

2025 RES Retail Rate Impact (“RRI”) Filing

The Empire District Electric Company (“Liberty-Empire”) filed its 2025 Missouri triennial Integrated Resource Plan compliance filing (“2025 IRP”) on April 1, 2025, in File No. EO-2024-0280. The 2025 IRP represents Liberty-Empire’s most recent electric utility resource planning analysis. Pursuant to 20 CSR 4240-22.100 (the “Rule”), Liberty-Empire used the 2025 IRP analysis to develop the assumptions regarding projected renewable energy resource additions.

As part of the process to perform analysis for the changes established in the 2025 IRP, Liberty-Empire refreshed its outlook for key parameters to capture changes in market dynamics since the filing of the 2024 IRP Annual Update. These include load and capacity reserve margin (SPP market and Liberty-Empire territory), capacity accreditation, cost of new builds, natural gas prices, and emissions prices. These updates were also used to inform a revised outlook for SPP retirements, new builds, and energy market pricing. Liberty-Empire found that long-term SPP energy market pricing under Base and Low/No carbon cases remained largely similar as those used in the 2024 IRP Annual Update. In place of the High carbon case used for the 2024 IRP Annual Update, Liberty-Empire introduced a new market pricing case predicted on potential implementation of the EPA’s recently proposed regulations for greenhouse gas emissions from power generation (“EPA GHG rule”).¹ Compared to the previous High carbon case, SPP energy market pricing under the EPA GHG rule case results in a substantially lower price level (i.e. \$62/MWh for EPA GHG rule vs \$110/MWh for previous High carbon case by 2041). Further detail about these factors can be found in the 2025 IRP report. Liberty-Empire updated the PVRR results used for purposes of the RES RRI filing on the basis of these outlook revisions.

Liberty-Empire’s 2025 RES RRI analysis contained herein calculates the retail rate impact (“RRI”) on an incremental basis for each planning year based on procurement or development of renewable energy resources averaged over the next ten (10) years. The RES RRI is calculated by subtracting the total retail revenue requirement incorporating an incremental non-renewable generation and purchased power portfolio from the total retail revenue requirement including an incremental RES-compliant generation and purchased power portfolio.

Section 5(B) of the Rule states that the non-renewable generation and purchase power portfolio shall be determined by adding, to the utility’s existing generation and purchased power resource portfolio excluding all renewable resources, additional non-renewable resources sufficient to meet the utility’s needs on a least-cost basis for the next ten (10) years. Consistent with the Rule, Liberty-Empire defined the non-renewable generation and purchased power portfolio (“Plan 1 – No RES”) as the utility’s existing generation and purchased power resource portfolio excluding all renewable resources except those owned or contracted prior to September 30, 2010,² plus additional non-renewable resources sufficient to meet the utility’s needs on a least-cost basis for the next ten years. To develop the Plan 1 – No RES portfolio, Liberty-Empire removed the following renewable resources from Liberty-Empire’s existing portfolio:

¹ The EPA GHG rule scenario involves retiring all coal units by 2032 while capping any new combined cycle gas turbine and single cycle gas turbine units at 40% and 20% capacity factor, respectively.

² Pursuant to Rule Section 5(A), because the Ozark Beach hydro facility, the Meridian Way Windfarm PPA and the Elk River Windfarm PPA were all owned or contracted prior to September 30, 2010, they were kept in the non-renewable generation and purchase power portfolio.

Resource Name	Resource Type	ICAP MW by 2044
Neosho Ridge	Wind	301
North Fork Ridge	Wind	149
Kings Point	Wind	149
Firm Solar Development Project	Solar	175

To maintain a minimum capacity margin³ over the modeling horizon, 200 MW natural gas aeroderivative (“aero”) combustion turbine (“CT”) capacity was added in 2026, 27 MW of small industrial natural gas CT was added in 2026, 50 MW of natural gas aero CT was added in 2028, 150 MW of natural gas aero CT was added in 2029, 50 MW of natural gas aero CT was added in 2032, 240 MW of natural gas frame CT was added in 2036, 50 MW of natural gas aero CT was added in 2041, and 40 MW of natural gas distributed reciprocating engine was added across the 2040-2044 time frame.

Rule 5(B) states that the RES-compliant portfolio shall be determined by adding to the utility’s existing generation and purchased power resource portfolio an amount of least cost renewable resources sufficient to achieve RES requirements and an amount of least-cost non-renewable resources, the combination of which is sufficient to meet the utility’s needs for the next ten (10) years. Because Liberty-Empire’s existing portfolio including all renewable resources already more than achieves RES requirements, Liberty-Empire added to the current existing portfolio a least-cost amount of non-renewable resources (“Plan 1”). To maintain a minimum capacity margin⁴ over the modeling horizon, Plan 1 adds 27 MW of small industrial natural gas CT in 2026, 150 MW of natural gas aero CT was added in 2029, 50 MW of natural gas aero CT was added in 2032, 240 MW of natural gas frame CT was added in 2036, 50 MW of natural gas aero CT was added in 2041, and 40 MW of natural gas distributed reciprocating engine was added across the 2040-2044 time frame. Relative to Plan 1 – No RES, Plan 1 also includes 600 MW wind already operating since 2020-2021 and 175 MW of solar planned for 2028.

Rule Section 5(B)4 states that the assumptions for this filing should utilize the most recent electricity utility resource planning analysis. Liberty-Empire used power market prices, natural gas fuel prices, and emissions prices from its most recent electric utility resource planning analysis assumptions. Consistent with the 2025 IRP, a 40% probability weighting was given to the Low carbon emissions cost scenario and a 40% probability weighting was given to the Base carbon emissions cost scenarios. A third emissions cost scenario with a 20% probability weighting was represented by implementation of the EPA’s GHG rule.⁵

Table 1 includes the expected value of costs associated with carbon emissions used in this analysis. Figure 1 includes forecast power prices for the EDE_EDE load node with impacts for the three emissions cost cases.

³ The 2025 IRP analysis applied an accredited capacity (ACAP) resource adequacy construct being implemented by SPP. Based on SPP guidance, installed reserve margin requirements are assumed to increase from 15% in 2024 to 17% by 2029 for summer, and initiated at 36% in 2026 and increasing to 44% by 2029. The construct is still being developed by SPP and could evolve further.

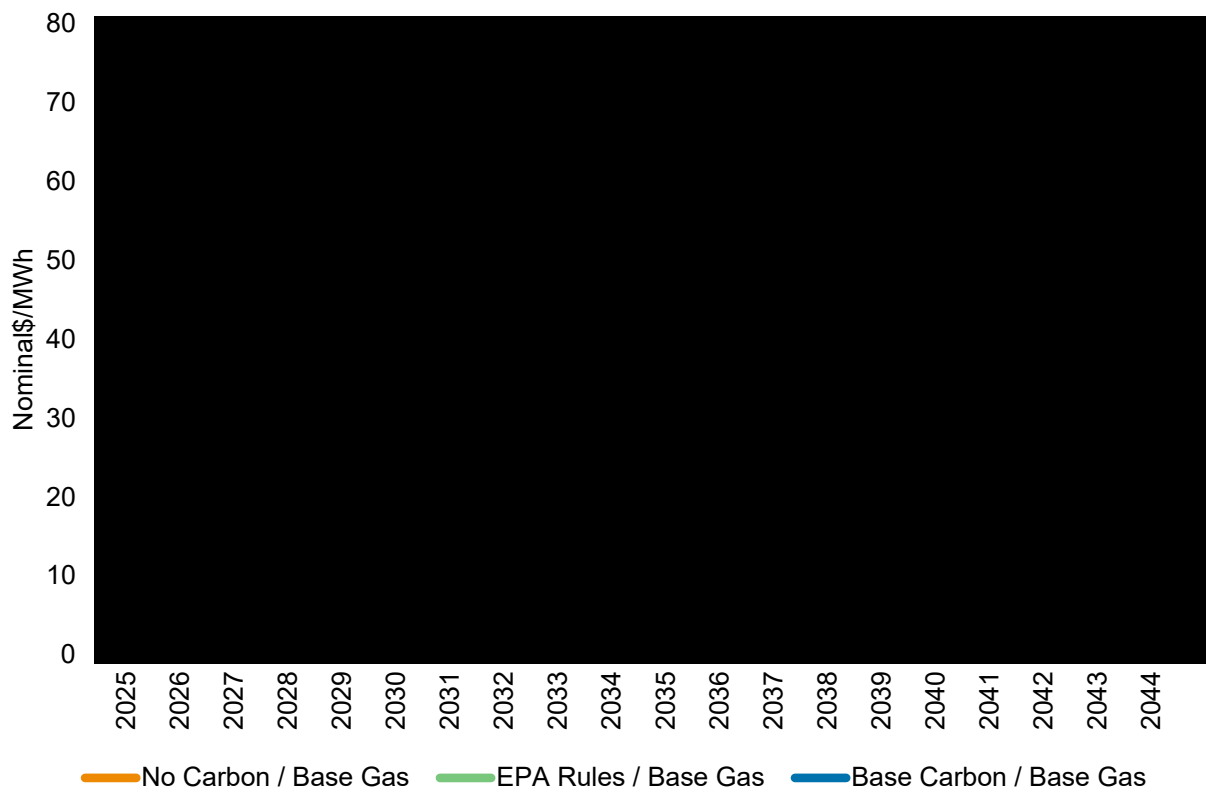
⁴ *ibid*

⁵ The EPA GHG rule scenario involves retiring all coal units by 2032 while capping any new combined cycle gas turbine and single cycle gas turbine units at 40% and 20% capacity factor, respectively.

Table 1 - Expected Value of Emissions Cost

Year	Emissions Cost (\$Nom/Short Ton)		EPA Rules – 20%
	No Carbon - 40%	Base Carbon - 40%	
2025	-	-	Cost of emissions implied in power price impacts resulting from early coal retirements and limited running time for new gas plants.
2026	-	-	
2027	-	-	
2028	-	-	
2029	-	-	
2030	-	-	
2031	-		
2032	-		
2033	-		
2034	-		
2035	-		
2036	-		
2037	-		
2038	-		
2039	-		
2040	-		
2041	-		
2042	-		
2043	-		
2044	-		

Exhibit 2 - EDE Annual Average Power Prices



Results:

The following table shows the calculation for the average 10-year compliance spend over the 10-year period (2025-2034) as required by Rule 5(B). The RRI Budget is calculated as 1% of the Plan 1 Revenue Requirement. Actual Compliance Spend is calculated as the difference between the PVRRs of Plan 1 – No RES and Plan 1 in each year. As indicated in the table, the average Actual Compliance Spend for the 10-year period does not exceed the budgeted 1% RRI for the 10-year period. In fact, the negative Compliance Spend indicates that the revenue requirement of Plan 1 - No RES is greater than that of Plan 1. The primary driver of the relatively lower cost of Plan 1 is a material increase in capital cost for thermal generation used to supplement Plan 1 – No RES, while the cost of the Liberty-Empire's existing wind assets used to achieve RES compliance in Plan 1 remains unchanged. Moreover, as the 10-year analysis window shifts forward by one year, the escalating price of carbon in the Base carbon case results in materially higher costs for the Plan 1 – No RES portfolio relative to Plan 1, due to the higher proportion of thermal gas generation.

Exhibit 3: 2025-2034 Annual Revenue Requirements and RES Compliance Spend

<i>Dollars in millions</i>	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Total
RRI Budget (2025-2034)											
Actual Compliance Spend (2025-2034)											
Revenue Requirement (2025-2034)											
Budget (% of RR)											
Actual Compliance Spend (% of RR)											

The following tables summarize the Retail Rate Impact calculation, including the annual carry-forward amount required by Rule 5(G).

Exhibit 4: 2025-2034 RRI Calculation Period

2025-2034 RRI Calculation Period		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 5: 2026-2035 RRI Calculation Period

2026-2035 RRI Calculation Period		2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 6: 2027-2036 RRI Calculation Period

2027-2036 RRI Calculation Period		2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 7: 2028-2037 RRI Calculation Period

2028-2037 RRI Calculation Period		2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 8: 2029-2038 RRI Calculation Period

2029-2038 RRI Calculation Period		2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 9: 2030-2039 RRI Calculation Period

2030-2039 RRI Calculation Period		2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 10: 2031-2040 RRI Calculation Period

2031-2040 RRI Calculation Period		2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 11: 2032-2041 RRI Calculation Period

2032-2041 RRI Calculation Period		2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 12: 2033-2042 RRI Calculation Period

2033-2042 RRI Calculation Period		2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												

Exhibit 13: 2034-2043 RRI Calculation Period

2034-2043 RRI Calculation Period		2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)												
	Annual 1% (\$MM)												
	Actual Costs of Compliance												
	Annual Over (Under)												
	Plus Prior Carryover												
	Cumulative Carryover												