ADVANCED ENERGY UNITED™

Wired for Success: Grid-Enhancing Technologies and Virginia's Energy Future

Background

Virginia's power grid is at a turning point. PJM, the entity which controls the mid-Atlantic grid, projects the Commonwealth's energy demand will sharply grow by **4-5 percent annually** over the next fifteen years. To ensure grid reliability, Virginia must work with utilities to ensure prices remain affordable and the lights stay on. By accelerating the uptake of grid-enhancing technologies (GETs), we can increase the capacity of the existing grid and get the maximum value out of our infrastructure.

A recent report from Grid Strategies found that in 2022, total grid congestion costs reached $20.8 billion nationwide, with the key driver of these costs being insufficient transmission expansion to keep up with the growth of low-cost renewable energy projects. A study by the Brattle Group found that GETs can reduce congestion costs by 40% by unlocking additional capacity on the existing grid.

Virginia has 90 GW of renewable energy projects waiting in the interconnection queue – enough to power 30 million homes. By making it easier for utilities and grid operators to monitor power flow more precisely and update models and assumptions, **GETs can double the capacity of the existing grid to absorb new, mostly renewable generation projects.**

This legislation calls on utilities in Virginia to demonstrate that they have considered GETs and advanced reconductoring in IRP long-range planning.

What are Grid-Enhancing Technologies (GETs)?

Simply put, grid-enhancing technologies are a suite of technological upgrades that allow us to get more capacity out of our existing power grid. These technologies include:

- **Dynamic Line Ratings -** Sensors plus software that make visible the true, real-time capacity of power lines so that grid operators can transmit more power through the existing overhead lines when it is safe to do so while also monitoring for potential line problems before they occur.
- **Power Flow Controllers -** Hardware plus software that allows operators to more optimally route power to lines with available capacity, which can increase the overall amount of power flowing through the system.
- **Topology Optimization -** Software that helps identify grid bottlenecks and recommends switching operations to prevent lines from becoming too congested.
- **Storage as Transmission (SATA) -** Used during normal operations, energy storage systems can act as "virtual transmission" to effectively increase headroom on the transmission line and allow delivery of renewable energy from distant locations to load centers. This increases the total throughput of energy across existing transmission lines. In contingency events, storage – sometimes considered a "non-wires alternative" - can provide a first line of defense to maintain system stability, avoiding thermal violations and buying operators time to redispatch the system.
- **Advanced Reconductoring -** While not a traditional GET, this approach replaces existing powerline cables with advanced conductors on existing towers, avoiding increased permitting. Advanced reconductoring significantly increases the capacity, efficiency, safety, resilience, and reliability of the existing powerline, within the existing footprint/right-of-way, and in the similarly short implementation timeframe of traditional GETs.

How Can GETs Help Virginia Meet its Clean Energy Goals?

The long wait for clean energy projects to connect to the grid is a primary obstacle to renewable developers. Projects are taking nearly twice as long to get approved now as they were in 2015. Building new transmission lines can take even longer – an average of ten years from conception to construction. To maximize the existing grid quickly, utilities can use grid-enhancing technologies that allow them to take full advantage of underutilized capacity. Nationwide, policymakers – including White House Office of Science and Technology Policy adviser Sally Benson, FERC Commissioner Allison Clements, and Energy Secretary Jennifer Granholm – have identified grid-enhancing technologies as a crucial tool to protect grid reliability and unlock the potential of renewables.