2 emissions (i.e. reduce the numerator) or use an increase in MWh from EE/RE projects/programs in the denominator. Since renewable generation will have metering, identifying the generation is very straightforward. The challenge for EE is to determine the MWh avoided from the program. Missouri has a verification program in place and could recommend using that verification method to identify the MWh from EE programs. Thus, the MWh (denominator) method is relatively straightforward and would seem preferable.

Conversely, if the numerator approach is used there are several key challenges. First, one would need to know the number of MWhs produced by both EE and Renewable Energy (RE), including energy generation by renewable distributed customer owned generation. Then one would need to determine which fossil fuel resource is avoided by EE and RE programs. Is it coal or some combination of natural gas and coal generation? This could lead to litigation among various parties as to the energy displaced. Thus, the denominator approach seems preferable.

r. EPA's proposed rule solicits comment about whether the final rule should establish presumptive mass-based goals for each state or if states should be able to develop the mass-based goals using their own assumptions and methodologies. Do you have a preference?

Answer: Until EPA approves a method to convert rate-based emissions to mass-based emissions, it is premature for Ameren Missouri to comment on a preferred method for Missouri. However, Ameren Missouri believes that states are in the best position to understand all of the state specific issues to set appropriate rate-based or mass-based goals for its state. In particular the issue of remaining useful life of existing facilities is best left to the states to incorporate. In addition EPA should approve the states having the flexibility to develop their own mass-based calculation.

s. EPA's proposed rule solicits comment about establishing consistent national guidelines for performing EM&V in order to credit EE/RE under the rule if a state uses a rate-based approach. Do you think EPA should establish such guidelines?

Answer: In order to allow for the possibility of multi-state implementation plans and also to ensure consistent and fair credit is given to energy efficiency programs across the nation, the EPA should establish guidelines to credit EE/RE. These guidelines should include:

- Count building code and appliance efficiency standards energy savings
- Count energy savings from prior years programs
- Count customer self-directed energy savings
- Expand energy efficiency benefits definition to include fuel savings as well as non-energy benefits
- Count gross savings
- In short, report annual savings in a similar fashion as do the states who have legislated energy efficiency resource standards

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EPA Proposed GHG Rule: Building Block 4 – Energy Efficiency Potential

August 14, 2014

Ameren MISSOURI

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ISSUES WITH DSM POTENTIAL STUDIES SELECTED BY EPA TO ASSUME 1.5% ANNUAL LOAD REDUCTIONS ARE REASONABLE

Building Block 4: EPA's Foundational Assumption

- Page 5-32

A direct indicator of the achievable incremental levels of energy savings performance is provided by past performance at the state and utility levels, and by requirements states have put in place for levels of savings to be achieved by 2020. As discussed, these requirements are typically in the form of energy efficiency resource standards or similar savings goals that are applied to utilities in the state.[220]

WHEN IT COMES TO ENERGY EFFICIENCY POTENTIAL, THE FUTURE DOES NOT RESEMBLE THE PAST.

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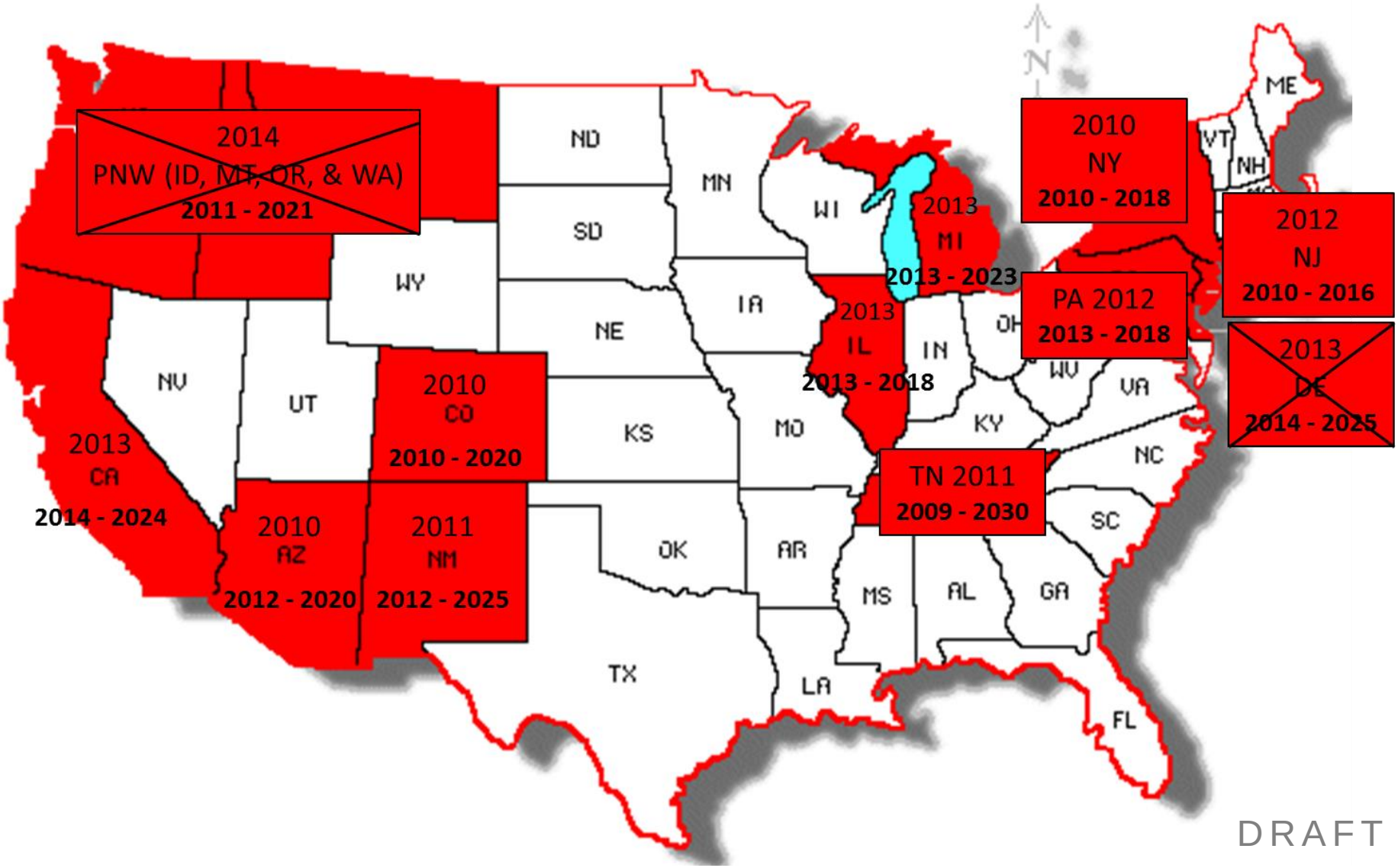
EPA Selected DSM Potential Studies by State



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LIST OF ISSUES WITH EPA SELECTION OF POTENTIAL STUDIES

Description	Amount
# of studies reviewed and used	10
Miscalculations of avg. potential	2
Gross potential reported	8
Measure level, not program level reported	1
Max. achievable reported	10
Studies reporting prior to 2020	7
Budget omitted	8
Studies based on secondary data	6

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Miscalculations (By EPA) Of Avg. Annual Achievable Potential

- Pennsylvania 2012 study
  - EPA says 2.9% per year (highest potential of all studies referenced)
  - Pennsylvania study says: 1.6% per year calculated from a 2010 baseline
    - Study assumed 85% customer participation rate
    - Study based on gross savings
    - Assumptions made for yet-to-be discovered unknown future energy efficiency improvement

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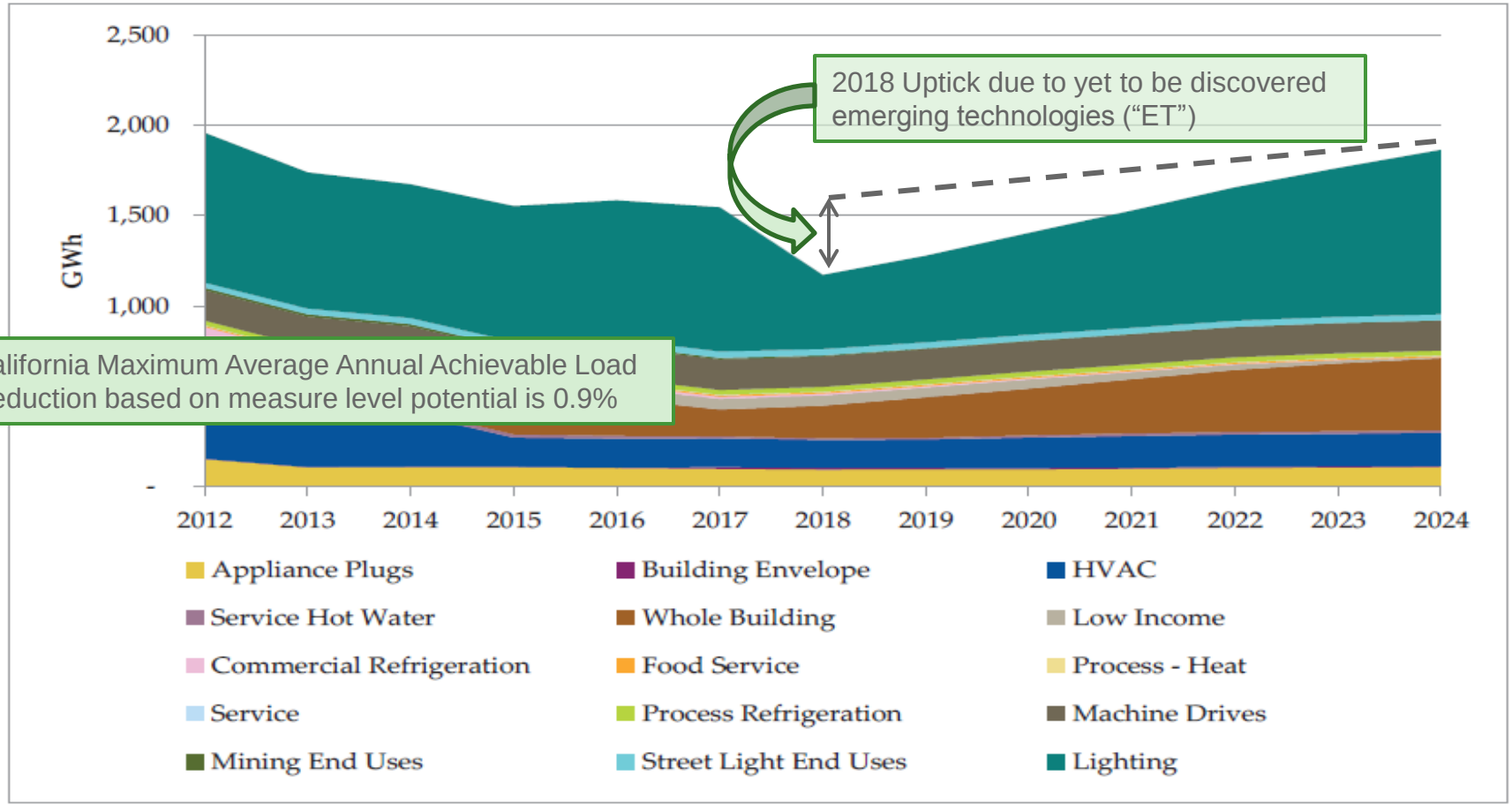
POTENTIAL REPORTED IN TERMS OF GROSS RATHER THAN NET SAVINGS

- SRP 2010 Study
  - EPA says achievable potential of 2.2% per year (2nd highest of all studies)
  - Study is based on gross savings and includes attribution for compliance with all codes and standards

Key Concept: Utilities Receive Credit For Net Savings

MEASURE LEVEL, NOT PROGRAM POTENTIAL, DEFINED

Figure 5-3. California Gross Incremental Market Potential Savings by End Use for 2012-2024 (GWh, program only, excluding codes and standards)



2013 Cumulative results exclude C&S savings and behavioral savings.
Source: PG model release February 2014

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EPA REPORTS MAXIMUM ACHIEVABLE POTENTIAL OR "MAP": REF. 2010 XCEL DSM POTENTIAL STUDY

Table 1-2

Average Annual Achievable Potentials and Program Costs from All Sources—2010-2020

Fuel	Source of Potential	Savings by Scenario			Costs ($ Millions) by Scenario		
		100% Incentives	75% Incentives	50% Incentives	100% Incentives	75% Incentives	50% Incentives
Electricity GWh	Base Energy Efficiency	444.8	255.1	163.8	$247.7	$87.0	$43.1
	Conservation	16.0	9.8	4.0	$6.2	$3.0	$0.8
	Total	460.8	264.8	167.8	$253.9	$90.0	$43.9
Electricity MW	Base Energy Efficiency	109.0	49.0	29.8	*Shown above under GWh*		
	Demand Response	43.5	43.5	27.3	$48.6	$48.6	$31.2
	Conservation	3.9	2.4	1.0	*Shown above under GWh*		
	Total	156.3	94.8	58.1	*Equals GWh total plus DR costs*		
Natural Gas Million Dth	Base Energy Efficiency	2.2	0.8	0.4	$113.3	$32.4	$13.5
	Conservation	0.2	0.1	0.0	$4.6	$2.6	$0.7
	Total	2.4	0.9	0.4	$118.0	$35.0	$14.2
Emerging Technologies	*GWh*	*90.1*	*30.5*	*10.8*	*$68.6*	*$14.1*	*$4.6*
	MW	*23.8*	*8.6*	*4.3*	*Shown above under GWh*		

Also, see notes for Table 1-1.

MAP COSTS A MULTIPLE OF 6X RAP.

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EPA REPORTS MAXIMUM ACHIEVABLE POTENTIAL OR "MAP": REF: 2010 XCEL DSM POTENTIAL STUDY

1.2.8 Uncertainty of Results

We want to caution the reader that there is inherent uncertainty in the results presented in this report because they are forecasts of what could happen in the future. Our estimates of technical and economic potential have the lowest degree of uncertainty. These are estimates that account for savings, costs, and current saturations of DSM measures but do not factor in human behavior.

The achievable program estimates do take into account behavior, as our modeling efforts try to predict program participation levels while factoring in measure awareness and economics, as well as barriers to measure uptake. Hence, the uncertainty in our achievable potential estimates is greater. This uncertainty is lowest in the 50-percent incentive scenario as these results are most consistent with current program experience. Uncertainty is higher in the 75-percent and 100-percent incentive scenarios, as these are projections that extend beyond the bulk of historical experience. **This uncertainty is greatest for the 100-percent incentive scenario because we have no "real world" program experience where all the incremental measure costs are paid for by the utility over an extended period of time.** Typically, a utility may offer the equivalent of 100-percent incentives for limited measures and customer segments in order to overcome high barriers in specific markets and to gain a high level of program participation while limiting program costs.

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While the MAP portfolio may be cost effective on a total basis, the incremental cost of achieving MAP results is high

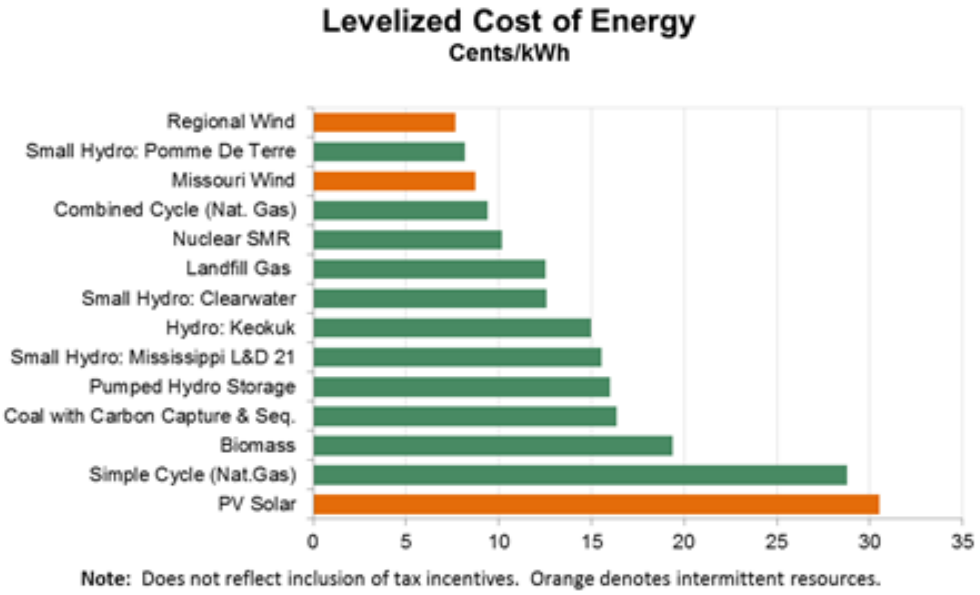
Highly Confidential

Levelized Cost ($/MWh)		
Through	2034	2044
RAP	57	40
MAP	81	57

Levelized Incremental Cost ($/MWh)		
Through	2034	2044
RAP-->MAP	148	106

The levelized costs of incremental energy savings from MAP relative to RAP is $106/MWh or 10.6 cents per kWh

Higher levelized cost than the top supply side options, including wind, natural gas and nuclear



Note: Does not reflect inclusion of tax incentives. Orange denotes intermittent resources.

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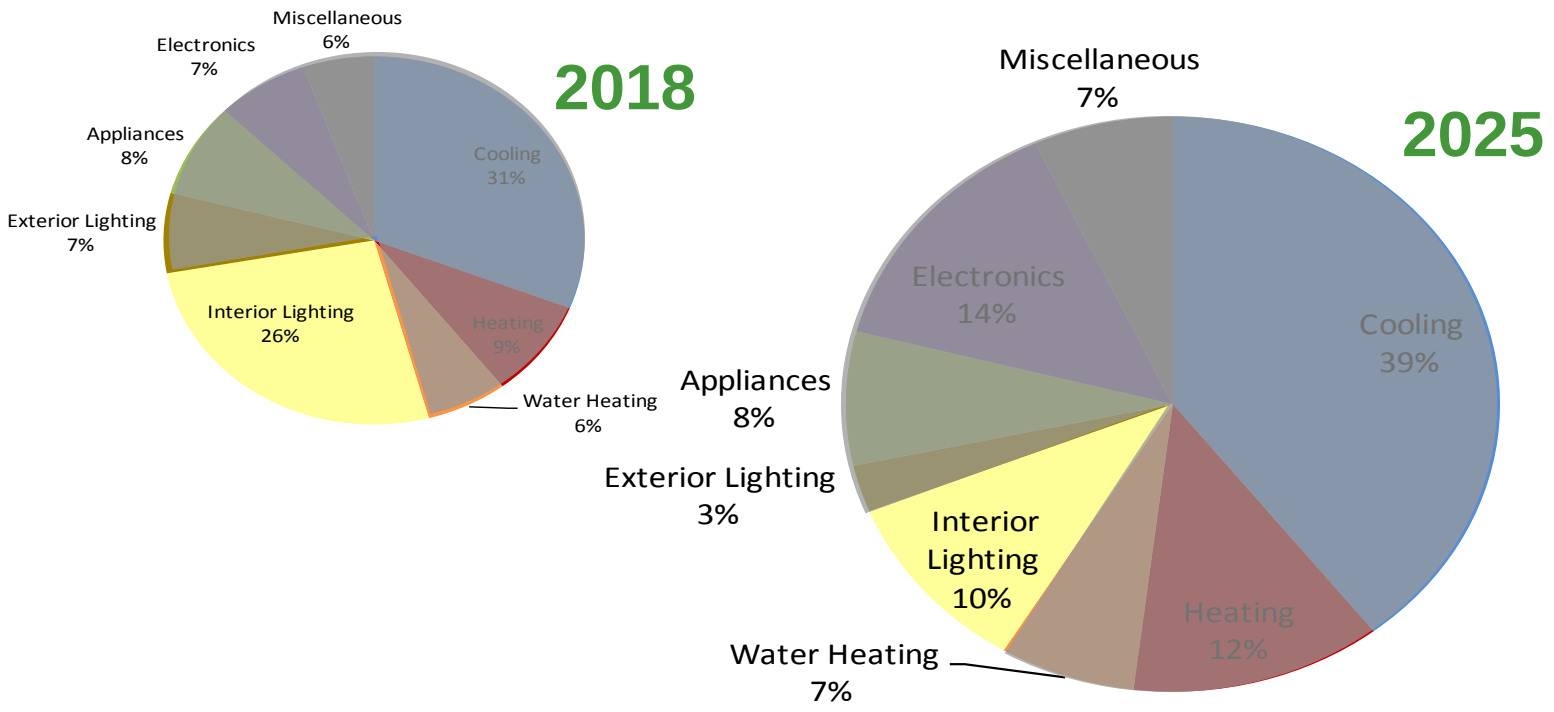
MEASURE MIX CHANGES OVER TIME
SOURCE: 2013 AMEREN MO DSM POT. STUDY

Figure 5-5 Residential Measure-level RAP by End Use in 2018 and 2025



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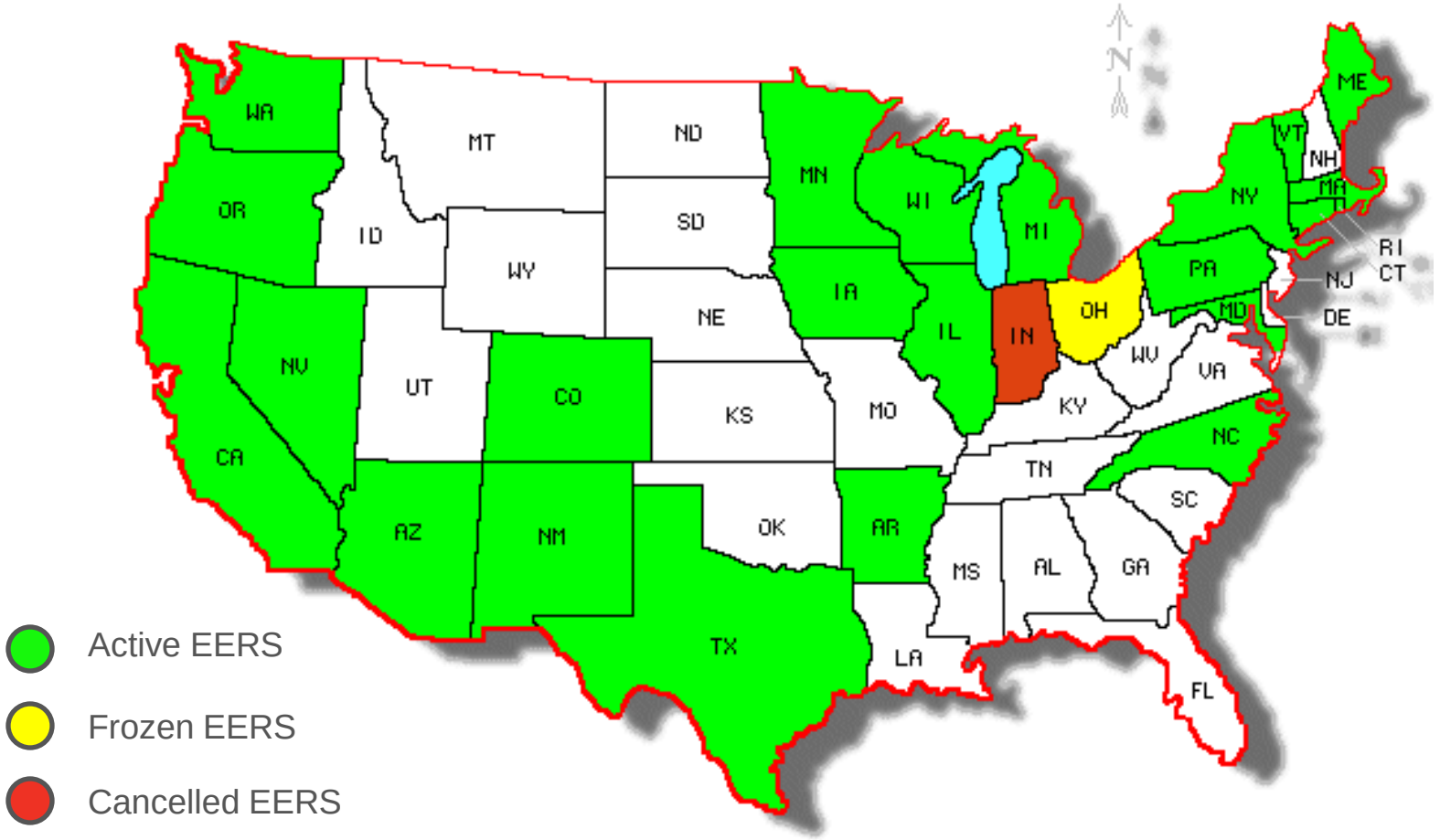
ISSUES WITH EXISTING STATE ENERGY EFFICIENCY RESOURCE STANDARD REFERENCED BY EPA TO ASSUME 1.5% ANNUAL LOAD REDUCTIONS ARE REASONABLE

States with EERS Statutes (ACEE Report)



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States with an EERS in place as of January 2014

	Provisions within each state EERS that impacts performance assessment										
	Rate Caps	Use Gross Savings	Credit for Renewables	Credit for Combined Heat and Power	Credit for Utility Infrastructure Improvements	Credit for Codes and Standards	Credit for Earlier Years EE Load Reductions	Credit for Demand Response as EE	Credit for Self Directed Energy Savings	Non-TRC Cost Effectiveness Test	Fuel Neutrality
Arizona											
Arkansas											
California											
Colorado											
Connecticut											
Hawaii											
Illinois											
Indiana†											
Iowa											
Maine											
Maryland											
Massachusetts											
Michigan											
Minnesota											
Nevada											
New Mexico											
New York											
North Carolina											
Ohio††											
Oregon											
Pennsylvania											
Rhode Island											
Texas											
Vermont											
Washington											
Wisconsin											

† Indiana cancelled their EERS in 2014

†† Ohio has frozen their EERS for 2014-2015

This slide is still a work in progress……

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My name is Michael Hutcheson and I am an environmental engineer for Ameren Corporation. Ameren Corporation is a public utility holding company with electric and gas utility operating subsidiaries serving over 3 million customers in Missouri and Illinois.

Ameren believes the proposed rule is legally and technically flawed, will result in unnecessary significant cost increases to our customers and businesses, cause job losses and damage the economy. However, before I discuss our concerns, I will describe what Ameren has been doing to protect the environment, and our plans going forward.

For many years Ameren has been taking steps to reduce emissions with the goal of transitioning our fleet to a cleaner more diverse portfolio. We have installed scrubbers and other pollution control devices, improved unit efficiency, converted landfill gas to energy, contracted for wind power, expanded our nuclear capacity, promoted and are installing solar power, increased hydro capacity and implemented significant energy efficiency programs in both Illinois and Missouri. We have made progress in reducing our carbon footprint, and are executing a 20-year plan designed to reduce emissions even further in a responsible manner. Our plan involves adding more renewables and combined cycle natural gas, increasing energy efficiency, retiring coal plants at the end of their useful lives and replacing them with cleaner resources, as well as retaining options for greater levels of nuclear generation. Our plan can achieve a 30% reduction from 2005 emission levels over a slightly longer timeframe at a cost to consumers that we currently estimate at nearly 4 billion dollars lower than the cost of EPA's proposed rule for Ameren customers alone.

Turning now to EPA's proposal, Ameren recommends that EPA define and limit the emission standards based solely on what is achievable at existing power plants. States should then be given the flexibility to develop any programs that achieve an equivalent emissions reduction. If EPA rejects this proposal, numerous other changes should be made. I will highlight a couple of them now.

First and foremost, EPA should eliminate the aggressive interim goals that start in 2020. Failure to make this adjustment will cause Ameren to incur $2 billion in capital investments by 2020 which will, in part, lead to nearly $4 billion of higher rates for customers through 2034. We recommend you replace the interim requirements with a directive to states to develop non-binding emission reduction milestones that are reasonably achievable and reflect the state's view of the appropriate glide path to the final state reduction goal. This single action will greatly reduce the cost of the rule and will provide greater flexibility to the states. We also believe the target compliance date should not be set in stone at 2030. Rather, states should be given the flexibility to extend the date in order to allow the orderly transition of generation fleets. This will help mitigate the potential for reliability concerns and rate shock, which would be particularly harmful to our fixed and low income customers. For Ameren, the compliance date would be 2035, yet significant reductions would occur prior to that time. These changes would save Ameren's customers nearly $4 billion dollars when compared to the proposed EPA rule and still achieve similar GHG reductions.

Ameren also believes the rule will not properly credit coal plant retirements that are not replaced with new generation under a rate-based compliance program. It is assumed that under a rate-based

program, both the emissions of C02 and the MWhs generated from retired coal plants are removed from the emission rate calculation when determining compliance. This approach does not properly reflect the emission reduction gained because it produces only a minor reduction in the overall emission rate. In order to properly reflect the benefits of coal plant retirements, these units should be treated as zero-emitting units whereby the associated MWhs remain in the denominator, similar to the treatment of energy efficiency.

In addition, Ameren believes the rule suffers from over-aggressive assumptions about the reduction potential in each of the four building blocks contained in the rule. However, I will focus on just two of them.

With respect to building block three, the level of renewable generation assumed is excessive because it assumes Coops and Munis in both Missouri and Illinois must comply with the relevant Renewable Energy Standards ("RES")—but they do not. Moreover, the Missouri and Illinois RES programs contain rate impact caps of one and two percent, respectively. Thus, the rule should, but does not respect state RES programs.

Finally, with respect to building block four, the proposed rule overestimates the amount of energy efficiency available. Moreover, each state has methods to determine the cost-effectiveness of energy efficiency, as well as methods for verifying the levels of reduction that should be, but are not respected by the rule. Additionally, companies can offer a full menu of efficiency programs, but if the end user does not implement them the efficiency targets will not be reached. Thus, the proposed rule does not respect existing state efficiency and demand response rules.

In conclusion, Ameren believes the proposed rule is legally and technically flawed, will result in unnecessary significant cost increases to our customers and businesses, cause job losses and damage the economy. We will be filing comments which will provide greater detail on all issues of concern and we urge EPA to read them carefully and give due consideration.

Thank you

My name is Steven Whitworth and I am Director, Environmental Services for Ameren Corporation. Ameren Corporation is a public utility holding company with electric and gas utility operating subsidiaries serving over 3 million customers in Missouri and Illinois.

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First and foremost, EPA should eliminate the aggressive interim goals that start in 2020. Failure to make this adjustment will cause Ameren to incur $2 billion in capital investments by 2020 which will, in part, lead to nearly $4 billion of higher rates for customers through 2034. We recommend you replace the interim requirements with a directive to states to develop non-binding emission reduction milestones that are reasonably achievable and reflect the state's view of the appropriate glide path to the final state reduction goal. This single action will greatly reduce the cost of the rule and will provide greater flexibility to the states. We also believe the target compliance date should not be set in stone at 2030. Rather, states should be given the flexibility to extend the date in order to allow the orderly transition of generation fleets. This will help mitigate the potential for reliability concerns and rate shock, which would be particularly harmful to our fixed and low income customers. For Ameren, the compliance date would be 2035, yet significant reductions would occur prior to that time. These changes would save Ameren's customers nearly $4 billion dollars when compared to the proposed EPA rule and still achieve similar GHG reductions.

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In addition, Ameren believes the rule suffers from over-aggressive assumptions about the reduction potential in each of the four Building Blocks contained in the rule. However, I will focus on just two of them.

With respect to Building Block 1, EPA has overestimated the amount of reduction that can be achieved by efficiency improvements on existing EGUs. Many companies, including Ameren already engage in the best practices built into Building Block 1, and the level of any additional reduction is limited. Ameren has also completed improvements to enhance plant efficiency and reduce emissions. The additional two percent reduction that EPA has included in the target is also simply not achievable.

With respect to Building Block 2, Ameren does not own a NGCC generating unit. Moreover, certain of these generating units may have permit limitations, warranty and/or other contractual arrangements that preclude their operation as assumed in the proposed rule. In addition, the proposal would require states to achieve the emission goal via increased dispatch, however, in RTO markets; it is FERC, not states that regulate the RTOs. Thus, the proposed rule imposes a

requirement on states that they do not have the authority to implement.

In conclusion, Ameren believes the proposed rule is legally and technically flawed, will result in unnecessary significant cost increases to our customers and businesses, cause job losses and damage the economy. We will be filing comments which will provide greater detail on all issues of concern and we urge EPA to read them carefully and give due consideration.

Thank you

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As noted, Ameren believes the rule is legally flawed and will not withstand judicial review.

First, EPA has not applied the rule to specific sources, but instead requires each *state* to meet a performance standard developed by application of a BSER that is a combination of inside the fence line and outside the fence line activities. This is a radical departure from EPA's past practice and the commonly accepted interpretation of the CAA.

A related legal argument involves EPA's intrusion into matters which have been traditionally left solely to the states. Specifically, EPA's proposal to define BSER as relying on a certain level of renewables and energy efficiency intrudes on state jurisdiction, and if implemented would represent a transformative expansion of its authority not approved by Congress.

In addition, regulation under Section 111(d) cannot occur until new sources of a similar kind are regulated under Section 111(b). By establishing a BSER that includes nuclear, renewables and energy efficiency, which are not regulated under Section 111(b), EPA's proposed rule violates the CAA.

Finally, EPA is precluded from regulating the affected units under Section 111.d because they are regulated Section 112.

In conclusion, Ameren believes the proposed rule is legally and technically flawed, will result in unnecessary significant cost increases to our customers and businesses, cause job losses and damage the economy. We will be filing comments which will provide greater detail on all issues of concern and we urge EPA to read them carefully and give due consideration.

Thank you