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News : NERC raises North American power system reliability flags as demand could outstrip supply

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- Resource adequacy shortfalls seen in many regions
- Gas-fired generation increasingly important

The North American Electric Reliability Corporation's 2023 Long-term Reliability Assessment found that most areas face power generation resource adequacy challenges, with many regions projected to have reserve shortages or emerging energy risks, and the incremental mix of resources increases fuel supply concerns as the reliance on just-in-time delivery of natural gas to fuel power generation grows.

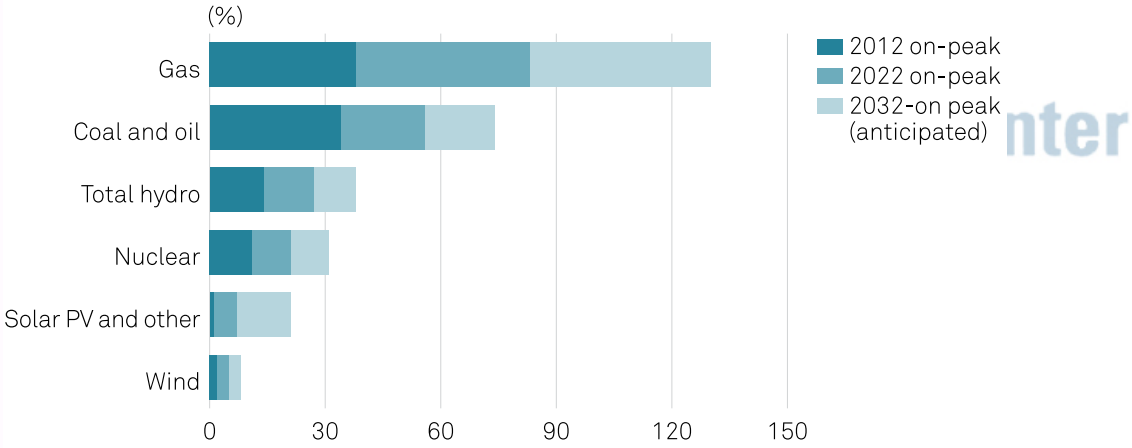
"The critical interdependence between the electric and gas sectors in this year's assessment stands out as a significant risk to future reliability," Mark Olson, NERC's manager of Reliability Assessment, said in a Dec. 13 statement.

"Subfreezing temperatures, as seen during Winter Storms Uri and Elliott, can disrupt the natural gas fuel supplies to generators. When this causes an electricity supply shortfall, it can further affect natural gas infrastructure, creating more severe impacts on the energy system as a whole," Olson said.

As NERC has warned in recent assessments, resource adequacy concerns emerge during the next 10 years due to a combination of higher power demand, generator retirements and the potential for replacement resources to "fall short of capacity and energy needs," the group said.

Specifically, over 83 GW of fossil fuel-fired and nuclear power generator retirements are anticipated through 2033, with additional generators having signaled plans for retirements. Over the same period, the generation resource mix continues to transition as wind, solar and battery resources are added, NERC said.

NERC region summer peak power generation resource capacity



Source: NERC

Additionally, the assessment found a total power capacity increase of 34 GW over the next 10 years, with most incremental capacity coming from solar, while simultaneously new emissions regulations are likely to prompt further resource retirements.

"You see tightening conditions where demand is rising, capacity is shrinking and the energy mix is taking on different characteristics," Olson said during a conference call with reporters to discuss the report.

Future power capacity shortfalls are projected in the Midcontinent Independent System Operator and SERC-Central regions, prompting NERC to categorize them as "high risk" areas.

In MISO, expected retirements result in a 4.7 GW capacity shortfall starting in 2028 despite 12 GW of incremental resource additions. However, delayed generator retirements and new resources have improved the market's overall outlook since the 2022 long-term reliability assessment.

Risk was identified in the SERC-Central region from 2025 to 2027 as power demand is forecast to increase faster than the transitioning resource mix grows. Plans to retire 5 GW of coal-fired power generation and replace it with gas-fired, solar PV, and battery resources "must be timed to prevent shortfalls," NERC said.

Recommendations

NERC's report included several actionable recommendations for meeting accelerating demand growth amid a rapidly changing US generation mix.

"It's important that we add new resources with the right reliability benefits, manage retirements, and make sure the existing resources that we have are more dependable," Olson said.

NERC has already launched multiple initiatives to address those issues, including ongoing work on generator winterization standards and energy assurance standards.

Olson also stressed the importance of expanding the nation's electric transmission capacity. To that end, NERC has been tasked with conducting a two-year study on the need for more interregional transfer capability with a final report due to the Federal Energy Regulatory Commission by December 2024.

"As new resources are often in different places than current resources and load behaviors are changing, it's important that the transmission network is able to adequately serve needs," Olson said.

Resource procurement will need to improve as the bulk power system becomes more complex, Olson added. For example, supply chain constraints have resulted in a major shortage of transformers for the US utility industry.

Yearslong delays in transformer procurement can create challenges in planning for extreme weather, Olson noted. Severe storms "oftentimes can cause a lot of damage to distribution transformers and therefore drive the need to have additional resources available," he said.

In addition, system operators must better account for the performance and availability of blackstart resources, according to NERC's assessment.

A recent FERC-NERC report on a severe December 2022 winter storm found that roughly 19,000 MW of blackstart capacity experienced forced outages, derates or failures during the extreme weather event.

Blackstart units, designed to start without the aid of external power sources, are relied on to restart the power system in the event of a grid collapse. Of 155 blackstart units that experienced some type of failure during the storm, 119 were natural gas fired.

On a related point, Olson said policymakers must address the growing interdependence of the US power and natural gas systems.

"As we rely increasingly on natural gas, it's going to require collaborative efforts and strong reliability standards," Olson said. "It's also important, given how policy and regulations can affect resources and demand, that there be a strong dialogue … to understand how each one is affecting the other."