

10. Strategy Selection

Highlights

- *Ameren Missouri is embarking on a transformation of its generation portfolio over the next twenty years while also considering portfolio implications through 2050.*
 - *Our plan includes our largest ever expansion of renewable wind and solar generation, bringing us to 3,100 MW of wind and solar by 2030 and 5,400 MW by 2040. This allows us to begin providing clean renewable energy to our customers now and mitigate significant risks associated with changes in energy policy, including policies that establish a price on carbon dioxide ("CO₂") emissions.*
 - *Our plan also includes continued customer energy efficiency and demand response program offerings, expansion of customer programs for renewable energy, and retirement of over three-fourths of our coal-fired generating capacity by 2040, which will be reaching the end of its useful life.*
 - *Our plan supports more aggressive reductions in CO₂ emissions, resulting in a 50% reduction by 2030 from 2005 levels and an 85% reduction by 2040, with a goal of achieving Net Zero CO₂ emissions by 2050.*
- *Our implementation plan for the next three years includes steps necessary to add an additional 1,200 MW of wind and solar generation to our portfolio by 2025, approval and implementation of energy efficiency and demand response programs beyond our current 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. These include prices for CO₂ and natural gas and costs for implementing customer demand-side programs.*
- *We will also continue to monitor prices for coal, costs for renewable generation, needs for transmission network infrastructure, and development of carbon-free resources such as large-scale long-cycle battery energy storage, hydrogen-based generation and storage, new nuclear technologies, and generation with carbon capture and sequestration.*

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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

We have established an implementation plan for 2021-2023 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 today.

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.

¹ 20 CSR 4240-22.010(2); 20 CSR 4240-22.010(2)(A);

² 20 CSR 4240-22.010(2)(B)

Customer Satisfaction: 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 impacted by resource decisions: 1) rate impacts – levelized average rates, 2) supply and service reliability, 3) customer preferences for renewable energy sources and demand-side programs that provide customers with options to manage their usage and costs, 4) availability of programs that allow customers to source more of their energy needs from renewable resources, and 5) reductions in energy center emissions.

Portfolio Transition (formerly 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. We therefore evaluate alternative resource plans based on the degree and pace of the transition from fossil generation sources to cleaner sources of energy.

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, invest in demand and/or supply side resources to meet customer demand, provide reliable service, and execute our portfolio transition. 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 for both construction and operation of resources, which in turn promotes additional economic activity.

Table 10.1 summarizes our planning objectives, the primary measures used to assess our ability to achieve these objectives with our alternative resource plans, and the weighting applied to each objective for scoring the alternative resource plans.

Table 10.1 Planning Objectives and Measures³

Planning Objective Categories	Measures	Weighting
Cost	Present Value of Revenue Requirements	30%
Customer Satisfaction	Customer Preferences, Levelized Rates	20%
Portfolio Transition	Resource Diversity, CO ₂ Emissions, Probable Environmental Costs	20%
Financial/Regulatory	Free Cash Flow, Financial Ratios, Stranded Cost Risk, Transaction Risk, Cost Recovery Risk	20%
Economic Development	Direct Job Growth (FTE-years)	10%

These planning objectives are consistent with Ameren's overall sustainability efforts. In early May 2020, Ameren Corporation released its corporate sustainability report – Our Sustainability Story: Customers at the Center. The report details Ameren's commitment to sustainability and environmental stewardship and offers a comprehensive view of the actions taken on key environmental, social, and governance ("ESG") matters. In the report Ameren addresses a range of topics, including:

- ✓ Addressing significant immediate and long-term needs of our communities, which include wide-ranging support during the COVID-19 pandemic³ as well as ongoing energy assistance support, philanthropy and apprenticeships.
- ✓ Plans to significantly increase renewable energy in our generation portfolio while reducing carbon and other greenhouse gas emissions.
- ✓ Improving reliability by investing in rate-regulated energy infrastructure while, at the same time, keeping electric rates more stable and affordable for customers.
- ✓ Actions we have taken to enhance our robust risk management and governance with respect to ESG matters.

10.2 Additional Alternative Resource Plans

Upon completion of the integration and risk analysis described in Chapter 9, additional alternative resource plans were identified to evaluate additional specific paths for the addition of renewable energy resources and to evaluate various DSM portfolios in the context of early retirement of the Sioux and Rush Island Energy Centers. Table 10.2 shows the additional plans that were developed and passed through the same risk

³ 20 CSR 4240-22.060(2); 20 CSR 4240-22.060(2)(A)1 through 7

analysis described in Chapter 9 and applied to the alternative resource plans listed in Table 9.4. This brings the number of alternative resource plans to 28.

These additions are based in part on the conclusions described in Chapter 9, in section 9.7. First, our risk analysis demonstrated that adding significant levels of wind and solar resources resulted in a reduction in total costs to customers. While these investments would provide benefits to all customers, some customers are seeking to source their energy needs from renewable sources more quickly or at levels greater than that available to all customers. This desire on the part of some customers may be based in part on explicit renewable energy or greenhouse gas reduction goals. To evaluate the potential for investments to specifically serve those customers interested in additional renewable energy under a Renewable Subscription offering, we have added a plan, Plan V shown in Table 10.2, for analysis. We have also added a potential contingency plan, Plan W, which includes investments for the Renewable Subscription program but no further DSM investment beyond our currently approved program plan.⁴

Table 10.2 Additional Alternative Resource Plans

	Plan Name	DSM	Renewables	New Supply Side	Coal Retirements/ Modifications
V	Sioux-Rush Early Retirement - Renewable Subscription	RAP	Renewable Expansion with Renewable Subscription	CC 2043	Sioux Dec-2028 Rush Island Dec-2039
W	Sioux-Rush Early Retirement - No DSM - Renewable Subscription	-	Renewable Expansion with Renewable Subscription	CC 2037, 2x2040, 2043	Sioux Dec-2028 Rush Island Dec-2039
X	Sioux-Rush Early Retirement - Renewables when needed	RAP	Renewables When Needed for Capacity	CC 2043	Sioux Dec-2028 Rush Island Dec-2039
Y	Sioux-Rush Early Retirement - Grain Belt Express	RAP	Renewable Expansion with Grain Belt Acceleration	CC 2043	Sioux Dec-2028 Rush Island Dec-2039
Z	Sioux-Rush Early Retirement - DOPE1 DSM	RAP	Renewable Expansion	CC 2040, 2043	Sioux Dec-2028 Rush Island Dec-2039
AA	Sioux-Rush Early Retirement - DOPE2 DSM	RAP	Renewable Expansion	CC 2040, 2043	Sioux Dec-2028 Rush Island Dec-2039
BB	Sioux-Rush Early Retirement - MAP	RAP	Renewable Expansion	-	Sioux Dec-2028 Rush Island Dec-2039

In addition, a potential opportunity exists with respect to a planned high voltage direct current ("HVDC") transmission line project which could deliver renewable energy from western Kansas to Missouri. The Grain Belt Express ("GBX") HVDC transmission project

⁴ EO-2020-0047 1.K

could deliver 1,000 MW of renewable energy to our service territory. To evaluate the potential value of this project, we have added a plan, Plan Y, which includes an investment by Ameren Missouri in 1,000 MW of transmission capacity along with the acceleration of investments represented in our Renewable Expansion portfolio described in Chapter 9.

We have also added Plan X, which includes the same total capacity of wind and solar additions as the Renewable Expansion portfolio described in Chapter 9, but adds the wind and solar resources when there is an explicit need for capacity. The wind and solar additions for Plans V-Y are shown in Table 10.3.

Table 10.3 Renewable Additions for Plans V-Y

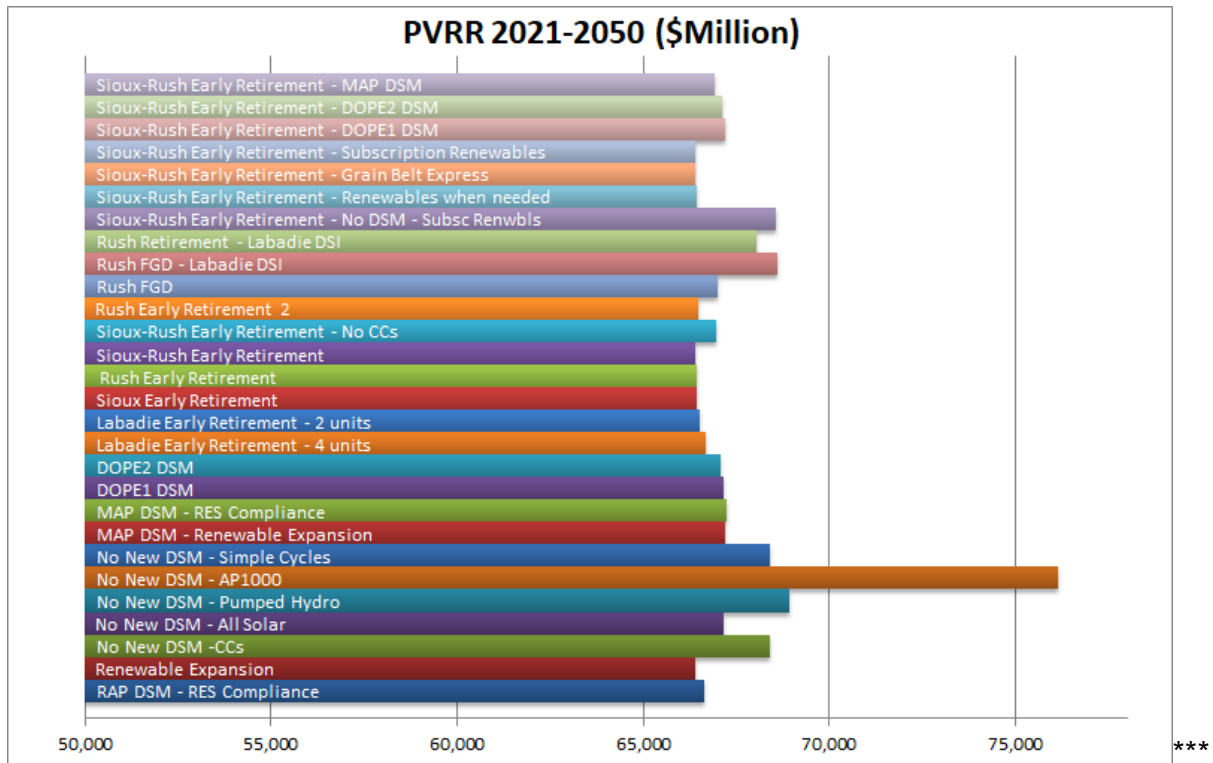
Renewable Additions		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Renewable Expansion	Wind	700	-	-	300	-	-	-	300	-	-	300	-	300	-	300	-	300	-	200	-	2,700
	Solar	-	30	20	-	250	-	400	-	300	400	-	300	-	300	-	300	-	400	-	-	2,700
Renewable Exp. w/ Subscription	Wind	700	-	-	400	-	-	-	300	-	-	200	-	300	-	300	-	300	-	200	-	2,700
	Solar	-	30	20	500	250	-	400	-	200	300	-	200	-	200	-	200	-	400	-	-	2,700
Renewable Exp. With GBX	Wind	700	-	-	1,000	-	-	-	-	-	-	-	-	200	-	300	-	300	-	200	-	2,700
	Solar	-	30	20	-	250	-	400	-	300	400	-	300	-	300	-	300	-	400	-	-	2,700
Renewables When Needed	Wind	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,000	2,700
	Solar	-	30	20	-	-	75	-	-	-	-	-	75	-	-	-	-	-	-	-	-	2,500

The second objective of the additional alternative resource plans is to evaluate the performance of various DSM portfolios in the context of early retirement of Sioux and Rush Island. Plans Z, AA and BB were added to evaluate the DSM portfolios DOPE 1, DOPE 2, and MAP, respectively. We performed our risk analysis for all 28 alternative resource plans using the same approach described in Chapter 9. Table 10.4 shows the PVRR results for the additional plans compared to the results for the reference plan, Plan P. Figures 10.1 and 10.2 show the PVRR and levelized rates for all alternative resource plans, including these additional plans.

Table 10.4 Comparison of Results for Additional Plans

Plan Description	PVRR (\$MM)	Lev. Rate (c/kwh)
P	66,412	15.82
V	66,391	15.81
W	68,549	15.08
X	66,431	15.82
Y	66,408	15.81
Z	67,255	15.51
AA	67,183	15.37
BB	67,048	16.51

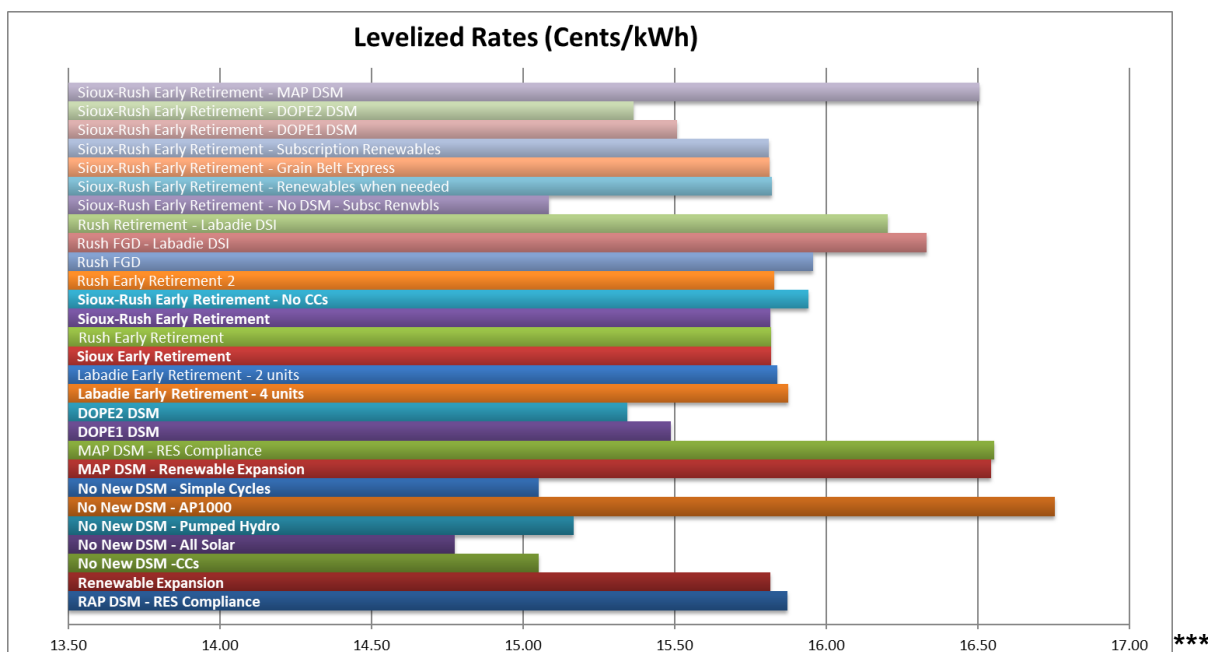
***Figure 10.1 Probability-Weighted PVRR Results⁵



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⁵ Plans include RAP-level DSM unless otherwise noted.

Figure 10.2 Probability-Weighted Levelized Rate Results***



10.3 Assessment of Alternative Resource Plans

Ameren Missouri uses 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 Ameren Missouri's management considers in balancing these 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.

10.3.1 Scoring of Alternative Resource Plans⁶

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 the weightings shown in Table 10.1 to each planning objective. As Cost is the primary selection criterion, it was given the greatest weight – 30% -- just as it was in the

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⁶ 20 CSR 4240-22.010(2)(C); 20 CSR 4240-22.010(2)(C)1; 20 CSR 4240-22.010(2)(C)2; 20 CSR 4240-22.010(2)(C)3; 20 CSR 4240-22.070(1); 20 CSR 4240-22.070(1)(A) through (D)

scoring performed for all of our IRP filings since 2011.⁷ The scoring approach for each planning objective is as follows:

Cost – The 28 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. Plans were given one additional point for each of the following:

- ✓ Inclusion of demand-side programs
- ✓ Early retirement of coal generation
- ✓ Addition of significant renewables (beyond those needed to comply with legal mandates)
- ✓ Inclusion of customer programs for renewable energy

Portfolio Transition – 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
- ✓ Early retirement of coal-fired generation (1 point per 2 large units)
- ✓ Addition of significant renewables (beyond those needed to comply with legal mandates)
- ✓ Addition of storage resources

⁷ 20 CSR 4240-22.010(2)(B)

- ✓ Acceleration of renewable transition

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. Plan scores were also reduced by one point each for potential risks associated with:

- ✓ Lack of any DSM programs
- ✓ Risks associated with delays in implementing energy efficiency measures
- ✓ Nuclear construction and operating risks
- ✓ Risks associated with the addition of gas-fired generation
- ✓ Risks associated with major environmental retrofits
- ✓ Risks associated with recovery of coal-fired generation investment
- ✓ Risks associated with access to low-cost capital

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 10.5 Alternative Resource Plan Scoring Results^{8***}

Plan	Description	Composite Score
V	Sioux-Rush Early Retirement - Renewable Subscription	4.90
Y	Sioux-Rush Early Retirement - Grain Belt Express	4.70
P	Sioux-Rush Early Retirement	4.50
M	Labadie Early Retirement - 2 units	4.30
N	Sioux Early Retirement	4.30
O	Rush Early Retirement	4.20
Q	Sioux-Rush Early Retirement - No CCs	4.20
R	Rush Early Retirement 2	4.00
X	Sioux-Rush Early Retirement - Renewables when needed	3.90
BB	Sioux-Rush Early Retirement - MAP	3.80
L	Labadie Early Retirement - 4 units	3.80
B	Renewable Expansion	3.70
Z	Sioux-Rush Early Retirement - DOPE 1	3.50
AA	Sioux-Rush Early Retirement - DOPE 2	3.40
W	Sioux-Rush Early Retirement - No DSM - Renewable Subscription	3.20
S	Rush FGD	3.10
H	MAP DSM - Renewable Expansion	3.00
J	DOPE1 DSM	2.90
U	Rush Retirement - Labadie DSI	2.90
K	DOPE2 DSM	2.80
A	RAP DSM - RES Compliance	2.70
T	Rush FGD - Labadie DSI	2.60
I	MAP DSM - RES Compliance	2.50
D	No New DSM - All Solar	2.20
E	No New DSM - Pumped Hydro Storage	2.20
G	No New DSM - Simple Cycle Gas	1.80
C	No New DSM - Combined Cycle Gas	1.70
F	No New DSM - AP1000 Nuclear	1.60

Table 10.5 shows the composite scores for each of the 28 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 4.0 were placed in the Top Tier. Plans with scores between 3.0 and 4.0 were placed in the Mid-Tier. Plans with scores below 3.0 were placed in the Bottom Tier. All Top Tier plans include energy efficiency and demand response at the realistic achievable potential (RAP) level.

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⁸ Plans include RAP-level DSM unless otherwise noted.

10.3.2 Renewable Resource Expansion

One of the key conclusions from our evaluation of alternative resource plans is that the inclusion of a sustained long-term expansion of renewable energy resources is beneficial across all of our planning objectives. It steadily transforms our portfolio to one that is cleaner and more diverse while enhancing customer affordability and providing much needed clean energy jobs for our communities and the state of Missouri. It also does something to help ensure our ability to accomplish these goals – it mitigates risks inherent in our existing portfolio as we manage the transition away from fossil fuels while relying on the reliability and economic benefits they continue to provide.

Resource planning has traditionally focused on the balance of generating capacity with customer demand and reserve margin requirements. While that remains important, transforming our generation portfolio requires that we carefully consider all the implications of how we effectuate that transformation. This includes the following considerations, which are discussed in more detail in this section:

- 1. Ameren Missouri will need energy resources as coal-fired generation is retired even as capacity resources remain sufficient to meet demand and reserve margin requirements.**
- 2. The large-scale expansion of renewable resources provides significant risk mitigation to Ameren Missouri's portfolio, particularly with respect to changes in climate policy.**
- 3. Ameren Missouri's coal-fired fleet continues to provide value to customers in order to provide reliable, affordable energy even as it faces significant risks to long-term operations.**
- 4. There is a growing need for renewable resources in both the near term and the long term and potential that the need could be further spurred by changes in energy policy.**
- 5. A large expansion of renewable generation must include consideration of practical limitations, including the potential for financing constraints.**
- 6. Initiating renewable resource builds in the nearer term provides the opportunity to realize tax incentives for customers.**

Ameren Missouri's Need for Energy Resources

Ameren Missouri's existing generation fleet has a total net capability of 10,142 MW. Of this, half is coal, 12% is nuclear, 8% is hydroelectric and other renewables, and 30% is gas or oil fired peaking generation. In contrast, coal currently provides approximately

70% of the energy produced by our fleet, with nuclear providing roughly 25% and renewables providing another 5%. Gas and oil fired resources provide less than 1% of the energy produced by our existing fleet. As coal-fired resources are retired or as their level of production decreases as a result of changes in operating efficiencies, CO₂ prices, other market conditions, regulatory constraints, or other factors, new energy resources will be needed to supplement the remaining generation. While the peaking generation will continue to provide capacity to meet peak demand and reserve margin needs, it will not be able to make up for the loss of coal-fired energy on its own. In fact, it is likely the production levels from these coal-fired energy assets will remain relatively low as they are dispatched in the Midcontinent Independent System Operator ("MISO") market and as they are operated in compliance with environmental permit constraints. The continued availability of these affordable coal-fired energy assets does allow Ameren Missouri to maintain reliability as increasing amounts of renewable energy are integrated into the system to meet customer needs.

**Figure 10.3 Energy Comparison for Selected Plans – Low CO₂ Price
Generation vs Load (MWh)**

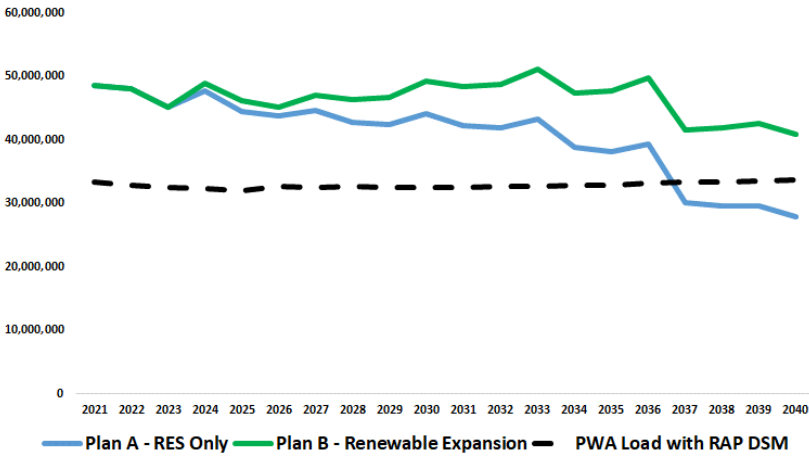
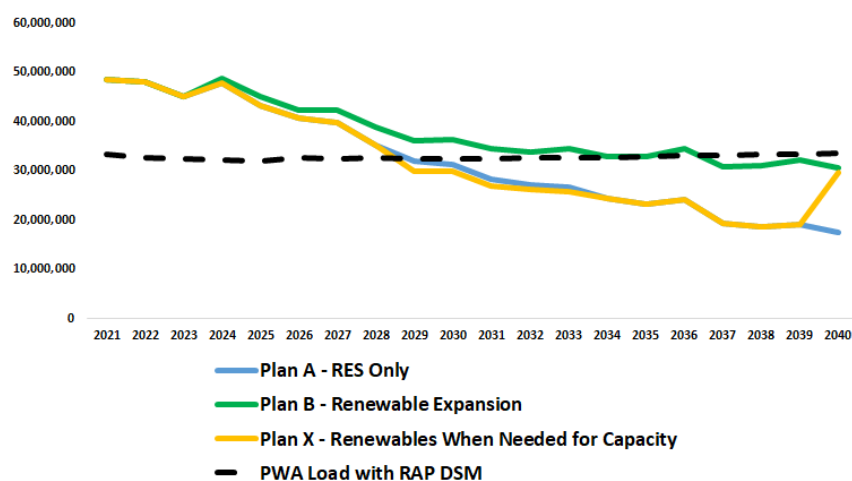


Figure 10.3 shows a comparison of the energy production from several of our alternative plans under our Low CO₂ price scenario. Figure 10.4 shows a similar comparison of energy production for several alternative plans under our High CO₂ price scenario, which results in reduced levels of generation from coal resources (and also gas to a much lesser extent) compared to the levels of production under the Low CO₂ price scenario. The chart shows that for Plan 2 (RAP – RES Compliance), which does not include a large renewable buildout, Ameren Missouri would be generating less energy than its customers use by 2030 and that this shortfall would grow to over one-third of total load by 2040. Any acceleration of coal energy center retirements further exacerbates this issue.

Taken together, the charts in Figures 10.3 and 10.4 highlight a key consideration in the approach to our renewable resource expansion. There is significant uncertainty regarding the level of production from our existing fleet of resources. Differences in future CO₂ prices is only one source of this uncertainty, but it helps to highlight the broader issue. Other sources of uncertainty include natural gas prices, power prices, environmental regulation, and potential changes in climate policy. All of these and perhaps others could impact coal-fired resources and result in a much earlier need for new energy generation. Waiting until such needs are certain may result in suboptimal solutions and potential higher costs to customers. It could also result in an unintended but necessary reliance on fossil-fueled generation like natural gas combined cycle, deferring or displacing some renewable resource additions.

Figure 10.4 Energy Comparison for Selected Plans – High CO₂ Price
Generation vs Load (MWh)

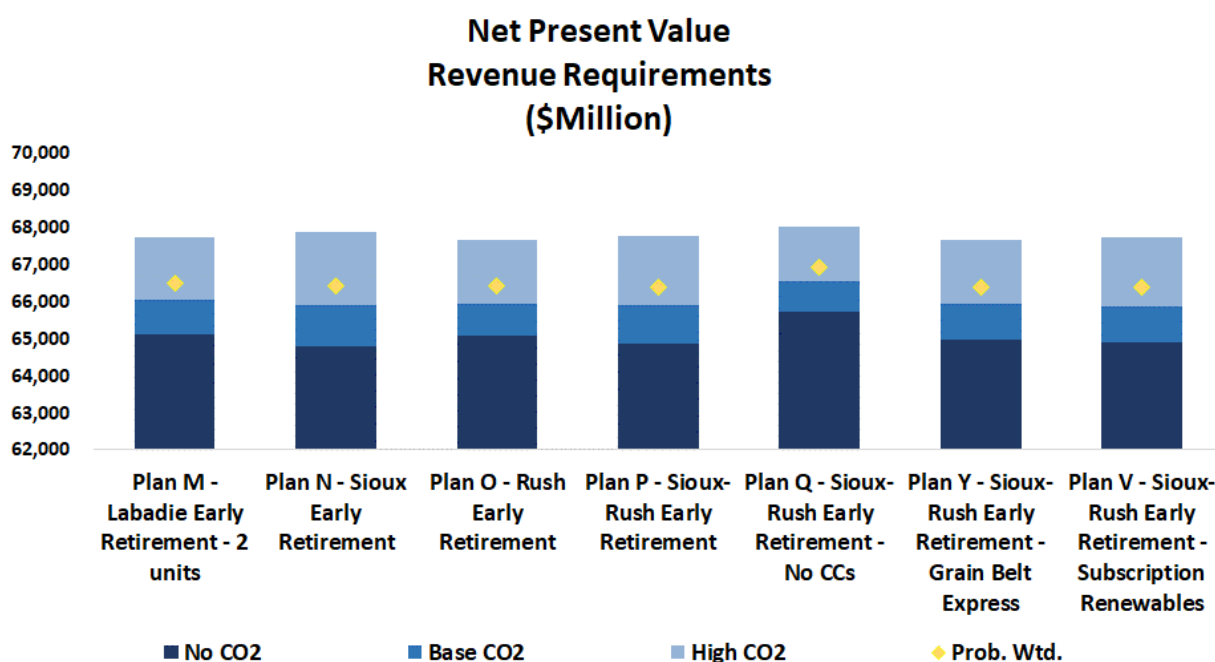


Risk Mitigation Benefits of Renewable Expansion

Our analysis shows that higher CO₂ prices have a beneficial impact on the economics of renewable resources and a detrimental effect on the economics of coal-fired resources. The impact on coal is somewhat obvious in that the CO₂ prices impose a cost directly on the energy production from coal generators. It is this cost imposed on coal and gas generators that also manifests itself in power market prices, as illustrated in Chapter 2. The higher the CO₂ price, the higher the power price. Wind and solar generation, along with other non-carbon-emitting generating sources like hydro and nuclear, therefore see a benefit from CO₂ prices through the revenue they receive in the market. In contrast, the absence of a CO₂ price results in maximal benefits to coal-fired generation and minimal benefits to renewables, nuclear and hydro.

By expanding the share of renewable resources in our portfolio, we increase the balance of resources that from an economic perspective perform better as CO₂ prices rise and resources whose performance diminishes as CO₂ prices rise. This is not unlike the diversification of personal investments like those many hold in retirement funds like a 401(k) plan. By investing in a variety of resources, each of which perform well under different conditions, the overall risk of the portfolio can be mitigated. To illustrate this effect in the context of resource planning, we can simply examine how various alternative resource plans perform under different levels of CO₂ price. Figure 10.5 shows the PVRR results for several plans with different levels of renewable energy resources under the three different scenarios for CO₂ price used in our risk analysis.

Figure 10.5 PVRR Results for Selected Plans by CO₂ Price Scenario



As the chart in Figure 10.5 shows, the steady addition of wind and solar resources provides risk mitigation around the range of CO₂ prices used for risk analysis, with costs to customers under the No CO₂ price scenario being slightly higher than without the steady buildout and significantly lower under the high CO₂ price scenario. This is in addition to the risk mitigation highlighted by the discussion of energy needs above. Specifically, the steady addition of renewable resources mitigates risk with respect to numerous factors that could impact the production of coal-fired resources, including market prices for energy, environmental regulations and other energy policies.

Continuing Value of Ameren Missouri's Coal-fired Fleet

Ameren Missouri's coal-fired generators are among the most efficient and cost-effective in MISO. They, along with our nuclear and hydro resources, provide around-the-clock

capability that serves as a foundation for reliable energy supply to our customers. While the challenges associated with coal-fired generation continue to increase, Ameren Missouri has found innovative ways to maintain affordability of reliable operations while meeting or exceeding current environmental standards. Our alternative resource plan demonstrates the ongoing viability of our Labadie and Rush Island Energy Centers as we prepare to manage our Meramec and Sioux Energy Centers to the ends of their useful lives during this decade.

The primary factor in our analysis influencing the long-term viability of Labadie and Rush Island is CO₂ prices. While high CO₂ prices would negatively affect the economics of these units, we are able to monitor climate policy developments and adjust our plans accordingly as future policies become clearer. In the meantime, we can continue to rely on these units to provide reliable energy in order to integrate increasing amounts of renewable energy, as well as to provide the resultant economic benefits to customers. As a result, we have an opportunity to build out a significant portfolio of cleaner and more diverse renewable resources that enhance customer affordability, mitigate the risks of CO₂ prices, and mitigate the risks of a potential urgent need for capacity that might otherwise need to be satisfied by gas-fired resources.

Customer and Policy Drivers of the Need for Renewable Resources

Customers are expressing an increasing preference for energy supplied by renewable resources. One way to meet this growing demand is to offer programs that allow customers to increase the share of their energy needs that is supplied by renewable resources. In addition to such programs, there has also been a growing sentiment that greater levels of renewable generation should be available to all customers. This is the sentiment that drove the adoption of Missouri's RES in 2008. Ameren Missouri will soon have the resources necessary to comply with the full requirement of the RES upon completion of 700 MW of wind generation projects in Missouri.

Because of the success of Missouri's RES and the still growing demand for renewable energy resources, policymakers and advocates are continuing to push for energy policies to promote clean and renewable energy resources. This includes the potential for a federal Clean Energy Standard ("CES") and an increase in the requirements for the Missouri RES in future years. Both policies could drive a further expansion of renewable resources.

Figure 10.6 Percentage of Retail Sales Served by Renewable Energy

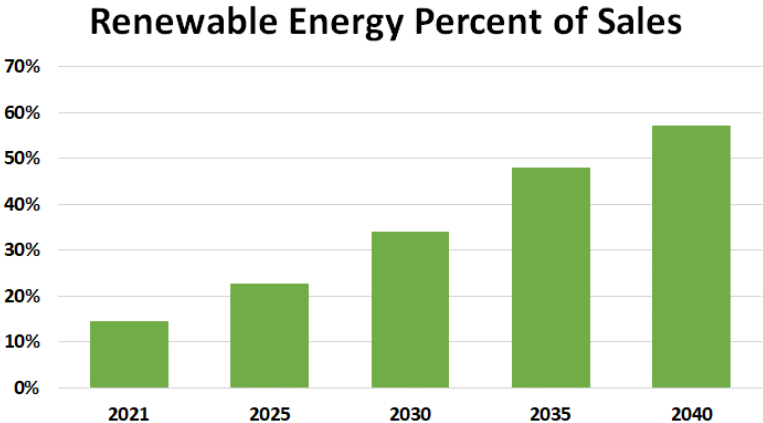


Figure 10.6 shows the percentage of customer sales generated by renewable resources with our Renewable Expansion portfolio. Should explicit policies requiring greater percentages of renewable resources than the current RES requires be enacted, this portfolio would better position Ameren Missouri to meet such requirements.

Practical Considerations for Large-Scale Renewable Expansion

It is one thing to set forth a plan to meet customer energy needs for the next twenty years. It is quite another thing to execute plans and construct the renewable energy resources to serve those needs. So while we have some time to build out the entire renewable resource portfolio, there are practical considerations that must be taken into account when embarking on the kind of portfolio transformation that Ameren Missouri believes is necessary to best meet our customers' future energy needs. These include practical limitations on project permitting, development and construction, environmental studies, the need for new transmission infrastructure to deliver renewable energy, and the ability to finance project construction. By spreading out the build of renewable resources, we mitigate practical project construction risks associated with the beneficial transformation of the generation portfolio and preserve flexibility to address these and possibly other potential roadblocks that may hamper resource acquisition.

As we have seen in recent years, the development, approval, and construction of renewable resources presents unique challenges. These include complications associated with permitting requirements, acquisition of land leases, and securing necessary regulatory approvals. Spreading out the addition of renewable resources allows us to maintain flexibility, reliability, and affordability in our acquisition and integration of those resources without the pressure of a clear and imminent capacity need.

Likewise, the need for transmission infrastructure can present unique and project-specific challenges that flexibility can help to overcome. As we saw with the planned Brickyard Hills wind project, the costs for transmission network upgrades associated with new

projects can change dramatically depending on the capacity of the existing transmission network to accommodate additional wind generation and the amount of wind generating capacity seeking interconnection through the queue in a given Regional Transmission Organization ("RTO"). This could easily be true for large-scale solar projects as well, which are likely necessary to achieve the level of solar resources called for in our plan. By pursuing a steady buildout of wind and solar generation, we maintain flexibility to be selective and opportunistic with respect to projects for a host of reasons, including costs for necessary transmission system upgrades.

Another key consideration is Ameren Missouri's ability to raise the necessary capital to fund project construction. Ameren Missouri seeks to maintain sufficient credit metrics to ensure access to capital markets to fund not only renewable resource acquisition but also grid modernization and a number of other investments necessary to ensure safe, reliable and affordable service to our customers. We have evaluated the performance all of our alternative resource plans with respect to these credit metrics and have included the results in Chapter 9. We also included consideration of these credit metrics in our scorecard assessment of alternative resource plans as part of our Financial/Regulatory planning objective.

Table 10.6 Credit Metrics for Selected Plans vs. Target Metrics

Plan Description		FFO/Debt	FFO Interest Coverage
	Target Credit Metrics	25.0%	6.30
P	Sioux-Rush Early Retirement	23.9%	6.91
V	Sioux-Rush Early Retirement - Renewable Subscription	23.9%	6.89
X	Sioux-Rush Early Retirement - Renewables when needed	19.3%	6.46

Table 10.6 shows the credit metrics for three plans compared to our target credit metrics. These represent the minimum results for the period 2030-2040 for funds from operations ("FFO") to total debt and FFO to interest expense. As the table shows, the credit metrics for Plan X, in which renewable additions are included only when needed for capacity are significantly lower than those for Plans P and V, in which renewable additions are added throughout the planning horizon. Most notably, the FFO/Debt metric for Plan X is well below our target for this metric. While metrics for individual years during the 20-year planning horizon may not indicate a credit challenge, the degree to which the metrics vary from other plans provides an indication that such challenges may be more likely.

Capturing the Value of Available Tax Credits

Current tax law includes production tax credits ("PTC") for wind generation and additional investment tax credits ("ITC") for solar generation. Ameren Missouri has captured significant value for customers with the wind projects currently nearing completion through the PTC. Continuing our buildout of renewable energy projects allows us the opportunity to capture significantly more value from PTC and ITC for wind and solar projects in the next several years.

Weighing the Considerations Together

In accounting for the foregoing considerations and in conjunction with our rigorous risk analysis of alternative resource plans, we conclude that a continued buildout of renewable wind and solar resources throughout the planning horizon yields significant real and potential benefits for our customers with limited downside. It provides us with valuable risk mitigation regarding CO₂ prices and other factors, and valuable flexibility in managing the transformation of our generation portfolio.

10.3.3 DSM Portfolio Considerations

While RAP DSM results in lower total customer costs than the other portfolios evaluated (MAP, DOPE 1, DOPE 2), it is important to also consider the potential risks associated with these portfolios. The DOPE portfolios are designed to target specific capacity needs in particular years based on a given schedule for retirement of coal-fired generation. However, we know that for a host of reasons these retirement dates may change. As is clear from our full risk analysis described earlier in this chapter, the acceleration of retirement of the Sioux and Rush Island Energy Centers appears to result in benefits to customers. This was a driving reason for the addition of Plans Z, AA, and BB. While the inclusion of either of the DOPE portfolios results in the deferral of combined cycle generation under our existing coal energy center retirement schedule, changing the retirement date for Rush Island to 2039 results in the first addition of combined cycle gas generation in 2040 rather than in 2043. Targeting capacity deferrals in specific years may result in missed opportunities for supply-side deferrals if conditions change and accelerate the need for capacity. Table 10.7 demonstrates a flaw with attempts to precisely time demand savings as contemplated with either of the two DOPE portfolios. Both DOPE portfolios resulted in higher PVRR when stress tested against changes in coal retirements. This result highlights the value of continuous deployment of demand-side resources in terms of both PVRR and risk mitigation.

Table 10.7 DSM Portfolio Sensitivity to Coal Retirements

PVRR Difference \$Million	Sioux-Rush Island Retirement	
	Regular	Early
MAP-RAP	788	636
DOPE1-RAP	757	843
DOPE2-RAP	685	771
DOPE1-MAP	(30)	207
DOPE2-MAP	(103)	135

Pursuing the Policy Goal of MEEIA

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.

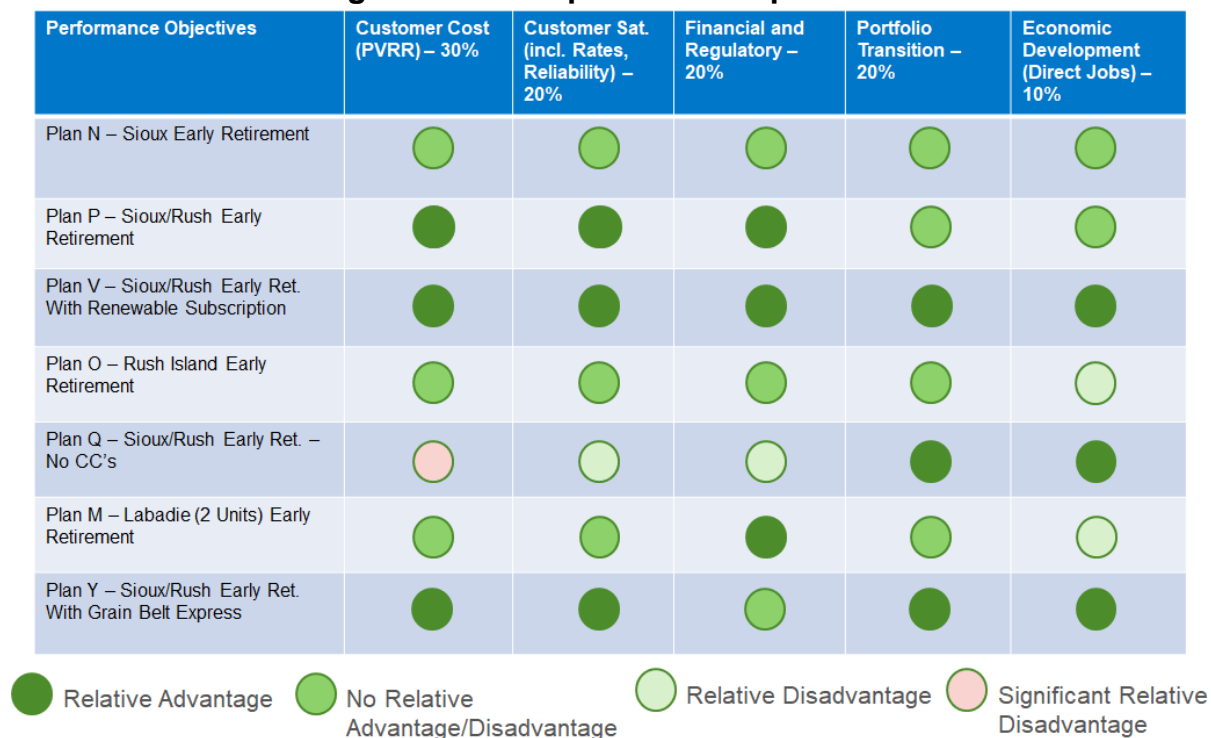
10.3.4 Electrification

As discussed in Chapter 3, the load forecasts used to evaluate alternative resource plans reflect a range of assumptions for electrification of transportation and other sectors. While these assumptions are used for evaluation of all plans, it is worth noting that electrification can play a significant role in the reduction of greenhouse gas emissions and in lowering customer rates. Ameren Missouri has shared cost-benefit analyses in proceedings before the MPSC. Based on these analyses and based on our continuing analysis of efficient electrification costs, we expect that there are many technologies and programs whose adoption will prove to be cost-effective. Ameren Missouri will build on this analysis in proposing future programs designed to accelerate adoption of efficient electrification which benefits all our customers. While Ameren Missouri has not yet modeled other potential benefits from efficient electrification, such as reduced carbon emissions from the transportation sector, we are confident that such benefits exist.

10.4 Preferred Plan Selection⁹

In selecting its Preferred Resource Plan, Ameren Missouri decision makers¹⁰ 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, early retirement of coal-fired generation and a significant expansion of renewables. These define the key options for consideration in the selection of the preferred resource plan.

Figure 10.7 Comparison of Top Tier Plans



To facilitate the selection of the preferred plan, an additional assessment was made of the top tier resource plans. Figure 10.7 presents the comparison of the top tier plans based on further assessment of Ameren Missouri's planning objectives. By isolating the top tier plans, we can assess their relative advantages with more specificity. This also means that the ratings applied in the scorecard in Table 10.4 does not constrain this comparison. Following is a description of the consideration of each planning objective for the top tier plans.

⁹ 20 CSR 4240-22.010(2)(C); 20 CSR 4240-22.010(2)(C)1; 20 CSR 4240-22.010(2)(C)2
 20 CSR 4240-22.010(2)(C)3; 20 CSR 4240-22.060(3)(A)5; 20 CSR 4240-22.070(1); 20 CSR 4240-22.070(1)(A) through (D)
¹⁰ Names, titles and roles of decision makers are provided in Appendix B.

PVRR – Table 10.7 summarizes the results for the top tier plans, including PVRR. Based on these results, Plans P, V and Y were rated as having a relative advantage compared to the other plans. Plans M, N, and O were rated as having no relative advantage. Plan Q was rated as having a significant relative disadvantage because its PVRR result is over \$400 million higher than the next most costly plan among the top tier plans.

Table 10.7 Results for Top Tier Plans¹¹

	Plan Description	PVRR (\$MM)	Lev. Rate (c/kwh)	2030 Rate (c/kwh)
N	Sioux Early Retirement	66,425	15.82	15.13
P	Sioux-Rush Early Retirement	66,412	15.82	15.10
V	Sioux-Rush Early Retirement - Renewable Subscription	66,391	15.81	15.08
O	Rush Early Retirement	66,425	15.82	15.82
Q	Sioux-Rush Early Retirement - No CCs	66,942	15.94	15.23
M	Labadie Early Retirement - 2 units	66,507	15.84	15.67
Y	Sioux-Rush Early Retirement - Grain Belt Express	66,408	15.81	14.99

Customer Satisfaction – Plans P, V, and Y were judged to have a relative advantage due to their relative low rate impacts in both the near term (through 2030) and the long term, the advancement of retirements for multiple coal energy centers, and in the case of Plans V and Y, the expansion of customer renewable programs. Plan Q was judged to have a relative disadvantage due to long-term rate impacts and uncertainty regarding the reliability of the portfolio given its increased reliance on wind, solar and battery storage. The other plans were judged to have no relative advantage or disadvantage.

Financial and Regulatory – Plans P, V, and M were judged to have a relative advantage given the acceleration of retirement for multiple coal-fired energy centers. Plans N and O were judged to have no relative advantage or disadvantage because they include accelerated retirement of one coal-fired energy center. Plan Y was also judged to have no relative advantage or disadvantage – while it does include accelerated retirement of multiple coal-fired energy centers, risks associated with the regulatory approval process offset that advantage. Plan Q was judged to have a relative disadvantage based on the potential challenges of regulatory approvals and risks of a potential need for other resources to ensure reliability.

Portfolio Transition – Plans V, Q, and Y were judged to have a relative advantage given the comparative acceleration of renewable resource additions. All other plans were judged to have no relative advantage or disadvantage.

Economic Development – Plans V, Q, and Y were judged to have a relative advantage based on the accelerated deployment of renewable resources. Plans O and M were

¹¹ Plans include RAP-level DSM unless otherwise noted.

judged to have a relative disadvantage based on the earlier elimination of jobs at coal-fired energy centers. Plans N and P were judged to have no relative advantage or disadvantage.

Along with these objectives, we have considered the costs and benefits of the specific components that define an integrated resource plan. These include consideration of DSM programs, the addition of renewable energy resources, and the retirement of existing generation resources, particularly coal-fired generation. These components define the transformation of our portfolio that we believe best achieves and balances the objectives discussed above.

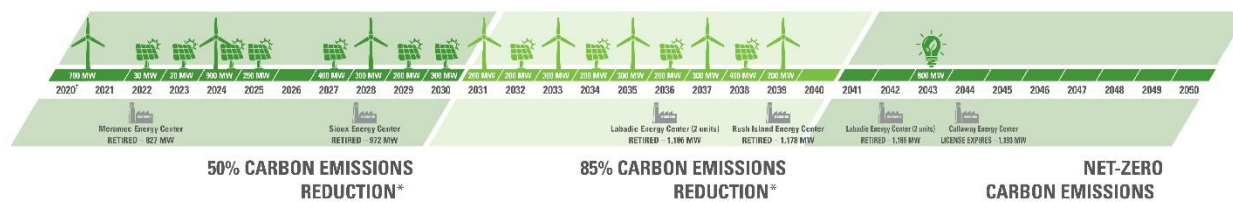
DSM Portfolio – Including RAP DSM in our preferred resource plan allows us to continue to offer highly cost-effective programs to customers at a reasonably aggressive level of annual spending while also allowing the potential for increased savings if our experience and expectations indicate they could 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. For the reasons set forth in section 10.3.2, we believe that the appropriate course of action is to begin the transition to greater levels of renewable energy today. Doing so will address both near-term and long-term risks and ensure flexibility in the face of uncertainty and changing conditions. These could include changes in environmental regulations, coal generation economics, and changes in policy that require or can be satisfied by the addition of renewable energy resources.

Coal Retirements – We evaluated various alternatives for earlier retirement of coal-fired generation. Advancing the retirement of Sioux Energy Center to 2028 and Rush Island Energy Center to 2039 yields benefits in terms of customer costs while also addressing risks associated with potential policy changes and changes in market conditions that affect coal generation economics. Making these changes now will ensure we can address recovery of the cost of these investments in way that is consistent with our objective to ensure affordability. These changes also help to accelerate our transition to a cleaner generation portfolio and allow us to realize even greater reductions in CO₂ emissions than those we announced with the filing of our 2017 IRP. At the same time, the managed drawdown of our coal-fired fleet helps us to ensure reliability of supply to our customers as we significantly expand our renewable portfolio.

Based on our consideration of all these objectives and factors and consideration of the results of our thorough analysis of a wide range of options, we have selected Plan V as our preferred resource plan. Figure 10.8 shows the major resource additions and retirements defined by Plan V.

Figure 10.8 Preferred Resource Plan



* Reductions are presented as of the end of the period indicated and based off of 2005 levels. Wind and solar additions, energy center retirements by end of indicated year.
 † Projects expected to be substantially complete in 2020, to fully in service in early 2021.

10.5 Contingency Planning¹²

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.

10.5.1 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 use energy more efficiently. In early 2019, the Missouri Public Service Commission ("Commission") approved our third 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. We have therefore included a contingency plan, Plan W, for this circumstance.

Ameren Missouri expects to file a request with the Commission for approval of a new portfolio of demand-side programs that would become effective starting in 2023. 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.

¹² 20 CSR 4240-22.070(4)

10.5.2 Renewable Subscription Program

Our preferred plan includes approval of a new Renewable Subscription Program to offer commercial and industrial customers and communities the means by which they can source more of their electric energy needs from renewable resources. Should this program not be approved by the MPSC, we would plan to pursue a renewable resource expansion without that program. We have included a contingency plan, Plan P, for this circumstance.

10.5.3 Environmental Retrofits

We evaluated several potential options for addressing the need for environmental retrofits. While the need for such retrofits is uncertain, and while the alternative resource plans we have evaluated do not cover all potential outcomes, they do provide some insight into the relative benefits of different approaches to address the potential need.

*****Plans R, S, T, and U reflect specific potential outcomes and demonstrate the relative costs of retrofit vs. retirement. The ultimate disposition of the current litigation will require careful consideration based on the specific details of the Appellate Court's judgment.*****

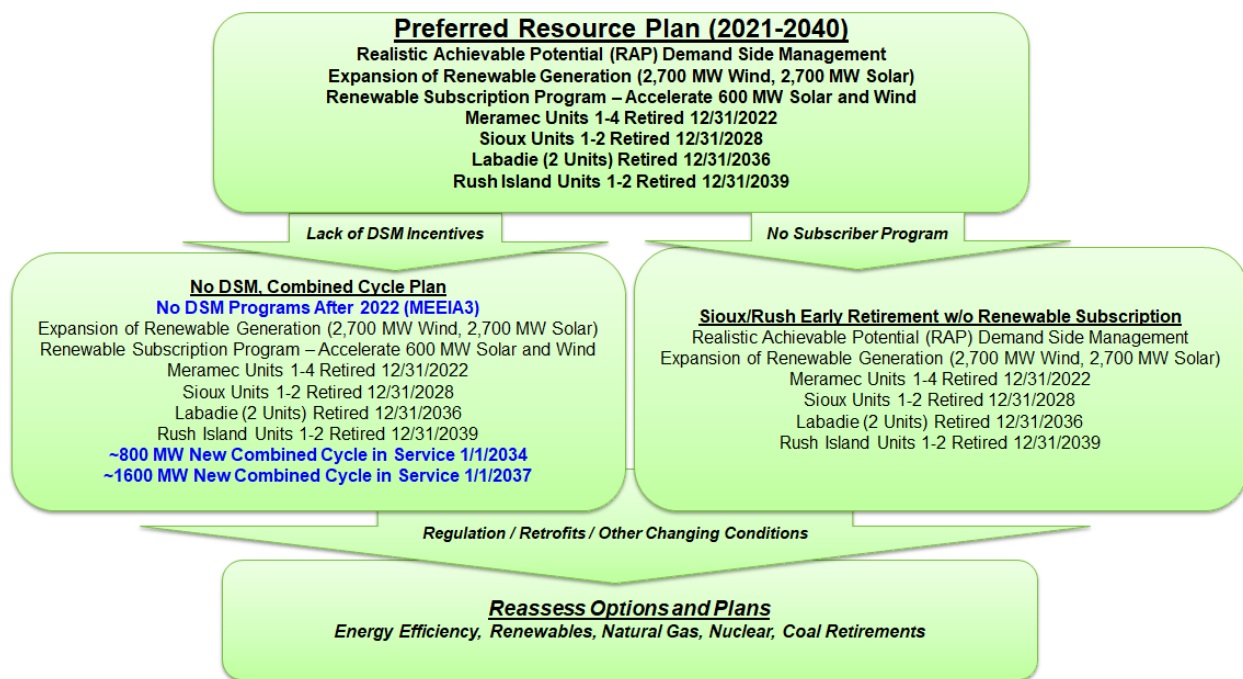
10.6 Resource Acquisition Strategy¹³

Our resource acquisition strategy has three main components. First is the Preferred Resource Plan which is discussed in more detail in Section 10.6.1. The second component of the resource acquisition strategy is contingency planning. Figure 10.9 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, 2021-2023.

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¹³ 20 CSR 4240-22.070(1); 20 CSR 4240-22.070(1)(A) through (D); 20 CSR 4240-22.070(2); 20 CSR 4240-22.070(4); 20 CSR 4240-22.070(4)(A) through (C); 20 CSR 4240-22.070(7); 20 CSR 4240-22.070(7)(A) through (C)

Figure 10.9 Preferred Plan and Contingency Plans



10.6.1 Preferred Plan

As discussed in Section 10.3, our Preferred Resource Plan includes RAP energy efficiency and demand response programs, 5,400 MW of wind and solar generation by 2040, retirement of all Meramec units by the end of 2022, retirement of Sioux Energy Center at the end of 2028, retirement of two of the four units at Labadie Energy Center at the end of 2036, and retirement of Rush Island Energy Center at the end of 2039.

Demand Side Resources

The preferred plan includes RAP energy efficiency, distributed energy resource and demand response programs. Energy efficiency programs under our current MEEIA plan run through 2022. Program spending for the 20-year planning horizon (after the current cycle of MEEIA programs) is over \$2.5 billion. Cumulative peak demand reductions exceeding 1,900 MW by 2040 (not including planning reserve margin), and cumulative energy savings (at the customer meter) total 50 million MWh.

Renewables

We are embarking on a transformation of our generation portfolio, and one of the key components of that transition is the significant expansion of renewable wind and solar generation resources, with a total of 5,400 MW of wind and solar generation by 2040 and 3,100 MW by 2030. In contrast to our 2017 IRP, these resource additions are not driven by the requirements of the Missouri RES. Instead, they reflect an understanding that these renewable energy resources will be necessary to ensure the energy supply that our

customers need and do so in a way that is environmentally responsible and ensures affordability for our customers. Included in these renewables are planned solar generation paired with energy storage (solar plus storage) that can provide generation-related benefits together with distribution system reliability benefits, as also discussed in Chapter 7.

Supply-Side Resources

The Preferred Resource Plan calls for the retirement of all Meramec units by the end of 2022, retirement of Sioux Energy Center by the end of 2028, retirement of two of the four units at Labadie Energy Center at the end of 2036, and retirement of the Rush Island Energy Center at the end of 2039.

10.6.2 Contingency Plans¹⁴

Figure 10.5 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 2022. The contingency plan therefore also includes the installation of an ~800 MW combined cycle facility to be in service in 2037 and another ~1,600 MW of combined cycle generation in 2040. In the event our proposed Renewable Subscription program is not approved, we have included a contingency plan that reflects a renewable resource expansion without the program.

10.1 Expected Value of Better Information Analysis¹⁵

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 ongoing research and implementation activities. Table 10.8 displays the results of the EVBI analysis as measured by PVRR. Under most critical uncertain factor values, the preferred plan results in the lowest PVRR. Plans A, B, L, and O result in the lowest PVRR under certain values for critical uncertain factors. Only for no CO₂ prices, does the PVRR difference from the preferred plan exceed \$100 million, or less than 0.2% of total revenue requirements.

¹⁴ 20 CSR 4240-22.070(4)

¹⁵ 20 CSR 4240-22.070(3)

***Table 10.8 EVBI Analysis Results

Alternative Resource Plans		PVRR Without Better Info	Carbon Price			Natural Gas Price			Load Growth			DSM		
			None	Base	High	Low	Base	High	Low	Base	High	Low	Base	High
A	RAP DSM - RES Compliance	66,647	63,769	65,316	68,111	66,000	66,071	66,186	65,051	66,174	66,735	65,781	66,043	66,494
B	Renewable Expansion	66,410	64,191	65,363	67,404	66,068	65,876	65,580	64,891	66,014	66,575	65,621	65,883	66,333
C	No New DSM - CCs	68,395	65,906	67,207	69,466	67,879	67,786	67,674	66,791	67,915	68,476	67,802	67,802	67,802
D	No New DSM - All Solar	67,143	65,026	66,159	68,085	66,873	66,633	66,244	65,652	66,775	67,336	66,663	66,663	66,663
E	No New DSM - Pumped Hydro	68,922	66,403	67,713	70,046	68,392	68,321	68,233	67,322	68,445	69,006	68,333	68,333	68,333
F	No New DSM - AP1000	76,139	73,717	74,882	76,833	75,579	75,360	75,028	74,379	75,503	76,063	75,390	75,390	75,390
G	No New DSM - Simple Cycles	68,402	65,923	67,220	69,503	67,898	67,810	67,698	66,814	67,937	68,498	67,825	67,825	67,825
H	MAP DSM - Renewable Expansion	67,197	65,133	66,236	68,145	66,944	66,707	66,338	65,728	66,851	67,412	66,166	66,667	67,885
I	MAP DSM - RES Compliance	67,238	64,471	65,964	68,666	66,657	66,691	66,739	65,675	66,799	67,359	66,113	66,614	67,832
J	DOPE1 DSM	67,167	64,844	66,075	68,208	66,772	66,615	66,379	65,626	66,749	67,310	66,430	66,594	67,185
K	DOPE2 DSM	67,094	64,745	65,983	68,142	66,680	66,532	66,311	65,542	66,665	67,226	66,379	66,518	67,008
L	Labadie Early Retirement - 4 units	66,657	65,025	65,809	67,180	66,159	66,172	66,202	65,161	66,284	66,845	65,891	66,153	66,603
M	Labadie Early Retirement - 2 units	66,507	64,611	65,560	67,228	66,063	65,992	65,882	64,991	66,114	66,675	65,721	65,982	66,433
N	Sioux Early Retirement	66,425	64,274	65,392	67,370	66,062	65,894	65,637	64,906	66,029	66,590	65,636	65,898	66,348
O	Rush Early Retirement	66,425	64,569	65,450	67,183	65,989	65,911	65,815	64,914	66,037	66,598	65,644	65,906	66,356
P	Sioux-Rush Early Retirement	66,412	64,382	65,401	67,294	66,027	65,890	65,698	64,900	66,023	66,584	65,630	65,892	66,342
Q	Sioux-Rush Early Retirement - No CCs	66,942	65,256	66,082	67,575	66,720	66,441	66,029	65,470	66,593	67,154	66,200	66,462	66,912
R	Rush Early Retirement 2	66,470	64,663	65,506	67,188	66,000	65,961	65,919	64,957	66,081	66,642	65,687	65,949	66,400
S	Rush FGD	67,011	64,830	65,983	67,981	66,666	66,485	66,204	65,498	66,622	67,183	66,228	66,490	66,941
T	Rush FGD - Labadie DSI	68,582	66,504	67,647	69,412	68,214	68,080	67,836	67,083	68,206	68,767	67,813	68,075	68,525
U	Rush Retirement - Labadie DSI	68,040	66,337	67,171	68,619	67,548	67,555	67,551	66,542	67,665	68,226	67,272	67,534	67,984
V	Sioux-Rush Early Retirement - Subscription Renewables	66,391	64,393	65,393	67,253	66,022	65,871	65,661	64,883	66,006	66,567	65,613	65,875	66,326
W	Sioux-Rush Early Retire - No DSM - Renewable Subscription	68,549	66,315	67,429	69,478	68,016	67,965	67,948	66,968	68,092	68,652	67,979	67,979	67,979
Minimum PVRR among plans			63,769	65,316	67,180	65,989	65,871	65,580	64,883	66,006	66,567	65,613	65,875	66,326
Plan with Minimum PVRR			A	A	L	O	V	B	V	V	V	V	V	V
Subjective Probability			15%	50%	35%	32%	56%	12%	20%	60%	20%	10%	80%	10%
Expected Value of Better Info			624	77	73	33	0	82	0	0	0	0	0	0

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10.6.3 Implementation Plan¹⁶

As mentioned earlier, the implementation plan outlines the major activities to be completed during the next three years, 2021-2023. Below is a description of those major activities.

Demand-Side Resources Implementation

Ameren Missouri continues to implement its third cycle of approved MEEIA programs, which run through 2022. Ameren Missouri expects to file a request with the Commission in 2021 for approval of demand-side programs and associated cost recovery and incentive mechanisms to be implemented beginning in 2023. Such a proposal will be consistent with the preferred resource plan which includes the RAP portfolio.

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 combined cycle 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. At the same time we will monitor and support efforts to develop dispatchable zero-carbon resources consistent with our goal of achieving Net Zero CO₂ emissions by 2050.

Renewables¹⁷

Our preferred resource plan includes the addition 1,200 MW of new wind and solar generation by the end of 2025, some of which will be used to serve customers under our planned Renewable Subscription program, and some of which will consist of solar plus storage projects as also addressed in Chapter 7. Ameren Missouri will be engaging in activities during the implementation period to support the development of the new wind and solar generation, including bid solicitation, contractor selection, applying for certificates of convenience and necessity, and construction. A request for proposal process for wind and solar resources is already underway.

¹⁶ 20 CSR 4240-22.070(6); 20 CSR 4240-22.070(6)(A) through (D)

¹⁷ EO-2020-0047 1.K

Meramec and Sioux

Ameren Missouri will be taking steps to retire the units at Meramec Energy Center by the end of 2022 and Sioux Energy Center by the end of 2028. This includes the construction of any necessary transmission infrastructure and required notifications to MISO.

Competitive Procurement Policies¹⁸

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. Projects make use of stock items where appropriate. Where material has not been established as a stock item, the CDT determines potential vendors, collects quotes, and scores the potential vendor to make the best selection. Ameren Missouri will be following Ameren's Project Oversight Process, which is provided in Appendix C, for monitoring the progress of projects that fulfill its Preferred Resource Plan.¹⁹

10.6.4 Monitoring Critical Uncertain Factors²⁰

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.

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.

¹⁸ 20 CSR 4240-22.070(6)(E)

¹⁹ 20 CSR 4240-22.070(6)(G)

²⁰ 20 CSR 4240-22.070(6)(F)

Natural Gas Prices

Ameren Missouri evaluates natural gas prices at least annually, included as part of its IRP annual update process.

Demand-Side Resource 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.

In addition to monitoring the critical uncertain factors, we will continue to monitor trends in energy and environmental policy, technology development, and resource cost trends, among other factors. We will also continue to monitor trends that affect customer demand including electrification, adoption of customer-owned DER, and efficiency trends, as well as underlying economic trends like population growth and economic growth.

10.7 Compliance References

20 CSR 4240-22.010(2) 2
 20 CSR 4240-22.010(2)(A) 2
 20 CSR 4240-22.010(2)(B) 2, 9
 20 CSR 4240-22.010(2)(C) 8, 21
 20 CSR 4240-22.010(2)(C)1 8, 21
 20 CSR 4240-22.010(2)(C)2 8, 21
 20 CSR 4240-22.010(2)(C)3 8, 21
 20 CSR 4240-22.060(2) 4
 20 CSR 4240-22.060(2)(A)1 through 7 4
 20 CSR 4240-22.060(3)(A)5 21
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