

ATTACHMENT 9 and 3: RES RETAIL RATE IMPACT

2023 RES Retail Rate Impact (“RRI”) Filing

The Empire District Electric Company (“Liberty” or “Company”) filed its 2022 Missouri triennial Integrated Resource Plan (“2022 IRP”) on April 1, 2022 in File No. EO-2021-0331. The 2022 IRP represents Liberty’s most recent electric utility resource planning analysis. Pursuant to 20 CSR 4240-22.100 (the “Rule”), Liberty used the 2022 IRP analysis to develop the assumptions regarding projected renewable energy resource additions. Liberty filed its 2023 IRP Annual Update compliance filing (“2023 IRP Annual Update”) in March 2023 in File No. EO-2023-0294. Liberty’s 2023 IRP Annual Update reviews the 2022 IRP preferred plan and the steps the Company has taken toward implementation since the filing of the 2022 IRP. As further described in the 2023 IRP Annual Update, Liberty has taken significant steps toward implementing its 2022 IRP preferred plan and does not expect any notable changes to the plan at this time.

As a part of developing the 2023 IRP Annual Update, Liberty identified how the uncertain factors identified as critical in the 2022 IRP have changed since the filing of the 2022 IRP. The identified critical uncertain factors were load, cost of new builds, natural gas prices, and emissions price and pressure to reduce carbon. In the 2023 IRP Annual Update, the critical uncertain factors were compared against the assumptions used in Liberty’s most recent and approved rolling six-year plan, which is internally referred to as the six-year budget and which is developed on an annual basis as a part of Liberty’s ongoing internal planning process. Liberty found that the values of fuel prices used in the latest six-year plan were higher than the 2022 IRP Base Case and more aligned with the 2022 IRP High Case, but not significantly enough to require re-modeling the IRP alternative plans in either the 2023 IRP Annual Update or in the 2023 RES filing. Additionally, the market power prices and fuel prices used for the 2023 IRP Annual Update were developed for internal planning and budgeting purposes and do not represent a fundamental long-term view of the SPP market. Liberty also found that new build capital costs for renewables have escalated more than expected in the 2022 IRP Base Case, although this effect has been largely offset by the enhanced tax credit provisions of the Inflation Reduction Act. Thus, Liberty did not update the PVRR results used for purposes of the RES RRI filing.

Liberty’s 2023 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 defined the non-renewable generation and purchased power portfolio (“Plan 1 – No RES”)¹ as the utility’s existing generation and purchased power resource portfolio excluding all renewable resources except those

¹ This analysis was performed on the basis of Plan 1 derived for the 2022 IRP. Plan 1 was not revised to reflect recent changes to the resource adequacy construct identified for the 2023 Annual Update, including accreditation and reserve margin. The substitution of a 30 MW gas turbine in place of RICE units at the Riverton site in 2025 was also not applied. These adjustments would yield similar incremental changes to thermal resources for Plan 1 and Plan 1 – No RES, resulting in an unchanged comparison baseline. Therefore, the basis of Plan 1 from the 2022 IRP remains a robust point of comparison for the RES Retail Rate Impact analysis.

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 removed the following renewable resources from Liberty’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, a 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’s existing portfolio including all renewable resources already more than achieves RES requirements, Liberty 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 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 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.

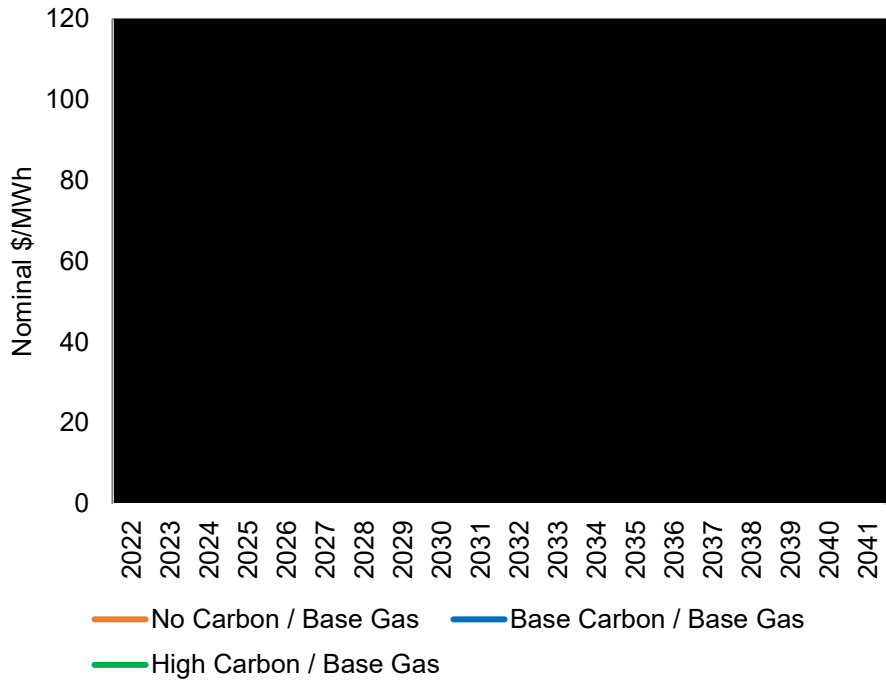
Table 1 includes the expected value of costs associated with carbon emissions used in this analysis. Exhibit 1 includes forecast power prices for the EDE_EDE load node with and without the impact of a carbon tax.

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.

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

	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 1: 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 (2023-2032) 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 PVRs 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.

***Exhibit 2: 2023-2032 Annual Revenue Requirements and RES Compliance Spend**

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<i>Dollars in millions</i>	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total
RRI Budget (2023-2032)											
Actual Compliance Spend (2023-2032)											
Revenue Requirement (2023-2032)											
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 3: 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]											
	Actual Costs of Compliance	[REDACTED]											
	Annual Over (Under)	[REDACTED]											
	Plus Prior Carryover	[REDACTED]											
	Cumulative Carryover	[REDACTED]											

Exhibit 4: 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]											
	Actual Costs of Compliance	[REDACTED]											
	Annual Over (Under)	[REDACTED]											
	Plus Prior Carryover	[REDACTED]											
	Cumulative Carryover	[REDACTED]											

Exhibit 5: 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 6: 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 7: 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 8: 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 9: 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 10: 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 11: 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]											

Exhibit 12: 2032-2041 RRI Calculation Period CONFIDENTIAL INFORMATION

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												