Southeast Energy Vision

KEY TAKEAWAYS

SEPTEMBER 2026

GridLAB

The Southeast region of the United States is facing increasing electricity demand, driven by new large loads such as data centers, as well as a growing population and increased electrification. In order to evaluate the opportunities for the region to reliably meet electricity demand, The Brattle Group developed a long-term resource planning model of the region. The Southeast Energy Vision Study evaluates how the southeast can cost-effectively meet growing electricity demand, continue the deployment of non-emitting resources, and maintain resource adequacy through the 2040s. The analysis includes the region's major utilities as a starting point – including in Georgia, Kentucky, Tennessee, Alabama, Mississippi, North Carolina, and South Carolina. Initial resource plans and load projections are taken from the utilities planning processes, and scaled across the region as necessary.

Overview

In this analysis, Brattle evaluated three key scenarios to examine the impact of certain incremental changes on the electricity system in the Southeast. The starting point of the assessment is the resource additions specified by nine Southeast utility IRPs. The model then evaluated a core scenario in which emissions are constrained linearly to achieve net-zero by 2050. The first sensitivity evaluates the impact of enhanced coordination and increased utilization of the existing transmission system in order to meet resource adequacy needs. A second sensitivity evaluates the impact of load flexibility providing approximately 10% of system peak demand by 2040.

In all cases, the Southeast region must build large amounts of new clean energy to meet growing demand. Across all scenarios, the model builds approximately 110 GW of new solar, 30 GW of new storage, and 27 GW of new "clean firm" capacity, modeled as new nuclear capacity, while retiring over 40 GW of fossil capacity by 2040. Such a build out will require utilities in the region to increase their current deployment of 5-6 GW of renewables per year today, up to 10 GW or more annually in the future.

Meeting the winter peak

As load grows throughout the region, the Brattle modeling finds that resource adequacy risk shifts to a winter-peaking system, in which planning for multi-day cold snaps drives major resource decisions. The value of firm resources and improved transmission capability increases steadily over the planning period. A diverse resource mix combined with the geographic diversity of the region helps enable appropriate energy flows during tight winter conditions. Excess solar generation can charge additional storage, ensuring more capacity throughout the evening and into the morning hours. Increased transmission coordination can enable increased imports to areas of high demand.

Improved coordination and transmission utilization can reduce capacity needs

Historically, utilities in the Southeast have relied little on regional coordination and interregional transmission expansion to meet resource needs, which results in inflated planning reserve margins for individual balancing areas. Brattle examined the impact of two small changes to existing coordination practices: first, increasing the energy import limits so power can move more freely from one region to another, and second, by increasing capacity imports such that neighboring regions can rely on each other for resource adequacy needs.

Better utilization of the existing transmission system and improved regional coordination creates a strong incentive to build solar and storage and reduce the overall capacity required on the system. This improved utilization and coordination enables solar to be shared across the region, while additional storage can take advantage of increased arbitrage opportunities. Similarly, the region can increase imports from neighbors, reducing the need for local capacity. As a result, the enhanced transmission scenarios result in 33 GW less fossil capacity relative to the utility-IRP proposals.

Modest amounts of new load flexibility enable a pathway for solar and storage

Load flexibility can be a valuable tool that provides resource adequacy and reduces the need for other firm capacity resources. In another scenario, Brattle evaluated the impact of 17 GW of load flexibility across the region, which can dispatch at a maximum of 4 hours. The 17 GW of available flexibility can be dispatched at lower capacity, enabling flexibility to provide capacity across longer durations of time. As a result, the system's peak demand is shifted to periods of high solar generation, which reduces the need for other firm dispatchable resources. The system builds more solar and less fossil capacity relative to the utility IRPs. Importantly, the flexibility in the model is represented by traditional demand response, including HVAC controls, EV charging, and batteries, and does not include large load flexibility, which suggests potential for additional capacity savings.

Conclusions

The existing IRP proposals from the major Southeast utilities suggest a business as usual approach to meeting growing demand. Considering a long term path to reduced emissions, the region will need to build at least 75 GW of solar and 18 GW more storage relative to the utilities' plans. Small, incremental improvements to the interregional transmission coordination and enhanced transmission utilization can further reduce fossil capacity requirements and increase the value of solar and storage. Additional load flexibility and demand response can similarly reduce local capacity needs and reduce the need for costly firm dispatchable resources by shifting demand to align with periods when solar is plentiful and cheap.

What does this mean for Southeast utilities?

- Solar and storage becomes the default, least-cost resource mix to help meet growing reliability needs in the Southeast.
- Modest improvements to regional coordination and increased utilization of the existing transmission system can help reduce local capacity needs and increase the value of solar and storage on the system.
- Small amounts of load flexibility or demand response can align peak demand with high solar generation hours, further enabling the retirement of legacy coal resources and reducing the need for local capacity