

LEVERAGING BATTERY STORAGE

Emma Clancy // Southern Environmental Law Center // eclancy@selc.org
Ashish Kapoor // Piedmont Environmental Council // akapoor@pecva.org
Brandon Praileau // Solar United Neighbors // bpraileau@solarunitedneighbors.org

WHY IT MATTERS

Energy storage provides a critical opportunity for Virginia to meet its energy needs through reliable, affordable, and clean power that creates jobs and economic development. A robust storage build-out in Virginia allows our existing renewables to deliver clean energy much more reliably, decreasing new energy development and mitigating impacts to our natural resources. Energy storage refers to any technology that captures energy produced at one time and makes it available for use later. It comes in many forms—most commonly batteries,¹ but also pumped hydro, compressed air, and thermal storage.

The critical role of storage in a zero-carbon future was on display in Dominion's recent long-term planning proceeding, during which intervenors' modeling showed that Dominion can meet projected demand, avoid building new gas, and achieve zero carbon by 2045 by investing significantly in storage in the near- and long-term.² In the face of Dominion's proposal to build 6 GW of new gas resources by 2039, this finding was significant, demonstrating that storage represents a no-regrets alternative that can serve near-term system capacity needs while also eliminating carbon emissions in a way that is more affordable for ratepayers over the long term.

Batteries are highly flexible, which complements a grid with increasing renewable energy. Batteries are also "enabling technologies," in that they increase the ability of renewables to provide dispatchable, reliable power.³ Batteries are less land-intensive than solar and can be readily sited in built environments or to relieve distribution and transmission constraints, which can help avoid costly upgrades.⁴ Investments in storage have paid off in Texas, where batteries saved \$750 million in energy costs and prevented grid shutdowns throughout several weather events.⁵ In Danville, officials estimate that two approved grid-scale batteries will save ratepayers tens of millions of dollars by mitigating transmission and capacity costs.⁶

For homeowners and businesses, storage provides back-up power, helping to meet critical needs for food, shelter, and safety during outages. When paired with rooftop solar, storage can also help lower utility bills and manage excess generation. Better yet, customer batteries can be aggregated through a virtual power plant (VPP) and coordinated to meet energy needs for all Virginians (see Rooftop Solar & Distributed Generation, page 103). By doing so, private investment and market competition can quickly build resources that are 40–60% more affordable than dispatchable energy sources.⁷

CURRENT LANDSCAPE

The Virginia Clean Economy Act (VCEA) requires investor-owned utilities to procure 3,100 megawatts (MW) of storage by 2035.⁸ Even more will be needed. Recent modeling showed that Dominion will need significantly more storage to support a 100% carbon-free grid by 2045.⁹

Virginia utilities are actively pursuing storage. Dominion is ahead of its current storage targets,¹⁰ with over 600 MW approved,¹¹ and is piloting three long-duration energy

storage (LDES) projects.¹² In May 2025, Appalachian Power (APCo) requested approval to build a 52.2 MW battery.¹³

As of June 2024, there were about 45 GW of Battery Energy Storage System (BESS) supply waiting in PJM's interconnection backlog.¹⁴ Despite recent efforts to facilitate quicker interconnection of storage at certain sites,^{15,16} permitting and interconnection requirements remain a barrier, and further PJM reform is urgently needed.¹⁷

Individual customers are also installing storage. 16% of APCo's solar customers already have batteries.¹⁸ Given the benefits of pairing solar and storage, that trend will likely continue statewide and will be aided by two recent developments in Dominion's territory. In September 2024, Dominion received a federal grant for a 150-MW VPP project in Suffolk.^{19,20} Additionally, a new law requires Dominion to propose a 450-MW VPP pilot program by the end of 2025.²¹ In a VPP program, customers voluntarily allow the utility to manage their batteries and other resources in aggregate and receive bill credits in return. These pilots will prove that local energy sources can deliver significant, real-time clean power when and where it is needed most.

Federal funding for battery storage has been vital.^{22,23} In August 2024, Virginia and other states received a grant of approximately \$190 million to fund, among other things, a battery at the Iron Mountain data center in Prince William County.²⁴ However, additional funding faces political headwinds; while the tax credit for utility-scale storage was maintained in the recent "Big Beautiful Bill" legislation, new Foreign Entity of Concern (FEOC) provisions could complicate development.²⁵

OPPORTUNITIES

A robust buildout of multiple battery technologies will increase the value and production of existing and future clean energy, decrease the impacts on our prime agricultural lands and forests, and mitigate against transmission impacts. Strong battery policy will also attract investment in battery manufacturing that has benefited other states in the Southeast.²⁶

A strong procurement target²⁷ for LDES technologies, such as those being piloted by Dominion, would help get the Commonwealth ahead of the duck curve,²⁸ in which excess solar production during peak times has to be curtailed and lost, since there is not enough storage on the grid. By creating best practices for these projects, these early LDES projects can gain more local buy-in and a greater rate of success, regardless of the technology type.

At the same time, short-duration storage in the 2- to 6-hour range is affordable and available now. Advancing battery chemistry technology and vast improvements in fire codes and standards have made newer grid-scale batteries much safer.^{29,30} These batteries can provide demand response, mitigate against transmission demands, and provide other critical grid services.³¹

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ENDNOTES

1. This paper uses the term storage and batteries interchangeably for simplicity, but VCN recognizes that the category of energy storage systems is much broader than batteries.
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