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The Empire District Electric Company d/b/a Liberty

Case No. EA-2025-0299

RE: Portions of the Direct Testimony of Aaron J. Doll and Confidential Direct Schedule AJD-2

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2025 Integrated Resource Plan Preferred Plan Update

The Empire District Electric Company
d/b/a Liberty

October 15, 2025

20 CSR 4240-2.135(2)(A)5

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SECTION 1 INTRODUCTION

The Empire District Electric Company d/b/a Liberty (“Liberty-Empire” or the “Company”) filed its last triennial Integrated Resource Plan (“IRP”) on April 1, 2025, as required under Missouri Public Service Commission (“Commission”) Chapter 20 CSR 4240-22. Liberty-Empire’s IRP described a Preferred Plan consisting of a combination of resource additions and retirements from 2025 to 2044. This plan was selected based on its ability to meet Liberty-Empire’s customers’ long-term needs. Subsequent to its filing of its IRP, Liberty-Empire determined that the Preferred Plan is no longer appropriate. Consistent with 20 CSR 4240-22.080, Liberty-Empire is notifying the Commission of its determination. Included herein is a description of all changes to the Preferred Plan and Acquisition Strategy, the impact of each change on the present value of the revenue requirement and all other performance measures specified in the last triennial compliance filing pursuant to 20 CSR 4240-22.080(3), and the rationale for each change. The primary changes are summarized as follows:

- Remove the 175 MW utility-scale solar project in the 2028 timeframe;
- Remove the demand-side programs throughout the planning horizon;
- Update for the newly extended Elk River purchased power agreement (PPA) until 2030; and
- In year 2041, near the end of the planning horizon, add more Distributed Reciprocating Internal Combustion Engine (“RICE”) generation to balance the capacity needs.

SECTION 2 LIBERTY-EMPIRE’S 2025 IRP PREFERRED PLAN

Liberty-Empire’s 2025 IRP Preferred Plan described a set of resource additions and retirements between 2025 and 2044. These additions and retirements are illustrated in Table 1, which depicts the resource additions and retirements common to all plans analyzed, and those specific to the 2025 IRP Preferred Plan.

Table 1 – 2025 IRP Preferred Plan Supply Side Resource Retirements and Additions

Year	Supply-Side Retirements and PPA Expirations	Supply-Side Additions
2025	Elk River Contract Expires (150 MW)	
2026	Riverton 10-11 Retires (27 MW)	
2027		RAP DSM* (Low-, Mid-, and High-Cost Bundles)
2028	Meridian Way Contract Expires (105 MW)	
2029		Gas Frame CT (240 MW)
2030		
2031		
2032		
2033		
2034		
2035	Energy Center 1 and 2 Expires (160 MW)	Utility-Scale Solar (150 MW)
2036		Gas Frame CT (240 MW)
2037		
2038		
2039	Iatan 1 Retires (84 MW)	
2040	Plum Point PPA Expires (50 MW)	
2041		Utility-Scale Solar (150 MW); Dist. RICE (2 MW)
2042		Dist. RICE (8 MW)
2043		Dist. RICE (8 MW); Dist. Storage (1 MW)
2044		Dist. RICE (10 MW)

* RAP DSM = Realistic Achievable Potential Demand Side Management

Note – In addition to the resources above, all plans include near-term firm additions established as a part of previous planning (27 MW gas CT at Riverton site in 2026, 175 MW solar in 2028)

Liberty-Empire developed 12 alternative resource plans for purposes of the 2025 IRP analysis. Eight of the 12 alternative resource plans assumed “baseline” (i.e., age-based) retirement dates and expected PPA expirations for the existing resources in Liberty-Empire’s portfolio. During the 20-year study horizon explicitly covered by the 2025 triennial IRP (2025-2044), the assumed resource retirements and PPA expirations of the existing resources are as follows:

- Expiration of the Elk River Wind PPA in 2025;
- Amendment of the 78 MW MJMEUC Capacity Sale PPA in 2025;
- Retirement of Riverton 10 and 11 in 2026;
- Expiration of the 25 MW MJMEUC Capacity Sale PPA in 2027;

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- Expiration of the Meridian Way Wind PPA in 2028;
- Retirement of Energy Center 1 and 2 in 2035;
- Retirement of Iatan 1 in 2039;
- Expiration of the Plum Point PPA in 2040.

The remaining four of the 12 alternative resource plans were intended to examine the feasibility and tradeoffs of achieving the hypothetical long-term net zero carbon emissions by 2050 and to examine compliance with the EPA Greenhouse Gas (“GHG”) Rule. Given that most of Liberty-Empire’s long-term scope 1 and 2 emissions come from its two natural gas-fired CCs, in addition to the expected retirements and PPA expirations listed previously, the “net zero” portfolios assumed the retirement or conversion of Riverton 12 and State Line CC in 2045 and 2050, respectively.

Minimization of the present worth of long-run utility costs, as measured by the present value of revenue requirements (“PVR”), was the primary selection criterion for the Preferred Plan, with all remaining planning objectives given consideration. Figure 1 compares the present worth of long-run utility costs under each of the 12 plans. Liberty-Empire found that Plan 4 performed best on an expected value basis for both 20-year and 30-year PVRs, though several plans that assume age-based or baseline retirements have similar cost profiles, including Plans 1-3 and Plan 6. Plan 4 also performed well on a risk-adjusted basis, with one of the lowest range of costs under uncertainty, as shown in Figure 2. Liberty-Empire selected Plan 4 as the Preferred Plan in its 2025 IRP.

Figure 1 - Deterministic 20-Year PVRR for 2025 IRP Resource Plans¹

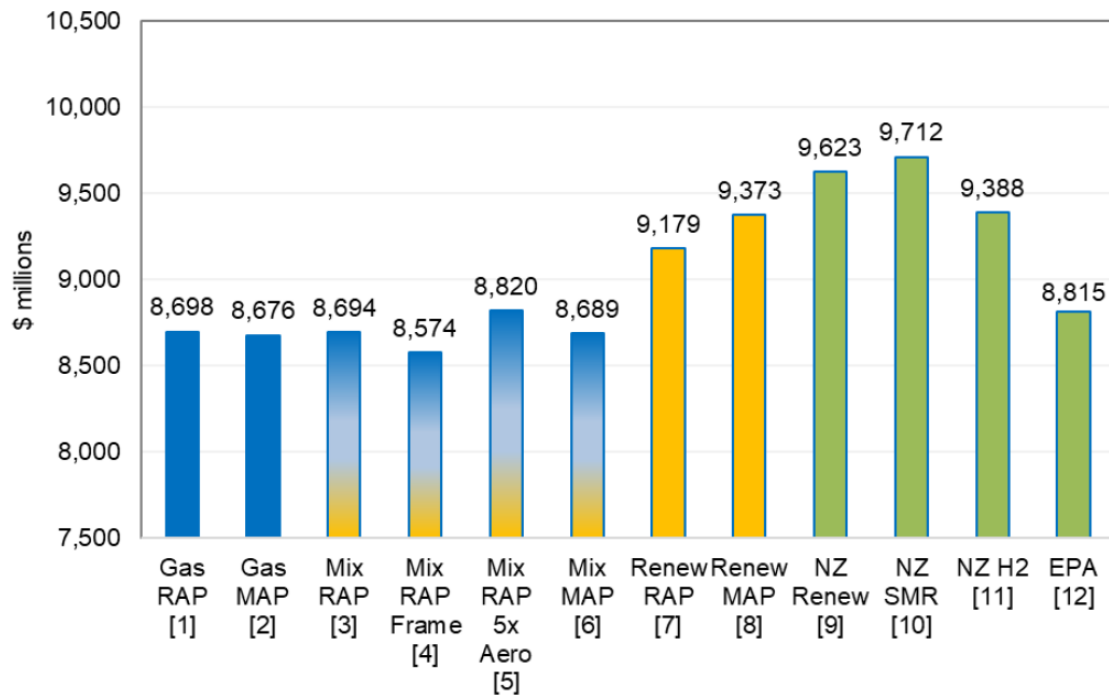
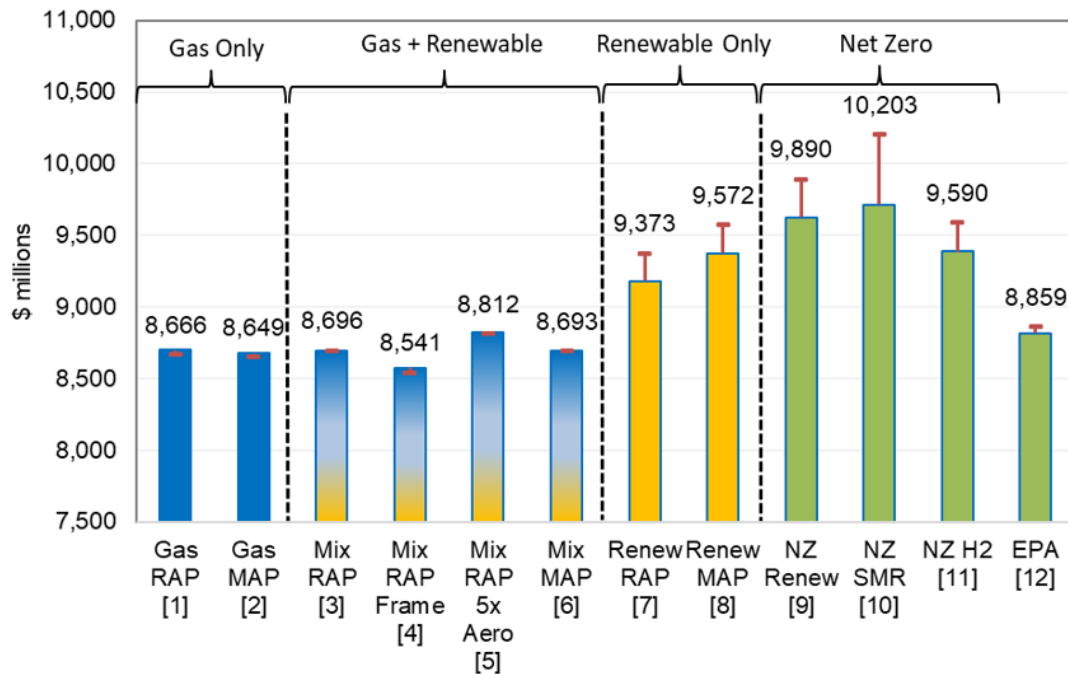


Figure 2 - PVRR with Risk Value for 2025 IRP Resource Plans – 20 Year NPV²



¹ Source: 2025 IRP Figure 6-4

² Source: 2025 IRP Figure 6-67

SECTION 3 CHAPTER 22 REQUIREMENTS – CHANGE IN PREFERRED PLAN

Commission Rule 20 CSR 4240-22.080(12) provides that in the event a utility determines that its Preferred Plan is no longer appropriate, the utility must notify the Commission of its determination and include therein a description of all changes to the Preferred Plan and Acquisition Strategy, the impact of each change on the present value of the revenue requirement and all other performance measures specified in the last filing pursuant to 20 CSR 4240-22.080, and the rationale for each change.

SECTION 4 LIBERTY-EMPIRE'S CHANGE IN PREFERRED PLAN AND ACQUISITION STRATEGY

The principal differences between the Original 2025 IRP Preferred Plan³ and the Updated Preferred Plan⁴ are the removal of a 175 MW standalone utility-scale solar project, removal of MEEIA Cycle 2 DSM programs, extension of the Elk River Wind Farm contract through March 31, 2030, and addition of incremental 20 MW distributed gas RICE resource in 2041. The rationale for the changes is outlined in the following paragraphs.

The 175 MW solar project slated for the 2028 timeframe that was in the 2025 IRP Preferred Plan will not proceed and is being removed as part of the Preferred Plan change. As stated in the 2025 IRP, "Liberty-Empire will continue the evaluation of approximately 175 MW solar facility due for operation in the 2028 timeframe. However, given the changing dynamics surrounding the SPP's resource adequacy construct, evolving market dynamics, and the timing of this filing, it is not certain that this project will proceed". SPP's shift to a seasonal capacity accreditation construct and significant increase in the winter Planning Reserve Margin ("PRM"), where solar is awarded relatively low levels of winter value, combined with Liberty-Empire's winter peaking nature, was a leading factor in reconsidering the solar project.

³ 2025 IRP Preferred Plan (Apr-2025)

⁴ 2025 IRP Preferred Plan Update (Oct-2025)

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In August 2025, Liberty-Empire successfully renegotiated its Purchased Power Agreement with Elk River Wind Farm. Initially set to expire in December of 2025, the new contract runs through March 2030, covering the Company's capacity needs in the near-term despite the abandonment of the utility-scale solar project and DSM program.

The Company has offered demand-side programs dating back to the early 2000s. In January 2022, Liberty-Empire began offering its first portfolio of demand-side programs under the regulatory framework prescribed by the Missouri Energy Efficiency Investment Act ("MEEIA"). At the time of inception, Liberty-Empire's portfolio represented a three-fold increase in its investment in energy efficiency in its Missouri service territory. The first cycle of the MEEIA was intended to run for one year through December 31, 2022, but the Commission approved an extension of Liberty-Empire's MEEIA Cycle 1 through December 31, 2024. On December 13, 2024, Liberty-Empire reached an agreement with multiple parties to extend their MEEIA Cycle 1 for a third time, through March 31, 2025, while Liberty-Empire worked on a MEEIA Cycle 2 application or settlement (Docket EO-2022-0078). The Company's application for MEEIA Cycle 2 was dismissed after the Commission raised concerns about the proposed programs and their alignment with MEEIA's intent. A settlement agreement reached by stakeholders and Liberty-Empire formally withdrew its MEEIA Cycle 2 application in April 2025, effectively cancelling the demand-side program, necessitating its removal from the Preferred Plan.

The reductions in supply outlined above result in a minor capacity shortfall beginning in 2041. To address this shortfall, the Updated Preferred Plan includes the addition of new capacity to meet the resulting capacity needs for 2041 and beyond, where the original 2 MW addition of distributed gas RICE in 2041 increases to 24 MW.

Description of Changes to the Acquisition Strategy

Given cancellation of the 175 MW solar project, DSM resources, and completed extension of the Elk River Wind Farm contract, the near term acquisition strategy has been simplified with no near-term action required by Liberty-Empire, other than pursuing the single cycle frame gas CT included in the Original 2025 IRP Preferred Plan.

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Table 2 illustrates how the planned resource additions change between the Original 2025 IRP Preferred Plan and the Updated Preferred Plan.

Table 2 - Comparison of the Original 2025 IRP Preferred Plan and the Updated 2025 IRP Preferred Plan

	2025 IRP Preferred Plan (Apr-2025)	2025 IRP Preferred Plan Update (Oct-2025)
2025	Elk River PPA Ends (17 MW Summer/18 MW Winter UCAP)	
2026		
2027	RAP DSM (Low-, Mid-, and High-Cost Bundles)	
2028	Firm Solar (175 MW)	
2029	Gas Frame CT (240 MW)	Gas Frame CT (240 MW)
2030		Elk River PPA Ends (21.9 MW Summer/22.5 MW Winter UCAP)
2031		
2032		
2033		
2034		
2035	Utility-Scale Solar (150 MW)	Utility-Scale Solar (150 MW)
2036	Gas Frame CT (240 MW)	Gas Frame CT (240 MW)
2037		
2038		
2039		
2040		
2041	Utility-Scale Solar (150 MW); Dist. RICE (2 MW)	Utility-Scale Solar (150 MW); Dist. RICE (24 MW)
2042	Dist. RICE (8 MW)	Dist. RICE (8 MW)
2043	Dist. RICE (8 MW); Dist. Storage (1 MW)	Dist. RICE (8 MW); Dist. Storage (1 MW)
2044	Dist. RICE (10 MW)	Dist. RICE (10 MW)

Note – In addition to the resources above, both plans include near-term firm addition of 27 MW gas CT at the Riverton site in 2026, established as a part of previous planning.

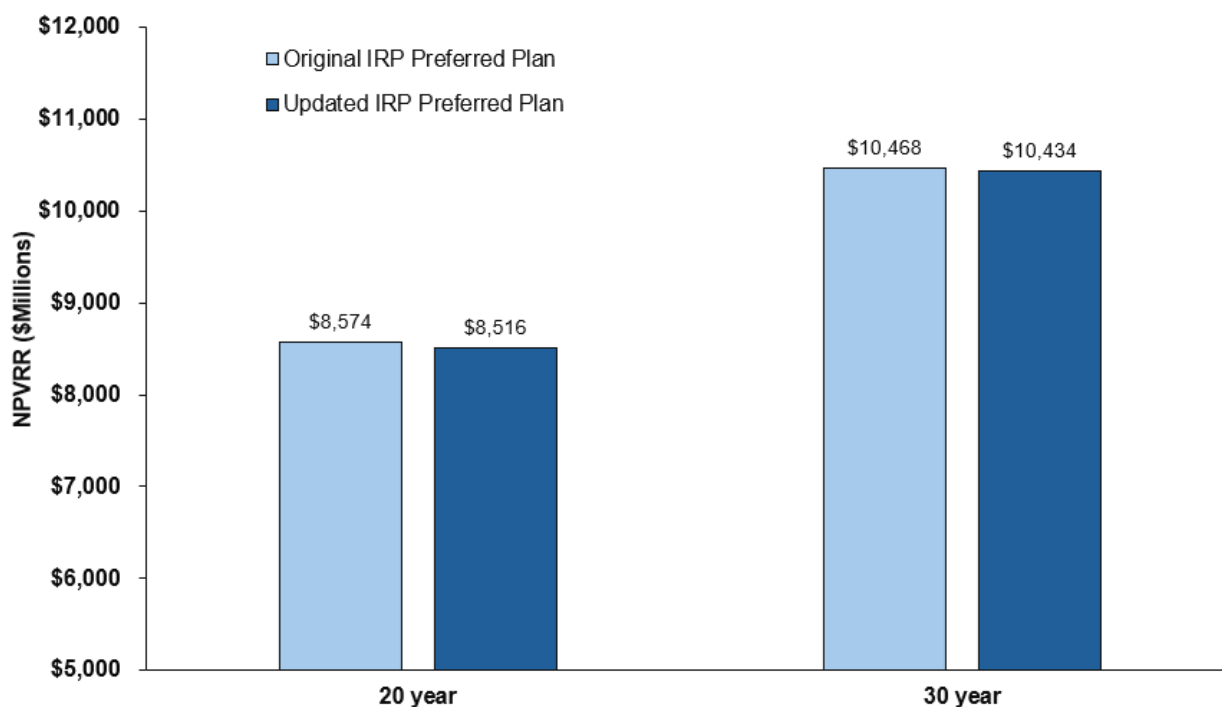
The Impact on the Present Value of the Revenue Requirement

The Updated Preferred Plan has a lower Present Value Revenue Requirement (“PVR”) than the original 2025 IRP Preferred Plan on both a 20 and 30-year basis. Figure 3

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compares the PVRR for the Original 2025 IRP Preferred Plan and the Updated Preferred Plan, under the same market conditions. Results under both plans use the 2025 IRP Reference Case for gas, power, and emissions prices. Relative to the Original 2025 IRP Preferred Plan, the Updated Preferred Plan results in \$58 million in savings on a 20-year basis and \$34 million in savings on a 30-year basis. The primary drivers of the savings are from not incurring capital and operating cost of the firm solar project and DSM programs, although these savings are in large part offset by increased cost from additional energy purchases and capital cost of the additional distributed RICE resource.

Figure 3 - Present Value Revenue Requirement – Original 2025 IRP Preferred Plan and the Updated Preferred Plan



Impacts to the other performance measures as well as capacity balance sheets can be found in SECTION 8.

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SECTION 5 CONTINGENCY PLANS FROM THE 2025 IRP

20 CSR 4240-22.080(12) states that if the utility decides to implement a new acquisition strategy that is not one of its contingency plans it shall explain why a contingency plan was not chosen.

The new acquisition strategy is not based on one of the 2025 IRP contingency plans, rather the Updated Preferred Plan outlined above. The new acquisition strategy is based on several assumptions that were not contemplated in the 2025 IRP. These include: (1) discontinuation of demand-side programs such as MEEIA Cycle 2; (2) successful renegotiation of the Elk River Wind Farm contract into 2030; and (3) abandonment of the construction of a standalone utility-scale solar project at a greenfield site.

As part of the 2025 IRP, Liberty-Empire developed 12 plans that it analyzed before settling on Plan 4 as the Preferred Plan. In addition to the 12 alternative resource plans, Liberty-Empire considered a contingency without the assumed 175 MW firm solar addition which would add a modest amount of incremental gas in the latter part of the outlook horizon to offset lower solar capacity. The contingency plan is no longer relevant due to the renegotiated Purchased Power Agreement with Elk River Wind Farm and removal of the DSM program. A description of the assumptions that went into each of the original 12 plans can be found in Table 3.

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Table 3 - Key Inputs for the 12 Resource Plans from the 2025 IRP

Plan	Plan Description	Replacement Tech.	Key Retirements*	DSM Bundle
1	Gas Only – Utility-Scale + Distributed	Natural Gas		RAP
2	Gas Only – Utility-Scale + Distributed	Natural Gas		MAP
3	Gas/Renew Mix – Utility-Scale + Distributed	Natural Gas + Renew.		RAP
4	Gas/Renew Mix – Utility-Scale + Distributed + Frame CT (2029)	Natural Gas + Renew.		RAP
5	Gas/Renew Mix – Utility-Scale + Distributed + 5x Aero (2029)	Natural Gas + Renew.		RAP
6	Gas/Renew Mix – Utility-Scale + Distributed	Natural Gas + Renew.		MAP
7	Renewable – Utility-Scale + Distributed	Renewable		RAP
8	Renewable – Utility-Scale + Distributed	Renewable		MAP
9	Net Zero 2050 – Renewable + Storage	Renewable	Riverton CC 2045 Stateline CC 2050	RAP
10	Net Zero 2050 – Nuclear SMR	Nuclear + Renewable	Riverton CC 2045 Stateline CC 2050	RAP
11	Net Zero 2050 – Hydrogen	Hydrogen + Renewable	Riverton CC 2045 Stateline CC 2050	RAP
12	EPA GHG Rule – Advanced Tech	Advanced Tech. + Renew.	Iatan 1 2031 Iatan 2 2031 Plum Point 2031	RAP

DSM = “Demand-Side Management”
 RAP = “Realistic Achievable Potential”
 MAP = “Maximum Achievable Potential”
 Renewable options include storage. Advanced storage options are allowed only in the net zero portfolios.

*Incremental to retirements and PPA expirations that are common across all plans:

Expiration of the Elk River Wind PPA in 2025
 Expiration of the 78 MW MJMEUC Capacity Sale PPA in 2025
 Retirement of Riverton 10 and 11 in 2026
 Expiration of the 25 MW MJMEUC Capacity Sale PPA in 2027
 Expiration of the Meridian Way Wind PPA in 2028
 Retirement of Energy Center 1 and 2 by 2035
 Retirement of Iatan 1 in 2039
 Expiration of the Plum Point PPA in 2040

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SECTION 6 IMPLEMENTATION PLAN

The implementation plan contains the descriptions and schedules for the major tasks necessary to implement the Preferred Plan over the implementation period, i.e., the time between the triennial compliance filings. The next triennial IRP filing is scheduled for 2028, therefore, the implementation period is the years 2025-2028. While Liberty-Empire has selected a new acquisition strategy, the changes from the Original 2025 IRP Preferred Plan do not require additions to the implementation plan for the remaining 2025-2028 timeframe. Rather, changes include removing MEEIA Cycle 2 and 175 MW of installed utility-scale solar capacity from the implementation plan. Additionally, the Elk River Wind Farm contract, set to expire in December of 2025, was renegotiated in August 2025. Development for the single cycle frame gas CT set for operation by 2029 continues as was envisioned in the 2025 IRP.

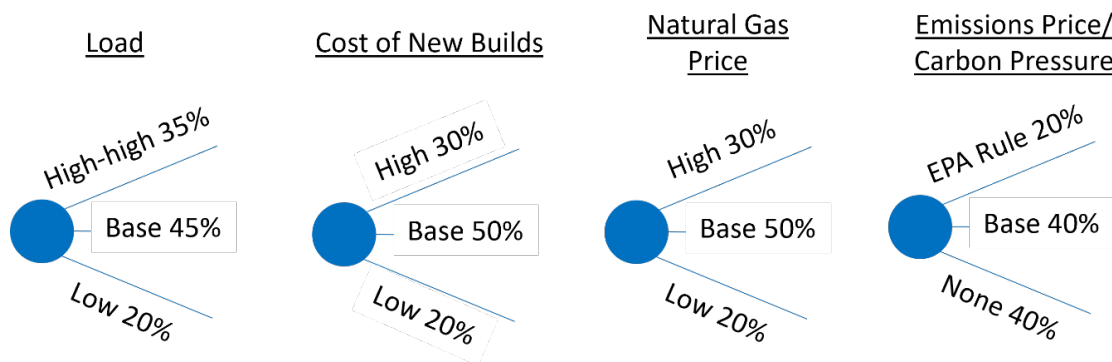
SECTION 7 CRITICAL UNCERTAIN FACTORS

20 CSR 4240-22.080(12) states that the utility shall specify the range or combinations of outcomes for the critical uncertain factors that define the limits within which the new alternative resource plan remains appropriate.

Liberty-Empire's 2025 IRP identified several critical uncertain factors ("CUFs"), including load growth, carbon prices, natural gas fuel prices, and a grouping of factors related to the cost of new builds, illustrated in Figure 4.

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Figure 4 - Critical Uncertain Factors Tree

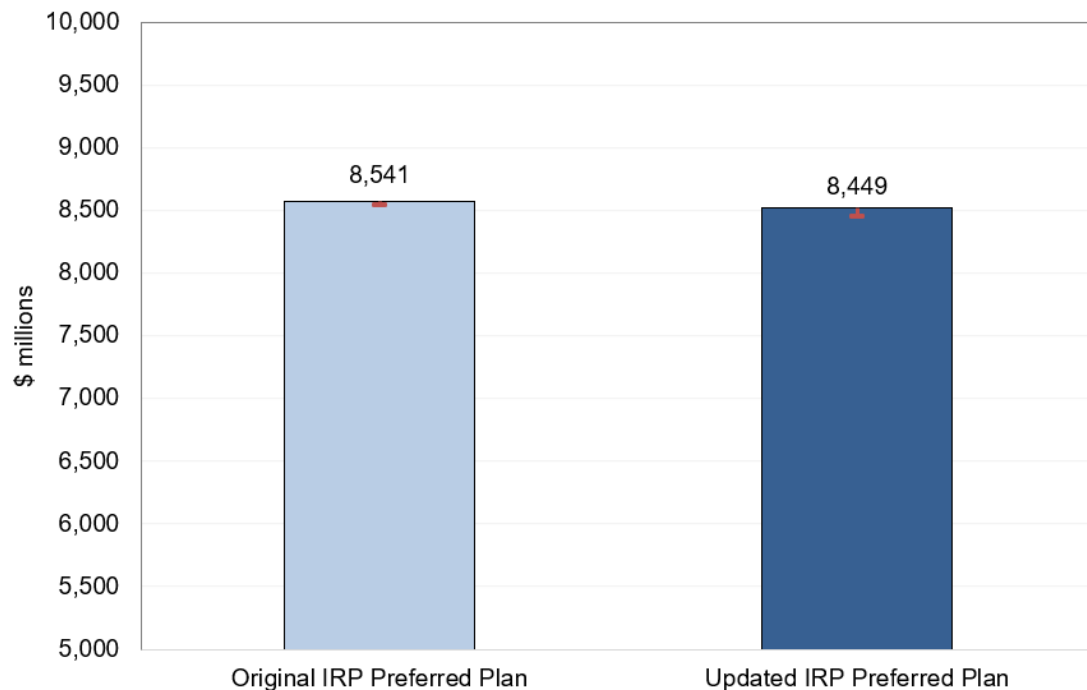


The subjective probabilities shown above were assigned by the utility decision-makers after review and discussion of the various critical uncertain factor scenario trajectories. The three potential endpoints for four critical uncertain factors resulted in 81 endpoints per plan, probability-weighted depending on the subjective probabilities of the scenario components. By calculating the PVRR of each plan on an expected value basis across all 81 subjective probability-weighted endpoints, Liberty-Empire determined the resilience of each plan to a wide range of risk for all critical uncertain factors.

Liberty-Empire tested the Updated Preferred Plan under the same range of Critical Uncertain Factors as the Original 2025 IRP Preferred Plan. The expected value PVRRs for both plans are shown in Figure 5, with the red “whisker” lines representing risk values incremental to the Base Case PVRRs. The expected 20-year present value revenue requirement of the Updated Preferred Plan is below that of the Original 2025 IRP Preferred Plan. As the Original 2025 IRP Preferred Plan had amongst the lowest risk profiles of all 2025 IRP plans (shown in Figure 2), the Updated Preferred Plan retains that risk resilience.

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Figure 5 - Base Case PVRR with Risk Value



SECTION 8 APPENDIX: IMPACT OF CHANGES ON OTHER PERFORMANCE MEASURES AND CAPACITY BALANCE

Impact of Changes on Other Performance Measures

Commission Rule 20 CSR 4240-22.080 states that the utility shall include the impact of Preferred Plan changes on all performance measures specified in the last filing pursuant to 20 CSR 4240-22.080. Section 22.080 describes the performance measures as including at least the following: A) Estimated annual revenue requirement; B) Estimated level of average retail rates and percentage of change from the prior year; and C) Estimated company financial ratios, all of which Liberty-Empire included in its last filing.

Table 4 and Table 5 show the Section 22.080 performance measures for the Updated 2025 IRP Preferred Plan and Original Preferred Plan, respectively.

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Table 4 - Performance Measures of the Updated 2025 IRP Preferred Plan

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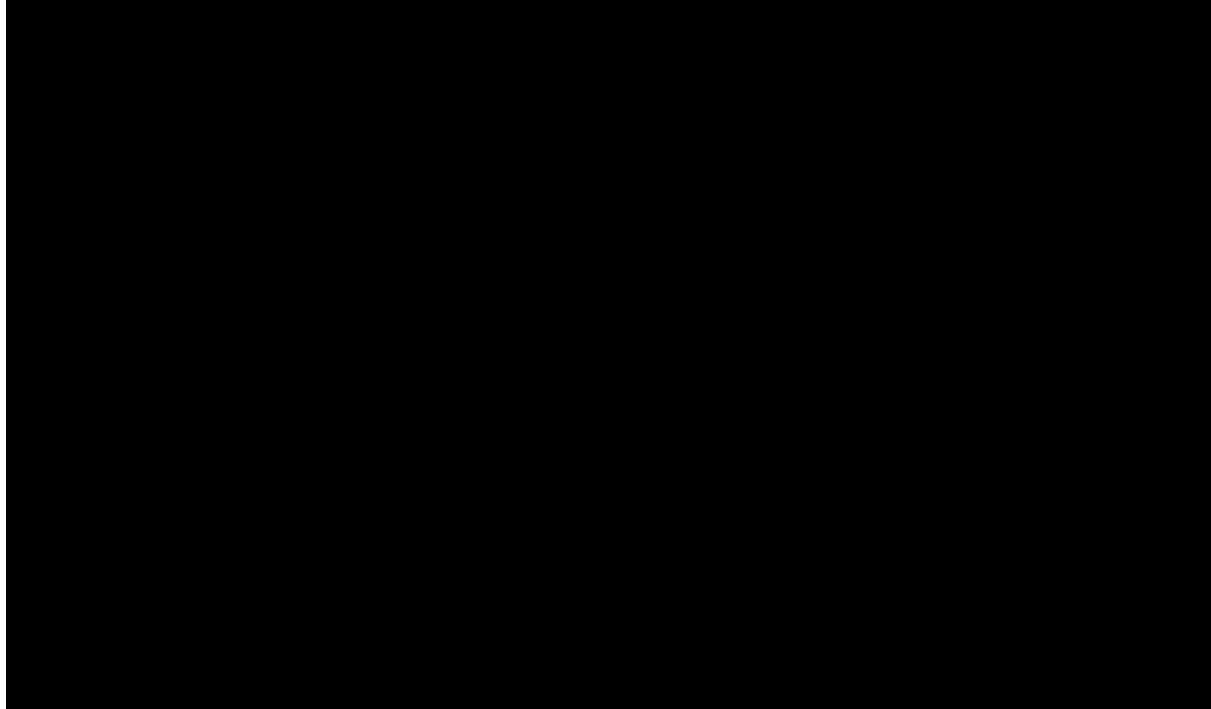
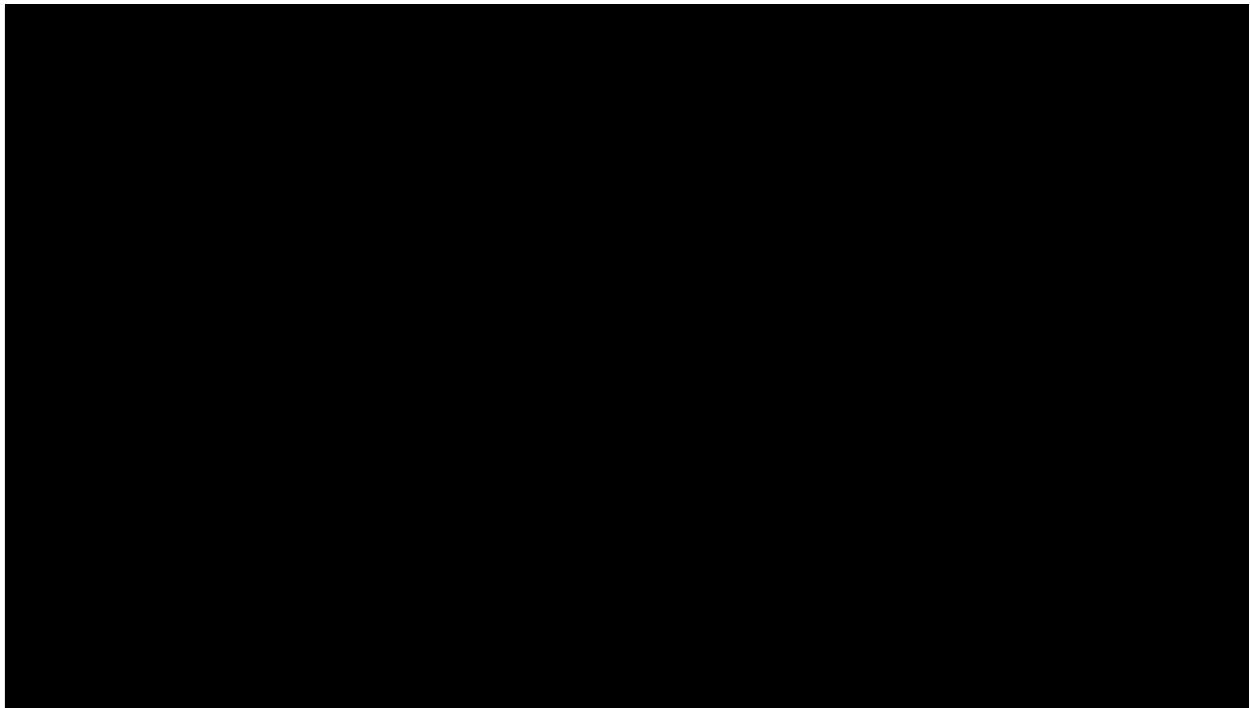


Table 5 - Performance Measures of the Original 2025 IRP Preferred Plan

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Capacity Balance

The summer and winter capacity balance of the Updated Preferred Plan and the Original 2025 IRP Preferred Plan is shown in Table 6 through Table 9.

Table 6 – Capacity Balance of Updated Preferred Plan (Summer)

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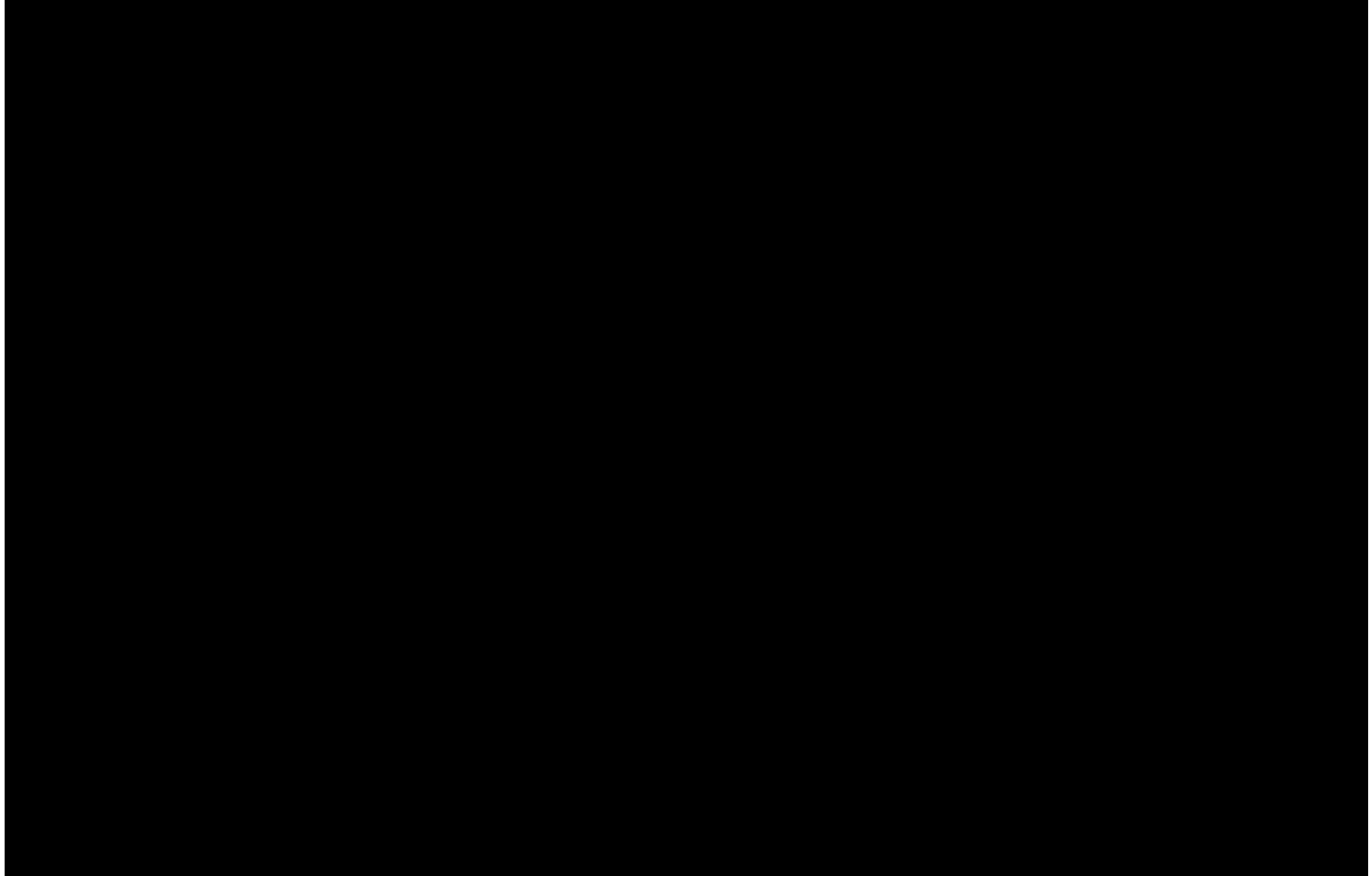


Table 7 – Capacity Balance of Updated Preferred Plan (Winter)

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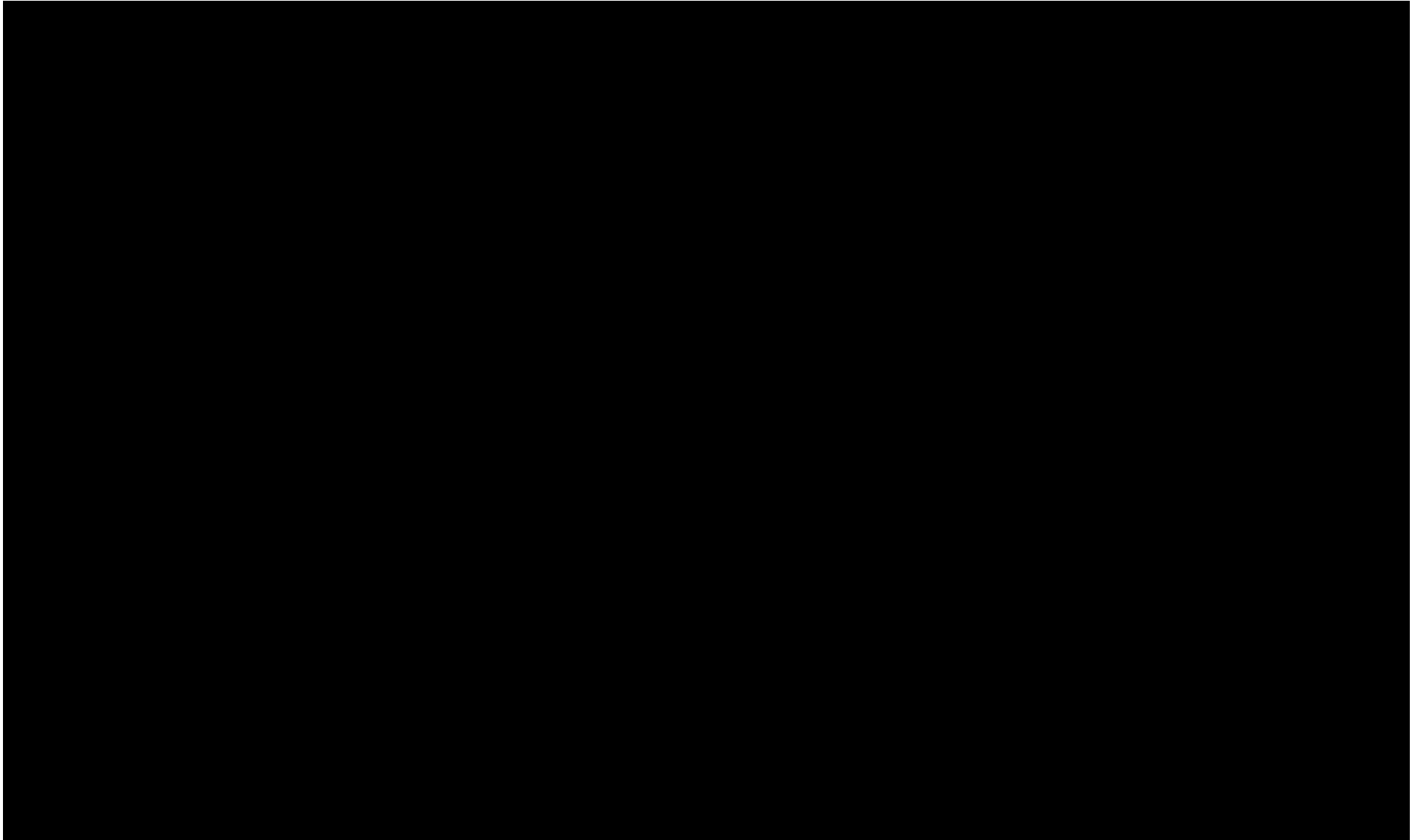
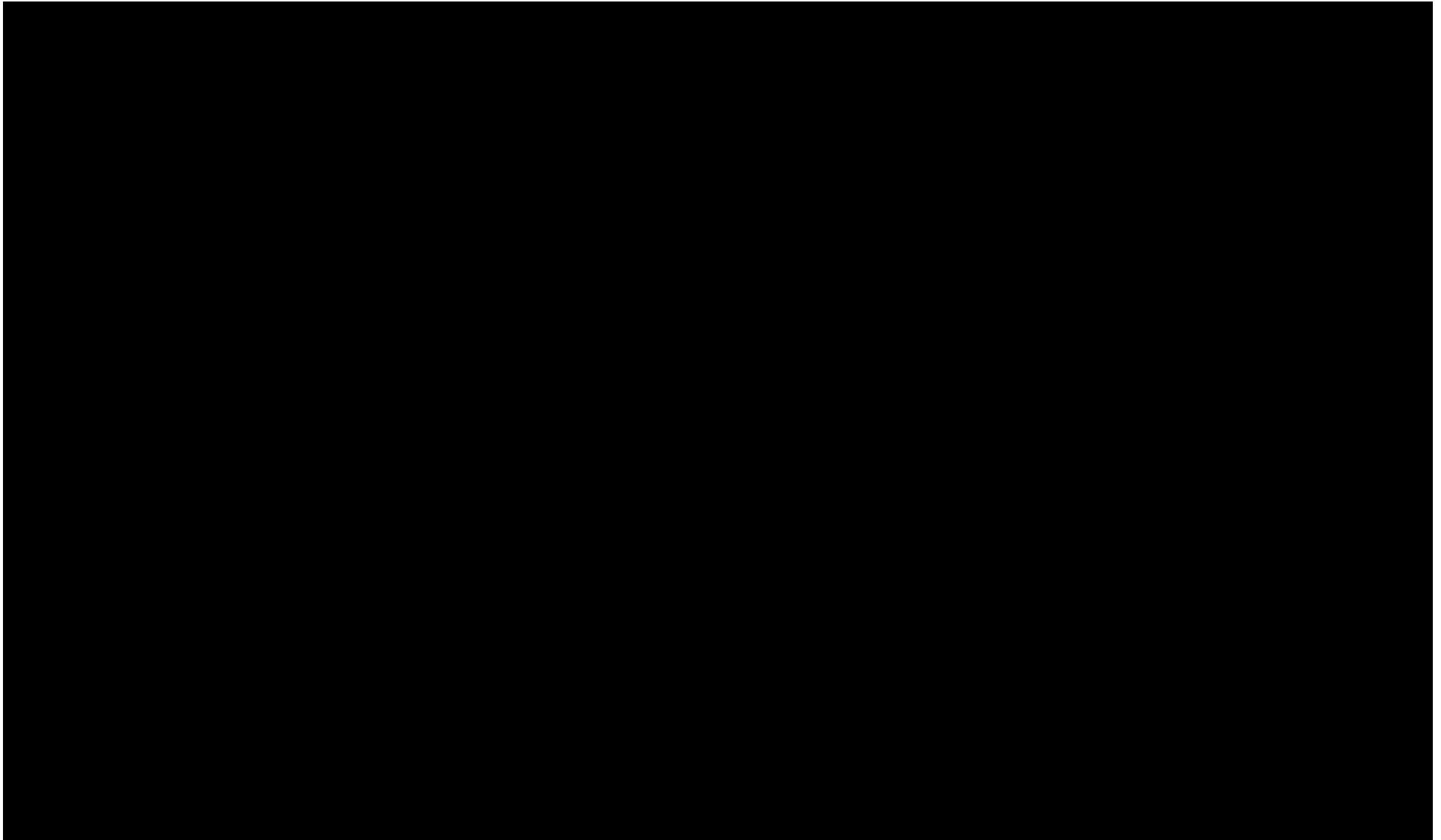


Table 8 – Capacity Balance of Original 2025 IRP Preferred Plan (Summer)

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Table 9 – Capacity Balance of Original 2025 IRP Preferred Plan (Winter)

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