SPP 2029 PLANNING RESERVE MARGIN RECOMMENDATION

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Published on April 4th, 2025

Version 1.0

CONTENTS

2029 PRM Overview ... 1
Study Observations ... 1
Additional Materials ... 4
Conclusion ... 4
APPENDIX A ... 5
APPENDIX B ... 5

2029 PRM OVERVIEW

SPP recommends setting the Base Planning Reserve Margin (PRM) for the 2029 Summer Season and the 2029-2030 Winter Season as part of its initiatives to mitigate Resource Adequacy risks. By setting the Base PRM for the 2029 Summer Season and 2029-2030 Winter Season in the 1st quarter of 2025, SPP LREs will have more foresight to be able plan, develop, and construct new generation resources or otherwise obtain the capacity needed to meet the PRM. The recommended Base PRM is an increase from the 2026 Summer Season and the 2026-2027 Winter Season approved in August of 2024. The 2029 recommendation is based on extensive analysis that has occurred under the direction, input, and approval of the Supply Adequacy Working Group (SAWG), the Cost Allocation Working Group (CAWG), and the Resource Energy and Adequacy Leadership (REAL) Team. The recommendation is as follows:

- For the Summer Season, SPP recommends setting the Base PRM for the 2029 Summer Season to 17%.

- For the Winter Season, SPP recommends setting the Base PRM for the 2029/2030 Winter season to 38%.

Upon completion of the 2023 Loss of Load Expectation (LOLE) Study, SPP Staff was directed by REAL Team to establish a PRM for Summer Season of 2029 and Winter Season 2029-2030 PRM values. Based on feedback from the SAWG and other stakeholder groups, the resource and load assumptions for planning year 2029 were updated using 2024 submissions while keeping all other modeling parameters consistent from the 2023 LOLE Study. These original and updated assumptions and forecasts were developed with the members for the SPP Balancing Authority Area, to accurately incorporate historical operational experiences of Resource performance, energy consumption and system conditions as well as projected generating capacity and new generator development timelines. As with the 2023 LOLE study, SPP directly analyzed seasonal risk beyond the Summer Season and included analysis for reduced amounts of Incremental Cold Weather Outages (ICWO), incremental inclusion of planned and maintenance outages, and varying risks across winter and summer seasons.

STUDY OBSERVATIONS

The updated LOLE study and associated analysis for study year 2029 demonstrated the following key observations:

COLD WEATHER IMPACTS

Consistent with the 2023 LOLE study, a reduced amount of ICWO was included in the Winter analysis.

The value of ICWO recommended to be used for the ultimate recommended PRM is representative of outages experienced during the two more recent winter storms, Winter Storm Elliot (December 2022) and Winter Storm Gerri (January 2024) but not as significant as those experienced during Winter Storm Uri.

SEASONAL BALANCE OF RISK

For the current PRM recommendation, a seasonal balance of risk of 50% allocation of LOLE risk (0.05 LOLE) in the Summer Season and 50% allocation of LOLE risk (0.05 LOLE) in the Winter Season is being used. The updated Resource mix submitted by LREs, which included a large increase in the amount of thermal resources, coupled with additional load forecast, allowed the expected unserved energy risk in the Winter Season to be mitigated more than it was in the previous analyses for the 2023 LOLE study, when the LOLE risk was recommended to be set at 30% of annual LOLE risk. By keeping the amount of LOLE risk equal in the Summer Season and Winter Season for the 2029 seasons, the Normalized Expected Unserved Energy risk is projected to remain less than 2 parts per million (ppm) on an annual basis.

LOLE		Seasonal PRM		EUE (MWh)				Annual	
Summer	Winter	Summer	Winter	Summer	Winter	Average Summer Event Duration (Hr)	Average Winter Event Duration (Hr)	Annual EUE (MWh)	PPM
0.01	0.09	19%	37%	29	1,014	3	6	1,043	3.0
0.02	0.08	19%	37%	62	876	3	6	937	2.7
0.03	0.07	18%	37%	102	770	3	6	872	2.5
0.04	0.06	18%	38%	145	678	3	6	823	2.3
0.05	0.05	17%	38%	188	539	4	6	727	2.1
0.06	0.04	17%	39%	239	372	4	5	611	1.7
0.07	0.03	17%	39%	296	242	4	5	537	1.5
0.08	0.02	17%	40%	352	138	4	5	490	1.4
0.09	0.01	16%	42%	409	50	4	4	459	1.3

Figure 1: Seasonal Risk Table

PLANNED AND MAINTENANCE OUTAGES

Evaluation of planned and maintenance outages provides insight into how planned, and maintenance outages are simulated in the SERVM software compared to how SPP Operations currently schedule and approve these outages. In the past LOLE studies, all planned, and maintenance outages were scheduled outside of the Summer Season. The 2023 LOLE study was the first LOLE study in which it was observed that planned and maintenance outages might need to be taken during a season that will have a binding Resource Adequacy Requirement (in this case the Winter Season).

To provide further ability for the SPP Balancing Authority to take planned and maintenance outages throughout the year, this PRM recommendation includes provisions for planned and maintenance outages for 2029 Summer Season and 2029-30 Winter Season.

RESOURCE MIX AND EUE CONSIDERATIONS

Different variations of future resource mix portfolios can result in differing LOLE risk impacts for portfolios that have a similar calculated PRM value. This updated LOLE study included the latest LRE Resource plans which included a vastly different resource mix for study year 2029 than included in the original 2023 LOLE study. The updated resource mix in the 2029 study included a fairly large increase in thermal resources (primarily gas turbines) which reduced the impacts of EUE, that stayed at relatively low levels (less than 2.5 ppm) while maintaining the 1 day in 10-year LOLE standard.

FORECASTED CAPACITY AND LOAD OUTLOOK

SPP has reviewed information outside of the LOLE study, which included information on current LRE Resource plans, recent load forecast trends compared to actual peak loads, and forecasted Resource additions/retirements. The items listed below are reliability risk observations that support Staff's recommendations.

- Based on the Winter Season accredited capacity of 62,647 MW and non-coincident net peak demand of 45,831MW reported for the 2024-2025 Winter Season, LREs currently report excess capacity of 37% during the Winter Season. However, there is an additional 3,400 MW of LRE accredited capacity included in the Summer Season not included in the Winter Season capacity.

- The 2026-2027 forecasted non-coincident peak load is approximately 1.3% higher than the SPP system coincident Winter Season peak set in 2022. Using the reported forecasted load for 2026-2027, the Winter Season results in 36.5% excess capacity, if the existing installed capacity reported by LREs remains in place and is made available for the Winter Season. However, this does not consider the new generation scheduled to be in service, additional demand response programs projected to be in place, or the incremental impact of ELCC accreditation for wind resources currently not claimed by LREs.

- While LREs continue to forecast increasing loads, recent history has shown that load forecasts may not keep up with actual peak loads observed in the planning horizon.

- LREs also have new capacity planned, including new requests in the Generator Interconnection queue. Some of these are planned for commercial operation prior to the

2026 Summer Season while a larger amount is planned to be in service by the 2029 Summer Season.

EXTERNAL ENERGY ASSISTANCE

The ability for the SPP Balancing Authority to reliably plan on energy assistance from neighboring regions has been reviewed and discussed at SPP working groups including the REAL Team and SAWG. Staff does not recommend that the PRM consider non-firm energy assistance from neighboring regions given the uncertainty that neighboring regions will have available energy and capacity at the times when the SPP Balancing Authority may require such assistance. The REAL Team may consider further evaluation of the ability of SPP to rely on non-firm energy and capacity assistance from neighboring regions. Additionally, the volatility of generation and load continues to increase on the SPP system.

ADDITIONAL MATERIALS

The PRM recommendation and associated materials approved by the REAL Team can be found in Appendix A of this document.

The methodology and assumptions used to conduct the LOLE study are outlined in the 2024 SPP Loss of Load Expectation Report document, which is attached to this document as Appendix B.

CONCLUSION

SPP, as the Transmission Provider, in conjunction with the stakeholders and REAL have considered this analysis, performed sensitivities for updated 2029 resource mix and load forecast, the future makeup of the SPP resource mix, and the current and ongoing industry research and trends which ultimately led to the following recommendation:

- *Set the Base Planning Reserve Margins at 38% for the winter season and 17% for the summer season, effective beginning with the 2029 summer season and 2029/30 winter season.*

APPENDIX A

SPP Staff Presentation to Resource and Energy Adequacy Leadership Team at their December 2024 Meeting

APPENDIX B

2024 Loss of Load Expectation Study