APPENDIX A: Ameren Missouri's 2020 IRP: Chapter 10 – Strategy Selection (pp. 12-19)

Below is an excerpt from Ameren Missouri's 2020 IRP – Chapter 10. It describes in detail the Company's consideration of the addition of renewable resources to its portfolio in accordance with the approach described in the main report.

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, CO_2 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 CO_2 Price

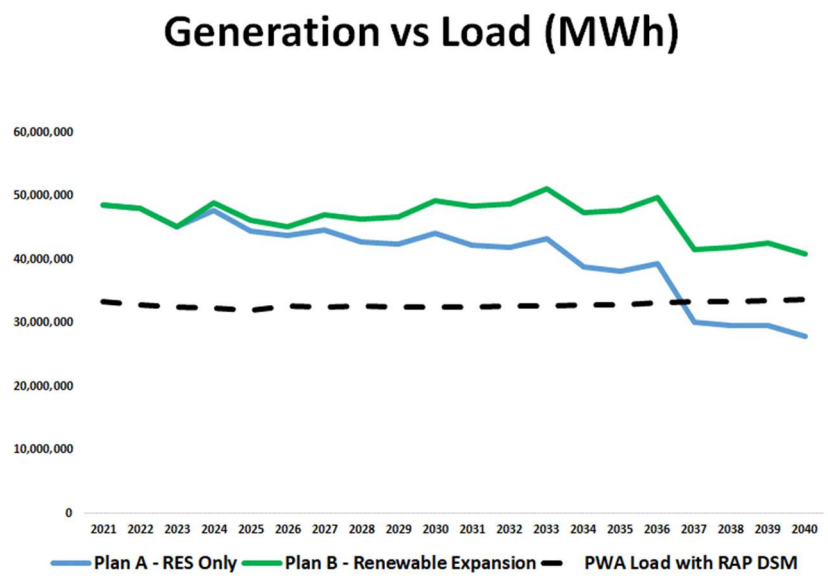
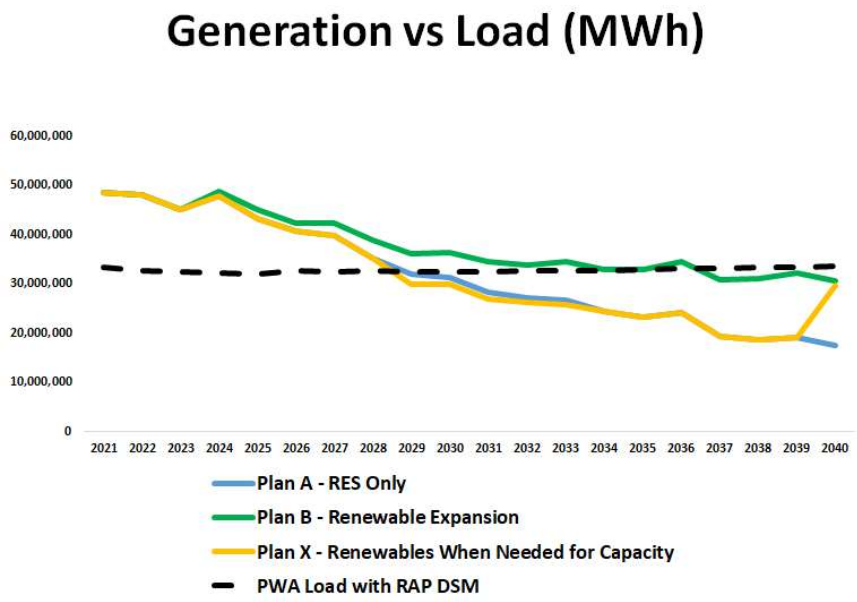


Figure 10.3 shows a comparison of the energy production from several of our alternative plans under our Low CO_2 price scenario. Figure 10.4 shows a similar comparison of energy production for several alternative plans under our High CO_2 price scenario, which

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 CO_2 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 CO_2 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 CO_2 Price



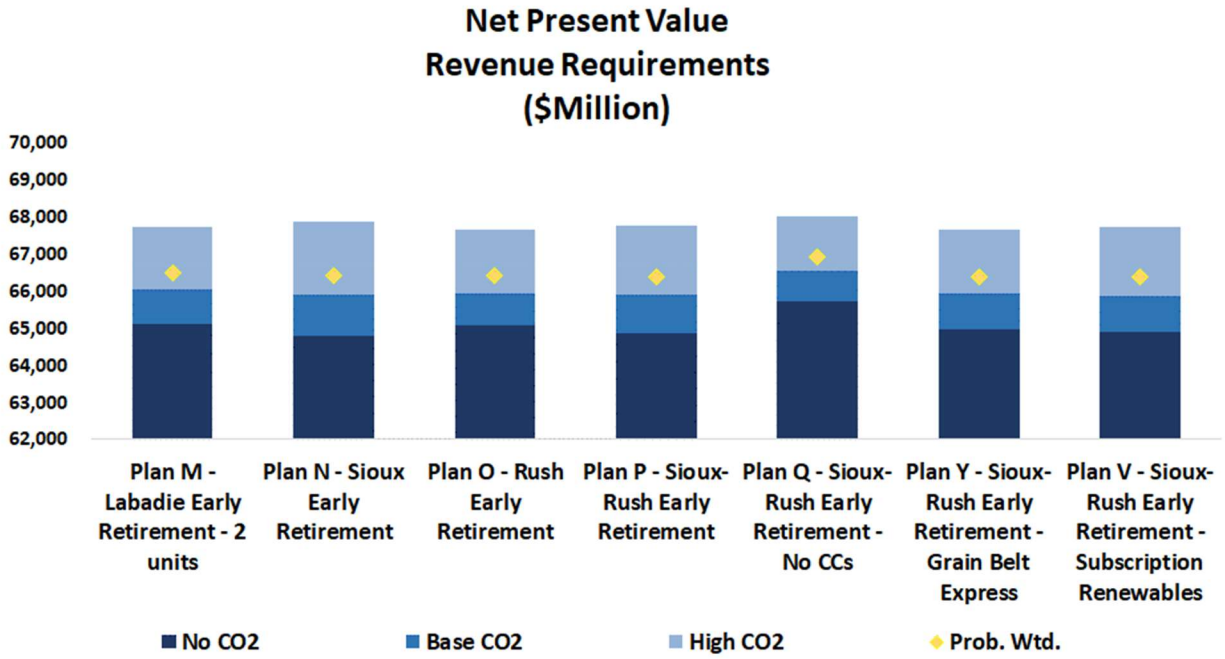
Risk Mitigation Benefits of Renewable Expansion

Our analysis shows that higher CO_2 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 CO_2 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 CO_2 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 CO_2 prices through the revenue they receive in the market. In contrast, the absence of a CO_2 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 CO_2 prices rise and resources whose performance diminishes as CO_2 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 CO_2 price. Figure 10.5 shows the PVRR results for several plans with different levels of renewable energy resources under the three different scenarios for CO_2 price used in our risk analysis.

Figure 10.5 PVRR Results for Selected Plans by CO_2 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 CO_2 prices used for risk analysis, with costs to customers under the No CO_2 price scenario being slightly higher than without the steady buildout and significantly lower under the high CO_2 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 CO_2 prices. While high CO_2 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 CO_2 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.[1]

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

[1] Since the time of the Company's 2020 IRP filing, the need for renewable resources for RES compliance has been reassessed, resulting in changes to the timing of need for solar resources as reflected in the Company's RES compliance plan and supporting workpapers filed April 15, 2021 (File No. EO-2021-0352).

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

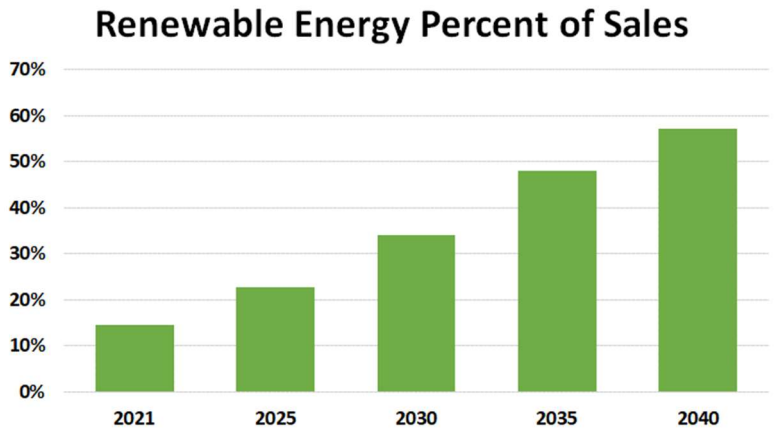


Figure 10.6 shows the percentage of customer sales generated by renewable resources with our Renewable Expansion portfolio. Should explicit policies requiring greater percentages of renewable resources than the current RES requires be enacted, this portfolio would better position Ameren Missouri to meet 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 provide us with valuable risk mitigation regarding CO_2 prices and other factors, and valuable flexibility in managing the transformation of our generation portfolio.