

The Empire District Electric Company – Liberty Utilities Central  
 2022 RES RRI Filing 20 CSR 4240-20.100  
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### ATTACHMENT 9 and 3: RES RETAIL RATE IMPACT

#### 2022 RES Retail Rate Impact (“RRI”) Filing

The Empire District Electric Company – Liberty Utilities Central (“Liberty-Empire”) intends to file its 2022 Missouri triennial Integrated Resource Plan compliance filing (“2022 IRP”) on April 1, 2022 in File No. EO-2021-0331. The 2022 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 2022 IRP analysis to develop the assumptions regarding projected renewable energy resource additions.

Liberty-Empire’s 2022 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,<sup>1</sup> 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:

Resource Name	Resource Type	ICAP MW by 2041
Neosho Ridge	Wind	301
North Fork Ridge	Wind	149
Kings Point	Wind	149
Prosperity Solar	Dist. Solar	2.5

To maintain a minimum capacity margin of 12% over the modeling horizon, 60 MW natural gas reciprocating engine (“RICE”) was added in 2022, 30 MW RICE was added in 2025, 180 MW RICE was added in 2035, 30 MW RICE was added in 2037, and 240 MW of a natural gas combustion turbine (“CT”) frame was added in 2039.

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 margin of 12% over the modeling horizon, Plan 1

<sup>1</sup> 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.

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adds 30 MW RICE in 2025, 150 MW RICE in 2035, and 240 MW CT Frame. Relative to Plan 1 – No RES, Plan 1 also includes 600 MW wind in 2020-2021.

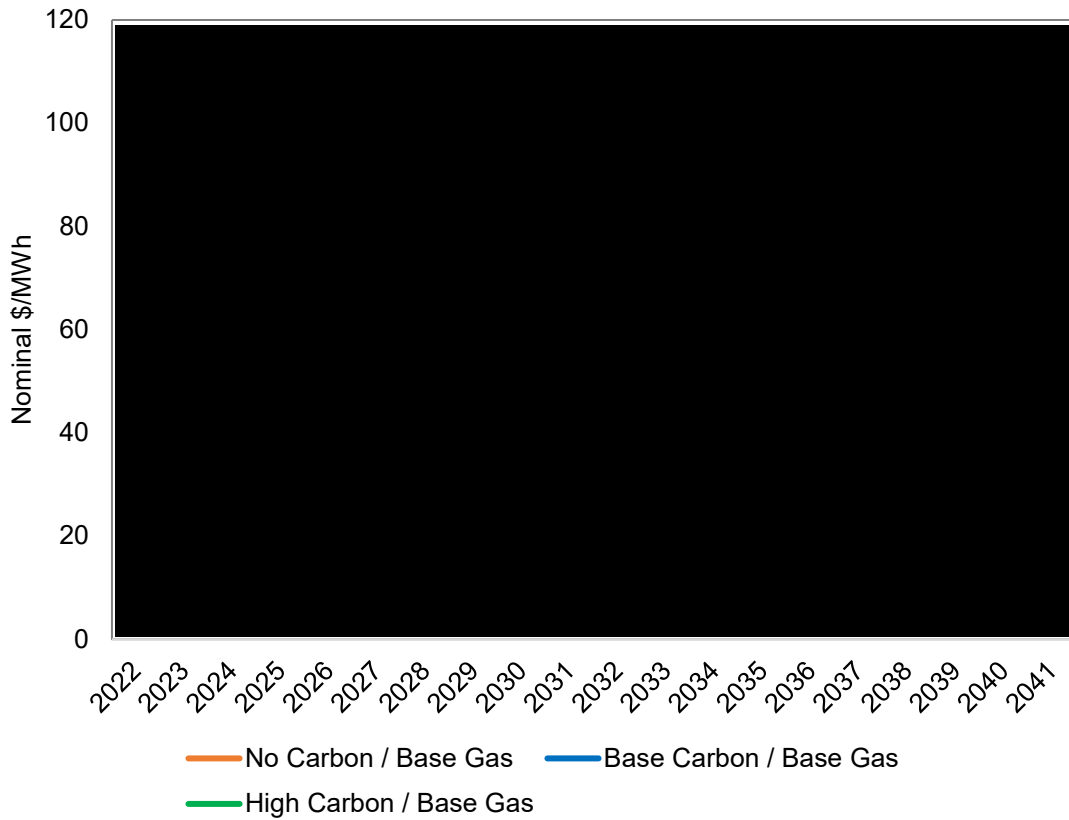
Rule Section 5(B)4 states that the assumptions for this filing should utilize the most recent electricity utility resource planning analysis. Liberty-Empire used power market prices, natural gas fuel prices, and emissions prices from its most recent electric utility resource planning analysis assumptions. Consistent with the 2022 IRP, a 20% probability weighting was given to the Low carbon emissions cost scenario and a 40% probability weighting was given to both the Base and High carbon emissions cost scenarios.

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 and without the impact of a carbon tax.

Table 1: Expected Value of Carbon Tax (Nom\$/Short Ton)

	Carbon Tax (\$Nom/Short Ton)			Expected Value
	No Carbon - 20%	Base Carbon - 40%	High Carbon – 40%	
2021	-	-	-	-
2022	-	-	-	-
2023	-	-	*	*
2024	-	-	*	*
2025	-	*	*	*
2026	-	*	*	*
2027	-	*	*	*
2028	-	*	*	*
2029	-	*	*	*
2030	-	*	*	*
2031	-	*	*	*
2032	-	*	*	*
2033	-	*	*	*
2034	-	*	*	*
2035	-	*	*	*
2036	-	*	*	*
2037	-	*	*	*
2038	-	*	*	*
2039	-	*	*	*
2040	-	*	*	*

\* Exhibit 2 EDE\_EDE Annual Average Power Prices (Nom\$/MWh) CONFIDENTIAL INFORMATION



**Results:**

The following table shows the calculation for the average 10-year compliance spend over the 10-year period (2022-2031) as required by Rule 5(B). The RRI Budget is calculated as 1% of the Plan 8 Revenue Requirement. Actual Compliance Spend is calculated as the difference between the PVRRs of Plan 1 – No RES and Plan 1 in each year. The average Actual Compliance Spend for the 10-year period exceeds the budgeted 1% RRI for the 10-year period due to the addition of 600 MW already existing wind in Plan 1 relative to Plan 1 – No RES. However, the excess amount of 0.1% is relatively minor relative to the 1% threshold.

This has been revised from the original filing which showed a higher RES RRI of 9.6%. The original filing was based on a 2022 beginning of year plant in service book value of \$1,131M for the Neosho Ridge, North Fork Ridge, and Kings Point wind projects, an amount representative of the full capital cost of wind not accounting for the value of the federal Production Tax Credit. The revised RES RRI of 1.1% is based on a 2022 beginning of year plant in service book value of \$621M for the same wind projects, representative of a capital cost of wind which accounts for the tax equity value generated by the federal Production Tax Credit. The lower book value drives a lower RES RRI.

*\* Exhibit 3: 2022-2031 Annual Revenue Requirements and RES Compliance Spend*

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<i>Dollars in millions</i>	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	Total
RRI Budget (2022-2031)	*	*	*	*	*	*	*	*	*	*	*
Actual Compliance Spend (2022-2031)	*	*	*	*	*	*	*	*	*	*	*
Revenue Requirement (2022-2031)	*	*	*	*	*	*	*	*	*	*	*
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 2022-2031 RRI Calculation Period CONFIDENTIAL INFORMATION*

2022-2031 RRI Calculation Period		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)	[REDACTED]											
	Annual 1% (\$MM)	[REDACTED]											
		[REDACTED]											
		[REDACTED]											
	Actual Costs of Compliance	[REDACTED]											
	Annual Over (Under)	[REDACTED]											
	Plus Prior Carryover	[REDACTED]											
	Cumulative Carryover	[REDACTED]											

*\* Exhibit 5 2023-2032 RRI Calculation Period CONFIDENTIAL INFORMATION*

2023-2032 RRI Calculation Period		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)	[REDACTED]											
	Annual 1% (\$MM)	[REDACTED]											
		[REDACTED]											
		[REDACTED]											
	Actual Costs of Compliance	[REDACTED]											
	Annual Over (Under)	[REDACTED]											
	Plus Prior Carryover	[REDACTED]											
	Cumulative Carryover	[REDACTED]											

*\* Exhibit 6 2024-2033 RRI Calculation Period CONFIDENTIAL INFORMATION*

2024-2033 RRI Calculation Period		2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-Year	Cumulative
	Baseline Revenue Requirement (\$MM)	[REDACTED]											
	Annual 1% (\$MM)	[REDACTED]											
		[REDACTED]											
		[REDACTED]											
	Actual Costs of Compliance	[REDACTED]											
	Annual Over (Under)	[REDACTED]											
	Plus Prior Carryover	[REDACTED]											
	Cumulative Carryover	[REDACTED]											

*\* Exhibit 7 2025-2034 RRI Calculation Period CONFIDENTIAL INFORMATION*

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

*\* Exhibit 8 2026-2035 RRI Calculation Period CONFIDENTIAL INFORMATION*

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

*\* Exhibit 9 2027-2036 RRI Calculation Period CONFIDENTIAL INFORMATION*

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

*\* Exhibit 10 2028-2037 RRI Calculation Period CONFIDENTIAL INFORMATION*

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

*\* Exhibit 11 2029-2038 RRI Calculation Period CONFIDENTIAL INFORMATION*

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

*\* Exhibit 12 2030-2039 RRI Calculation Period CONFIDENTIAL INFORMATION*

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

*\* Exhibit 13 2031-2040 RRI Calculation Period CONFIDENTIAL INFORMATION*

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