9. Integrated Resource Plan and Risk Analysis

Highlights

- *Ameren Missouri has developed a robust range of alternative resource plans that reflect different combinations of energy efficiency ("EE"), demand response ("DR"), various types of new renewable and conventional generation, energy storage, and retirement of each of its existing coal-fired generators.*
- *In addition to the scenario variables and modeling discussed in Chapter 2, one critical independent uncertain factor has been included in the final probability tree for risk analysis: demand-side management ("DSM") costs.*
- *Our risk analysis also includes the evaluation of a range of load growth.*

Ameren Missouri's modeling and risk analysis consisted of a number of major steps:

1. Identification of **alternative resource plan attributes**. These attributes represent the various resource options used to construct and define alternative resource plans – demand side resources, new renewable and non-renewable supply side resources, and retirement of existing supply side resources.
2. Development of the **baseline capacity position**, which reflects forecasted peak demand, reserve requirements and existing resources.
3. Development of **planning objectives** to guide the development of alternative resource plans.
4. Development of the **alternative resource plans**. The alternative resource plans were developed using the plan attributes identified in step 1, the base capacity position developed in step 2, and the planning objectives identified in step 3.
5. Identification and screening of **candidate uncertain factors**, which are key variables that can influence the performance of alternative resource plans.
6. **Sensitivity analysis** and selection of critical uncertain factors, which are key variables that are determined to have a significant impact on the performance of alternative resource plans.

7. **Risk analysis** of alternative resource plans, which is used to evaluate the performance of alternative resource plans under combinations of the scenarios discussed in Chapter 2 and the critical uncertain factors identified in step 6.

This chapter describes these various steps and the results and conclusions of our integration and risk analysis.

9.1 Alternative Resource Plan Attributes[1]

Development of alternative resource plans include considering various combinations of demand-side and supply-side resources to meet future capacity needs. However, alternative resource plans may also include elements or attributes that serve the other planning objectives described in Section 9.3. Including these elements can significantly affect the capacity position that needs to be considered when developing alternative resource plans. Figure 9.1 includes the attributes considered during the development of resource plans.

***

Figure 9.1 Attributes of Alternative Resource Plans[2]

Retirements (End of Year)
- Meramec Retired 2022
- Sioux Retired 2033/2028
- Labadie 2 Units Retired 2036/2028/2028
- Labadie 2 Units Retired 2042/2036/2028
- Rush Island Retired 2045/2039/2028/2024

Demand-Side Management
- Maximum Achievable Potential ("MAP")
- Realistic Achievable Potential ("RAP")
- Dynamically Optimized Portfolio Estimate ("DOPE") 1
- DOPE 2
- Missouri Energy Efficiency Investment Act ("MEEIA") Cycle 3 Only

New Supply-Side Types
- Combined Cycle (Nat. Gas)
- Simple Cycle (Nat. Gas)
- Nuclear
- Pumped Hydro Storage
- Solar
- Wind
- Batteries

Renewable Portfolios
- Missouri Renewable Energy Standard ("RES") with RAP DSM
- RES with MAP DSM
- Renewable Expansion
- Renewable Expansion Plus

***

[1] 20 CSR 4240-22.060(1); 20 CSR 4240-22.060(3)

[2] Pursuant to the Motion for Protective Order filed concurrently with the filing of this IRP, and 20 CSR 4240-2.135(4)(A) and (B), the information for which protection is sought by the Motion has been marked "Highly Confidential" (denoted by three asterisks with two asterisks used for "Confidential" information), and is protected as such pending the Commission's ruling on the Motion.

HIGHLY CONFIDENTIAL

Schedule MM-S7

9.2 Capacity Position

To determine the timing and need for resources, Ameren Missouri first developed its baseline capacity position, including:

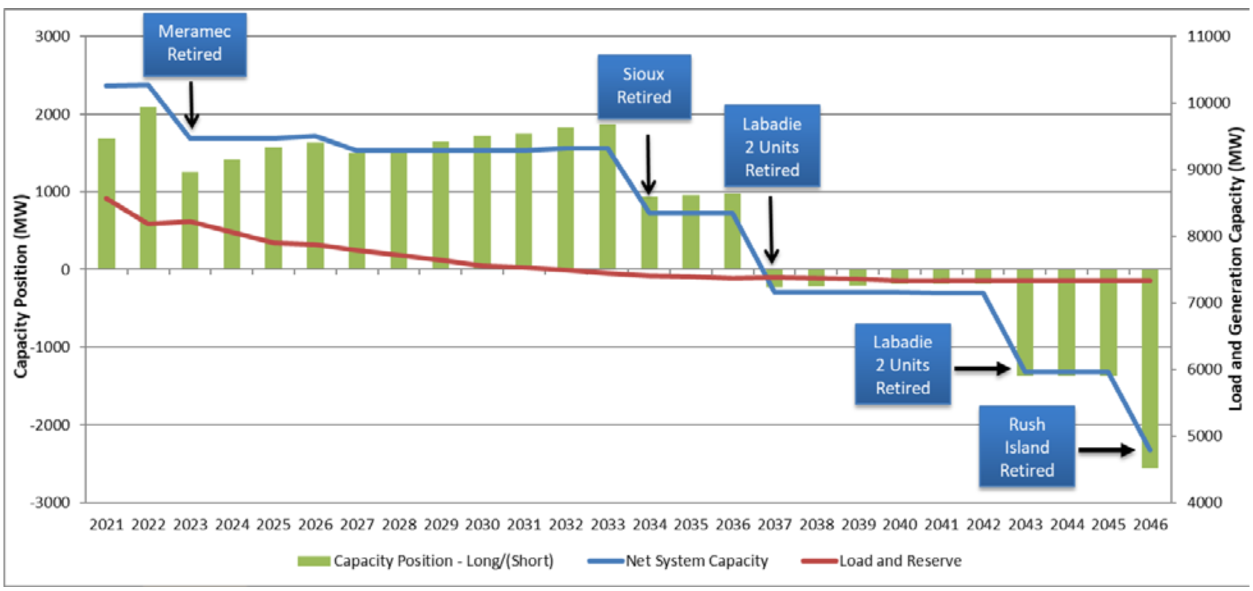
- Existing plant capabilities based on Ameren Missouri's annual generating unit rating update (i.e., August 2020 planned ratings)
- Existing obligations for capacity purchases and sales
- Peak demand forecast, as described in Chapter 3
- Planning reserve margin ("PRM") requirement, based on MISO's Planning Year 2020 Loss of Load Expectation ("LOLE") Study Report (November 2019). Table 9.1 shows the MISO System PRM from 2021 through 2029. The long-range PRM was assumed to continue at 18.3% through the remainder of the analysis period.

Table 9.1 MISO System Planning Reserve Margins 2021 through 2029

Year	2021	2022	2023	2024	2025	2026	2027	2028	2029
PRM Installed Capacity	18.0%	17.9%	17.9%	18.2%	18.2%	18.1%	18.2%	18.2%	18.3%

Figure 9.2 shows Ameren Missouri's net capacity position with no new major generating resources.

Figure 9.2 Net Capacity Position – No New Supply-Side Resources (Baseline)



The chart shows the system capacity, customer needs (including the MISO reserve requirement), and capacity above/below the MISO requirement (i.e., long/short position). The customer needs include peak load reductions due to RAP EE, distributed energy resources ("DER"), and DR. The system capacity includes the capacity benefit of the RES Compliance portfolio. Retirement dates reflected in the base capacity position for existing coal-fired units are those established in Ameren Missouri's most recent depreciation study filed with the Missouri Public Service Commission ("MPSC") and are considered to be the base retirement dates.

Retirements and Modifications[3]

Ameren Missouri is considering retirement of some or all of its six older gas- and oil-fired CTG units – Fairgrounds, Meramec CTG-1, Meramec CTG-2, Mexico, Moberly, and Moreau – with a total summer net capacity of 263 MW, over the next 20 years. Chapter 4 - Table 4.3 provides a summary of the planned CTG retirements. The CTG retirements were included in all alternative resource plans.

Coal energy center retirements were also included in the capacity planning process. Meramec retirement by December 31, 2022 is included in all alternative resource plans. Two different Sioux retirement options were considered: 1) retirement by December 31, 2033 based on prior analysis of Ameren Missouri's coal power plant life expectancy by Black and Veatch, and 2) retirement by December 31, 2028. Three different retirement options for Labadie were considered: 1) current retirement dates as determined by the Black and Veatch life expectancy study with two units retired by December 31, 2036 and two units retired by December 31, 2042, 2) two units retired by December 31, 2028 and two units retired by December 31, 2036, 3) all four units retired by December 31, 2028. Four retirement dates were evaluated for Rush Island: 1) retired by December 31, 2045, which is the current retirement date as determined by the Black and Veatch life expectancy study, 2) retired by December 31, 2039, 3) retired by December 31, 2028, and 4) retired by ****December 31, 2024****.

The alternative retirement dates were based on the ability to avoid significant ongoing costs, the potential for an explicit price on carbon starting in 2025 included in the scenarios described in Chapter 2, coupled with the time needed to ensure transmission upgrades are in place to continue to reliably serve our customers. ****The 2024 Rush Island retirement date, along with wet flue gas desulfurization technology ("FGD") at Rush Island and dry sorbent injection system ("DSI") at Labadie***** are included in order to evaluate specific potential outcomes pending a final judgment in the Rush Island New Source Review ("NSR") litigation which is under appeal and a decision by the federal court of appeals is not expected until 2021. Importantly, numerous potential

---

[3] EO-2020-0047 1.D; EO-2020-0047 1.O

HIGHLY CONFIDENTIAL

Schedule MM-S7

outcomes are possible, including reversal of the trial court's rulings on both liability and remedy, and the actual outcome may be different than the limited outcomes modeled.

DSM Portfolios

DER, EE, and DR programs as described in detail in Chapter 8 are included in the DSM portfolios. DSM programs not only reduce the peak demand but also reduce reserve requirements associated with those DRs. The following combinations of DSM portfolios were evaluated: 1) RAP, 2) MAP, 3) DOPE1, 4) DOPE2, and 5) No DSM after MEEIA Cycle 3. The No DSM portfolio reflects completion of Ameren Missouri's current program cycle with no further EE or DR during the planning horizon. Note that the recent MPSC approval of Ameren Missouri's request for a one-year extension of MEEIA programs occurred after the IRP analysis was underway, which means that the No Further DSM portfolio starts one year before that extension ends.[4]

Renewable Portfolios[5]

Compliance with Missouri's RES was updated to reflect current assumptions, including baseline revenue requirements and an updated 10-year forward-looking model which calculates the impact of the statutory 1% rate impact limitation.

Ameren Missouri performed its RES compliance analysis with the *2020 IRP RES Compliance Filing Model* (model). The model is designed to calculate the retail rate impact, as required by the Commission's RES rules.[6] This model determines the quantity of renewable energy needed to meet both the overall RES portfolio standard and the 2% solar portfolio standard "carve-out" absent any rate impact constraints. The model then determines the amount of renewable energy, both solar and non-solar that can be built without exceeding an average 1% revenue requirement increase over a ten-year period. Ameren Missouri's expected renewable energy credit (REC) position is presented in Figure 9.3.

[4] The extension of MEEIA Cycle 3 should not have a material impact on the analysis.
[5] EO-2020-0047 1.R
[6] 20 CSR 4240-20.100(5)

Figure 9.3 Ameren Missouri's RES REC Positions

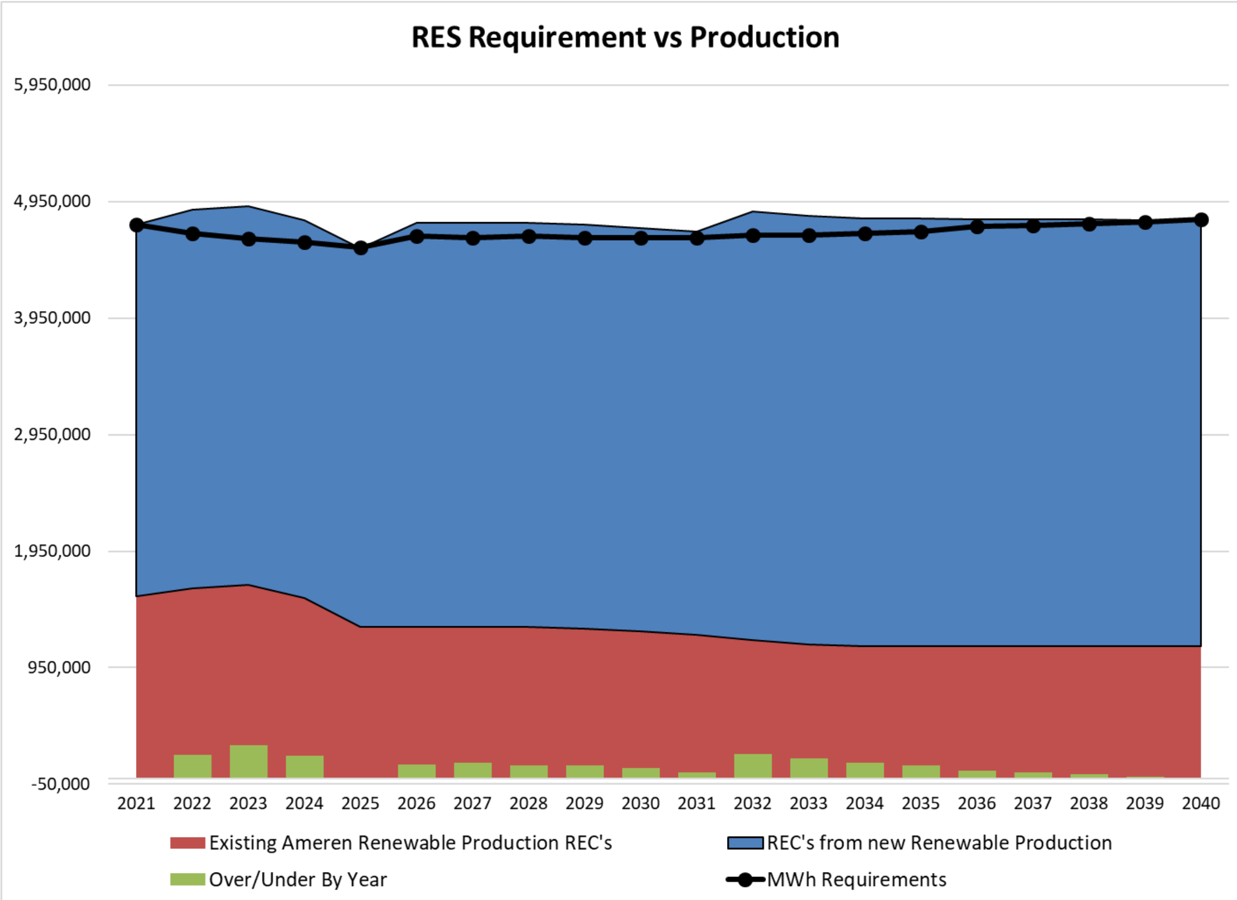


Figure 9.3 shows that Ameren Missouri expects to meet the overall REC requirement through 2040 primarily with owned renewable generation. Year-to-year compliance may also include banked RECs and purchased RECs. Starting in 2021, Ameren Missouri will be able to fully meet the overall standard using RECs generated by its existing qualifying resources, additional wind resources which will largely be completed by the end of 2020, with the remaining generation completed in the first quarter of 2021, and solar RECs acquired from customer rebate programs.

Table 9.2 shows the amounts of wind and solar resources added for various renewable portfolios, including RES compliance under different load cases. The RES compliance portfolio established by the previously described model is used for alternative resource plans and reflects wind resource additions that take advantage of Production Tax Credits, allowing full compliance with the RES while remaining under the one percent rate cap limitation. Appendix A shows the amounts of wind, and solar resources needed in Term 1 (2021-2030) and Term 2 (2031-2040).

When developing the RES compliance investment needs, consideration was given to the potential difference between RAP DSM investment vs MAP DSM investment. As MAP DSM results in more energy savings, the RES Compliance requirements are slightly lower than the requirements when RAP DSM is assumed.

In addition to the RES Compliance portfolios, we also included a "Renewable Expansion" and a “Renewable Expansion Plus” portfolio to evaluate the performance of additional solar and wind resources. The Renewable Expansion portfolio includes a total of 2,700 MW wind and 2,700 MW solar while the Renewable Expansion Plus portfolio includes a total of 3,900 MW wind and 4,000 MW solar resources.[7]

Table 9.2 shows the timing of new resources for renewables included in the alternative resource plans.

Table 9.2 Renewable Portfolios (Nameplate Capacity)

Renewable Additions		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
RES Compliance w/ RAP DSM	Wind	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Solar	-	30	20	-	-	-	-	75	-	-	-	-	75	-	-	-	-	-	-	-
RES Compliance w/ MAP DSM	Wind	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Solar	-	30	20	-	-	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Renewable Expansion	Wind	700	-	-	300	-	-	-	300	-	-	300	-	300	-	300	-	300	-	200	-
	Solar	-	30	20	-	250	-	400	-	300	400	-	300	-	300	-	300	-	400	-	-
Renewable Expansion Plus	Wind	700	-	-	400	-	400	-	400	-	-	-	-	500	-	500	-	500	-	500	-
	Solar	-	30	295	-	375	-	400	-	400	400	-	400	-	400	-	400	-	400	-	500

With the Renewable Expansion Plus renewable portfolio, batteries were also included: 100 MW in each year from 2031 to 2035, 150 MW in each year from 2036 to 2043 for a total of 1,700 MW.

Other Supply-side Resources

After including DSM resources and the renewable portfolios, if the capacity shortfall in a given year met or exceeded the build threshold, then supply side resources are added to eliminate the shortfall. The build threshold was determined to be 300 MW regardless of the type of supply-side resource under consideration and reflects a level that Ameren Missouri trading staff assess as a reasonable level of capacity market dependence. The full rated capacity and the build thresholds for each supply side type are shown in Table 9.3. Ameren Missouri has assumed reliance on short-term capacity purchases to cover shortfalls that are less than the build threshold and has assumed that any long capacity position would be sold. The earliest in-service dates for each supply-side resource are

[7] EO-2020-0047 1.K

also shown in Table 9.3. The in-service date constraints represent the expectations for construction lead time as well as the commercial availability of each technology.

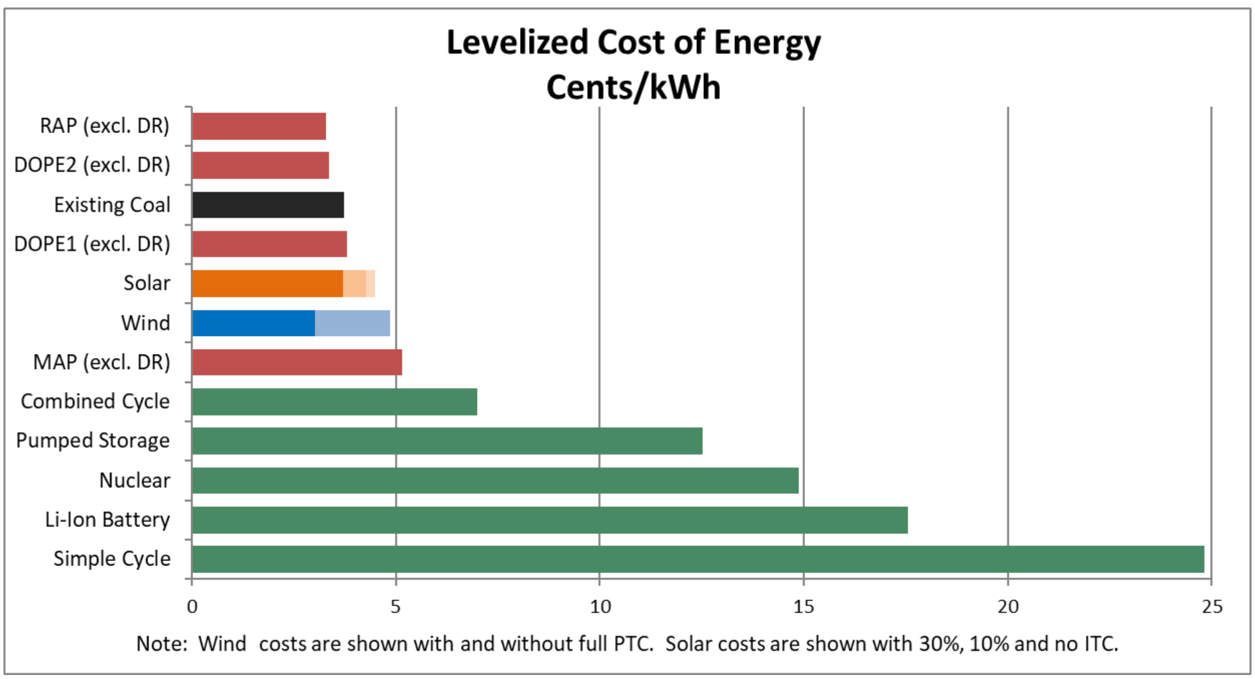
Table 9.3 Build Threshold for Supply Side Types

Supply Side Type	Capacity (MW)	Build Threshold (MW)	Earliest Year In-Service
CC-Natural Gas	824	300	2025
SC-Natural Gas	690 (3x230)	300	2025
Nuclear	1100	300	2030
Pumped Hydro	600	300	2029
Solar	800	300	2022

The remaining net capacity position was represented in the financial model as capacity purchases and sales priced at the market-based capacity costs as discussed in Chapter 2. The capacity purchases and sales were also adjusted for the various peak demand forecasts associated with each of the 15 scenarios and DSM impacts.

Figure 9.4 summarizes the levelized cost of energy ("LCOE") for all potential future resources evaluated in the alternative resource plans.

Figure 9.4 Levelized Cost of Energy – All Resources[8]



[8] 20 CSR 4240-22.010(2)(A)

9.3 Planning Objectives

The fundamental objective of Missouri's electric resource planning process is to provide energy to customers in a safe, reliable and efficient way, at just and reasonable rates while being in compliance with all legal mandates, and in a manner that serves the public interest and is consistent with state energy and environmental policies.[9] Ameren Missouri considers several factors, or planning objectives, that must be considered in meeting the fundamental objective. Planning objectives provide a guide to the decision making process while ensuring the resource planning process is consistent with business planning and strategic initiatives.

Five planning objectives were used in the development of alternative resource plans: Portfolio Transition (formerly Environmental/Resource Diversity); Financial/Regulatory; Customer Satisfaction; Economic Development; and Cost. These planning objectives, which are the same as those discussed in Ameren Missouri's IRP filings since 2011, were selected by Ameren Missouri decision makers and are discussed below.[10]

Portfolio Transition

Ameren Missouri has relied for many years on a portfolio that consists, in large part, of large, efficient coal-fired generators. Current and potential future environmental regulations may have a significant impact on Ameren Missouri's coal-fired fleet and its selection of future generation resources. Ameren Missouri seeks to transition its generation portfolio to one that is cleaner and more diverse in a responsible fashion. To test various options for advancing this transition, alternative resource plans were developed to include varying levels of DSM portfolios, renewables in addition to those required for RES compliance, new gas-fired generation, new nuclear generation, storage resources and early coal retirements.

Financial/Regulatory

The continued financial health of Ameren Missouri is crucial as it will need access to large amounts of capital in order to comply with RES and environmental regulations, invest in new supply side resources, and fund continued EE programs while maintaining or improving safety, reliability, affordability, and customers' ability to control their energy use and costs. While making its investment decisions, it is important for Ameren Missouri to consider factors that may influence its access to low-cost sources of capital.

---

[9] 20 CSR 4240-22.010(2)
[10] 20 CSR 4240-22.010(2)(C)

This includes measures of cash flow, profitability, and creditworthiness as well as assessment of risks associated with investment management and cost recovery.[11]

Customer Satisfaction

While there are many factors that can influence customer satisfaction, there are several that can be significantly affected by resource decisions. Ameren Missouri has focused on levelized annual rates, inclusion of EE, reliability, availability of DER and DR programs, inclusion of new clean energy resources, and significant reductions in CO_2 emissions to assess relative customer satisfaction expectations.[12]

Economic Development

Ameren Missouri assesses the relative economic development potential of alternative resource plans in terms of job growth opportunities associated with its resource investment decisions. Plans were rated on a relative scale based on direct jobs (FTE-years) required for both construction and operation.[13] We have assumed that second and third level economic impacts would not significantly affect the relative economic development potential of alternative resource plans, and therefore have not included such impacts in our assessment.

Cost

Ameren Missouri is mindful of the impact that its future resource choices will have on its customers' rates and bills. Maintaining reasonable costs while meeting its other planning objectives is of utmost importance to Ameren Missouri. Cost alone does not and should not dictate resource choices, but it is a very important factor in making resource decisions. Therefore, minimization of the present value of revenue requirements was used as the primary selection criterion.[14]

9.4 Determination of Alternative Resource Plans[15]

Twenty-one alternative resource plans were developed to incorporate different combinations of demand-side and supply side resource options, seek to fulfill Ameren Missouri's planning objectives, and answer key questions, including the following:

- Does inclusion of DSM programs reduce overall customer costs?

[11] 20 CSR 4240-22.060(2)(A)6
[12] 20 CSR 4240-22.060(2)(A)4
[13] 20 CSR 4240-22.060(2)(A)7
[14] 20 CSR 4240-22.060(2)(A)1; 20 CSR 4240-22.010(2)(B)
[15] 20 CSR 4240-22.060(3)

- What level of DSM – RAP, MAP, DOPE1 or DOPE2 – results in lower costs?
- Is early retirement of Rush Island Energy Center cost effective?
- Is early retirement of Labadie Energy Center cost effective?
- Is early retirement of Sioux Energy Center cost effective?
- Is early retirement of the Sioux and Rush Energy Centers cost effective?
- What is the impact of reducing SO_2 emissions further?
- What are the benefits of including renewables beyond those needed for RES compliance?
- What is the impact of pursuing only new renewables?
- How would our plans and customer costs be affected if DSM cost recovery and incentive needs are not met?
- How do various supply side resource options compare?

Table 9.4 provides a summary of the alternative resource plans.

***

Table 9.4 Alternative Resource Plans[16]

	Plan Name	DSM	Renewables	New Supply Side	Coal Retirements/ Modifications
A	RAP DSM - RES Compliance	RAP	RES Compliance	2 CCs in 2043, CC in 2046	Base
B	Renewable Expansion	RAP	Renewable Expansion	CC in 2046	Base
C	No New DSM - CCs	-	Renewable Expansion	CC in 2037, 2 CCs in 2043, CC in 2046	Base
D	No New DSM - All Solar	-	Renewable Expansion	6400 MW 2034-2046	Base
E	No New DSM - Pumped Hydro	-	Renewable Expansion	PS in 2037, CC in 2037, 2043, 2046	Base
F	No New DSM - AP1000	-	Renewable Expansion	Nuke 2037, CC in 2043, 2 CCs in 2046	Base
G	No New DSM - Simple Cycles	-	Renewable Expansion	SC 2037, CC in 2037, 2043, 2046	Base
H	MAP DSM - Renewable Expansion	MAP	Renewable Expansion	-	Base
I	MAP DSM - RES Compliance	MAP	RES Compliance	2 CCs in 2046	Base
J	DOPE1 DSM	DOPE	Renewable Expansion	CC in 2043, 2046	Base
K	DOPE2 DSM	DOPE	Renewable Expansion	CC in 2043, 2046	Base
L	Labadie Early Retirement - 4 units	RAP	Renewable Expansion	CC in 2034	Labadie 4U Dec-2028
M	Labadie Early Retirement - 2 units	RAP	Renewable Expansion	CC in 2046	Labadie 2U Dec-2028 Labadie 2U Dec-2036
N	Sioux Early Retirement	RAP	Renewable Expansion	CC in 2046	Sioux Dec-2028
O	Rush Early Retirement	RAP	Renewable Expansion	CC in 2043	Rush Island Dec-2028
P	Sioux-Rush Early Retirement	RAP	Renewable Expansion	CC in 2043	Sioux Dec-2028 Rush Island Dec-2039
Q	Sioux-Rush Early Retirement - No CCs	RAP	Renewable Expansion Plus	Battery 1700MW 2031-2043	Sioux Dec-2028 Rush Island Dec-2039
R	Rush Early Retirement 2	RAP	Renewable Expansion	CC in 2043	Rush Island Dec-2024
S	Rush FGD	RAP	Renewable Expansion	CC in 2046	Base Rush Island FGD
T	Rush FGD - Labadie DSI	RAP	Renewable Expansion	CC in 2046	Base Rush Island FGD Labadie DSI
U	Rush Early Retirement 2 - Labadie DSI	RAP	Renewable Expansion	CC in 2043	Rush Island Dec-2024 Labadie DSI

***

[16] 20 CSR 4240-22.010(2)(A); 20 CSR 4240-22.060(3); 20 CSR 4240-22.060(3)(A)1 through 8; 20 CSR 4240-22.060(3)(B); 20 CSR 4240-22.060(3)(C)1; 20 CSR 4240-22.060(3)(C)2; 20 CSR 4240-22.060(3)(C)3; EO-2020-0047 1.D; EO-2020-0047 1.K

HIGHLY CONFIDENTIAL

Schedule MM-S7

Does inclusion of DSM programs reduce overall customer costs?

Plans B, H, J, and K include RAP, MAP, DOPE1 and DOPE2 level of DSM programs, respectively. Therefore, these plans can be compared against plans C, D, E, F, and G that have the same level of renewable portfolios but do not include DSM programs to assess the impact on cost and other performance measures due to inclusion of different levels of DSM.

What level of DSM -RAP, MAP, DOPE1 or DOPE2- results in lower costs?

Plans with the same attributes except for the level of DSM resources have been evaluated as described above and provide a direct comparison of the relative cost of the various DSM portfolios.

Is early retirement of Rush Island Energy Center cost effective?[17]

Plan O evaluates the cost effectiveness of early retirement of Rush Island Energy Center by the end of 2028.

Is early retirement of Labadie Energy Center cost effective?[18]

Plans L and M evaluate the cost effectiveness of early retirement of all four units by the end of 2028, and two units by the end of 2028 followed by two units by the end of 2036, respectively.

Is early retirement of Sioux Energy Center cost effective?[19]

Plan N evaluates the cost effectiveness of early retirement of Sioux Energy Center alone.

Is early retirement of Sioux and Rush Island Energy Centers cost effective?[20]

Plan P evaluates the cost effectiveness of early retirements of Sioux Energy Center by the end of 2028 and Rush Island Energy Center by the end of 2039.

[17] 20 CSR 4240-22.060(3)(A)7; EO-2020-0047 1.O
[18] 20 CSR 4240-22.060(3)(A)7; EO-2020-0047 1.O
[19] 20 CSR 4240-22.060(3)(A)7; EO-2020-0047 1.O
[20] 20 CSR 4240-22.060(3)(A)7; EO-2020-0047 1.O

What is the impact of potential outcomes of the active NSR litigation?[21]

Four plans are constructed in order to evaluate different potential outcomes for the active NSR litigation: *****Plan R includes Rush Island Energy Center retirement by the end of 2024, Plan S includes installation of FGD at Rush Island Energy Center in 2025, Plan T is similar to Plan S but also includes a DSI system installation at Labadie Energy Center in 2023, and Plan U includes early retirement of Rush Island Energy Center by the end of 2024 as well as addition of DSI system at Labadie Energy Center**.***

What are the benefits of including renewables beyond those needed for RES compliance?

To assess the relative benefits of including additional renewable resources, several alternative resource plans were developed that exceed the level of renewable investment indicated by the RES compliance model. Plans A and B with RAP DSM and Plans H and I with MAP DSM can be compared to assess the costs/benefits of additional renewables. Furthermore, Plans P and Q can be compared to assess additional renewables coupled with batteries. Also included is resource plan D that features solar as a major supply-side resource and the only supply-side resource addition during the planning horizon in addition to the 'renewable expansion' level of wind and solar resource additions.

What is the impact of pursuing only new renewables?

Plan D is the all renewables alternative resource plan without DSM beyond MEEIA Cycle 3.[22]

How do various supply-side resource options compare?

The relative performance of the new supply-side resources can be determined by comparing Plans C through G, and by comparing Plan P against Plan Q.

How would our plans and customer costs be affected if DSM cost recovery and incentive needs are not met?

Plans C through G also evaluate the impact if DSM cost recovery and incentive requirements are not met.

---

[21] EO-2020-0047 1.D
[22] 20 CSR 4240-22.060(3)(A)2

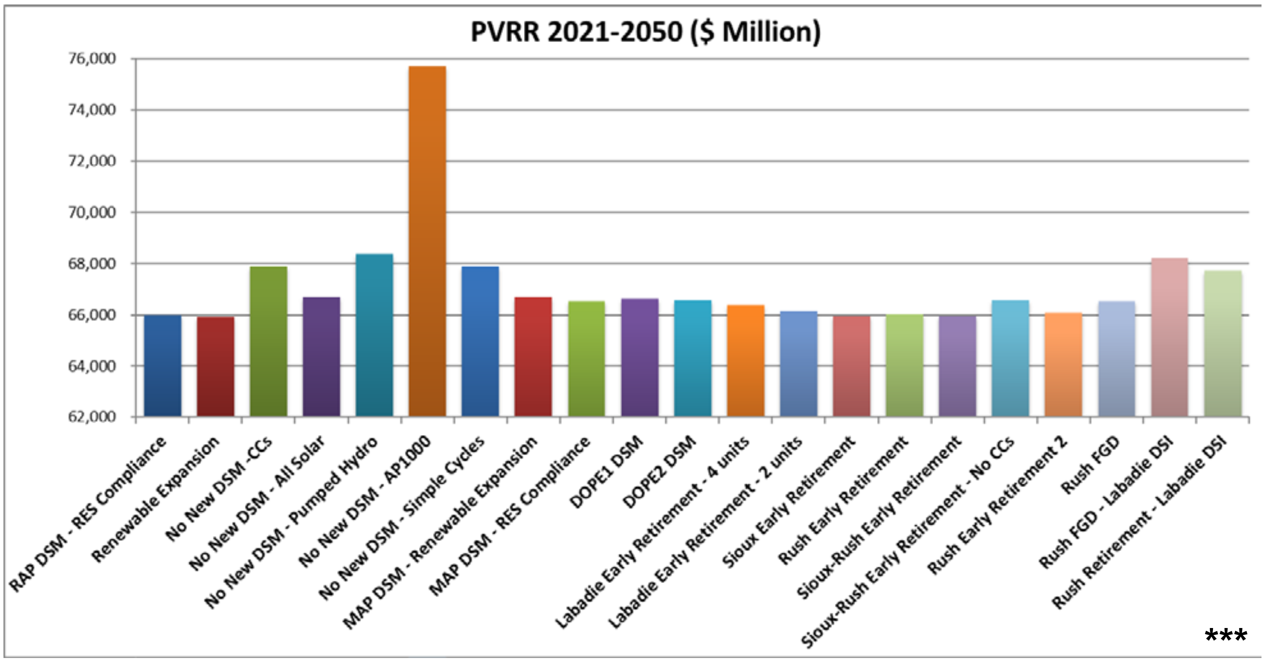
HIGHLY CONFIDENTIAL
Schedule MM-S7

The type, size, and timing of resource additions/retirements for the alternative resource plans are provided in Appendix A and also in the electronic workpapers.[23]

Integration, sensitivity, and risk analyses for the evaluation of alternative resource plans were done assuming that rates would be adjusted annually for the 20-year planning horizon and 10 additional years for end effects, and by treating both supply-side and demand-side resources on an equivalent basis. Integration analysis was performed on the most likely scenario of the probability tree (Scenario 5) as explained in Chapter 2. Integration analysis present value of revenue requirements ("PVRR") results are shown below in Figure 9.5. Results for the remaining performance measures for integration analysis are provided in the workpapers.[24]

***

Figure 9.5 Integration PVRR Results[25]



***

It should be noted that all costs and benefits in all analyses were expressed in nominal dollars, and Ameren Missouri's current discount rate of 6.04% was used for present worth and levelization calculations. Also, in all integration, sensitivity, and risk analyses, it was assumed that rates are adjusted annually (i.e., no regulatory lag).[26]

---

[23] None of the alternative resource plans analyzed include any load-building programs 20 CSR 4240-22.060(3)(B); 20 CSR 4240-22.080(2)(D); 20 CSR 4240-22.060(3)(D)
[24] 20 CSR 4240-22.060(4)
[25] All plans include RAP DSM unless otherwise noted.
[26] 20 CSR 4240-22.060(2)(B)

HIGHLY CONFIDENTIAL
Schedule MM-S7

9.5 Sensitivity Analysis

Sensitivity analysis involves determining which of the candidate independent uncertain factors are critical independent uncertain factors. Once identified in this step, critical uncertain factors were added to the scenario probability tree discussed in Chapter 2 to create the risk analysis probability tree.

9.5.1 Uncertain Factors[27]

Ameren Missouri developed a list of uncertain factors to determine which factors are critical to resource plan performance. Table 9.5 contains the list as well as information about the screening process.

Table 9.5 Uncertain Factor Screening

Uncertain Factor	Candidates?	Critical?	Included in Final Probability Tree?
Load Growth	✔	--	✔
Carbon Policy	✔ #	--	✔
Fuel Prices Coal	✔	✘	✘
Natural Gas	✔ #	--	✔
Nuclear	✘	✘	✘
Project Cost (includes transmission interconnection costs)	✔	✘	✘
Project Schedule	✔	✘	✘
Emissions Prices SO_2	✘	✘	✘
NO_x	✘	✘	✘
CO_2	✔ #	--	✔

[27] 20 CSR 4240-22.040(5); 20 CSR 4240-22.040(5) (B) through (F); EO-2020-0047 1.A(i)-(iii); 20 CSR 4240-22.060(5); 20 CSR 4240-22.060(5) (A) through (M)

Uncertain Factors	Candidate?	Critical?	Included in Final Probability Tree?
Purchased Power	✗	✗	✗
Forced Outage Rate	✓	✗	✗
DSM Cost Only	✓	✓	✓
DSM Load Impacts & Costs	✓	✗α	✗α
Foreseeable Demand Response Technologies	✓	✗β	✗β
Foreseeable Distributed Energy Resources	✓	✗β	✗β
Foreseeable Energy Storage Technologies	✓	✗	✗
Fixed and Variable O&M	✓	✗	✗
Return on Equity	✓	✗ε	✗ε
Interest Rates	✓	✗ε	✗ε

Included in the scenario probability tree

-- Not tested in sensitivity analysis

α DSM impacts and costs combined. Costs not the same costs as in "DSM Cost Only" sensitivity.

β Included as part of DSM load impacts and costs sensitivity

ε Return on Equity and Long-term Interest rates were combined

Chapter 2 describes how two of the candidate uncertain factors were determined to be critical dependent uncertain factors, which defined the nine scenarios described in that chapter. The two critical dependent uncertain factors are natural gas prices and CO_2 prices. Energy and capacity prices are an output of the scenarios, as described in Chapter 2, and reflect a range of uncertainty consistent with the scenario definitions.

A review of these candidates prior to the sensitivity analysis determined several could be eliminated without conducting a quantitative analysis.

- Nuclear Fuel Prices – Our 2011 and 2014 IRP analyses concluded that nuclear fuel prices were not critical to the relative performance of the alternative resource plans; the same conclusion is expected to be obtained should high/low nuclear prices be included in the sensitivity analysis, particularly given the significant increase in our assumption for nuclear capital costs.

- Purchased Power – Purchased power is excluded since Ameren Missouri is a member of MISO and Ameren Missouri has employed planning criteria that minimize our dependence on the market.
- SO_2 and NO_x Emissions Prices – SO_2 and NO_x Emissions Prices were excluded as candidates because of the expectation for very low prices as a result of current and expected environmental regulations.

There are two pairs of candidate independent uncertain factors that are highly correlated:

- Interest Rates and Return on Equity
- DSM Load Impacts and Costs

Including all the possible permutations of high/base/low would geometrically increase the size of the analysis, with some combinations being much less meaningful and less probable. Since the expectation is that these factors are highly correlated, we have made the simplifying assumption that the individual probability nodes for each pair be combined into a single probability node reflecting the high value for both, base value for both, and low value for both without explicitly considering the less likely and less meaningful joint probabilities.

In addition to including DSM load impacts and costs, Ameren Missouri also analyzed only DSM costs changing in high and low scenarios while the load impacts remain the same. It is important to note that the high and low case costs in the "DSM Cost Only" candidate uncertain factor are different than the high and low case costs in the "DSM Load Impacts and Costs" candidate factor. More detail on the DSM sensitivities can be found in Chapter 8.

Uncertain Factor Ranges[28]

We use the sensitivity analysis to examine whether or not candidate independent uncertain factors have a significant impact on the performance of alternative resource plans, as measured by their impact on PVRR.

The candidate uncertain factors are characterized by a 3-level range of values for this analysis; those 3 levels being low, base, and high values.

[28] 20 CSR 4240-22.060(7)(C)1A; 20 CSR 4240-22.060(7)(C)1B

Unless the meaning of low, base, and high are treated in a standardized manner, the probability of occurrence for the value used for "low" for one uncertain factor could be significantly different than the probability of occurrence for the value used for "low" for other uncertain factors. Thus, for all of the uncertain factors, Ameren Missouri standardized the meaning of low to be the value found at the 5th percentile of a probability distribution of values for an uncertain factor, the value at the 50th percentile to be the base value, and the value at the 95th percentile to be the high value. The probability distribution for each candidate uncertain factor was inferred from a series of estimated values produced by subject matter experts for each uncertain factor.

For the majority of candidate uncertain factors, probability distributions were used to obtain the values for low, base, and high. This process began with subject matter experts providing/revising estimates of (A) an expected value, (B) estimates of deviations from that expected value, and (C) the probabilities of those deviations from the expected value. That information was used to create the probability distribution collectively implied by that data. Values at the 5th, 50th, and 95th percentiles of those implied probability distributions were then obtained for use as the values for low, base, and high for the various candidate independent uncertain factors. Appendix A contains the standard value, estimated deviation and probabilities for project costs, project schedule, fixed operations & maintenance ("FOM"), variable operations & maintenance ("VOM"), equivalent forced outage rate ("EFOR"), environmental capital expenditures, and transmission-retirement expenditures.

Example

The expected value for total project cost including transmission interconnection costs for the Greenfield Combined Cycle option is $1,245/kW-year (2019$). Project cost and some other candidate uncertain factors are characterized by differing standard values among various supply-side types, while standard values for some other candidate uncertain factors are not uniquely correlated to each supply side type. For example the Long Term Interest Rates uncertain factor does not differ depending on the supply-side type; it is the same across all supply-side types.

The subject matter experts, in this example, members of Ameren Missouri's generation organization, provided estimates of deviations from the standard value as well as the probabilities of those deviations. An example of that initial uncertainty distribution is shown in Table 9.6. In this example, the first of these estimates for project cost deviations was a -15% deviation from the expected

Table 9.6

CC Project Cost Uncertainty Distribution

Deviation	Probability
-15%	10%
-10%	20%
0%	50%
15%	15%
30%	5%

Schedule MM-S7

value with a 10% probability of occurring. These deviation estimates provide sufficient information to derive continuous probability distributions from which the low/base/high values can be derived.

The process of developing the probability distributions involve using the deviation estimates like the ones shown above, the probability distribution can be determined for the uncertain factor in question. An example of the result of analyzing deviation estimates is shown in Figure 9.6.

From this distribution, the deviation values for the low, base, and high values (84,1, 1.17) are obtained at the respective percentiles in Figure 9.6. By multiplying these values by the expected value $1,245/kW-year, we estimate the costs at the 5th, 50th, and 95th percentiles; e.g., the low value at the 5th percentile would be:

$$.84 \times 1{,}245 = \$1{,}046$$

Figure 9.6 Example of Probability Distribution---CC Project Cost

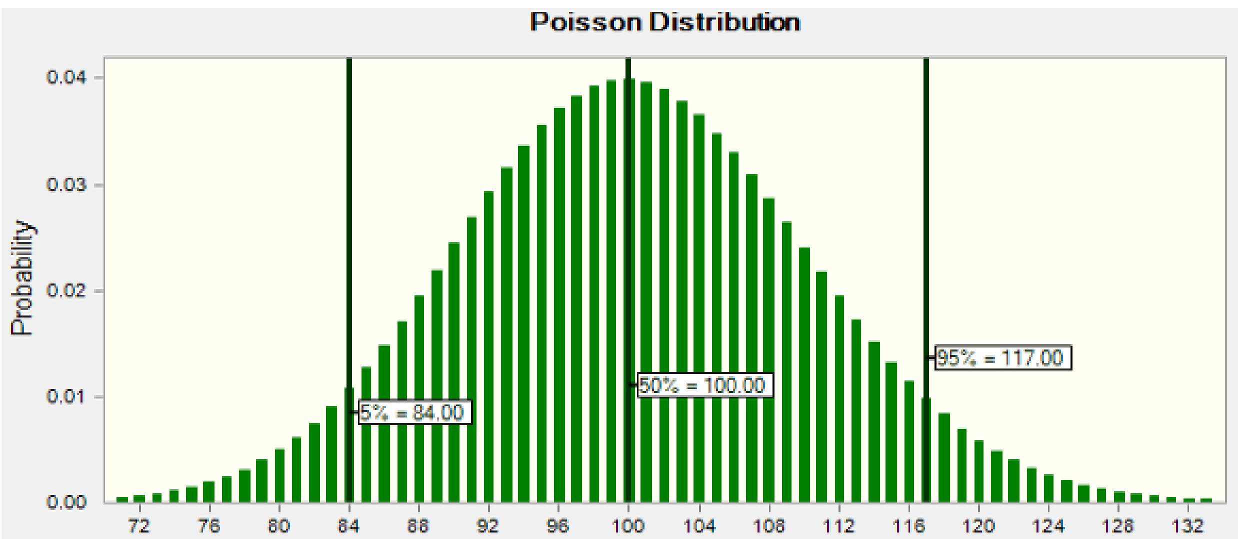


Figure 9.7 shows the resulting range of project costs, which also include interconnection costs estimates, for each new supply-side resource. For most of the technologies shown in Figure 9.7, base values found at 50th percentile were very close to their expected values. For the nuclear technology, however, the base value inferred from the probability distribution was 27% higher than the expected value- $11,302/kW vs $8,899/kW.

Figure 9.7 Resource-Specific Project Cost Ranges (2019$/kW)

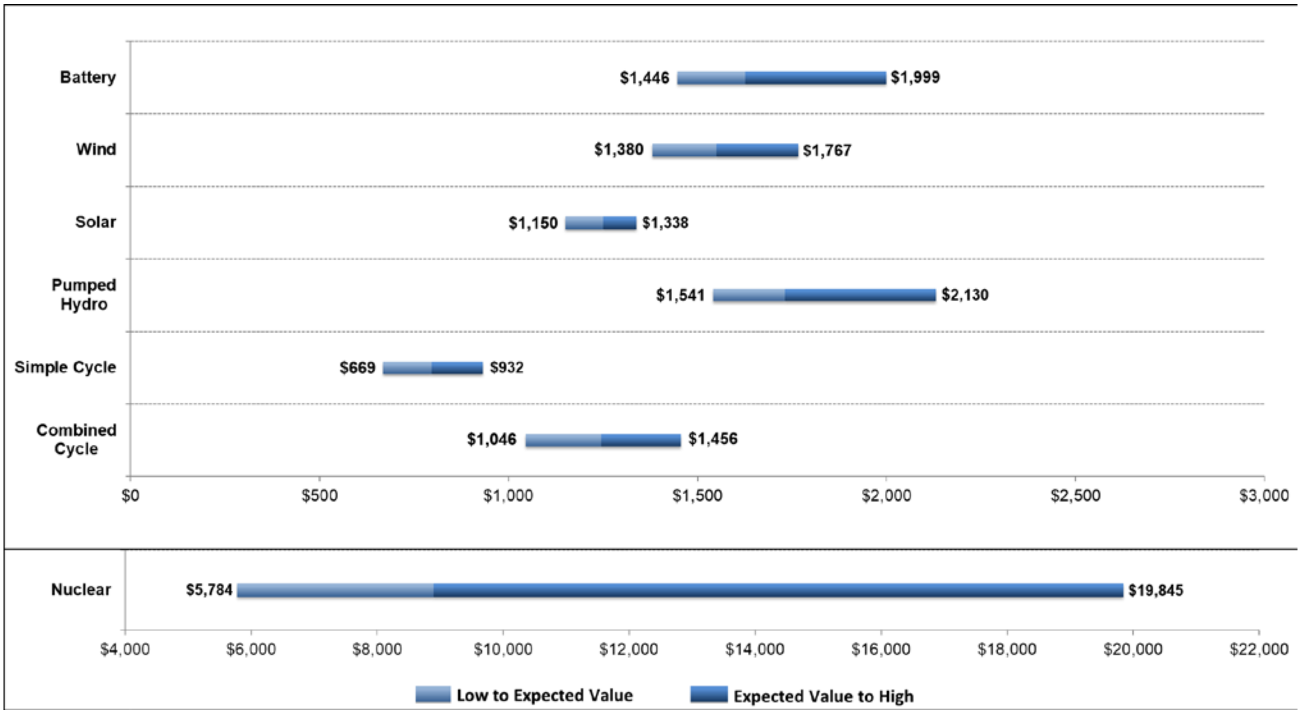


Table 9.7 Resource-Specific Uncertain Factor Ranges[29]

Uncertain Factor	Value	Probability	CC (Nat. Gas)	SC (Nat. Gas)	Pumped Hydro	Nuclear	Solar*	Wind*	Battery*
Project Cost ($/kW) 2019 $	Low	10%	$1,046	$669	$1,541	$5,784	$1,150	$1,380	$1,446
	Base	80%	$1,245	$796	$1,836	$11,302	$1,250	$1,550	$1,625
	High	10%	$1,456	$932	$2,130	$19,845	$1,338	$1,767	$1,999
Project Schedule (Months)	Low	10%	27	27	55	68	18	36	18
	Base	80%	36	36	73	91	24	48	24
	High	10%	48	48	95	119	32	63	32
Fixed O&M ($/kW-yr) 2019 $	Low	10%	$23.25	$6.98	$3.16	$102.54	$3.32	$25.74	$0.83
	Base	80%	$25.69	$8.18	$3.81	$126.02	$4.01	$31.07	$1.00
	High	10%	$29.30	$9.95	$4.76	$155.44	$5.03	$38.95	$1.26
Variable O&M ($/MWh) 2019 $	Low	10%	$0.98	$9.16	$2.50	$1.95	-	-	-
	Base	80%	$2.55	$10.90	$3.15	$2.41	-	-	-
	High	10%	$4.11	$12.64	$3.96	$3.05	-	-	-
EFOR (%)	Low	10%	1%	0%	0%	1%	-	-	-
	Base	80%	2%	5%	5%	2%	-	-	-
	High	10%	5%	10%	10%	3%	-	-	-

[29] * Denotes that Ameren Missouri used a declining cost curve for solar, wind and batteries, and multipliers were applied to estimate base, low and high project costs. Assumed capacity factor for solar, wind and battery resources include effects of FOR.

Table 9.7 shows the uncertain factor ranges for the various candidate uncertain factors. It should be noted that, for the project schedule uncertainty, as the number of years in a project schedule change, the distribution of the cash flows was also updated to be consistent with those changes.

Table 9.8 contains the non-resource specific uncertain factor ranges analyzed.

Table 9.8 Non-Resource Specific Uncertain Factor Ranges

Uncertain Factors	Low	Base	High
Probability -->>	**10%**	**80%**	**10%**
Coal Price		Varies By Year	
Long Term Interest Rates	2.5%	3.7%	4.0%
Return on Equity	10.0%	10.5%	10.6%
DSM Load Impact and Cost			
MAP - EE&DER Load Impact	84%	100%	107%
MAP - EE&DER Cost	82%	100%	108%
MAP - DR Load Impact	99%	100%	116%
MAP - DR Cost	99%	100%	101%
RAP - EE&DER Load Impact	88%	100%	113%
RAP - EE&DER Cost	82%	100%	113%
RAP - DR Load Impact	99%	100%	116%
RAP - DR Cost	99%	100%	101%
DOPE1 - EE&DER Load Impact	100%	100%	100%
DOPE1 - EE&DER Cost	100%	100%	100%
DOPE1 - DR Load Impact	100%	100%	100%
DOPE1 - DR Cost	100%	100%	100%
DOPE2 - EE&DER Load Impact	100%	100%	100%
DOPE2 - EE&DER Cost	100%	100%	100%
DOPE2 - DR Load Impact	100%	100%	100%
DOPE2 - DR Cost	100%	100%	100%
DSM Cost Only			
MAP - EE&DER Cost	85%	100%	135%
MAP - DR Cost	85%	100%	125%
RAP - EE&DER Cost	80%	100%	140%
RAP - DR Cost	85%	100%	125%
DOPE1 - EE&DER Cost	80%	100%	170%
DOPE1 - DR Cost	85%	100%	170%
DOPE2 - EE&DER Cost	80%	100%	170%
DOPE2 - DR Cost	85%	100%	170%

As discussed in Chapter 2, long-range interest rate assumptions are based on the December 1, 2019, semi-annual Blue Chip Financial Forecast, a consensus survey of 44 economists. Ameren Missouri internal experts used this same set of data and process to develop a range of interest rate assumptions for use in the 2020 IRP. The high and low interest rate assumptions are based on the average of the 10 highest and 10 lowest forecasts from the survey. Additionally, the high and low forecasts for Treasury rates are used as inputs to the calculation of high and low ranges for allowed return on equity using the same process as discussed in Chapter 2.

Note that the DOPE1 and DOPE2 portfolios have no variations under the DSM Load Impact and Cost uncertainty. By definition, DOPE portfolios are "optimized" to provide a threshold load savings target. Any deviations in load savings would be proactively managed through the budget, with lesser or greater programming as needed. The DSM Cost Only sensitivities reflect a greater range of outcomes, to account for both traditional cost estimation risk and additional program management risk to achieve defined load reduction targets. Chapter 8 includes details on how low and high ranges were obtained for DSM portfolios.

9.5.2 Sensitivity Analysis Results[30]

To conduct the sensitivity analysis, each of the 21 alternative resource plans was analyzed using the varying value levels (low/base/high) for each of the candidate independent uncertain factors, for the most likely scenario in the probability tree (Scenario 5). An uncertainty-probability weighted result for PVRR was obtained for each plan for each relevant candidate uncertain factor. Finally, the results of using a "non-base" value were compared to the results of using an integration/base value for each plan for each candidate uncertain factor. The sensitivity analysis results for all of the candidate independent uncertain factors (resource-specific and non-resource specific) are presented in Appendix A.

The sensitivity analysis identified one critical independent uncertain factor: DSM Cost Only. Table 9.9 shows the change in PVRR ranking (i.e., number of positions the plan moved in the ranking) for the critical independent uncertain factor compared to the integration/base value.

[30] 20 CSR 4240-22.060(5); 20 CSR 4240-22.060(7)(A); 20 CSR 4240-22.060(7)(C)1A

***

Table 9.9 Critical Independent Uncertain Factors – Change in PVRR Ranking[31]

Plan		Integration Ranking	DSM Cost Only PWA	DSM Cost Only Low	DSM Cost Only High
A	RAP DSM - RES Compliance	4	0	0	0
B	Renewable Expansion	1	0	0	0
C	No New DSM - CCs	18	0	0	2
D	No New DSM - All Solar	15	1	0	7
E	No New DSM - Pumped Hydro	20	0	0	1
F	No New DSM - AP1000	21	0	0	0
G	No New DSM - Simple Cycles	17	0	0	2
H	MAP DSM - Renewable Expansion	14	-1	4	-3
I	MAP DSM - RES Compliance	10	-2	2	-4
J	DOPE1 DSM	13	0	-1	0
K	DOPE2 DSM	11	1	-2	-1
L	Labadie Early Retirement - 4 units	8	0	-1	-1
M	Labadie Early Retirement - 2 units	7	0	0	0
N	Sioux Early Retirement	2	0	0	0
O	Rush Early Retirement	5	0	0	0
P	Sioux-Rush Early Retirement	3	0	0	0
Q	Sioux-Rush Early Retirement - No CCs	12	1	0	1
R	Rush Early Retirement 2	6	0	0	0
S	Rush FGD	9	0	0	0
T	Rush FGD - Labadie DSI	19	0	0	0
U	Rush Early Retirement 2 - Labadie DSI	16	0	0	0

***

Table 9.10 shows the change in PVRR ($) for the critical independent uncertain factor compared to the integration/base values. The DSM Cost Only uncertain factor was selected as a critical independent uncertain factor because of the variety in the change in PVRR ranking.

[31] All plans include RAP DSM portfolio unless otherwise noted.

HIGHLY CONFIDENTIAL

***

Table 9.10 Critical Independent Uncertain Factors – Change in PVRR (Million $)[32]

Plan		Integration PVRR	DSM Cost Only PWA	Low	High
A	RAP DSM - RES Compliance	66,000	19	(260)	447
B	Renewable Expansion	65,940	19	(260)	447
C	No New DSM - CCs	67,880	-	-	-
D	No New DSM - All Solar	66,709	-	-	-
E	No New DSM - Pumped Hydro	68,384	-	-	-
F	No New DSM - AP1000	75,700	-	-	-
G	No New DSM - Simple Cycles	67,877	-	-	-
H	MAP DSM - Renewable Expansion	66,758	71	(498)	1,210
I	MAP DSM - RES Compliance	66,611	71	(498)	1,210
J	DOPE1 DSM	66,678	43	(161)	587
K	DOPE2 DSM	66,598	35	(137)	486
L	Labadie Early Retirement - 4 units	66,397	19	(260)	447
M	Labadie Early Retirement - 2 units	66,155	19	(260)	447
N	Sioux Early Retirement	65,973	19	(260)	447
O	Rush Early Retirement	66,035	19	(260)	447
P	Sioux-Rush Early Retirement	65,977	19	(260)	447
Q	Sioux-Rush Early Retirement - No CCs	66,602	19	(260)	447
R	Rush Early Retirement 2	66,097	19	(260)	447
S	Rush FGD	66,555	19	(260)	447
T	Rush FGD - Labadie DSI	68,219	19	(260)	447
U	Rush Early Retirement 2 - Labadie DSI	67,761	19	(260)	447

***

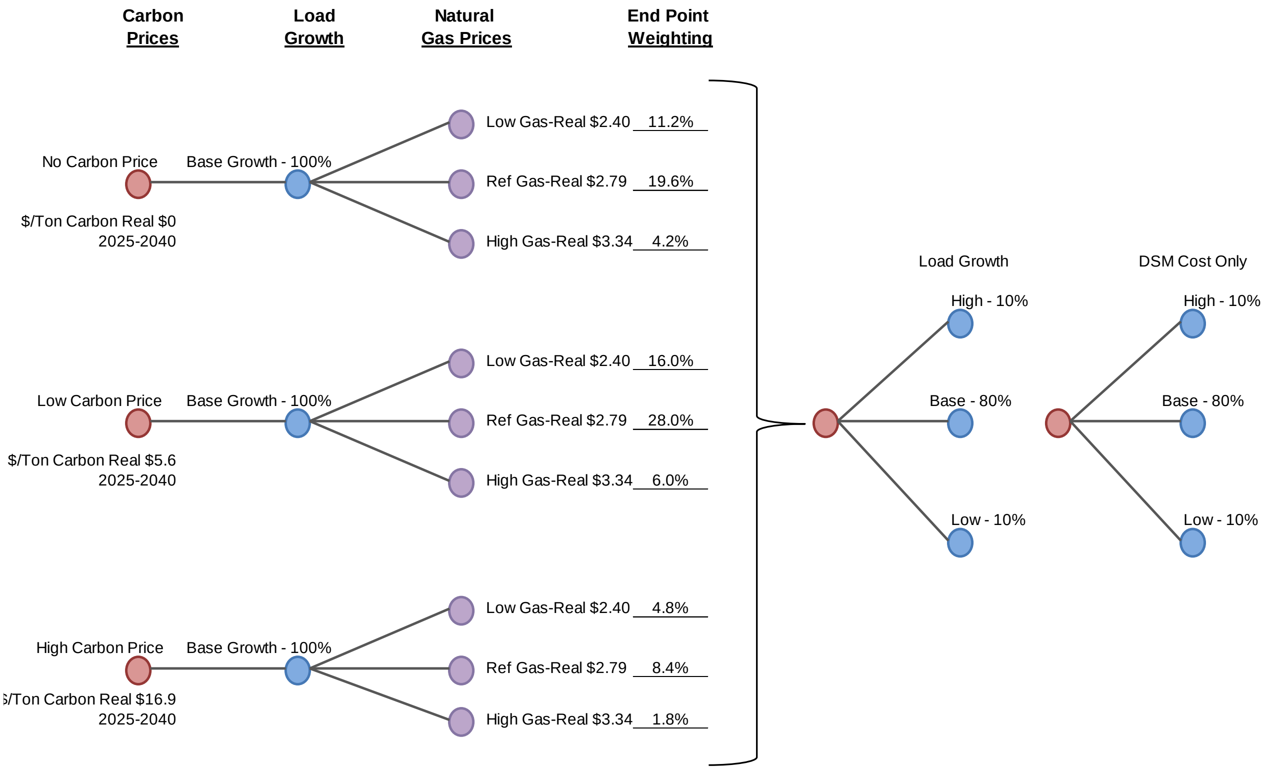
Ameren Missouri low-base-high load growth cases along with the DSM Cost Only critical independent uncertain factor were added as nodes to the scenario probability tree that was developed in Chapter 2. The updated and expanded probability tree is shown in Figure 9.8, with the two uncertain factors shown on the right-hand side.

[32] All plans include RAP DSM portfolio unless otherwise noted.

HIGHLY CONFIDENTIAL

Schedule MM-S7

Figure 9.8 Final Probability Tree Including Sensitivity Analysis Results[33]



9.6 Risk Analysis[34]

The Risk Analysis consisted of running each of the candidate resource plans in Table 9.4 through each of the branches on the final probability tree shown in Figure 9.8. The probability tree consisted of 81 different branches. Each branch is the combination of different value levels among the nine scenarios, themselves defined by combinations of the two critical dependent uncertain factors (gas prices, and environmental regulations/carbon policy), and the two critical independent uncertain factors (DSM cost and load growth). Each branch therefore represents a unique combination of the critical uncertain factors. Once all the combinations are calculated, the sum of the individual branch probabilities equals 100%.

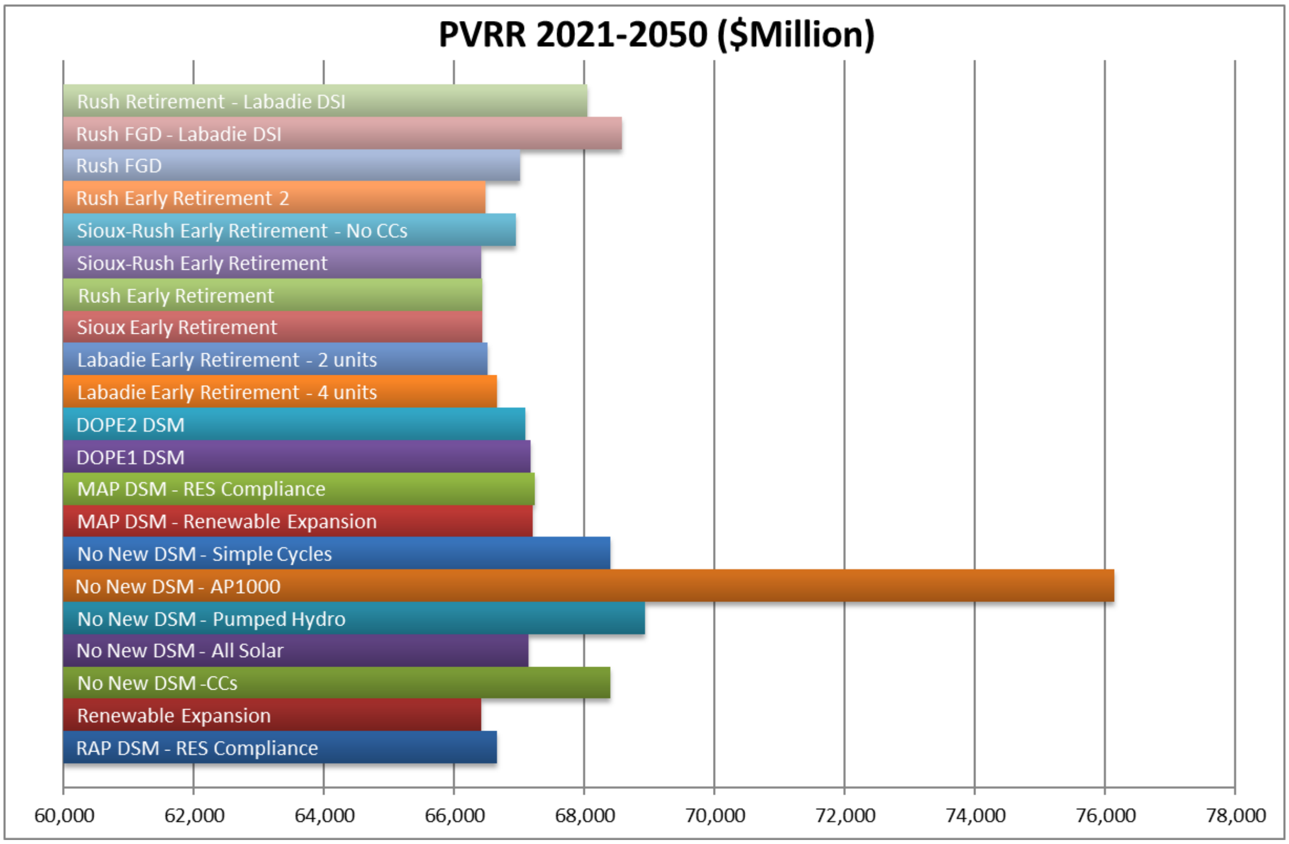
[33] 20 CSR 4240-22.060(6)
[34] 20 CSR 4240-22.060(6)

9.6.1 Risk Analysis Results

The PVRR results of the risk analysis of the 21 alternative resource plans are shown in Figure 9.9. The levelized rate results for the risk analysis are shown in Figure 9.10. The PVRR results are lower for plans with RAP compared to plans without DSM. Plan B, with renewable expansion and RAP DSM has the lowest PVRR followed very closely by Plan P, which include the Sioux and Rush Island early retirements. Plan F (No DSM-Nuclear) exhibits the highest PVRR and the highest levelized rates followed by Plan E (No DSM-Pumped Hydro), which has the second highest PVRR, and by Plan I (MAP DSM-Res Compliance), which has the second highest levelized rates. Results for other performance measures can be found in Chapter 9 - Appendix A.

***

Figure 9.9 Probability-Weighted PVRR Results[35]



***

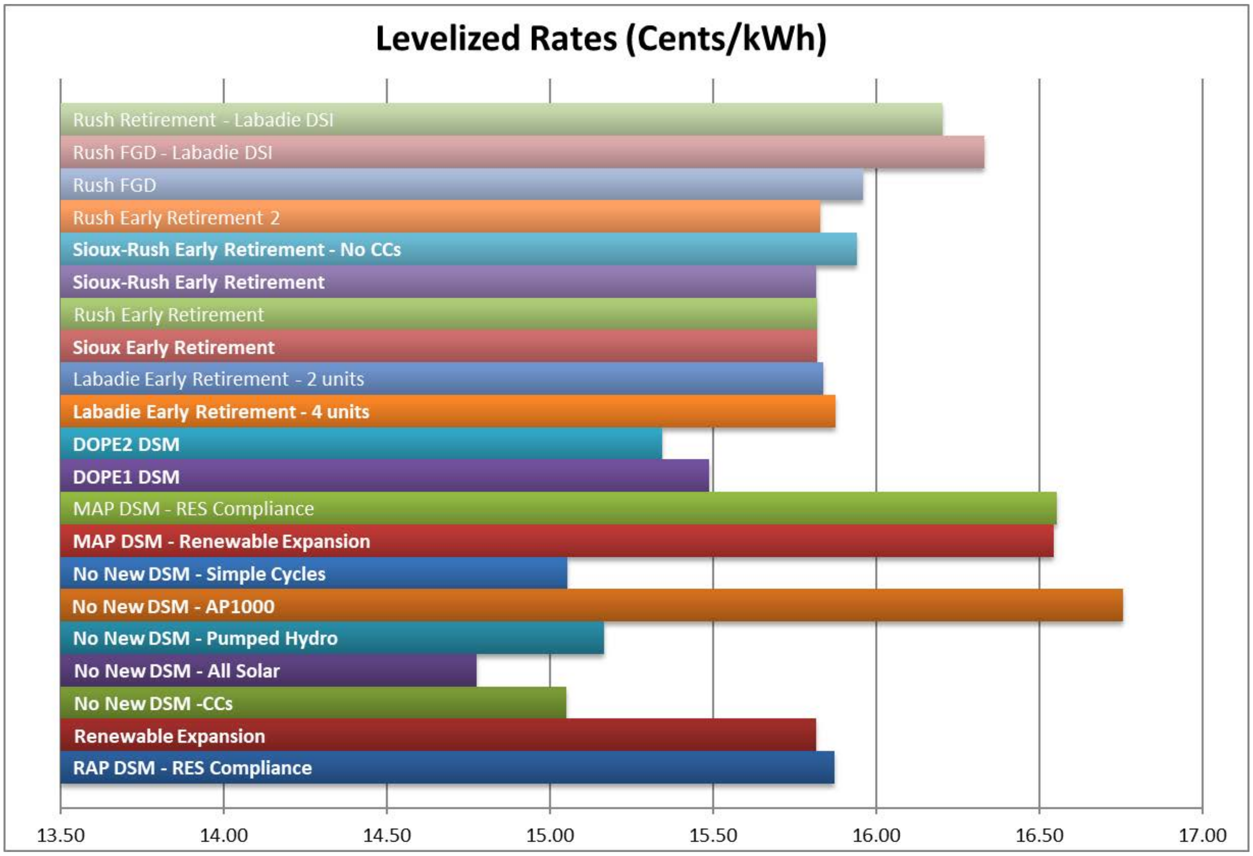
[35] All plans include RAP DSM portfolio unless otherwise noted.

HIGHLY CONFIDENTIAL

Schedule MM-S7

***

Figure 9.10 Probability-Weighted Levelized Rate Results[36]



***

If decision making were solely based on PVRR and levelized rate impacts, then the analysis would be complete at this point. Since decision making is multi-dimensional, Ameren Missouri created a scorecard that embodies its planning objectives to evaluate the performance of alternative resource plans. With 21 alternative resource plans, Ameren Missouri can take a closer look at the performance of the plans by evaluating their relative strengths and weaknesses in meeting our planning objectives and whether other factors may be important in the selection of the preferred resource plan. Chapter 10 – Strategy Selection includes the additional analysis and decision-making considerations that lead to the selection of the Resource Acquisition Strategy.

[36] All plans include RAP DSM portfolio unless otherwise noted.

HIGHLY CONFIDENTIAL
Schedule MM-S7

9.7 Conclusions from Integration and Risk Analysis

Below are several conclusions from the integration and risk analysis.

- RAP DSM results in the lowest PVRR compared to plans with different levels of DSM.
- Inclusion of DSM resources in general results in lower costs than the supply-side alternatives. This finding demonstrates that using an avoided capacity curve that excludes capacity impacts of DSM resources for cost effectiveness analyses (as explained in Chapter 2) is appropriate. Using a more restrictive capacity curve could have resulted in screening out DSM resources that ultimately prove to be the lowest cost option when compared to supply-side alternatives.
- Sioux 2028 and Rush Island 2039 retirement results in the lowest cost among the early retirement options while early retirement of Labadie's four units by the end of 2028 results in the highest costs among the same plans.
- *****Adding an FGD and/or DSI result in significantly higher costs and levelized rates. Retirement of Rush Island Energy Center by the end of 2024 is less costly than the energy center modifications.*****
- Plans with additional renewable resources beyond those included for RES compliance as in Plans B and H reduce costs and customer rates. Coupling even more renewable resources with batteries, on the contrary, results in higher cost and levelized rates.[37]
- Plan D, which assumes all future resource needs are met with only renewable resources, performs better than it did in the previous IRP due to reductions in the cost of solar resources; it is the 10th most costly alternative resource plan. From a cost standpoint, it is very competitive with other supply-side resources.
- Wind, solar, and natural gas combined cycle resources are attractive options for development due to their competitive overall cost, relatively low capital cost, and relatively short lead time.
- *****The five highest cost alternative resource plans are those with no DSM or with FGD and DSI additions at the two energy centers.***** The alternative resource plan including new nuclear is by far the most costly.

[37] 20 CSR 4240-22.060(4)(E)

9.8 Resource Plan Model

Ameren Missouri has used a modular approach to modeling for this IRP as it did in the 2017 IRP. Instead of using MIDAS or other off-the-shelf alternatives for integration and risk analyses, Ameren Missouri continues to use a combination of stand-alone models for 1) production costing, 2) market settlements, 3) revenue requirements, and 4) financial statements. Items 2-4 on this list are collectively referred to as the “Financial Model.” This approach permitted analysts maximum flexibility, customization and trouble-shooting capabilities. It also lends itself to greater transparency for stakeholders by limiting the use of proprietary third-party software.

Ameren Missouri used a generation simulation model from Simtec, Inc., typically referred to as RTSim ("Real-Time Simulation") for production cost modeling.[38] RTSim provides a realistic simulation of an electric generating system for a period of a few days to multiple years.

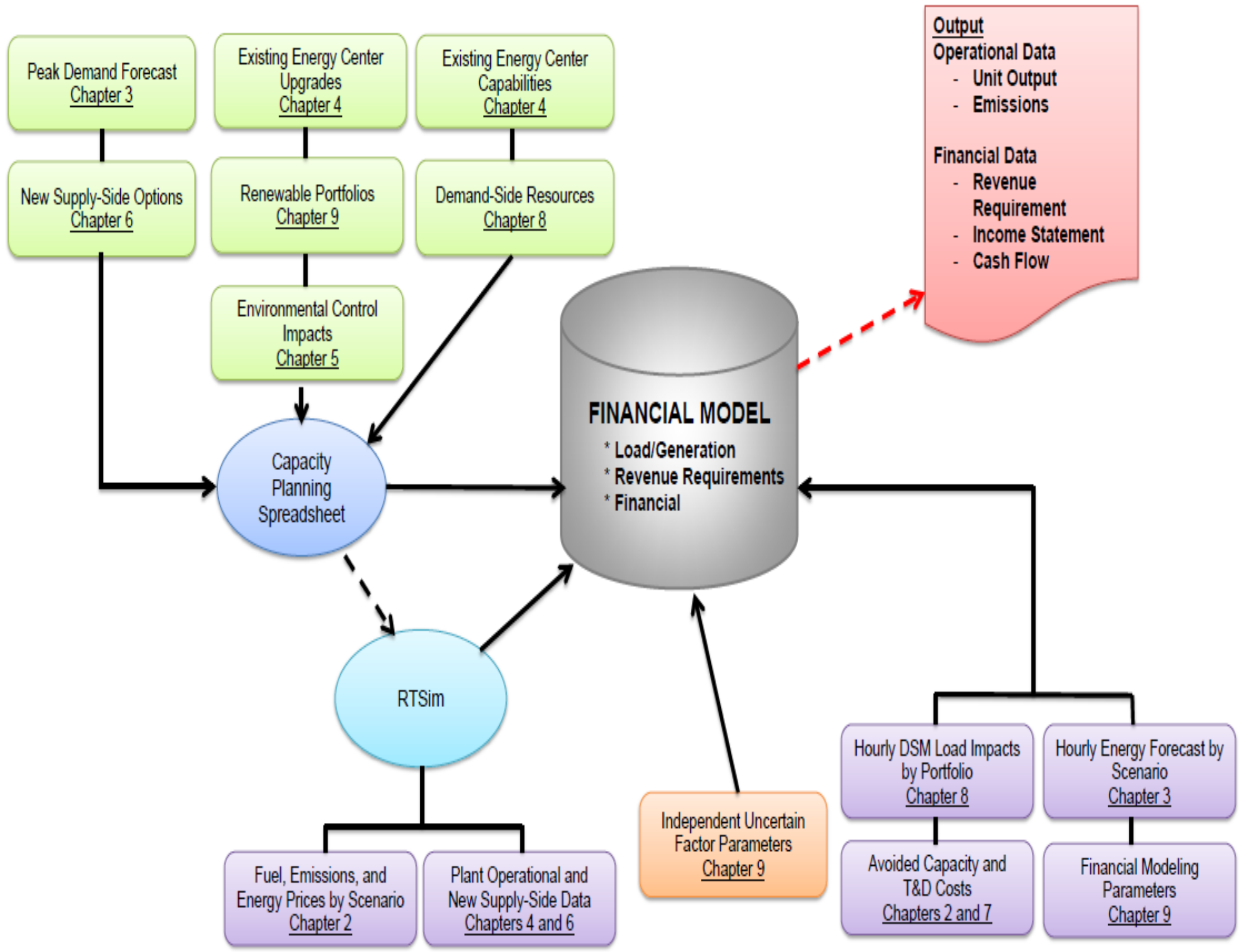
RTSim simulates hourly chronological dispatch of all system generating units, including unit commitment logic that is consistent with the operational characteristics and constraints of system resources. The model plans are based on a capacity planning spreadsheet, which was used to determine the timing of new resources. The RTSim model contains all unit operating variables required to simulate the units. These variables include, but are not limited to, heat rates, fuel costs, variable operation and maintenance costs, emission rates, emission allowance costs, scheduled maintenance outages, and full and partial forced outage rates. The generation fleet is dispatched competitively against market prices. The multi-area mode of the Ventyx Midas® model was used for the creation of forward price curves as described in Chapter 2.

Ameren Missouri developed its own revenue requirements and financial model using Microsoft Excel. This model incorporates the capacity position and RTSim outputs, as well as other financial aspects regarding costs external to the direct operation of units and other valuable information that is necessary to properly evaluate the economics of a resource portfolio. The financial portion of the model produces bottom-line financial statements to evaluate profitability and earnings impacts along with revenue requirement and various financial and credit metrics.

Figure 9.11 shows how the various assumptions are integrated into the financial model.

[38] 20 CSR 4240-22.060(4)(H)

Figure 9.11 Resource Plan Model Framework[39]



Future Plans for Modeling Tools

Ameren Missouri plans to continue to evaluate options for modeling tools for use in its resource planning process. Having developed a modular approach to our modeling, we have the flexibility to evaluate models with varying degrees of capabilities (production costing, market settlements, revenue requirements, and financial statements) that can be used in place of, and/or in combination with, the current modules. As a result, we expect that our modeling needs over time will be characterized more by evolution rather than the deployment of a single integrated solution. Our current modular approach was in large part an outcome of our evaluation of solutions that are currently commercially

[39] 20 CSR 4240-22.060(4)(H)

Schedule MM-S7

available. For example, we were unable to identify any available integrated solutions that produce full financial statements other than MIDAS, which is no longer being developed by Ventyx. Our current approach also allows us to expand our review of production costing solutions beyond those used primarily for long-term resource planning. We are currently using a production cost modeling software PowerSIMM for use in our fuel budgeting and short term trading support analysis which has the potential to support longer term analysis like the IRP.

We expect to continue our efforts to improve the efficiency, effectiveness, and transparency of our modeling tools into 2021. The nature and timing of any changes we make will largely be a function of our assessment of the currently available options. As we consider these options, we plan to share thoughts with other Missouri utilities and with our stakeholder group. This may or may not provide opportunities to move to a common modeling platform. Ameren Missouri will remain open to such an outcome while ensuring that its own tools and processes are able to support our business needs and objectives.

9.9 Compliance References

Schedule MM-S7