NPRR1296: Residential Demand Response (RDR) Program – Reliability Deployment Price Adder (RDPA) Analysis

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Wholesale Market Subcommittee (WMS)
March 4, 2026

Agenda

- Background
- Summary of Findings
- Current RDPA Trigger Methodology
- Alternative RDPA Trigger Methodology
- Additional Considerations
- Next Steps

Purpose and Context

- At the February 4, 2026 WMS, ERCOT presented comments[1] on NPRR1296, outlining a potential methodology for estimating the impact of Residential Demand Response deployments in prices (through the Reliability Deployment Price Adder (RDPA)).
  - Market Participants requested that ERCOT extend its considerations to methodologies that utilize seasonal Net Load Thresholds to more properly align with the RDR program's seasonal incentive structure.
  - Market Participants also requested that ERCOT expand the analysis to compare peak Net Load levels from additional historical years to gauge how the proposed Net Load Threshold may vary over a longer time horizon.
- Today's discussion will focus on some expanded historical analysis of high net-load hours to determine whether and how to derive a 'high net-load trigger' considering:
  - Different methodologies
  - Historical and seasonal variations

1) NPRR1296 ERCOT Comments

Summary of Findings

Seasonal peak Net Load levels vary from year to year

- Year-to-year variance may affect how accurately the Net Load Threshold captures actual RDR deployment hours within each season
- This variance is most pronounced in the shoulder seasons

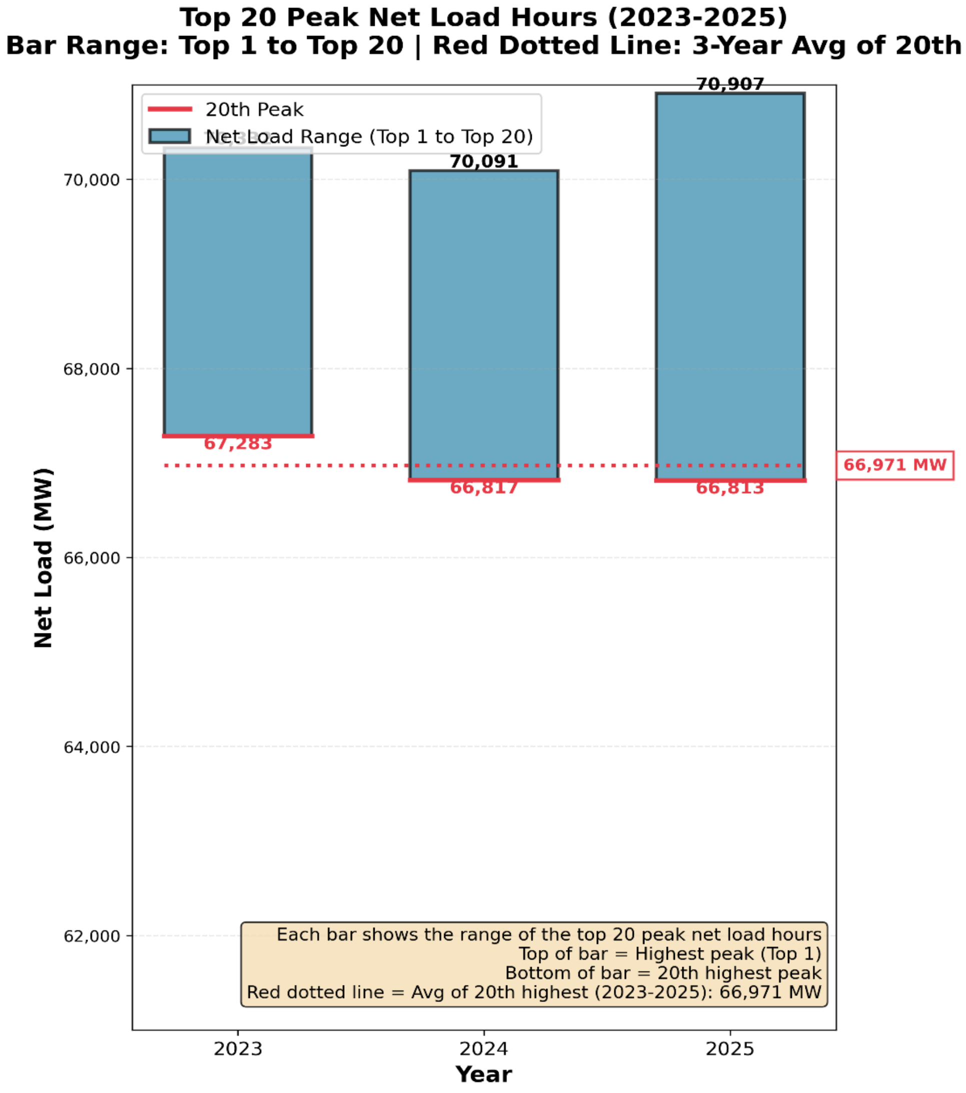
Adjustments to the proposed methodology better support a seasonal approach

- **Pooling peak Net Load levels over the preceding two years**, rather than averaging across three years, may better balance threshold stability with responsiveness to evolving grid conditions
- Depending on the season, anchoring the threshold to the 10th through 16th highest Net Load levels, rather than the 20th, may help prevent excessive RDPA deployments under the current incentive structure
- **ERCOT is recommending the ‘2-Year Pooling Option’**

Original Concept

- ERCOT proposed the addition of a RDPA under NPRR 1296* that would trigger during hours in which Net Load exceeds a pre-defined threshold, established by averaging the 20th highest Net Load value from each of the three preceding years (illustrated in Figure 1).
- The rationale behind this approach was that anchoring the RDPA trigger to the 20th highest Net Load hour would effectively capture the expected hours of RDR participation, while also providing a reasonable degree of stability as shown across recent years.

Figure 1



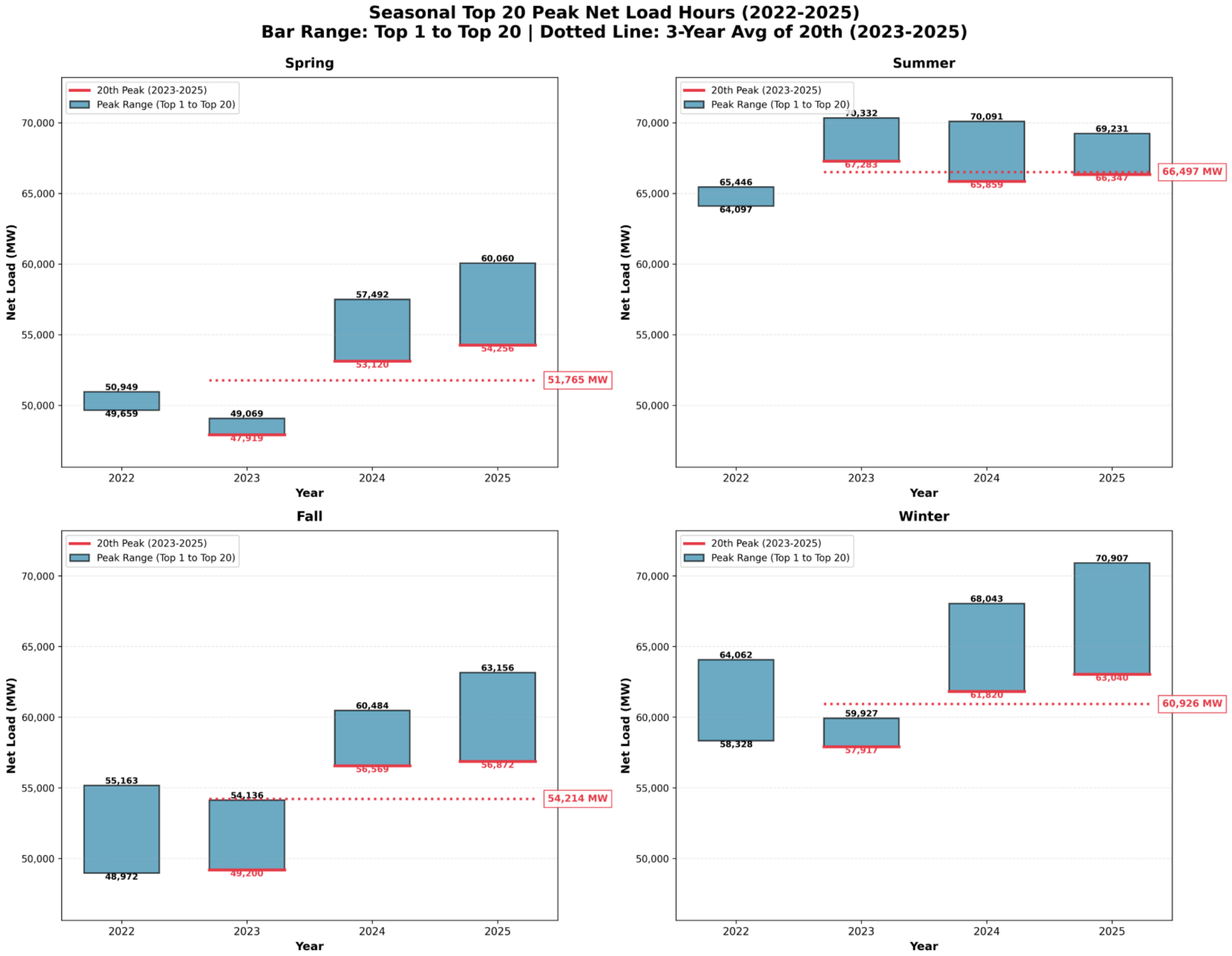
*NPRR1296 proposes the creation a Residential Demand Response (RDR) Program, offering incentive payments to REPs and NOIEs for reducing residential load during the top 6 of 8 highest Net Load hours in the summer and winter, and the top 3 of 5 highest Net Load hours in the spring and fall.

Current Methodology: Seasonal Approach

3-year Average of 20th Peak

- The Net Load Threshold for the RDPA would be calculated using the same methodology as originally proposed, but applied separately for each season.
  - Net Load Threshold = Average of the 20th highest Net Load level from each of the preceding three years
- Figure 2 shows how the Net Load Threshold would be constructed for 2026 under this approach

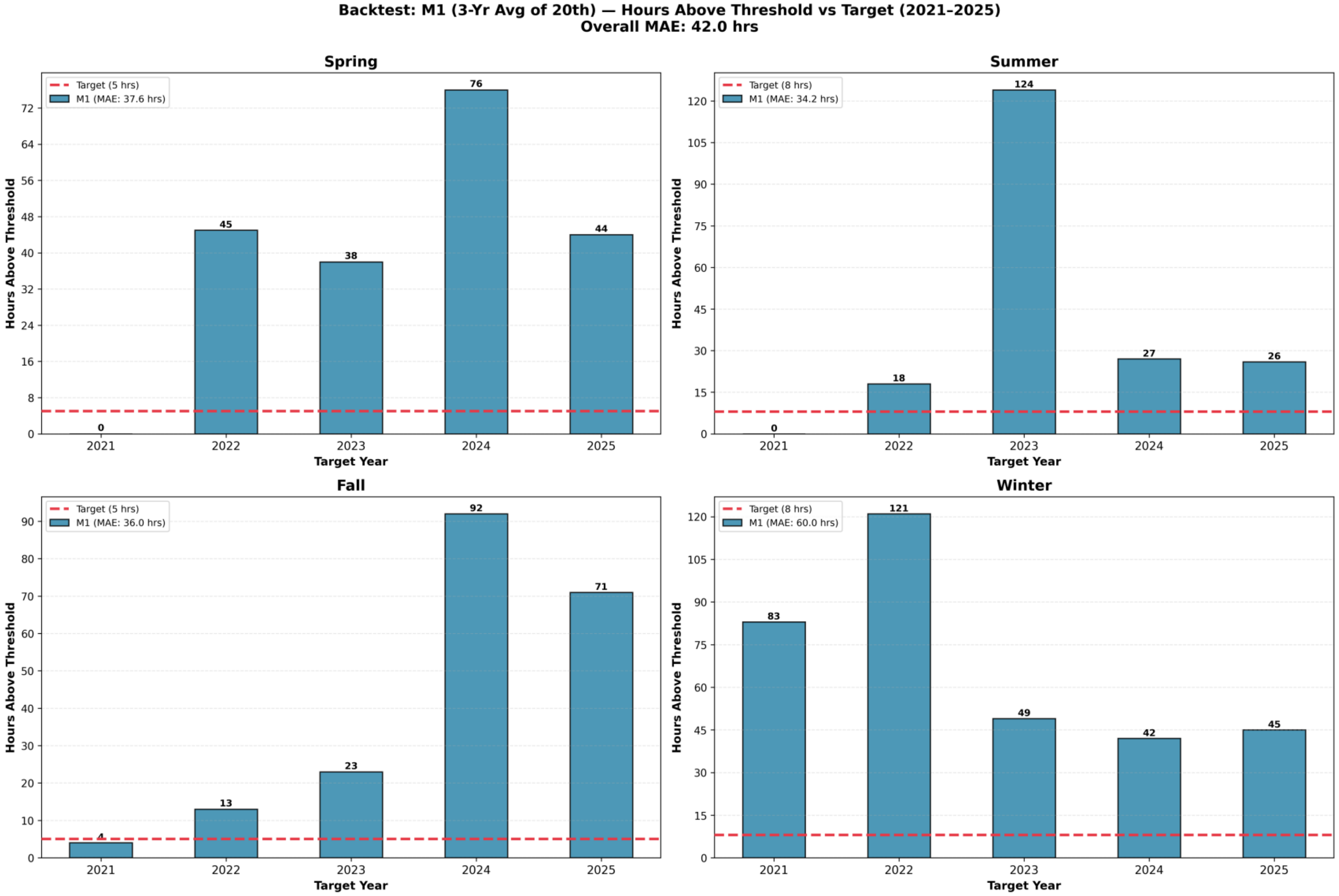
Figure 2



Current Methodology: Seasonal Approach

3-year Average of 20th Peak

- The current methodology under a seasonal construct may be susceptible to consistently over-triggering or under-triggering the RDPA if Net Load levels exhibit a sustained directional trend
  - Seasonal peak Net Load levels have generally trended upward in recent years, increasing the risk that a threshold based on a 3-year historical average may lag behind current grid conditions
- On a seasonal level, the 20th highest Net Load threshold captures more hours than those for which participants are compensated
  - Under NPRR1296, compensation is based on performance during 6 of the top 8 hours in the summer and winter, and 3 of the top 5 hours in the fall and spring



MAE: Mean Absolute Error

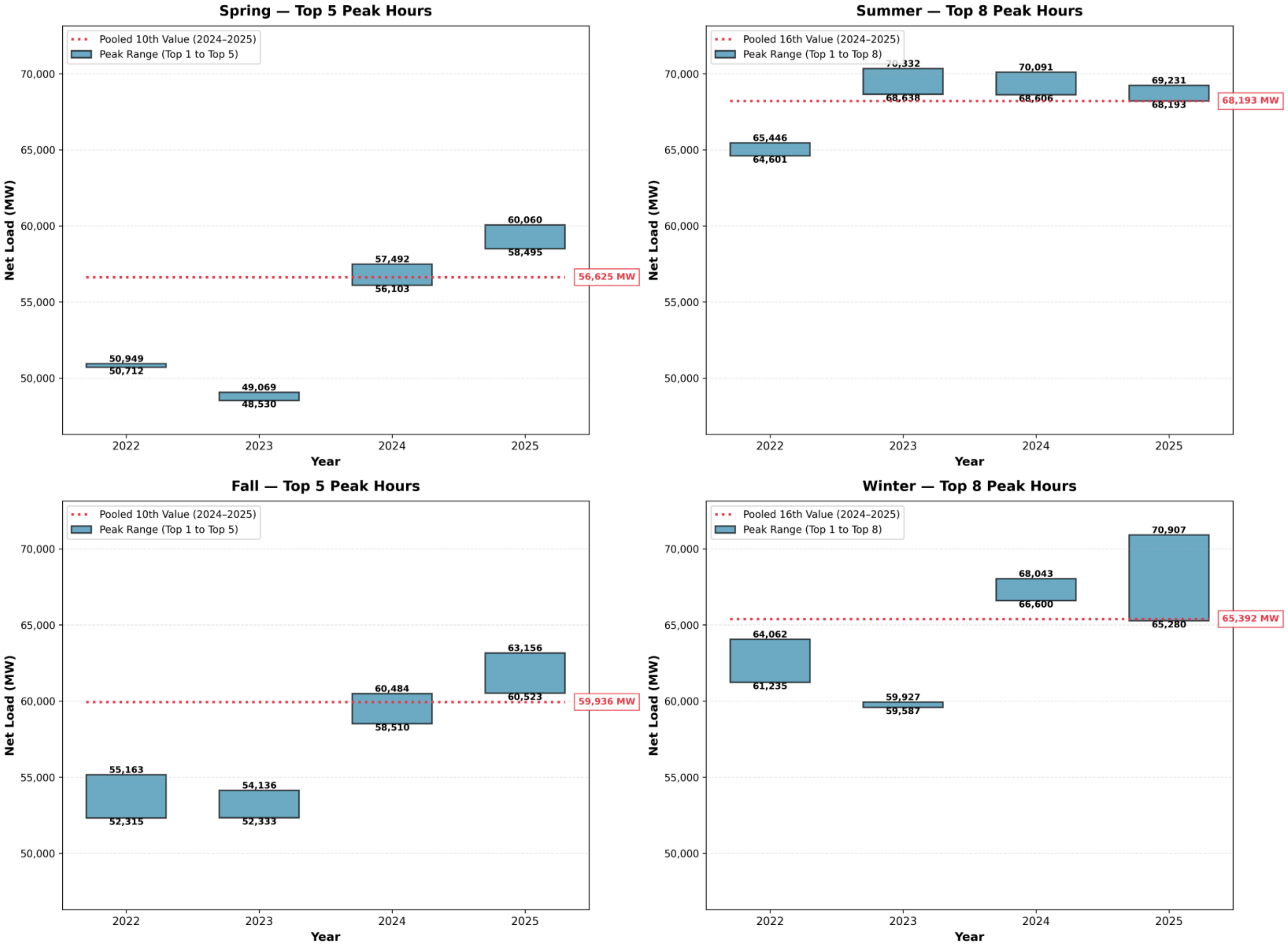
Alternative Methodology: Seasonal Approach

2-year Pooled 10th/16th Peak (“2-Year Pooling”)

- The proposed methodology aligns the RDPA trigger with the hours for which RDR resources would be compensated under NPRR1296
  - To achieve this, the Net Load Threshold is set at the 10th or 16th highest Net Load level from the pooled peak Net Load hours of the preceding two years, depending on the season
- Figure 3 shows how the Net Load Threshold would be constructed for 2026 under this approach

Figure 3

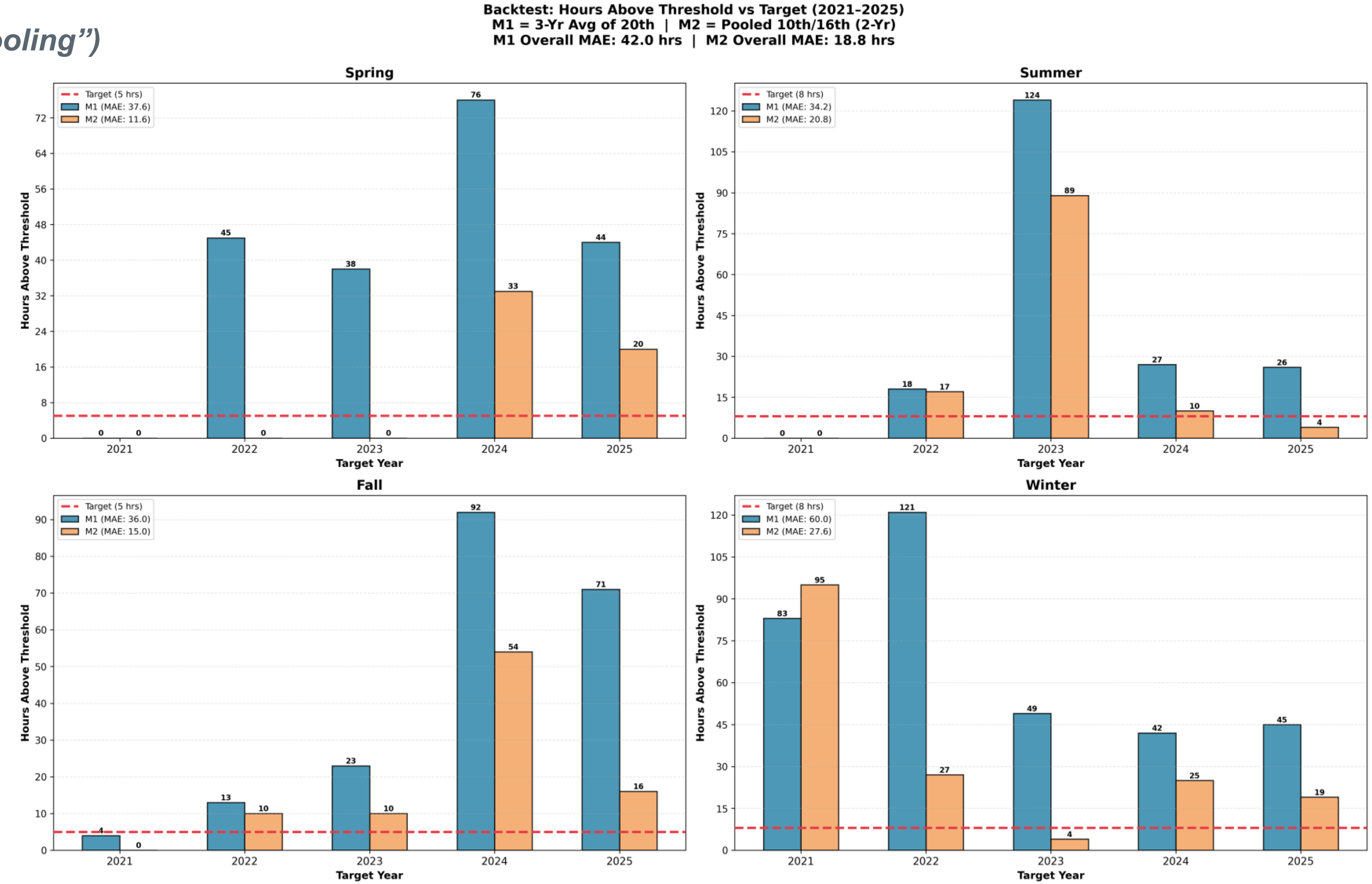
Seasonal Peak Net Load Analysis by Year (2022–2025)
Bar Range: Top 1 to Top 5/8 | Dotted Line: Pooled 10th/16th Value (2024–2025)



Alternative Methodology: Seasonal Approach

2-year Pooled 10th/16th Peak ("2-Year Pooling")

- The pooled 10th/16th threshold anchors the RDPA trigger to Net Load levels more consistent with the hours for which RDR resources are compensated under NPRR1296 (top 5 hours in spring/fall, top 8 hours in summer/winter), as opposed to the broader 20th highest Net Load approach'
- A 2-year pooling window keeps the threshold responsive to significant shifts in grid conditions, reducing the risk of the RDPA triggering too frequently or too infrequently compared to the 3-year average approach
- **Based on the analysis, ERCOT recommends adopting the outlined '2-year Pooling' methodology under a seasonal construct**



Additional Considerations

- Additional seasonal methodology considerations for establishing the Net Load Threshold are included in the appendix, covering the following alternative approaches:
  - 20th highest Net Load level averaged over the past two years
  - 5th/8th highest Net Load level averaged over the past three years
  - 5th/8th highest Net Load level averaged over the past two years
- Energy price data during peak Net Load hours is also available in the appendix

Summary

ERCOT is recommending proceeding a '2-Year Pooled Option to derive a seasonal net-load trigger for the RDPA; this approach

- Better aligns the trigger with the performance hours
- Increases program transparency
- Supports price formation

The Net-Load Trigger and seasonal MW estimates from participants can be refined/reviewed and improved for accuracy based on actual experience

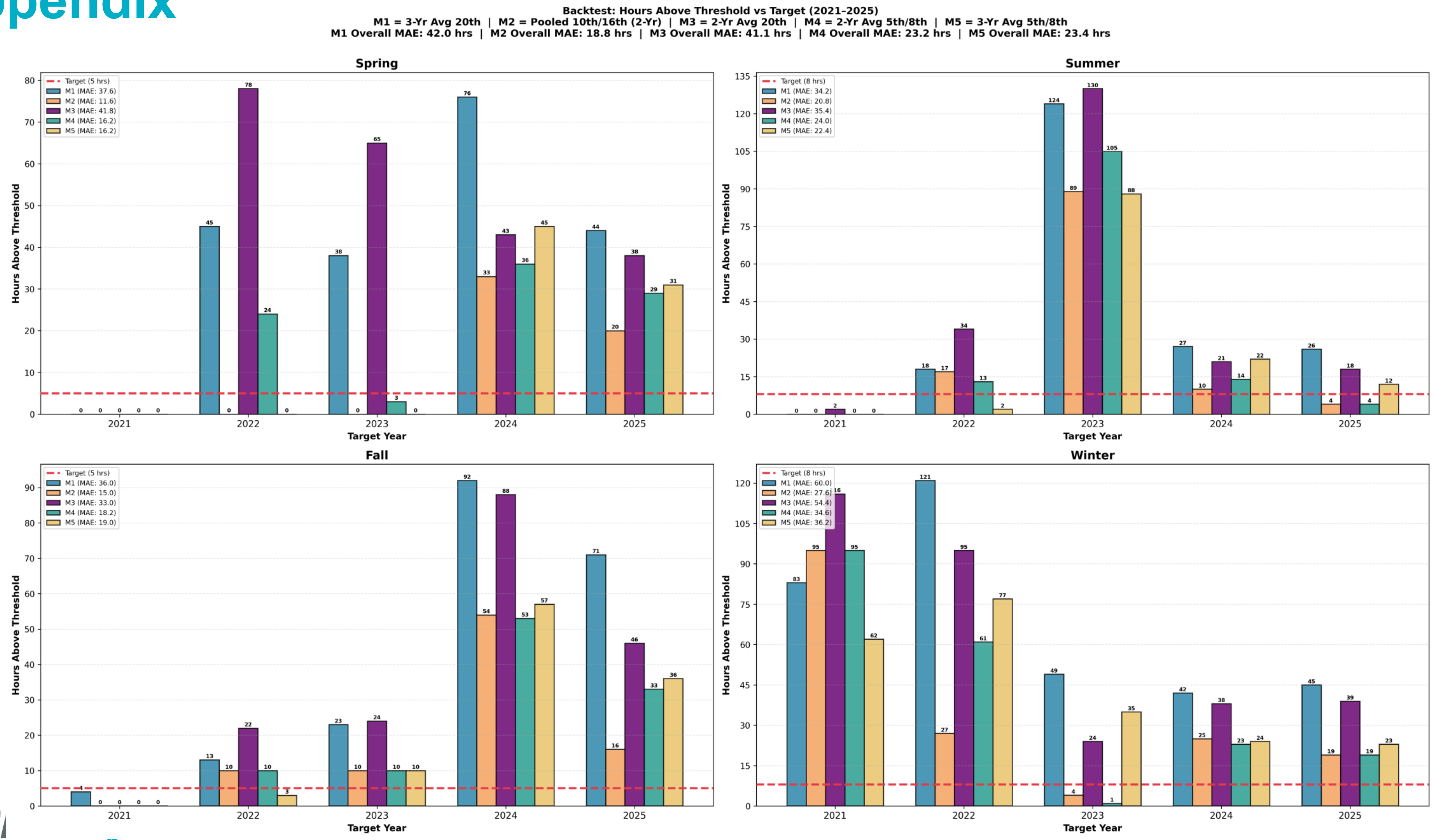
Next Steps

- Based on discussion and feedback from today, ERCOT will respond to any additional analysis requests and/or bring forward formal protocol language to reflect this concept.

Appendix

Appendix

Backtest Results – All Methods



Appendix

3-year Average 20th Peak – Backtest Results

System Lambda Analysis - M1: 3-Yr Avg of 20th
Hours above Net Load threshold | Percentiles vs all hours in year

Spring

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	46,995	45 / 5	$74.15 (70.56%)	$139.87 (93.25%)	$4,981.13 (99.91%)
2023	46,570	38 / 5	$24.55 (47.09%)	$75.01 (85.53%)	$240.83 (95.73%)
2024	46,450	76 / 5	$27.37 (57.41%)	$97.95 (94.45%)	$4,998.51 (99.98%)
2025	50,233	44 / 5	$38.89 (62.93%)	$126.68 (96.43%)	$3,379.99 (99.94%)

Summer

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	64,156	18 / 8	$249.59 (96.23%)	$2,457.86 (99.75%)	$5,001.00 (100.00%)
2023	63,745	124 / 8	$60.77 (79.90%)	$2,560.46 (99.04%)	$5,001.00 (100.00%)
2024	64,818	27 / 8	$42.03 (77.45%)	$211.72 (97.86%)	$5,001.00 (100.00%)
2025	65,747	26 / 8	$84.12 (92.22%)	$142.97 (97.15%)	$464.18 (99.78%)

Fall

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	50,733	13 / 5	$65.00 (63.30%)	$227.12 (95.80%)	$989.14 (99.26%)
2023	48,768	23 / 5	$28.67 (57.77%)	$74.76 (84.04%)	$4,988.19 (99.63%)
2024	48,846	92 / 5	$29.32 (61.26%)	$80.00 (92.27%)	$4,954.37 (99.93%)
2025	51,581	71 / 5	$36.02 (57.81%)	$94.07 (93.84%)	$608.50 (99.87%)

Winter

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	50,452	121 / 8	$41.18 (35.58%)	$73.45 (69.93%)	$4,462.40 (99.85%)
2023	53,858	49 / 8	$38.22 (69.04%)	$54.97 (78.48%)	$305.95 (96.55%)
2024	57,557	42 / 8	$44.15 (79.19%)	$150.51 (96.78%)	$1,134.48 (99.78%)
2025	59,355	45 / 8	$44.75 (71.83%)	$99.50 (94.65%)	$509.15 (99.83%)

Appendix

2-year Pooled 10th/16th Peak – Backtest Results

System Lambda Analysis - M2: Pooled 10th/16th (2-Yr)
Hours above Net Load threshold | Percentiles vs all hours in year

Spring

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	51,019	0 / 5	N/A	N/A	N/A
2023	50,239	0 / 5	N/A	N/A	N/A
2024	50,239	33 / 5	$39.28 (75.16%)	$156.42 (96.89%)	$4,998.51 (99.98%)
2025	54,221	20 / 5	$74.54 (89.65%)	$200.00 (98.48%)	$3,379.99 (99.94%)

Summer

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	64,213	17 / 8	$257.36 (96.43%)	$2,457.86 (99.75%)	$5,001.00 (100.00%)
2023	64,440	89 / 8	$64.65 (80.79%)	$4,015.26 (99.29%)	$5,001.00 (100.00%)
2024	67,685	10 / 8	$297.67 (98.52%)	$880.72 (99.57%)	$5,001.00 (100.00%)
2025	68,606	4 / 8	$100.87 (95.09%)	$203.79 (98.55%)	$286.45 (99.14%)

Fall

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	51,083	10 / 5	$65.00 (63.30%)	$238.04 (96.04%)	$989.14 (99.26%)
2023	51,426	10 / 5	$49.45 (76.72%)	$128.68 (93.38%)	$961.76 (98.18%)
2024	52,315	54 / 5	$32.98 (67.71%)	$105.93 (95.19%)	$586.34 (99.30%)
2025	57,432	16 / 5	$49.67 (77.00%)	$89.34 (93.14%)	$249.16 (99.00%)

Winter

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	57,036	27 / 8	$78.01 (76.80%)	$211.23 (95.57%)	$4,462.40 (99.85%)
2023	59,738	4 / 8	$49.72 (76.84%)	$78.24 (87.59%)	$78.24 (87.59%)
2024	59,738	25 / 8	$92.20 (93.93%)	$227.72 (98.04%)	$1,134.48 (99.78%)
2025	63,061	19 / 8	$86.00 (92.59%)	$145.75 (97.24%)	$509.15 (99.83%)

Appendix

2-year Average 20th Peak – Backtest Results

System Lambda Analysis - M3: 2-Yr Avg of 20th
Hours above Net Load threshold | Percentiles vs all hours in year

Spring

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	45,025	78 / 5	$69.45 (66.63%)	$141.08 (93.37%)	$4,981.13 (99.91%)
2023	45,715	65 / 5	$24.41 (46.50%)	$73.96 (83.45%)	$956.14 (98.09%)
2024	48,790	43 / 5	$39.28 (75.16%)	$148.03 (96.69%)	$4,998.51 (99.98%)
2025	50,520	38 / 5	$43.02 (69.72%)	$130.85 (96.62%)	$3,379.99 (99.94%)

Summer

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	63,569	34 / 8	$92.59 (87.43%)	$1,446.14 (99.51%)	$5,001.00 (100.00%)
2023	63,585	130 / 8	$60.77 (79.90%)	$2,412.54 (99.00%)	$5,001.00 (100.00%)
2024	65,691	21 / 8	$73.29 (89.67%)	$297.67 (98.52%)	$5,001.00 (100.00%)
2025	66,572	18 / 8	$84.12 (92.22%)	$176.53 (98.03%)	$464.18 (99.78%)

Fall

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	48,665	22 / 5	$65.00 (63.30%)	$98.83 (89.05%)	$989.14 (99.26%)
2023	48,669	24 / 5	$28.67 (57.77%)	$74.76 (84.04%)	$4,988.19 (99.63%)
2024	49,086	88 / 5	$29.32 (61.26%)	$80.00 (92.27%)	$4,954.37 (99.93%)
2025	52,885	46 / 5	$45.52 (72.86%)	$89.34 (93.14%)	$608.50 (99.87%)

Winter

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	51,622	95 / 8	$41.84 (36.56%)	$76.60 (75.41%)	$4,462.40 (99.85%)
2023	57,376	24 / 8	$40.82 (70.97%)	$55.28 (78.62%)	$225.90 (95.49%)
2024	58,123	38 / 8	$44.15 (79.19%)	$154.73 (96.85%)	$1,134.48 (99.78%)
2025	59,869	39 / 8	$44.75 (71.83%)	$103.60 (95.33%)	$509.15 (99.83%)

Appendix

2-year Average 5th/8th Peak – Backtest Results

System Lambda Analysis - M4: 2-Yr Avg of 5th/8th
Hours above Net Load threshold | Percentiles vs all hours in year

Spring

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	49,444	24 / 5	$78.71 (77.66%)	$193.01 (95.11%)	$4,981.13 (99.91%)
2023	48,663	3 / 5	$73.96 (83.45%)	$77.70 (87.35%)	$106.11 (92.07%)
2024	49,622	36 / 5	$39.28 (75.16%)	$156.42 (96.89%)	$4,998.51 (99.98%)
2025	52,317	29 / 5	$48.76 (76.22%)	$146.03 (97.26%)	$3,379.99 (99.94%)

Summer

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	64,391	13 / 8	$257.36 (96.43%)	$2,995.58 (99.81%)	$5,001.00 (100.00%)
2023	64,137	105 / 8	$64.65 (80.79%)	$3,471.57 (99.20%)	$5,001.00 (100.00%)
2024	66,620	14 / 8	$99.85 (94.67%)	$500.00 (99.10%)	$5,001.00 (100.00%)
2025	68,622	4 / 8	$100.87 (95.09%)	$203.79 (98.55%)	$286.45 (99.14%)

Fall

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	50,883	10 / 5	$65.00 (63.30%)	$238.04 (96.04%)	$989.14 (99.26%)
2023	51,454	10 / 5	$49.45 (76.72%)	$128.68 (93.38%)	$961.76 (98.18%)
2024	52,324	53 / 5	$32.98 (67.71%)	$105.93 (95.19%)	$586.34 (99.30%)
2025	55,422	33 / 5	$45.52 (72.86%)	$90.32 (93.21%)	$249.16 (99.00%)

Winter

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	53,762	61 / 8	$49.78 (46.52%)	$89.75 (85.90%)	$4,462.40 (99.85%)
2023	59,879	1 / 8	$55.28 (78.62%)	$55.28 (78.62%)	$55.28 (78.62%)
2024	60,411	23 / 8	$92.20 (93.93%)	$232.34 (98.11%)	$1,134.48 (99.78%)
2025	63,094	19 / 8	$86.00 (92.59%)	$145.75 (97.24%)	$509.15 (99.83%)

Appendix

3-year Average 5th/8th Peak – Backtest Results

System Lambda Analysis - M5: 3-Yr Avg of 5th/8th
Hours above Net Load threshold | Percentiles vs all hours in year

Spring

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	51,569	0 / 5	N/A	N/A	N/A
2023	49,866	0 / 5	N/A	N/A	N/A
2024	48,619	45 / 5	$39.28 (75.16%)	$148.03 (96.69%)	$4,998.51 (99.98%)
2025	51,782	31 / 5	$43.02 (69.72%)	$134.14 (96.75%)	$3,379.99 (99.94%)

Summer

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	64,946	2 / 8	$5,001.00 (100.00%)	$5,001.00 (100.00%)	$5,001.00 (100.00%)
2023	64,461	88 / 8	$64.65 (80.79%)	$4,019.77 (99.30%)	$5,001.00 (100.00%)
2024	65,637	22 / 8	$73.29 (89.67%)	$297.67 (98.52%)	$5,001.00 (100.00%)
2025	67,282	12 / 8	$84.12 (92.22%)	$176.53 (98.03%)	$386.97 (99.59%)

Fall

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	53,049	3 / 5	$227.12 (95.80%)	$962.89 (99.16%)	$989.14 (99.26%)
2023	51,360	10 / 5	$49.45 (76.72%)	$128.68 (93.38%)	$961.76 (98.18%)
2024	51,747	57 / 5	$32.98 (67.71%)	$105.93 (95.19%)	$586.34 (99.30%)
2025	54,386	36 / 5	$45.52 (72.86%)	$89.34 (93.14%)	$249.16 (99.00%)

Winter

Year	Threshold (MW)	Hrs/Target	Min Lambda $/MWh (Yr%)	Median Lambda $/MWh (Yr%)	Max Lambda $/MWh (Yr%)
2022	52,463	77 / 8	$46.82 (42.86%)	$80.33 (79.05%)	$4,462.40 (99.85%)
2023	56,253	35 / 8	$38.64 (69.40%)	$53.71 (78.14%)	$304.04 (96.53%)
2024	59,782	24 / 8	$92.20 (93.93%)	$232.34 (98.11%)	$1,134.48 (99.78%)
2025	62,474	23 / 8	$86.00 (92.59%)	$131.69 (96.69%)	$509.15 (99.83%)

Appendix

Historical Peak Net Load Levels