

**ATTACHMENT 9 and 3: RES RETAIL RATE IMPACT**

**2021 RES Retail Rate Impact (“RRI”) Filing**

The Empire District Electric Company – Liberty Utilities Central (“Liberty-Empire”) filed its most recent Missouri triennial Integrated Resource Plan compliance filing (“2019 IRP”) in June 2019 in File No. EO-2019-0049, consistent with 4 CSR 240-22. Liberty-Empire filed its 2020 IRP Annual Update compliance filing (“2020 IRP Annual Update”) in March 2020 in File No. EO-2020-0049. As of the writing of this 2021 RES RRI report, Liberty-Empire also plans to submit its 2021 IRP Annual Update compliance filing (“2021 IRP Annual Update”) in March 2021, consistent with 4 CSR 240-22.080(3). Liberty-Empire’s 2021 IRP Annual Update reviews the 2019 IRP preferred plan and the steps the Company has taken toward implementation since the filing of the 2019 IRP and of the 2020 IRP Annual Update. As further described in the 2021 IRP Annual Update, Liberty-Empire has taken significant steps toward implementing its 2019 IRP preferred plan and does not expect any notable changes to the plan at this time.

As a part of developing the 2021 IRP Annual Update, Liberty-Empire identified how the uncertain factors identified as critical in the 2019 IRP have changed since the filing of the 2021 IRP and of the 2020 IRP Annual Update. The identified critical uncertain factors were load; environmental standards and carbon prices; market power prices and fuel prices; and capital costs, transmission, and interest rates. In the 2021 IRP Annual Update, the critical uncertain factors were validated against the assumptions used in Liberty-Empire’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-Empire’s ongoing internal planning process. Liberty-Empire found that the values of the market power prices and fuel prices used in the latest six-year plan were lower than the 2019 IRP Base Case and slightly lower than the 2019 IRP Low Case, but not significantly enough to require re-modeling the IRP alternative plans in either the 2021 IRP Annual Update or in the 2021 RES filing. Additionally, the market power prices and fuel prices used in for the 2021 IRP Annual Update were developed for internal planning and budgeting purposes and do not represent a fundamental long-term view of the SPP market. Thus, Liberty-Empire did not update the PVRR results used for purposes of the RES RRI filing.

Liberty-Empire’s 2021 RES RRI analysis contained herein calculates the current year’s RRI and the RRI of the next ten (10) years per Section 5 of Missouri 4 CSR 240-20.100 (the “Rule”). According to the Rule, the RES RRI is determined by subtracting the total retail revenue requirement including 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.

Consistent with the Rule, Liberty-Empire defined the non-renewable generation and purchased power portfolio (“Plan 4 – No RES”) as the utility’s existing generation and purchased power resource portfolio excluding all renewable resources, plus additional non-renewable resources sufficient to meet the utility’s needs on a least-cost basis for the next ten years. To calculate the total retail revenue requirement of the Plan 4 – No RES portfolio, Liberty-Empire removed the following renewables resources from the 2019 IRP preferred plan:

Resource Name	Resource Type	Year Removed	UCAP MW
Elk River Meridian Way	Wind	2020	31
Ozark Beach	Hydro	2020	16
Neosho Wind	Wind	2020	91
Community Solar	Solar	2021	0.5
2023 Utility-Scale Solar 2034 Utility-Scale Solar	Solar	2023 2034	50

Resource Name	Resource Type	Year Removed	UCAP MW
2027 Utility-Scale Solar Plus Storage	Solar + Storage	2027	30
2022 Distributed Solar Plus Storage	Solar + Storage	2022	44
2028 Distributed Solar Plus Storage		2028	
2032 Distributed Solar Plus Storage		2032	
2036 Distributed Solar Plus Storage		2036	
<b>Total</b>			262.5

To account for the 262.5 MW reduction in total accredited capacity and to maintain a minimum capacity margin of 12% over the modeling horizon, a 49 MW gas aeroderivative was added in 2020, a 148 MW gas aeroderivative was added in 2027, and a 49 MW gas aeroderivative was added in 2034.

Consistent with the Rule, Liberty-Empire defined the RES-compliant generation and purchased power portfolio (“Plan 4 – RES”) as the utility’s existing generation and purchased power resource portfolio, plus an amount of least-cost renewable resources sufficient to achieve RES standards, plus any additional non-renewable, least-cost resources needed to meet the utility’s needs for the next ten years. To calculate the total retail revenue requirement of the Plan 4 – RES portfolio, Liberty-Empire used the 2019 IRP preferred plan (Plan 4), which complies with this definition and includes renewable resources that meet the RES requirements set forth in the Rule. As required by Rule Section 5(C), rebates made during each calendar year were also included in the cost of generation from renewable energy resources.

Rule Section 5(B)4 states that the assumptions regarding projected renewable energy resource additions must utilize the most recent electricity utility resource planning analysis. As mentioned earlier in this report, and as described further in the 2021 IRP Annual Update filing, due to a relatively small magnitude of change in the values of the updated critical uncertain factors compared to the 2019 IRP, Liberty-Empire did not develop new fundamental commodity prices or re-model Plan 4 – No RES and Plan 4 – RES using market assumptions. Consistent with the Rule language, Liberty-Empire used market and fuel prices from its most recent electric utility resource planning analysis assumptions, which were taken from ABB’s 2018 Fall Midwest Power Reference Case. Consistent with the 2019 IRP, a 50% probability weighting was given to the no-carbon tax scenario and 50% to the carbon tax scenario.

Exhibit 1 includes the expected value of costs associated with carbon emissions used in this analysis. Exhibit 2 includes market prices for the SPP-KSMO market area with and without the impact of a carbon tax beginning in 2026.

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

	Carbon Tax (\$Nom/Short Ton)		
	No Carbon - 50%	Carbon - 50%	Expected Value
2021	*-	-	-
2022	*-	-	-
2023	*-	-	-
2024	*-	-	-
2025	*-	-	-
2026	*-		*
2027	*-		*
2028	*-		*
2029	*-		*
2030	*-		*

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2031	*_		*
2032	*_		*
2033	*_		*
2034	*_		*
2035	*_		*
2036	*_		*
2037	*_		*
2038	*_		*
2039	*_		*
2040	*_		*

Exhibit 2 SPP-KSMO 7x24 Weighted Market Prices (Nom\$/MWh)

**Results:**

The following table shows the calculation for the average 10-year compliance spend over the 10-year period (2021-2030) as required by Rule 5(B). The RRI Budget is calculated as 1% of the Plan 4 Revenue Requirement. Actual Compliance Spend is calculated as the difference between the PVRRs of Plan 4 and Plan 4 – RES 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 3: 2021-2030 Annual Revenue Requirements and RES Compliance Spend*

<i>Dollars in millions</i>	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
RRI Budget (2021-2030)	*										*
Actual Compliance Spend (2021-2030)	*										*
Revenue Requirement (2021-2030)	*										*
Budget (% of RR)	*%										*%
Actual Compliance Spend (% of RR)	*%										*%

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

Exhibit 4 2021-2030 RRI Calculation Period

2021-2030 RRI Calculation Period		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2030 10-Year Budget	Cumulative Budget (2021-2030)
Baseline Revenue Requirement (\$MM)	Annual 1% (\$MM)	*	*	*	*	*	*	*	*	*	*	*	*
Actual Costs of Compliance	Annual Over (Under) Plus Prior Carryover	*	*	*	*	*	*	*	*	*	*	*	Cumulative Costs (2021-2030)
Cumulative Carryover		*	*	*	*	*	*	*	*	*	*	*	*

Exhibit 5 2022-2031 RRI Calculation Period

2022-2031 RRI Calculation Period		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2031 10-Year Budget	Cumulative Budget (2021-2031)
Baseline Revenue Requirement (\$MM)	Annual 1% (\$MM)	*	*	*	*	*	*	*	*	*	*	*	*
Actual Costs of Compliance	Annual Over (Under) Plus Prior Carryover	*	*	*	*	*	*	*	*	*	*	*	Cumulative Costs (2021-2031)
Cumulative Carryover		*	*	*	*	*	*	*	*	*	*	*	*

Exhibit 6 2023-2032 RRI Calculation Period

2023-2032 RRI Calculation Period		2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2032 10-Year Budget	Cumulative Budget (2021-2032)
Baseline Revenue Requirement (\$MM)	Annual 1% (\$MM)	*	*	*	*	*	*	*	*	*	*	*	*
Actual Costs of Compliance	Annual Over (Under) Plus Prior Carryover	*	*	*	*	*	*	*	*	*	*	*	Cumulative Costs (2021-2032)
Cumulative Carryover		*	*	*	*	*	*	*	*	*	*	*	*

Exhibit 7 2024-2033 RRI Calculation Period

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2024-2033 RRI Calculation Period

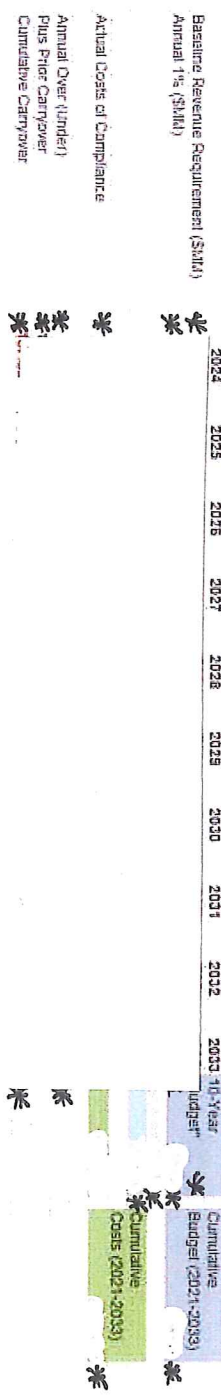


Exhibit 8 2025-2034 RRI Calculation Period

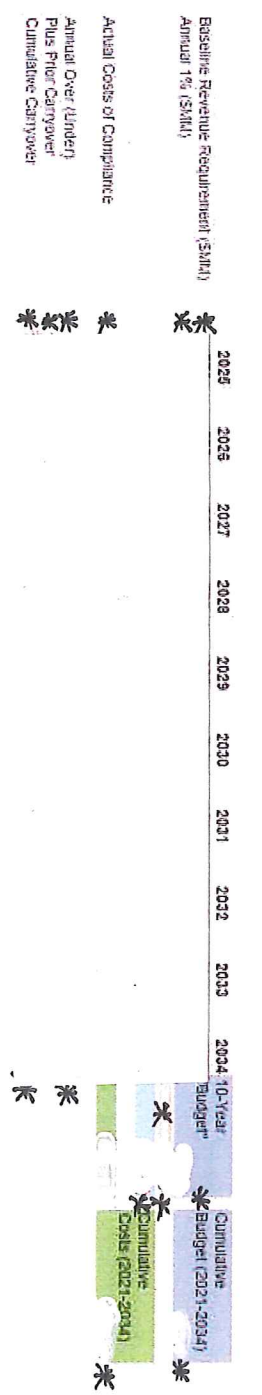


Exhibit 9 2026-2035 RRI Calculation Period

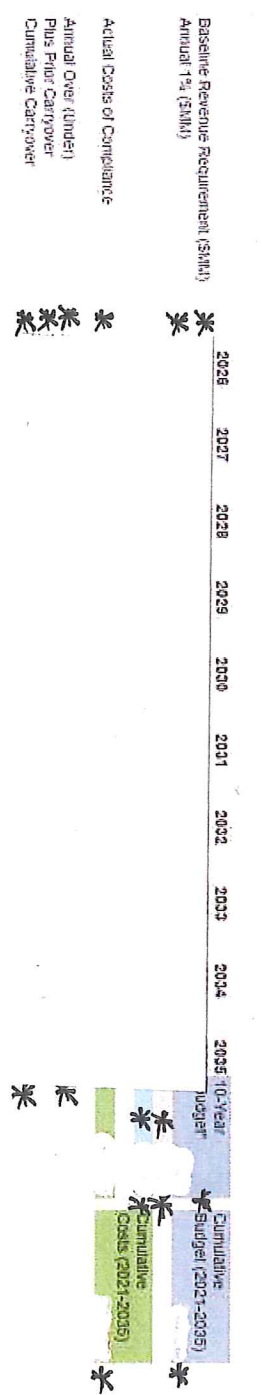
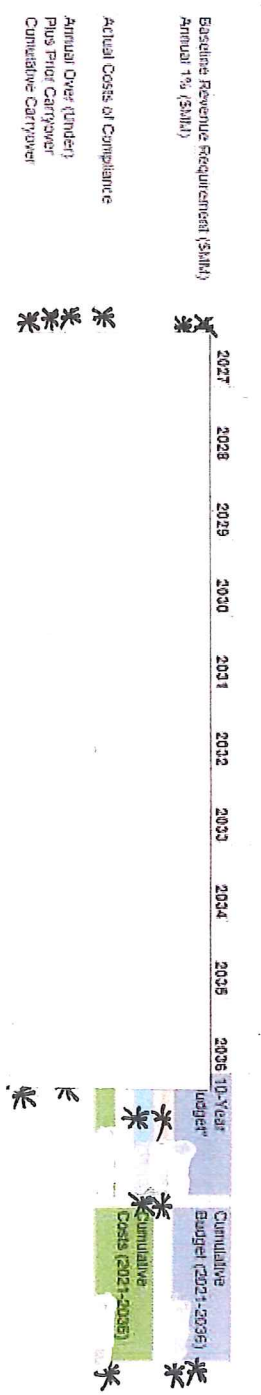


Exhibit 10 2027-2036 RRI Calculation Period



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Exhibit 11 2028-2037 RRI Calculation Period

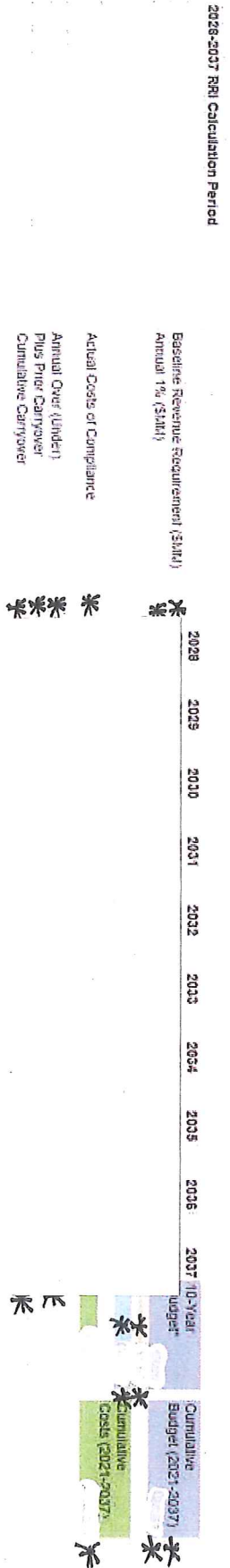


Exhibit 12 2029-2038 RRI Calculation Period

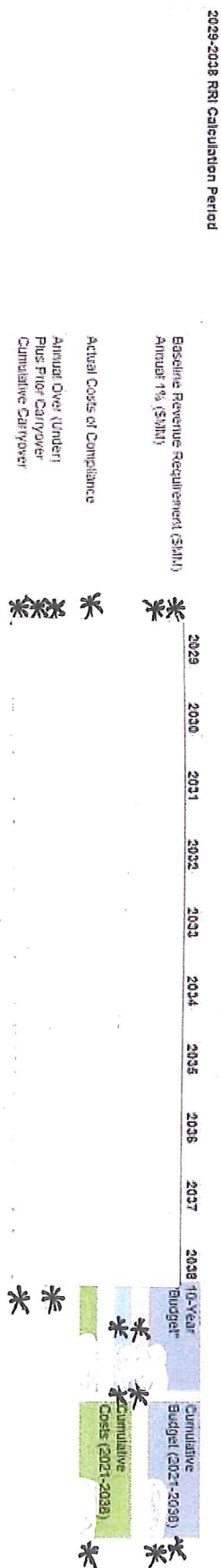


Exhibit 13 2030-2039 RRI Calculation Period

