Winter 2023-24 Capacity Scarcity Risk Assessment

For the upcoming winter season, the ERCOT Region will face reserve shortage risks during high net load hours. In winter, peak demands typically occur before sunrise and after sunset, when solar generation is not available to serve those peaks (except for a negligible amount), making the system dependent on wind generation and dispatchable Resource availability to serve the peak demands. The risk is greater than last winter due primarily to robust load growth along with insufficient new dispatchable Resources to fully serve the higher net peak loads. The ERCOT Region has also experienced a large increase in the number of thermal units that are planned to be indefinitely mothballed by the start of the 2023-24 winter Peak Load Season or will operate under a summer-only availability schedule. There are currently 15 units expected to be out of service, representing a loss of 1,283 MW of winter-rated capacity.

Capacity Scarcity Simulations using ERCOT's *Probabilistic Reserve Risk Model*

ERCOT ran its Probabilistic Reserve Risk Model (PRRM) for the upcoming 2023-24 winter Peak Load Season. The PRRM, which performs Monte Carlo simulations, determines the probability that Capacity Available for Operating Reserves (CAFOR) for a seasonal peak load day is at or below the various EEA risk thresholds. ERCOT's simulations included analyzing the probabilities of entering various stages of EEA if the ERCOT Region were subjected to extreme winter weather comparable to Winter Storm Elliott in 2022, accounting for the Demand growth experienced in 2023. The highest-risk hour for the winter continues to be hour ending 8:00 AM, and the tables below summarize probabilities of CAFOR being at or below the EEA thresholds for that hour under various scenarios. The Base case reflects the various EEA risks if Winter Storm Elliott-like weather occurred in the 2023-24 winter Peak Load Season and no additional capacity was procured. Other cases reflect varying amounts of capacity procured through one or more contracts for capacity.

Capacity scarcity risk is "elevated" when the probability is above 10%. When the probability is below 10%, the risk is deemed "low."

Winter Storm Elliott Scenario, Base

Assumptions:

- Load forecast based on Elliott Weather, 78,900 MW (No incremental demand response other than what is reflected in the load forecast)
- Unplanned weather-related outages during Elliott, 3,056 MW (reduced for weatherization improvement)
- Green Mountain STG8 Returns (568 MW winter rating)
- Battery Storage based on an average 80% HSL-based capacity factor for the peak load hours during Elliott: 3,438 MW (80% CF x 4,298 MW installed capacity expected by December 1, 2023)

	Hourly Risk Profile (Hour-ending)
	8 AM

	Probability of EEAs (%)
Probability of Reserves being equal to or less than 3,000 MW	29.612
Probability of Reserves being equal to or less than the 2,500 MW EEA1 threshold	19.909
Probability of Reserves being equal to or less than the 2,000 MW EEA2 threshold	18.166
Probability of Reserves being equal to or less than the 1,500 MW EEA3 threshold	16.374

	Probability of Substantial Firm Load Shed (%)
Probability of Reserve Deficit being equal to or less than -5,000 MW	1.027
Probability of Reserve Deficit being equal to or less than -10,000 MW	0.012
Probability of Reserve Deficit being equal to or less than -15,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -20,000 MW	0.000

October 2, 2023

Winter Storm Elliott Base Scenario with 2,000 MW of Contracted Capacity

	Hourly Risk Profile (Hour-ending)
	8 AM

	Probability of EEAs (%)
Probability of Reserves being equal to or less than 3,000 MW	21.946
Probability of Reserves being equal to or less than the 2,500 MW EEA1 threshold	12.733
Probability of Reserves being equal to or less than the 2,000 MW EEA2 threshold	10.999
Probability of Reserves being equal to or less than the 1,500 MW EEA3 threshold	9.482

	Probability of Substantial Firm Load Shed (%)
Probability of Reserve Deficit being equal to or less than -5,000 MW	0.243
Probability of Reserve Deficit being equal to or less than -10,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -15,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -20,000 MW	0.000

Winter Storm Elliott Base Scenario plus 3,000 MW of Contracted Capacity

	Hourly Risk Profile (Hour-ending)
	8 AM

	Probability of EEAs (%)
Probability of Reserves being equal to or less than 3,000 MW	18.268
Probability of Reserves being equal to or less than the 2,500 MW EEA1 threshold	9.482
Probability of Reserves being equal to or less than the 2,000 MW EEA2 threshold	8.175
Probability of Reserves being equal to or less than the 1,500 MW EEA3 threshold	6.722

	Probability of Substantial Firm Load Shed (%)
Probability of Reserve Deficit being equal to or less than -5,000 MW	0.105
Probability of Reserve Deficit being equal to or less than -10,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -15,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -20,000 MW	0.000

October 2, 2023

Winter Storm Elliott Base Scenario plus 3,500 MW of Contracted Capacity

	Hourly Risk Profile (Hour-ending)
	8 AM

	Probability of EEAs (%)
Probability of Reserves being equal to or less than 3,000 MW	16.307
Probability of Reserves being equal to or less than the 2,500 MW EEA1 threshold	8.175
Probability of Reserves being equal to or less than the 2,000 MW EEA2 threshold	6.722
Probability of Reserves being equal to or less than the 1,500 MW EEA3 threshold	5.658

	Probability of Substantial Firm Load Shed (%)
Probability of Reserve Deficit being equal to or less than -5,000 MW	0.082
Probability of Reserve Deficit being equal to or less than -10,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -15,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -20,000 MW	0.000

Winter Storm Elliott Base Scenario plus 4,000 MW of Contracted Capacity

	Hourly Risk Profile (Hour-ending)
	8 AM

	Probability of EEAs (%)
Probability of Reserves being equal to or less than 3,000 MW	14.595
Probability of Reserves being equal to or less than the 2,500 MW EEA1 threshold	6.722
Probability of Reserves being equal to or less than the 2,000 MW EEA2 threshold	5.658
Probability of Reserves being equal to or less than the 1,500 MW EEA3 threshold	4.629

	Probability of Substantial Firm Load Shed (%)
Probability of Reserve Deficit being equal to or less than -5,000 MW	0.035
Probability of Reserve Deficit being equal to or less than -10,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -15,000 MW	0.000
Probability of Reserve Deficit being equal to or less than -20,000 MW	0.000

Results Summary

Scenario	Probability of EEA	Expected Unserved Energy, 8 AM (MWh)	Expected Unserved Energy, 7 AM-9 PM (MWh)
Base	19.9%	470	951
Base + 2000 MW Contracted Capacity	12.7%	214	404
Base + 3000 MW Contracted Capacity	9.5%	133	240
Base + 3500 MW Contracted Capacity	8.2%	103	181
Base + 4000 MW Contracted Capacity	6.7%	77	134

October 2, 2023