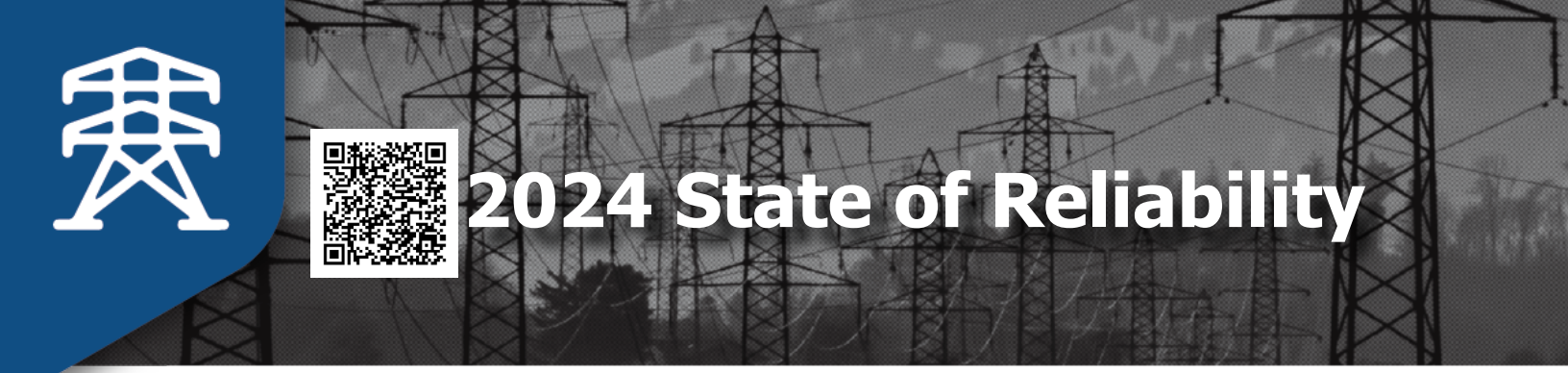

2024 State of Reliability

NERC's 2024 State of Reliability (SOR) provides an in-depth analysis of bulk power system (BPS) performance during the past year using information and data from the six Regional Entities and registered entities. It identifies system performance trends and emerging reliability risks; reports on the relative health of the interconnected system; and measures the success of mitigation activities deployed. Leading indicators show that the BPS remained highly reliable and resilient in 2023; however, high generator outage trends and ongoing inverter ride-through challenges signal potential risks that require mitigating action.

Key Findings

Response to Severe Weather Events Confirms Overall Resilience of the BPS

While there were no extreme weather events in 2023 that impacted the BPS, the grid demonstrated resilience, with no instances of operator-initiated firm load shedding, during several severe weather events and historic Canadian wildfires.

Generation Forced Outage Rates Remain High

In 2023, baseload coal, peaking natural gas, and wind generation forced outage rates remained high, exceeding rates for all years prior to 2021. Analysis of these outages aligns with industry statements about reduced maintenance investment and increased cycling.

Performance of Inverter-Based Resources Continues to Impact the BPS

The response by inverter-based resources to system disturbances continues to negatively affect many solar facilities and has now been observed at large battery storage and wind plants. Industry collaboration with manufacturers demonstrates possible solutions.

Texas Interconnection's Reliability Performance Improves while Facing New Challenges

The Texas Interconnection's reliability performance improved with the use of battery energy storage systems to support balanced frequency. In addition, the misoperation rate improved significantly when compared to the preceding four years. However, new challenges have arisen due to increasing dependence on variable resources.

BPS Key Statistics

4,687,894 GWh
2023 Actual Energy

1,071,370 MW
2023 Summer Peak Capacity

527,698 mi
Total Transmission Circuit Miles ≥ 100kV

5,915
Number of Conventional Generating Units ≥ 20MW