10. Strategy Selection

Highlights

- *Ameren Missouri continues to execute on a plan that is focused on transitioning its generation fleet to a cleaner and more fuel diverse portfolio in a responsible fashion over the next 20 years to ensure we provide service to our customers that is safe, reliable and environmentally responsible at a reasonable cost.*
    - *Our plan includes a dramatic increase in the amount of wind and solar generation in our portfolio, with 700 MW of new wind resources in the next three years and 100 MW of new solar resources in the next ten years.*
    - *Our plan also includes continued customer energy efficiency program offerings, introduction of customer demand response programs, and retirement of approximately half of our coal-fired generating capacity, which will be reaching the end of its useful life.*
    - *Our plan allows us to continue to rely on our existing, low-cost and dependable nuclear generation.*
- *Our plan allows us to achieve carbon dioxide emission reductions of 35% from 2005 levels by 2030, 50% by 2040 and 80% by 2050.*
- *Our implementation plan for the next three years includes steps necessary to add 700 MW of wind to our portfolio, approval and implementation of energy efficiency and demand response programs beyond our current 3-year plan, and actions to preserve contingency resource options and enable us to quickly respond to changing needs and conditions while continuing to ensure safe, reliable and cost-effective service to our customers.*
- *Ameren Missouri will continue to monitor critical uncertain factors to assess their potential impacts on our preferred plan, contingency plans and implementation.*

Ameren Missouri has selected its preferred resource plan and contingency plans in accordance with its planning objectives and practical considerations that inform our decision making. Our selection process consists of several key elements:

- ✓ Establishing planning objectives and associated performance measures to develop and assess alternative resource plans
- ✓ Creating a scorecard based on our planning objectives and performance measures to evaluate the degree to which various alternative resource plans would satisfy our planning objectives

- ✓ Critically analyzing the most promising alternative resource plans to ensure that we select a plan that best balances competing objectives

In addition, Ameren Missouri has subjected its preferred resource plan to testing under several scenarios that represent events that, while not necessarily considered probable, could have a significant impact on our resource needs and the performance of our preferred resource plan. These include 1) the addition of significant customer demand associated with an aluminum smelter, and 2) compliance with regulation of emissions of greenhouse gases (GHG) by existing power plants.

We have established an implementation plan for 2018-2020 that allows us to begin implementing the resource decisions embodied in our preferred resource plan and to preserve contingency options to allow us to effectively respond to changing needs and conditions while continuing to ensure safe, reliable and cost-effective electric service to our customers.

10.1 Planning Objectives

The fundamental objective of the resource planning process in Missouri is to ensure delivery of electric service to customers that is safe, reliable and efficient, at just and reasonable rates in a manner that serves the public interest. This includes compliance with state and federal laws and consistency with state energy policies.[1] Ameren Missouri considers several factors, or planning objectives, that are critical to meeting this fundamental objective. Planning objectives provide guidance to our decision making process and ensure that resource decisions are consistent with business planning and strategic objectives that drive our long-term ability to satisfy the fundamental objective of resource planning. Following are the planning objectives, established in the development of our 2011 IRP, that continue to inform our resource planning decisions.

Cost (to Customers): Ameren Missouri is mindful of the impact that its future energy choices will have on cost to its customers. Therefore, minimization of present value of revenue requirements is our primary selection criterion.[2]

Costs alone do not and should not dictate resource decisions. Our other planning objectives are discussed below.

Customer Satisfaction: Ameren Missouri is dedicated to continuing to improve customer satisfaction. While there are many factors that can be measured, for practical reasons Ameren Missouri focused primarily on measures that can be significantly

[1] 4 CSR 240-22.010(2); 4 CSR 240-22.010(2)(A); EO-2017-0073 1.N
[2] 4 CSR 240-22.010(2)(B)

impacted by resource decisions: 1) rate impacts – levelized average rates and 2) customer preferences – cleaner energy sources and demand-side programs that provide customers with options to manage their usage and costs.

Environmental & Resource Diversity: Ameren Missouri, like other electric utilities in Missouri, produces the majority of the energy it generates from coal. Ameren Missouri continues to be focused on transitioning its generation fleet to a cleaner and more fuel diverse portfolio.

Financial/Regulatory: The continued financial health of Ameren Missouri is crucial to ensuring safe, reliable and cost-effective service for customers in the future. Ameren Missouri will continue to need the ability to access large amounts of capital for investments needed to comply with renewable energy standards and environmental regulations and invest in demand and/or supply side resources to meet customer demand and reliability needs. Measures of expected financial performance and creditworthiness are evaluated along with potential risks.

Economic Development: Ameren Missouri is committed to support the communities it serves beyond providing reliable and affordable energy. Ameren Missouri assesses the economic development opportunities, for its service territory and for the state of Missouri, associated with our resource choices. We do this by examining the potential for direct job growth, which in turn promotes additional economic activity.

Table 10.1 summarizes our planning objectives and the primary measures used to asses our ability to achieve these objectives with our alternative resource plans.

Table 10.1 Planning Objectives and Measures[3]

Planning Objective Categories	Measures
Cost	Present Value of Revenue Requirements
Customer Satisfaction	Customer Preferences, Levelized Rates
Environmental & Resource Diversity	Resource Diversity, CO_2 Emissions, Probable Environmental Costs
Financial/Regulatory	ROE, EPS, FCF, Financial Ratios, Stranded Cost Risk, Transaction Risk, Cost Recovery Risk
Economic Development	Direct Job Growth (FTE-years)

[3] 4 CSR 240-22.060(2); 4 CSR 240-22.060(2)(A)1 through 7

10.2 Assessment of Alternative Resource Plans

Ameren Missouri used a scorecard to evaluate the performance of alternative resource plans with respect to our planning objectives and measures described above. The scorecard and measures include both objective and subjective elements that together represent the trade-offs between competing objectives. It is important to keep in mind that the scorecard is a tool for decision makers and does not, in and of itself, determine the preferred resource plan. The selection of the preferred resource plan is informed by the scorecard and by a more critical analysis of the relative merits of alternative resource plans, including an assessment of any risks or other constraints.

10.2.1 Scoring of Alternative Resource Plans[4]

To score each of the alternative resource plans, we employed a standard approach to scoring for each planning objective on a 5-point scale and determined a composite score by applying a weighting to each planning objective. As Cost is the primary selection criterion, it was given the greatest weight – 30% -- just as it was in the scoring performed for our 2011 and 2014 IRPs.[5] Economic Development carried a weight of 10%. Each of the other three planning objectives – Customer Satisfaction, Environmental & Resource Diversity, and Financial/Regulatory – carried a weight of 20%. The scoring approach for each planning objective is as follows:

Cost – The 18 alternative resource plans were separated into five groups according to probability weighted average PVRR results from the risk analysis discussed in Chapter 9. The lowest cost group of plans were given a score of 5, the next lowest cost group a score of 4, and so on, with the highest cost group of plans receiving a score of 1.

Customer Satisfaction – Alternative resource plans were evaluated based on levelized annual average rates for a portion of the score. As was done with the PVRR results, the alternative resource plans were separated into five groups according to the probability-weighted average levelized annual average rate results produced from our risk analysis. The plans resulting in the lowest rates were given a score of 5, the next lowest rate group a score of 4, and so on, with the highest rate group of plans receiving a score of 1. Plans that yielded a score greater than 3 for rates were given 3 points in the overall scoring for Customer Satisfaction. Plans that yielded a score of 3 were given 2 points. In addition, plans which include continued energy efficiency programs (RAP or MAP) were given a point. Also, plans which included demand response programs were given an additional point. Plans that include significant reductions in emissions, either

[4] 4 CSR 240-22.010(2)(C); 4 CSR 240-22.010(2)(C)1; 4 CSR 240-22.010(2)(C)2; 4 CSR 240-22.010(2)(C)3; 4 CSR 240-22.070(1); 4 CSR 240-22.070(1)(A) through (D)
[5] 4 CSR 240-22.010(2)(B)

as a result of early coal retirements or to achieve emission reduction targets, were given an additional point. Finally, plans that include significant additional renewable generation sources beyond those needed to comply with legal mandates were given an additional point.

Environmental & Resource Diversity – Alternative resource plans were awarded points for each plan attribute contributing to greater resource diversity and/or environmental impact in terms of emission reductions. Plans were awarded one point each for each of the following:

- ✓ Inclusion of demand-side programs
- ✓ Addition of nuclear generation
- ✓ Addition of combined cycle gas generation (1 point per 600 MW)
- ✓ Addition of significant renewables (beyond those needed to comply with legal mandates)
- ✓ Addition of storage resources
- ✓ Early retirement of coal generation (1 point per 1,200 MW)

Financial/Regulatory – Scoring for Financial/Regulatory is based on a default score of 5 with deductions for risks and financial impacts that may detrimentally affect Ameren Missouri's ability to continue to access lower cost sources of capital. Plans that would result in relatively lower free cash flow were reduced by one point. Plans were also reduced by one point each for potential risks associated with:

- ✓ Lack of any DSM programs
- ✓ Significant risk of not achieving energy efficiency targets
- ✓ Nuclear construction costs (2 point deduction)
- ✓ Retirement and replacement of additional coal units beyond Meramec and Sioux (1 point deduction for every 1,200 MW of additional retirement)

Economic Development – Alternative plans were scored based on direct job creation, including construction and ongoing operation. Estimates for direct job creation were developed using the Jobs and Economic Development Impact (JEDI) Model, developed by Marshall Goldberg of MRG & Associates under contract with the National Renewable Energy Laboratory, or more specific estimates where available (e.g., nuclear).

Construction and operating jobs were translated into full-time equivalent years (FTE-years). Alternative plans were ranked based on FTE-years and divided into five groups based on relative rank. The group of plans resulting in the highest FTE-year values were given a score of 5 points each, the next highest FTE-year group a score of 4, and so on, with the lowest FTE-year group of plans receiving a score of 1.

Table 10.2 Alternative Resource Plan Scoring Results

Description	Overall Assessment
R - RAP-35% CO2 Reduction	**4.30**
A - RAP	**3.90**
P - Meramec Retired 2020	**3.90**
Q - RES Compliance only	**3.90**
B - RAP EE only	**3.60**
M - Rush Island Retired 2024	**3.60**
N - Labadie Retired 2024	**3.60**
O - Meramec 2020-Labadie 2024	**3.60**
D - MAP	**3.40**
E - MAP EE only	**3.00**
F - MAP DR only	**3.00**
C - RAP DR only	**2.70**
L - No DSM-Solar	**2.50**
K - No DSM-Wind&SC	**2.40**
G - No DSM-CC	**2.30**
I - No DSM-Pumped Storage	**2.30**
H - No DSM-SC	**2.10**
J - No DSM-Nuclear	**1.40**

Table 10.2 shows the composite scores for each of the 18 alternative resource plans. The full scorecard with scores for each planning objective for each alternative resource plan is shown in Appendix A.

Based on the scoring results, the alternative resource plans were separated into three tiers – Top, Mid, and Bottom. Plans with scores greater than 3.6 were placed in the Top Tier. Plans with scores between 2.8 and 3.6 were placed in the Mid-Tier. Plans with scores below 2.8 were placed in the Bottom Tier. All Top Tier plans include energy efficiency and demand response at the realistic achievable potential (RAP) level.

10.2.2 DSM Portfolio Considerations

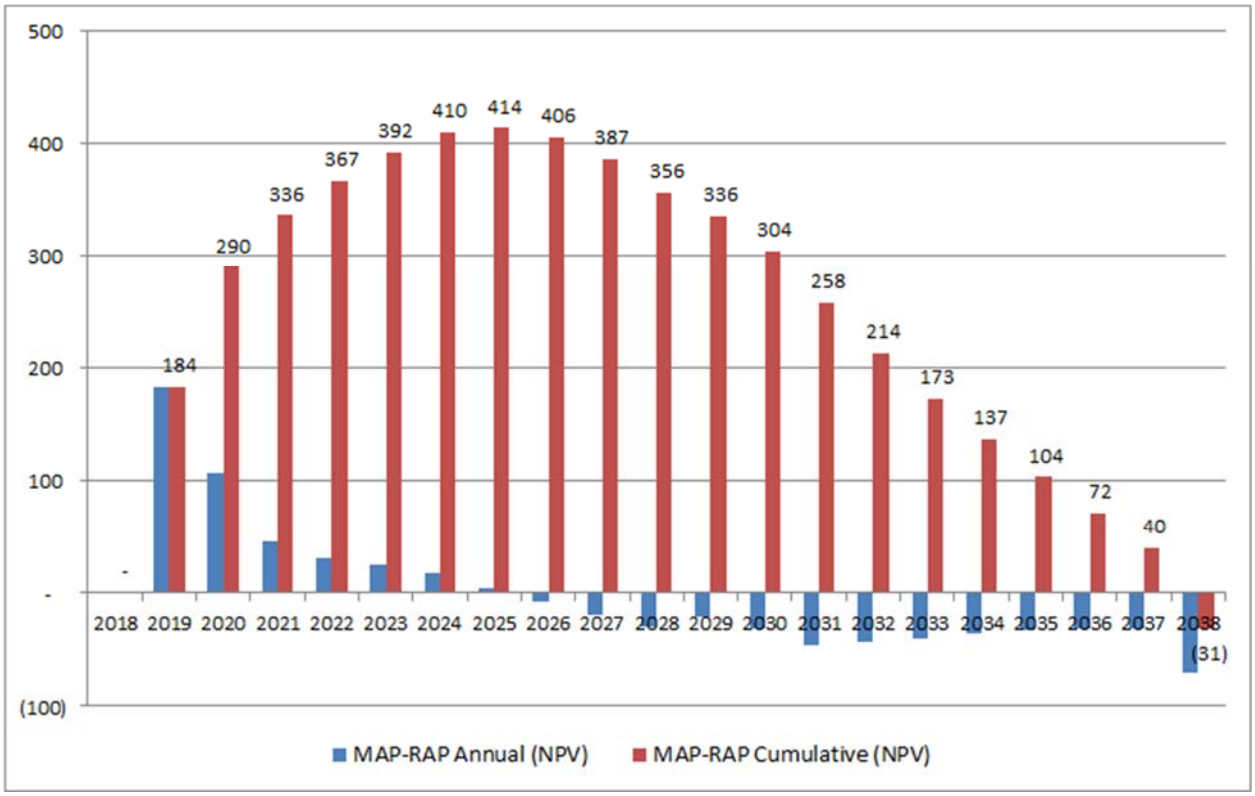
While MAP DSM results in lower total customer costs than RAP DSM over the 30 years evaluated in our risk analysis, it is important to further evaluate the performance of MAP relative to RAP, in particular because MAP is defined as the hypothetical upper boundary of achievable demand-side potential, assuming ideal conditions for implementation. To further investigate the relative merits of RAP and MAP DSM portfolios, we evaluated:

- ✓ The year-by-year relative net benefits for RAP and MAP
- ✓ A "Mid DSM" portfolio between RAP and MAP

Year-by-Year Net Costs/Benefits

Implementation of the MAP energy efficiency portfolio would require a program budget for that is nearly double the budget needed to implement the RAP portfolio, although MAP reflects cumulative energy savings that are only roughly 40% greater than those for RAP. We analyzed the year-by-year revenue requirement impacts of the RAP plan (Plan A) and the MAP plan (Plan D), including all costs and benefits. Figure 10.1 shows the annual and cumulative revenue requirement differences between the two plans.

Figure 10.1 Year-by-Year PVRR Differences for RAP and MAP Plans



As the chart shows, the MAP plan results in higher overall costs than the RAP plan through 2025. While the MAP plan results in lower overall costs starting in 2026, the cumulative increase in costs for the MAP plan reaches $414 million in 2025 and persists until 2038, beyond the last year of the twenty-year planning horizon. The greater net benefits of MAP relative to RAP increase significantly after the end of the planning horizon as captured in the end effects.

Portfolios between RAP and MAP

To further evaluate the economics of DSM portfolios and to assist us in addressing the policy goal of MEEIA to achieve all cost-effective demand-side savings, we evaluated the possibility of a DSM portfolio that results in savings that are between those represented by RAP and MAP. Because market research exists only to support the development of RAP and MAP portfolios, we must estimate the costs and savings for any other portfolio assumptions.

We started by estimating the costs and savings for a portfolio that lies midway between the RAP and MAP portfolios, called the "Mid DSM" portfolio as discussed in Chapter 8. We then constructed a test plan including this portfolio and supply side resources necessary to meet load and reserve requirements. The plan was evaluated using the same ranges of assumptions used to evaluate alternative resource plans in our risk analysis. The results of the analysis, with a comparison of comparable plans including RAP and MAP portfolios (Plans A and D), is shown in Table 10.3. As the table shows, the PVRR results for the Mid DSM portfolio are roughly midway between the results for plans with RAP and MAP DSM portfolios.

Table 10.3 PVRR Comparison of RAP and MAP

DSM Portfolio	PVRR
RAP	54,429
MAP	53,892
Mid	54,165

While it is possible to repeat this process, estimating other portfolios between RAP and MAP at different points on a continuum between the two portfolios, it would not provide additional insight into the merits of these various portfolios. Based on the results of our analysis of the Mid DSM portfolio, we would expect such additional portfolios to produce results that are similarly predictable. We would also expect the year-by-year analysis to produce similarly predictable results, showing a net advantage for RAP through 2025 on an annual basis and through 2037 on a cumulative basis.

Pursuing the Policy Goal of MEEIA

As stated previously, the stated goal of MEEIA is to achieve all cost-effective demand-side savings by aligning utility incentives with helping customers to use energy more efficiently. Ameren Missouri has demonstrated its commitment to pursuing this goal by implementing the largest utility energy efficiency program in Missouri history. And while we believe this is a goal worth pursuing, it cannot be quantified with any degree of accuracy for the next twenty years. Rather, it is a goal that will constantly be shaped and reshaped through continuous implementation, evaluation, research, testing and readjustment.

As noted earlier, Ameren Missouri has conducted a DSM Potential Study, prepared by a nationally recognized independent contractor team. The primary objective of the study was to assess and understand the long-term technical, economic, and achievable potential for all Ameren Missouri customer segments. Assuming regulatory treatment that reflects the requirements of MEEIA, RAP represents all cost-effective energy efficiency because, by definition, it represents a forecast of likely customer behavior under realistic program design and implementation.

10.3 Preferred Plan Selection[6]

In selecting its Preferred Resource Plan, Ameren Missouri decision makers[7] relied on the planning objectives discussed earlier in this chapter and the considerations reflected in the scoring and comparison of DSM portfolios highlighted in the previous section. As was noted previously, the Top Tier plans identified through scoring include the RAP DSM portfolio as well as renewables, including three plans that go beyond the renewable requirements of the RES. These define the key options for consideration in the selection of the preferred resource plan.

DSM Portfolio[8] – RAP and MAP DSM portfolios both result in reduced total costs to customers compared to plans with no DSM beyond the current MEEIA Cycle 2 program. The decision between the two must involve a consideration of risk and reward from the perspective of both customers and Ameren Missouri. Based on our analysis of the year-by-year cost differences between RAP and MAP, and an understanding of the increased level of risk in achieving MAP relative to RAP, Ameren Missouri has chosen to include the RAP portfolio in its preferred resource plan.

[6] 4 CSR 240-22.010(2)(C); 4 CSR 240-22.010(2)(C)1; 4 CSR 240-22.010(2)(C)2
4 CSR 240-22.010(2)(C)3; 4 CSR 240-22.060(3)(A)5; 4 CSR 240-22.070(1); 4 CSR 240-22.070(1)(A) through (D)
[7] Names, titles and roles of decision makers are provided in Appendix B.

This is not to say that there couldn't be additional potential energy savings that can be realized. Indeed, our uncertainty range for the RAP portfolio includes potential upside. However, we must consider the immediate cost impact to all customers of a large increase in DSM expenditures (approximately $250 million per year for MAP vs. $135 million per year for RAP) and the significant uncertainty of the relative long-term benefits. We must also consider that the path for demand-side programs is not "locked in" for twenty years.

Including RAP DSM in our preferred resource plan allows us to continue to offer highly cost-effective programs to customers at a reasonably aggressive level of annual spending while also allowing the potential for increased savings if our experience and expectations indicate they could be achieved in a cost-effective manner. Identifying such opportunities will depend on the results of program implementation and periodic updates of our market research.

Renewable Resources – One of Ameren Missouri's planning objectives is to transition our generation portfolio to one that is cleaner and more fuel diverse in a responsible fashion. Compliance with the Missouri RES is reflected in all of our alternative resource plans. This includes approximately 734 MW of wind and solar generation. An additional 66 MW of solar results in a relatively modest increase in PVRR under current assumptions. Because costs for solar resources are expected to continue to decline, it is possible that these additional resources could be added at no additional cost, or perhaps a savings to customers, by the time implementation is considered. We have therefore included additional solar generation in our preferred resource plan to bring our renewable generation additions to 800 MW. It is also possible that additional wind resources beyond those included in our plan could be beneficial to customers. Implementation of our planned wind additions will provide us with an opportunity to identify additional potentially beneficial projects.

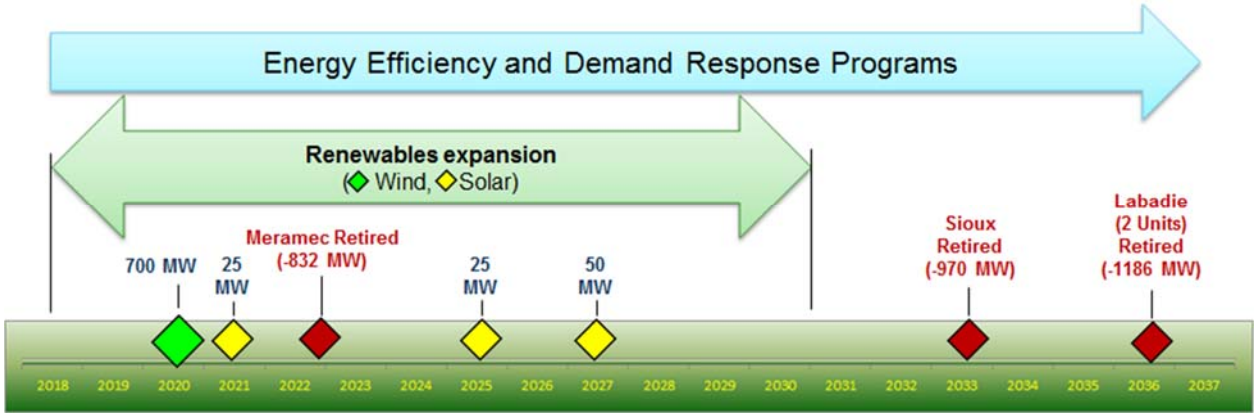
Meramec Retirement – We evaluated two plans with early retirement of Meramec at the end of 2020 rather than at the end of 2022 – Plans O and P. As described in Chapter 9, our risk analysis results demonstrated that the cost of plan O, which also includes early retirement of Labadie, is more than a billion dollars higher than that for the preferred plan. The cost of plan P is about $49 million higher than that for plan A, which differs only in the retirement date for Meramec, on a probability weighted basis. As our EVBI analysis shows, the cost of plan P is consistently higher than that for plan A across all values of the critical uncertain factors.

Carbon Dioxide Emissions – We evaluated a plan (plan R) that targets additional reductions in CO_2 emissions to achieve a 35% reduction from 2005 levels by 2030. This plan differs from plan A only in this regard and results in costs that are about $52 million higher. The additional costs are expected to be incurred in 2030-2033 and are based on our current IRP assumptions. Targeting greater levels of CO_2 emission

reductions is expected to help spur innovation in the optimization of fleet operations, leading to potential efficiencies that may result in net savings to customers in the long run.

The plan that embodies these key choices is listed in Table 10.2 as "Plan R". It includes RAP energy efficiency and demand response programs, 800 MW of new renewable generation, retirement of all Meramec units by the end of 2022, retirement of Sioux Energy Center at the end of 2033, and retirement of two of the four units at Labadie Energy Center at the end of 2036. It also includes CO_2 emission reductions of 35% by 2030 and supports achievement of our long-term goal of an 80% reduction by 2050. Figure 10.2 shows the preferred resource plan and its key elements.

Figure 10.2 Preferred Resource Plan



10.4 Contingency Planning[9]

Because any assumptions about the future are subject to change, we must be prepared for changing circumstances by evaluating such potential circumstances and options for providing safe, reliable, cost-effective and environmentally responsible service to our customers. We have identified several cases which could significantly impact the performance of our preferred resource plan. These include cases that may result in 1) significantly higher demand, and 2) altered costs and feasibility of continuing to operate existing generating units.

10.4.1 DSM Cost Recovery and Incentives

As stated previously, MEEIA provides for cost recovery and incentives for utility-sponsored demand-side programs to align utility incentives with helping customers to

[9] 4 CSR 240-22.070(4)

use energy more efficiently. In early 2016, the Missouri Public Service Commission (Commission) approved our second cycle of MEEIA programs and supporting cost recovery and incentives. Our preferred resource plan is based on the expectation that supporting cost recovery and incentives will continue to be approved in the future. If such alignment is not achieved, it may be necessary for Ameren Missouri to change its preferred resource plan.

Ameren Missouri expects to file a request with the Commission for approval of a new portfolio of demand-side programs in the first quarter of 2018. Costs are expected to be recovered through our Rider Energy Efficiency Investment Charge (Rider EEIC). In our request, we will also seek recovery of costs associated with the so-called "throughput disincentive."

In addition to recovery of program costs and addressing the throughput disincentive, MEEIA also mandates that utilities be provided with timely earnings opportunities that serve to make investments in demand-side resources equivalent to investments in supply-side resources. Ameren Missouri will seek such incentives in its upcoming MEEIA filing.

10.4.2 Addition of Large Customer Load

Ameren Missouri's largest customer in recent years has been the aluminum smelter now owned by Magnitude 7 Metals in New Madrid, Missouri. The smelter historically used roughly 4,200 GWh of electricity annually with a peak demand of approximately 500 MW. The smelter suffered damage to its potlines in 2016 and has significantly reduced it electric usage since that damage occurred. To evaluate the impact on our preferred plan of a return to full operation of the smelter and its impact on our need for resources under the preferred plan, we evaluated a capacity position included this demand. We found that the addition of load would not result in the need for new supply side resources during the planning horizon.

10.4.3 Greenhouse Gas Regulation

As described in Chapter 5, the EPA's previously proposed "Clean Power Plan" (CPP) continues to be subject to a stay issued by the U.S. Supreme Court in early 2016. As a result, many states (including Missouri) suspended any significant further action to implement the rule unless and until the stay is lifted. While much uncertainty remains, we have evaluated the potential effect of implementation of the rule in its final form prior to the stay on the performance of our preferred resource plan. In doing so, we assumed a mass-based compliance regime for the state of Missouri. Table 10.4 shows the PVRR results for the preferred plan with and without application of the CPP limits. The

cost of the preferred plan would be expected to increase by about $55 million as a result of applying the CPP limits.

Table 10.4 PVRR Comparison With and Without CPP Limits

Plan	PVRR ($Million)
Preferred Plan	54,481
CPP	54,536

10.4.4 Optionality for New Generation

As the contingency cases described earlier illustrate, it is important to maintain options and flexibility to ensure Ameren Missouri can meet its customers' energy needs in a safe, reliable, and environmentally responsible manner at a reasonable cost. Our analysis has shown that renewables and gas-fired combined cycle continue to be attractive options for meeting our customers' future energy needs. It is therefore important to ensure that we can exercise these options when needed and in response to changing circumstances. This includes continuing to evaluate opportunities for developing additional renewable energy resources and evaluating potential sites for new gas-fired generation. As the discussion of greenhouse gas regulation demonstrates, options for cleaner and dependable resources are also critical for ensuring compliance with such regulations while maintaining safe, reliable, and cost-effective service to customers.

10.5 Resource Acquisition Strategy[10]

Our resource acquisition strategy has three main components. First is the Preferred Resource Plan which is discussed in more detail in Section 10.5.1. The second component of the resource acquisition strategy is contingency planning. Under no ranges or combinations of outcomes for the critical uncertain factors, would the Preferred Resource Plan be inappropriate. Figure 10.3 shows the Preferred Resource Plan as well as contingency options and the events that could lead to a change in our preferred plan. The final component of the resource acquisition strategy is the implementation plan which includes details of major actions over the next three years, 2018-2020.

[10] 4 CSR 240-22.070(1); 4 CSR 240-22.070(1)(A) through (D); 4 CSR 240-22.070(2);
4 CSR 240-22.070(4); 4 CSR 240-22.070(4)(A) through (C);
4 CSR 240-22.070(7); 4 CSR 240-22.070(7)(A) through (C)

Figure 10.3 Preferred Plan and Contingency Plans

10.5.1 Preferred Plan

As discussed in Section 10.3, our Preferred Resource Plan includes RAP energy efficiency and demand response programs, 800 MW of new renewable generation, retirement of all Meramec units by the end of 2022, retirement of Sioux Energy Center at the end of 2033, and retirement of two of the four units at Labadie Energy Center at the end of 2036.

Demand Side Resources

The preferred plan includes RAP energy efficiency and demand response programs. Energy efficiency programs under our current three-year MEEIA plan run through February 2019. Program spending for the 20-year planning horizon (after the current cycle of MEEIA programs) is over $3 billion. Cumulative peak demand reductions exceeding 2,000 MW by 2037 (not including planning reserve margin), and cumulative energy savings (at the customer meter) total nearly 56 million MWh.

Renewables

Chapter 9 includes a detailed description of renewable resource requirements. In summary, Ameren Missouri will need additional RECs or non-solar resources starting in 2019. We also expect to need additional solar resources to continue to meet the RES

solar requirements when SRECs transferred to Ameren Missouri from customer-owned solar facilities are no longer available. Beyond those renewable resources included for RES compliance, we have included additional solar resources to advance our objective to transition our generation portfolio to a cleaner and more fuel diverse mix of resources. Our expansion of renewables includes 700 MW of wind and 100 MW of solar generation.

Supply-Side Resources

The Preferred Resource Plan calls for the retirement of all Meramec units by the end of 2022. It also includes retirement of Sioux Energy Center by the end of 2033 and retirement of two of the four units at Labadie Energy Center at the end of 2036.

10.5.2 Contingency Plans[11]

Figure 10.3 presents our key contingency options. In the event that Ameren Missouri's interests are not aligned with helping customers use energy more efficiently, as required by MEEIA, we have included a contingency plan that reflects a discontinuation of demand side programs after our current MEEIA cycle programs expire at the end of February 2019. The contingency plan therefore also includes the installation of a 600 MW combined cycle facility to be in service in 2034 and another 1,200 MW of combined cycle generation in 2037.

10.5.3 Expected Value of Better Information Analysis[12]

After selecting the preferred plan, Ameren Missouri conducted an expected value of better information (EVBI) analysis to assess the performance of its preferred resource plan under the range of values defined for the critical uncertain factors and to inform its on-going research and implementation activities. Table 10.5 displays the results of the EVBI analysis as measured by PVRR. Under almost all critical uncertain factor values, Plan D results in a lower PVRR than the preferred plan. In part, because it is possible that additional cost-effective energy savings could be identified, we will continue to undertake rigorous evaluation of our programs and periodically update our market research to identify additional such opportunities.

[11] 4 CSR 240-22.070(4)
[12] 4 CSR 240-22.070(3)

Table 10.5 EVBI Analysis Results

Alternative Resource Plans		PVRR Without Better Info	Coal Retirements			Carbon		Load Growth			Natural Gas Price				DSM			Coal Price		
			Low	Base	High	None	Base	Low	Base	High	PWA	Low	Base	High	Low	Base	High	Low	Base	High
A	RAP	54,429	53,431	54,830	54,816	53,431	54,823	53,375	54,527	55,187	54,281	54,535	54,617	54,166	54,067	54,404	54,992	52,633	54,484	55,787
B	RAP EE only	54,740	53,745	55,141	55,126	53,745	55,133	53,526	54,861	55,593	54,560	54,864	54,951	54,503	54,438	54,719	55,212	52,944	54,795	56,098
C	RAP DR only	57,158	56,034	57,610	57,595	56,034	57,602	55,774	57,311	58,085	56,929	56,931	57,551	57,254	57,099	57,154	57,250	55,362	57,213	58,516
D	MAP	53,892	52,931	54,276	54,266	52,931	54,271	53,113	53,961	54,462	53,788	54,084	54,011	53,486	53,236	53,846	54,914	52,095	53,946	55,249
E	MAP EE only	54,534	53,577	54,916	54,906	53,577	54,911	53,469	54,639	55,283	54,376	54,755	54,691	54,171	53,978	54,495	55,399	52,738	54,588	55,892
F	MAP DR only	56,641	55,519	57,096	57,072	55,519	57,084	55,399	56,777	57,476	56,437	56,417	57,003	56,725	56,541	56,634	56,798	54,845	56,696	57,999
G	No DSM-CC	57,679	56,551	58,127	58,122	56,551	58,124	56,119	57,856	58,709	57,414	57,450	58,112	57,797	57,679	57,679	57,679	55,883	57,734	59,037
H	No DSM-SC	57,532	56,401	57,985	57,973	56,401	57,979	55,972	57,711	58,557	57,264	57,316	57,959	57,657	57,532	57,532	57,532	55,736	57,587	58,890
I	No DSM-Pumped Storage	58,250	57,129	58,702	58,682	57,129	58,692	56,695	58,428	59,268	57,982	57,990	58,692	58,414	58,250	58,250	58,250	56,453	58,304	59,607
J	No DSM-Nuclear	63,924	62,974	64,296	64,302	62,974	64,299	62,351	64,107	64,949	63,650	64,136	64,175	63,779	63,924	63,924	63,924	62,128	63,979	65,282
K	No DSM-Wind&SC	59,042	58,069	59,418	59,433	58,069	59,425	57,467	59,222	60,075	58,771	59,218	59,312	58,880	59,042	59,042	59,042	57,246	59,096	60,399
L	No DSM-Solar	57,947	56,878	58,373	58,364	56,878	58,369	56,385	58,129	58,962	57,674	58,094	58,218	57,864	57,947	57,947	57,947	56,151	58,002	59,305
M	Rush Island Retired 2024	55,450	54,692	55,764	55,736	54,692	55,750	54,106	55,626	56,267	55,186	55,125	55,895	55,735	55,089	55,425	56,014	54,049	55,496	56,483
N	Labadie Retired 2024	55,869	55,177	56,155	56,130	55,177	56,142	54,215	56,123	56,759	55,487	55,393	56,458	56,505	55,507	55,844	56,432	54,636	55,911	56,767
O	Meramec 2020-Labadie 2024	55,918	55,224	56,204	56,180	55,224	56,192	54,221	56,155	56,904	55,562	55,412	56,490	56,563	55,556	55,893	56,482	54,722	55,957	56,801
P	Meramec Retired 2020	54,478	53,478	54,880	54,866	53,478	54,873	53,382	54,559	55,332	54,357	54,554	54,649	54,225	54,117	54,453	55,042	52,719	54,530	55,821
Q	RES Compliance only	54,406	53,407	54,808	54,793	53,407	54,800	53,348	54,506	55,165	54,256	54,505	54,598	54,151	54,044	54,381	54,969	52,610	54,461	55,764
R	RAP-35% CO_2 Reduction	54,481	53,494	54,880	54,862	53,494	54,871	53,422	54,582	55,239	54,330	54,541	54,687	54,269	54,120	54,456	55,045	52,734	54,535	55,801
Minimum PVRR among plans			52,931	54,276	54,266	52,931	54,271	53,113	53,961	54,462	53,788	54,084	54,011	53,486	53,236	53,846	54,914	52,095	53,946	55,249
Plan with Minimum PVRR			D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
Subjective Probability			28%	35%	37%	28%	72%	20%	60%	20%	40%	19%	32%	8%	10%	80%	10%	10%	80%	10%
Expected Value of Better Info			563	605	596	563	600	308	621	777	542	457	677	783	883	610	131	638	588	552

10.5.4 Implementation Plan[13]

As mentioned earlier, the implementation plan outlines the major activities to be completed during the next three years, 2018-2020. Below is a description of those major activities.

Demand-Side Resources Implementation

Our approach to implementation of demand side programs is presented in Chapter 8. It includes our planned approach for soliciting bids from potential vendors and collaborating with stakeholders to define the demand-side portfolio, budgets and targets for our next MEEIA plan.

Demand-Side Resources Cost Recovery and Incentives

Ameren Missouri continues to implement its second cycle of approved MEEIA programs, which run through February 2019. Ameren Missouri expects to file a request with the Commission in the first quarter of 2018 for approval of demand-side programs and associated cost recovery and incentive mechanisms to be implemented during a six-year program cycle beginning in 2019.

Supply-Side Contingency

While the preferred resource plan does not include new combined cycle generation, our contingency planning indicates a need to prepare for the possibility of needing new generation during the planning horizon. This may be as a result of triggering a contingency option related to DSM cost recovery and incentives or to address increases in customer demand associated with electrification. To prepare for such contingency options, Ameren Missouri will continue evaluating potential sites for new combined cycle generation.

Renewables

Our preferred resource plan includes the addition of new wind generation by the end of 2020 and new solar generation in 2022, 2025 and 2027. Ameren Missouri will be engaging in activities during the implementation period to support the development of the new wind generation by the end of 2020, including bid solicitation, contractor selection, applying for a certificate of convenience and necessity, and construction. We will also be continuing to evaluate potential sites and options for solar generation.

[13] 4 CSR 240-22.070(6); 4 CSR 240-22.070(6)(A) through (D)

Meramec

Ameren Missouri will be taking steps to retire the units at Meramec Energy Center by the end of 2022. This includes the construction of any necessary transmission infrastructure and required notifications to MISO.

Environmental

Ameren Missouri will continue to monitor changes in environmental regulations and options for compliance. In the near term, we will complete work needed to comply with regulations for Coal Combustion Residuals (CCR), Effluent Limitation Guidelines (ELG) and 316(a) and (b).

Competitive Procurement Policies[14]

Ameren Missouri assigns a Project Manager to lead the activities necessary to ensure the successful completion of its acquisition and development of supply-side resources. In general, a project team comprised of a Project Manager and various lead engineers will identify all items to be procured and will coordinate with the Strategic Sourcing and Purchasing departments within Ameren to ensure proper contract structures are considered and used for each procurement activity. A Contract Development Team (CDT) is assembled and assists in collecting material and labor estimates based on the overall project design. Strategic Sourcing, CDT and the project team work to set up a number of components as Ameren stock items that are the basis for ordering materials. A detailed procurement matrix is developed to identify the major purchases that are anticipated to be required as part of the project. Material purchases make use of stock items established by the CDT. Where material has not been established as a stock item, the preferred approach is to solicit and obtain at least three quotations from a group of preferred Ameren vendors wherever possible to ensure the most competitive pricing for the material. Competitive bids are acquired from multiple vendors capable of meeting the requirements of the project. Ameren Missouri will be following Ameren's Project Oversight Process, which is provided in Appendix C, for monitoring the progress made implementing its Preferred Resource Plan.[15]

10.5.5 Monitoring Critical Uncertain Factors[16]

Ameren Missouri will be monitoring the critical uncertain factors that would help determine whether the Preferred Resource Plan is still valid and whether contingency options should be pursued. Below is a description of how Company decision makers will be monitoring the factors most relevant to future resource decisions.

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[14] 4 CSR 240-22.070(6)(E)
[15] 4 CSR 240-22.070(6)(G)
[16] 4 CSR 240-22.070(6)(F)

Climate Policy

Ameren Missouri senior management and the Environmental Services Group will continue to monitor and evaluate developments on efforts to regulate greenhouse gas emissions as well as state and industry efforts aimed at reducing greenhouse gas emissions.

Gas Prices

The President and CEO of Ameren Missouri is updated at least annually by Corporate Planning on trends and drivers of natural gas prices as part of the update on the drivers of forward commodity prices. Ameren Missouri senior management may, in its sole discretion, request more frequent updates to discuss significant changes in natural gas prices.

Load Growth

Corporate Planning will update Ameren Missouri's capacity position as needed based on the latest assumptions regarding load growth. Any significant changes in resource needs, whether timing or size, will be communicated to Ameren Missouri senior management. Corporate Planning will also reassess, at least annually, its assumptions for load growth in the Eastern Interconnect, which is a critical dependent uncertain factor included in our power price scenario modeling.

Coal Prices

Corporate Planning will work with Ameren Missouri's Fuels organization to monitor coal prices, with updates at least annually and as needed.

Demand-Side Resource Impacts and Cost

Ameren Missouri will continue to evaluate the cost-effectiveness of its DSM programs internally and through the evaluation process. Any major deviations from planning assumptions like participation rates, technology costs, and customer opt-out will be communicated to Ameren Missouri senior management.

10.6 Compliance References