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ATTACHMENT 9: RES RETAIL RATE IMPACT

2020 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”) on June 28, 2019 in File No. EO-2019-0049, consistent with 4 CSR 240-22. As of the writing of this 2020 RES RRI report, Liberty-Empire also plans to submit its 2020 IRP annual update compliance filing (“2020 IRP Annual Update”) in March 2020, consistent with 4 CSR 240-22.080(3). Liberty-Empire’s 2020 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. As further described in the 2020 IRP Annual Update, Liberty-Empire has taken significant steps toward implementing its 2019 IRP preferred plan since June 2019 and does not expect any notable changes to the plan at this time.

As a part of developing the 2020 IRP Annual Update, Liberty-Empire identified how the uncertain factors identified as critical in the 2019 IRP have changed since the IRP was filed in June 2019. In the 2020 IRP Annual Update, these critical uncertain factors were validated against the assumptions used in Liberty-Empire’s most recent and approved rolling five-year plan, which is internally referred to as the five-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 these critical uncertain factors used in the five-year plan were within the predicted range of uncertainty as defined by the low, base, and high cases modeled and evaluated in the 2019 IRP. Liberty-Empire determined that it was not necessary to re-model the IRP alternative plans in either the 2020 IRP Annual Update or the 2020 RES filing or update the PVRR results related to the RES RRI filing.

Liberty-Empire’s 2020 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
2027 Utility-Scale Solar Plus Storage	Solar + Storage	2027	30
2022 Distributed Solar Plus Storage	Solar + Storage	2022	44

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2028 Distributed Solar Plus Storage		2028	
2032 Distributed Solar Plus Storage		2032	
2036 Distributed Solar Plus Storage		2036	
Total			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 will utilize the most recent electricity utility resource planning analysis. As mentioned earlier in this report, and as described further in the 2020 IRP Annual Update filing, due to the relatively small magnitude of change in the values of the updated critical uncertain factors compared to the 2019 IRP, Liberty-Empire did not 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 electricity 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 greenhouse gas emissions used in this analysis. Exhibit 2 includes market prices for the SPP-KSMO market area with 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
2020	*		*
2021	*		*
2022	*		*
2023	*		*
2024	*		*
2025	*		*
2026	*		*
2027	*		*
2028	*		*
2029	*		*
2030	*		*

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

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

The following table shows the calculation for the average 10-year compliance spend over the 10-year period (2020-2029) 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 Annual Revenue Requirements and RES Compliance Spend

<i>Dollars in millions</i>	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
RRI Budget (2020-2029)	*										*
Actual Compliance	*										*

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Spend (2020-2029)											
Total RR (2020-2029)	*										*
RRI 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 2020-2029 RRI Calculation Period

2020-2029 RRI Calculation Period		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	10-Year "Budget"	Cumulative Budget (2020-2029)
	Baseline Revenue Requirement (\$MM)	*										*	*
	Annual 1% (\$MM)	*											
													Cumulative Costs (2020-2029)
	Actual Costs of Compliance	*											*
	Annual Over (Under)	*											
	Plus Prior Carryover	*											
	Cumulative Carryover	*											

Exhibit 5 2021-2030 RRI Calculation Period

2021-2030 RRI Calculation Period		2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	10-Year "Budget"	Cumulative Budget (2020-2030)
	Baseline Revenue Requirement (\$MM)	*									*	*	*
	Annual 1% (\$MM)	*											
										Less Carryover	*	*	
										Adjusted "Budget"	*	*	Cumulative Costs (2020-2030)
	Actual Costs of Compliance	*											*
	Annual Over (Under)	*									*		
	Plus Prior Carryover	*											
	Cumulative Carryover	*									*		

Exhibit 6 2022-2031 RRI Calculation Period

2022-2031 RRI Calculation Period		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	10-Year "Budget"	Cumulative Budget (2020-2031)
	Baseline Revenue Requirement (\$MM)	*									*	*	*
	Annual 1% (\$MM)	*											
										Less Carryover	*	*	
										Adjusted "Budget"	*	*	Cumulative Costs (2020-2031)
	Actual Costs of Compliance	*											*
	Annual Over (Under)	*									*		
	Plus Prior Carryover	*											
	Cumulative Carryover	*									*		

Exhibit 7 2023-2032 RRI Calculation Period

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Liberty Utilities
2019 Annual RES Compliance Report
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2023-2032 RRI Calculation Period												
	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	10-Year "Budget"	Cumulative Budget (2020-2032)
Baseline Revenue Requirement (\$MM)	*									*		*
Annual 1% (\$MM)	*											*
									Less Carryover		*	*
									Adjusted "Budget"		*	*
Actual Costs of Compliance	*											Cumulative Costs (2020-2032)
Annual Over (Under)	*									*		
Plus Prior Carryover	*											
Cumulative Carryover	*									*		

Exhibit 8 2024-2033 RRI Calculation Period

2024-2033 RRI Calculation Period												
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	10-Year "Budget"	Cumulative Budget (2020-2033)
Baseline Revenue Requirement (\$MM)	*									*		*
Annual 1% (\$MM)	*											*
									Less Carryover		*	*
									Adjusted "Budget"		*	*
Actual Costs of Compliance	*											Cumulative Costs (2020-2033)
Annual Over (Under)	*									*		*
Plus Prior Carryover	*											
Cumulative Carryover	*									*		

Exhibit 9 2025-2034 RRI Calculation Period

2025-2034 RRI Calculation Period														
	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	10-Year "Budget"	Cumulative Budget (2020-2034)		
Baseline Revenue Requirement (\$MM)	*									*		*		
Annual 1% (\$MM)	*											*		
									Less Carryover		*	*		
									Adjusted "Budget"		*	*		
Actual Costs of Compliance	*											Cumulative Costs (2020-2034)		
Annual Over (Under)	*									*		*		
Plus Prior Carryover	*													
Cumulative Carryover	*									*				

Exhibit 10 2026-2035 RRI Calculation Period

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2026-2035 RRI Calculation Period												
	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	10-Year "Budget"	Cumulative Budget (2020-2035)
Baseline Revenue Requirement (\$MM)	*									*		*
Annual 1% (\$MM)	*											*
									Less Carryover		*	*
									Adjusted "Budget"		*	*
												Cumulative Costs (2020-2035)
Actual Costs of Compliance	*											*
Annual Over (Under)	*									*		
Plus Prior Carryover	*											
Cumulative Carryover	*									*		

Exhibit 11 2027-2036 RRI Calculation Period

2027-2036 RRI Calculation Period													
	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	10-Year "Budget"	Cumulative Budget (2020-2036)	
Baseline Revenue Requirement (\$MM)	*									*		*	
Annual 1% (\$MM)	*											*	
									Less Carryover		*	*	
									Adjusted "Budget"		*	Cumulative Costs (2020-2036)	
Actual Costs of Compliance	*											*	
Annual Over (Under)	*									*			
Plus Prior Carryover	*												
Cumulative Carryover	*									*			

Exhibit 12 2028-2037 RRI Calculation Period

2028-2037 RRI Calculation Period												
	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	10-Year "Budget"	Cumulative Budget (2020-2037)
Baseline Revenue Requirement (\$MM)	*									*		*
Annual 1% (\$MM)	*											*
									Less Carryover		*	*
									Adjusted "Budget"		*	Cumulative Costs (2020-2037)
Actual Costs of Compliance	*											*
Annual Over (Under)	*									*		
Plus Prior Carryover	*											
Cumulative Carryover	*									*		

Exhibit 13 2029-2038 RRI Calculation Period

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