

UNLEASHING VIRGINIA

STRENGTHENING THE COMMONWEALTH'S
TRANSMISSION SYSTEM FOR NATIONAL DEFENSE

PREPARED BY



CONVERGE
STRATEGIES



ENERGY
STRATEGIES



ACKNOWLEDGEMENTS

Authors

This publication was written by:

Leah Emanuel, Jonathon Monken,
Madeline Lydon, Wilson Rickerson, and
Will Rogers with **Converge Strategies, LLC**.

Keegan Moyer, John Muhs, Ben Walborn,
Tom Green, and Jacob Janhke with
Energy Strategies.

Creative Direction

Adair Douglas, **Converge Strategies, LLC**.

Released August 2026



Converge Strategies, LLC provides consulting services focused on the intersection of energy resilience and national security.

www.convergestrategies.com



Energy Strategies is an independent energy consultancy providing clients with technically grounded analysis and objective guidance.

www.energystrat.com



TABLE OF CONTENTS

FORWARD	1
EXECUTIVE SUMMARY	2
SECTION 1 Introduction	7
SECTION 2 The Relationship Between the Transmission Grid and National Defense	9
SECTION 3 The Defense and Energy Landscape of the Commonwealth of Virginia	13
3.1 The Defense Landscape	13
3.2 The State of Virginia's Grid and Drivers of a Changing Energy Landscape	18
SECTION 4 Case Study: Transmission Resilience Under Increased Load Scenarios	21
4.1 Methodology	21
SECTION 5 Case Study Results: A System Near Its Limits	24
5.1 Increased Load Scenarios	26
5.2 Compounding Extreme Conditions	30
5.3 Summary of Findings	31
SECTION 6 Case Study Implications	32
SECTION 7 What's Next	34

FORWARD



In March 2025, Converge Strategies, LLC and The Association of Defense Communities released *Unleashing the Grid: Energy Dominance for National Defense*. That publication introduced a framework for defense stakeholders to understand electricity system risks in their regions and explore opportunities to support national defense through power grid planning and investment.

The original *Unleashing the Grid* report was informed by input from dozens of engagements, interviews, and workshops focusing on grid resilience with defense, energy, and government stakeholders. A key conclusion from the report was that the framework should be used to characterize the landscape for grid reliability, transmission planning, and national defense in specific states and regions.

This publication applies the *Unleashing the Grid* framework at the state level for the first time, with a focus in Virginia. Stakeholders identified Virginia as a high priority for analysis, given the state's important contributions to national defense, and its dynamic energy landscape. This report also presents the results of a power flow analysis focusing specifically on defense requirements in one of the first state-level analyses of its kind.

This report focuses on the transmission system, the high-voltage network that moves electricity over long distances. It is intended as a discussion report to support emerging state-level conversations on grid resilience and defense, both in Virginia and across the country.

◀ U.S. Marines with Charlie Company, 1st Recruit Training Battalion

SOURCE: [Sgt. Yvonna Stark](#)

EXECUTIVE SUMMARY



The Commonwealth of Virginia (“Virginia” or “the Commonwealth”) is central to national defense. It is home to the Pentagon, the world’s largest naval station, the nation’s sole builder of nuclear-powered aircraft carriers, and half of the U.S. Air Force’s F-22 Raptor aircraft. More than 246,000 military and civilian Department of War (DoW) personnel are stationed across over 20 major installations. The intelligence community’s most critical agencies, including the Central Intelligence Agency, the Office of the Director of National Intelligence, and the National Reconnaissance Office, are headquartered in the state. Defense spending associated with these, and other critical defense facilities contributed \$76.2 billion to the Commonwealth’s economy in FY24 and accounted for 10 percent of state GDP.

All of it runs on electricity.

The civilian electric grid (“the power grid”)—the massive network of infrastructure that generates, transmits, and distributes electricity—is foundational to these missions. Military installations, defense communities, and the defense industrial base (DIB) depend almost entirely on the power grid to execute their operations. Congress recognized this in 2020 and required that critical defense missions achieve an energy uptime of at least 99.9 percent. DoW has set even higher standards for its most sensitive missions, such as cyber operations and missile fields, requiring no more than 30 seconds of downtime per year.

The Department of Energy (DOE)’s most recent reliability assessment found that significant

◀ U.S. Air Force F-22 Raptor

SOURCE: Master Sgt. Keith Baxter, U.S. Air Force

portions of the country, including the PJM region,¹ face acute vulnerabilities that threaten mission assurance. That reality has reinforced DoW's focus on investments in resilience at military installations, including generation, storage, and microgrids. Though critical, focusing exclusively on resilience within the fence line is insufficient. Targeted investments in grid expansion and hardening are necessary complements to on-base solutions, particularly as evolving military requirements drive increased DoW energy demand.

In addition to hosting critical national security infrastructure, Virginia also sits at the epicenter of one of the most dramatic surges in electricity demand of any state in the country. Northern Virginia is the largest data center market in the world and larger than the next five U.S. markets combined. Dominion Energy's interconnection pipeline includes nearly 47,000 megawatts (MW) of data center capacity, nearly as much as the entire state of California's all-time peak load.² Dominion projects its peak demand will grow to 41,500 MW by 2035, up from a winter peak of 24,678 MW in 2025.³ Meeting that demand will require new generation and new transmission capacity, both of which will face interconnection and delivery constraints.

As demand grows, defense loads are competing for constrained civilian grid capacity without a dedicated planning channel.

This report examines what this load growth trend means in practice.

To assess the risk, the study team conducted a scenario-based transmission reliability study using powerflow modeling of Dominion Energy's Virginia service territory under a 2030 forecast year.⁴ Four scenarios evaluating the efficiency of the high-voltage grid were analyzed: three "Heightened Defense Operations" scenarios representing 20, 50, and 100 percent load increases at defense footprint locations, and a "Compounding Extreme Conditions" scenario, which layered a State-Wide Summer Electricity Emergency on top of Moderate defense load growth.

The modeled scenarios indicate limited headroom. Virginia's transmission system, as currently configured and planned, appears able to support only about a 5 to 10 percent coincident increase in defense load before requiring transmission reinforcements to maintain North American Electric Reliability Corporation (NERC) reliability standards.⁵ In concrete terms, that margin amounts to just 175 to 350 MW over the 3,500 MW defense footprint baseline, which is less than the load of a single large data center. The results across scenarios point to a system with little margin for the kinds of load growth Virginia is already experiencing:

1 PJM Interconnection is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in 13 states, including Virginia.

2 California ISO, [California ISO Peak Load History 1998 through 2023](#).

3 Dominion Energy, [Powering Virginia](#).

4 This study applies steady-state transmission analysis consistent with regional planning practices and does not assess the full range of operational actions used to manage contingencies in real time.

5 NERC reliability standards are a set of mandatory, enforceable rules developed by NERC to ensure the security, reliability, and stability of the bulk power system in the US, Canada, and parts of Mexico. They cover key areas such as, but not limited to, critical infrastructure protection, operations and planning, emergency preparedness and operations, resource and demand balancing, and facilities design, connections, and maintenance.

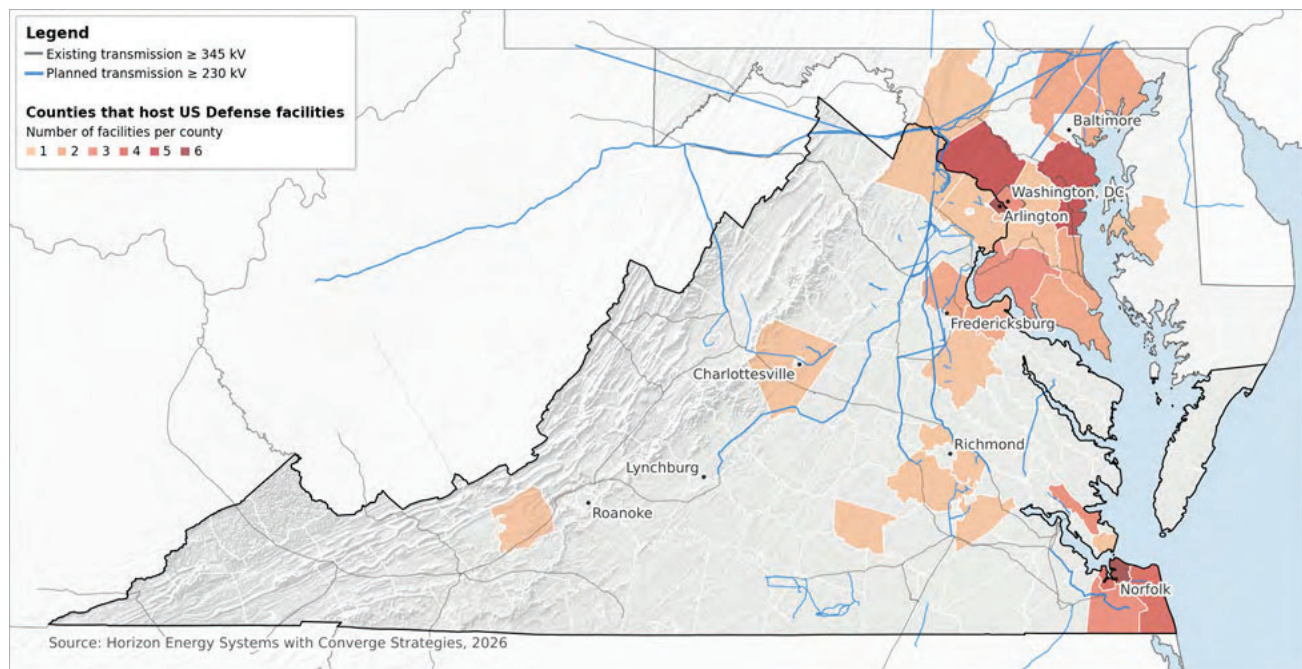
- 1 A **20 percent defense load increase**, the most conservative scenario and one well within the range of near-term plausibility, would require local transmission reinforcements totaling less than 30 miles and costing approximately \$44 million. Generation could be dispatched to serve the new loads, but the transmission system could not reliably deliver that power to the affected load pockets.
- 2 A **50 percent load increase** produced instability under transmission outage conditions, required power imports from neighboring states, and would require 91 miles of new and rebuilt transmission to mitigate, costing approximately \$221 million.
- 3 A **100 percent load increase**, achievable with just four large data centers added to the Virginia grid, strained both the local transmission network and the 500 kilovolt (kV) backbone responsible for delivering power across state boundaries. Mitigation would require nearly 1,000 miles of new and rebuilt transmission, including a complete rebuild of the local 230 kV and 115 kV systems, costing approximately \$3.9 billion.
- 4 A **State-Wide Summer Emergency** event combined with a 20 percent defense load increase strained Virginia's import pathways to a point of significant stress, with currently planned projects insufficient to prevent reliability violations.

These results almost certainly understate the risk. The study conservatively did not model winter conditions, cyber or coordinated physical attacks, transient stability effects, or the full scale of commercial data center demand in Dominion's interconnection pipeline. The findings should be understood as a lower bound, and are intended to inform, rather than replace, existing transmission planning processes. These illustrative assessments highlight where grid infrastructure may be misaligned with defense and national security needs.



The central problem is not simply the amount of planned transmission investment. The map below plots defense installations by Virginia county alongside existing and proposed transmission lines, with color intensity reflecting facility density. Dominion Energy is planning more than \$28 billion in transmission investment over the next 20 years. **The challenge is that existing planning processes do not systematically translate defense mission requirements into load forecasts, benefit metrics, or project selection criteria.**

Figure 1. Defense Facilities and Transmission Infrastructure



Additionally, PJM's Regional Transmission Expansion Plan (RTEP) does not consider defense mission assurance requirements. While PJM and other grid stakeholders cannot reasonably be expected to meet defense uptime standards directly, using existing planning processes to ensure that defense load needs are incorporated into regional and utility-level transmission planning can enhance defense resilience. Transmission investments are being planned and built in Virginia that may incidentally benefit defense installations, but few are explicitly informed by broader defense requirements.

Virginia's policymakers have pathways to consider grid planning and defense. The State Corporation Commission (SCC) regulates Dominion Energy's transmission investments. The General Assembly sets the Commonwealth's energy policy framework. PJM's stakeholder processes are open to the participation of state and regional organizations. Federal transmission planning rules such as FERC Order 1920 provide Virginia with pathways to support defense-informed grid investments. The National Interest Electric Transmission Corridor (NIETC) authority offers an additional avenue for designating Virginia's defense corridors as national priorities,

though defense considerations were absent from recent NIETC designations despite being authorized under statute. What has been missing is structured engagement between defense and energy stakeholders needed to ensure that the Commonwealth's grid investments reflect the national security interests its grid is uniquely positioned to serve. Policy and planning can consider where infrastructure is sited, how resilience and redundancy are measured, and whether planning outcomes align with defense requirements.

Several developments make this moment particularly timely for action and change: the Spanberger Administration brings fresh perspective to align Virginia's energy and economic development policies; the most recent National Defense Authorization Act (NDAA) expanded the role of the DoW in national and regional grid planning; the 2026 National Defense Strategy calls for "supercharging" the DIB; and efforts such as the Joint Legislative Audit and Review Commission (JLARC) report on data centers in Virginia have elevated grid capacity as a statewide priority. The convergence of these and other drivers creates both urgency and opportunity for Virginia.

This report provides the analytical foundation for next steps: regional detail, technical evidence, and policy concepts to catalyze coordination between Virginia's defense, energy, and economic development stakeholders. While stakeholders interviewed for this effort identified many options that Virginia could take to strengthen the grid, this study presents several concepts that could lay the foundation for additional conversation and sustained collaboration:

- 1 Convene stakeholder dialogue** specifically focusing on grid resilience and national defense, including representatives from utilities, state and local governments, the military, defense communities, defense industries, and other partners. These dialogues could be hosted by state agencies, regional planning organizations, or other entities.
- 2 Consider the grid risk to Virginia's defense footprint** in state energy planning processes, coordination with PJM under FERC Order 1920, and engagement with the U.S. Department of Energy.
- 3 Examine opportunities to align grid requirements with the NIETC** process to designate defense corridors as national priority transmission corridors.
- 4 Assess whether utilities should** forecast defense footprint energy requirements in their Integrated Resource Plans and feed that data into PJM planning.
- 5 Engage the DoW on shared infrastructure investment** and work with the DoW Office of Local Defense Community Cooperation and related organizations to validate findings and fund targeted upgrades.
- 6 Elevate interstate coordination** by engaging leaders in neighboring states to strengthen import pathways and build the case for federal financing.

SECTION 1

Introduction

Virginia's importance to U.S. national defense is unmatched. It is home to the Pentagon, the world's largest naval station, the military's premier amphibious operations base, and half of the U.S. Air Force's fleet of F-22 Raptor fighter aircraft. Major commands responsible for organizing, training, and equipping the joint force, and a DIB anchored by the nation's sole builder of nuclear-powered aircraft carriers are hosted in the state. Significant elements of the U.S. intelligence community, including the headquarters of the Central Intelligence Agency, the Office of the Director of National Intelligence, and the National Reconnaissance Office, are based in Virginia.

Defense spending contributed \$76.2 billion to the Commonwealth's economy in FY24. This accounted for 10 percent of the state's GDP. Virginia also leads the nation in DoW contracts, totaling \$53 billion in FY24, and hosts more than 246,000 military and civilian personnel across more than 20 major installations.

These installations depend on the civilian electric grid, a system under strain from shifting generation and surging demand. This report examines what that dependence means for military readiness, defense communities, and the DIB, and what Virginia's policymakers can do about it.

This report builds on two earlier publications by the Association of Defense Communities (ADC): [Transmission Expansion for National Defense \(TREND\)](#) and [Unleashing the Grid: Energy Dominance for National Defense](#). The ADC publications establish that the electric grid should be treated as an enabler and extension of military missions and weapons platforms, and this report applies the ADC frameworks to Virginia.

- ◀ **Sailors assigned to the Virginia-class fast-attack submarine USS John Warner (SSN 785) shift colors at Naval Station Norfolk, Nov. 25, 2020.**

SOURCE: Petty Officer 2nd Class Alfred Coffield



Intended Audience. The primary audiences for this report are regional organizations focused on defense, economic development, and resilience in Virginia, as well state and federal policy makers. The intent of this report is to:

- 1 Provide the analytical foundation for discussions around grid resilience and transmission investment as a matter of national defense and state economic competitiveness.
- 2 Identify the planning processes and policy mechanisms that are relevant to national defense and grid resilience, including utility regulatory proceedings, regional transmission planning, and legislation.

Report Overview. This report contains the following sections:

Section 2. An overview of the relationship between the transmission grid and national defense.

Section 3. A snapshot of the defense landscape of Northern Virginia and Hampton Roads, including military installations, defense communities, and the defense industrial base. It also examines the state of Virginia’s grid and the key drivers of the changing energy landscape.

Section 4. Presentation of the methodology, analytical framework, and scope and limitations of the case study.

Section 5. Review of the results for each scenario, and an estimate of transmission mitigation costs.

Section 6. A summary of the findings from the study and their implications.

Section 7. Recommendations for potential next steps.

A U.S. Air Force F-22 Raptor aircraft assigned to the 1st Fighter Wing prepare to take off at Joint Base Langley-Eustis, Virginia, Nov. 3, 2020.

SOURCE: [Nicholas J. De La Pena](#)



SECTION 2

The Relationship Between the Transmission Grid and National Defense

The power grid is a vital asset to the globally networked U.S. military. Over the last half-century, the U.S. military has become increasingly dependent on domestic installations for force projection. Those installations no longer merely prepare troops to deploy, they also conduct pivotal operations, from cyber warfare to remotely piloted aircraft support. **Electricity outages that interrupt these missions are not nuisances; they can cause casualties and may be strategically decisive.**

Energy resilience efforts for national defense have historically focused on “islanding” bases to insulate them from power grid disruptions. Defense energy resilience increasingly requires a focus on critical infrastructure and capabilities located beyond the fence lines of military installations.⁶ This report focuses on three interdependent layers of defense activity, collectively the **defense footprint**, that depend on reliable electricity from the bulk power system:

- 1 Critical Missions and Installations.** Nearly all the approximately 450 U.S. military installations depend on the power grid. Congress requires that critical military missions maintain at least 99.9 percent energy uptime on an annual basis.⁷ DoD's internal standards for the most sensitive missions (e.g., cyber operations, satellite control, missile fields) require no more than 30 seconds of downtime per year.⁸

6 Wilson Rickerson et al., *Unleashing the Grid: Energy Dominance for National Defense*, Association of Defense Communities, March 2025.

7 10 U.S. Code § 2920 – Energy resilience and energy security measures on military installations, Cornell Law School Legal Information Institute.

8 DoD, *Metrics and Standards for Energy Resilience at Military Installations*, May 2021.

◀ Airmen with the 9th Operational Support Squadron

SOURCE: Senior Airman Justin Parsons

No region currently meets these standards, including PJM, and only two regions meet the lower-bound reliability requirements for DoW facilities.⁹ DoW policy requires critical missions to operate independently for 14 days using backup power, but recent disasters have exceeded this planning horizon:

- **Hurricane Ida** caused multi-week power outages in Louisiana in 2021, with some areas dark for 21 days—a full week beyond DoW’s resilience standard for critical missions.¹⁰
- **Winter Storm Uri** caused widespread outages and rolling blackouts over more than 70 percent of Texas in 2021, and resulted in water service disruptions for 14 million people across the state.¹¹ The storm pushed the Texas grid within minutes of a complete blackout that ERCOT estimated would have taken weeks or even months to restore.¹²
- **Typhoon Mawar** nearly wiped out the power system on Guam in 2023, which impacted the availability of running water, as the water system relied on electricity.¹³ Six weeks out from the storm, the power had yet to be completely restored.¹⁴

National laboratory research confirms that diesel generators alone cannot guarantee power for critical loads over multi-day outages.¹⁵ On-site resilience is necessary for installations to remain running during short duration outages but is not sufficient for supporting critical military infrastructure and the broader defense footprint beyond that timeframe.

2 Defense Communities. Military installations rely on the civilian water, wastewater, communications, natural gas, and transportation systems that are located within surrounding defense communities and are outside of military control. More than 70 percent of military personnel and their families live outside the fence line, along with nearly all the civilian personnel who work for the military.¹⁶ Power outages at their homes directly degrade readiness. During Winter Storm Uri, more than 235,000 DoW employees in Texas, nearly ten times the Pentagon’s workforce, lost power, water, and heat.¹⁷ Service members had to leave their families to conduct relief operations. Defense communities are not peripheral to mission capability; they are integral to it. Their electricity loads, which reach hundreds or thousands of megawatts, should be taken into account.

9 U.S. Department of Energy, *Resource Adequacy Report: Evaluating the Reliability and Security of the United States Electric Grid*, July 2025.

10 Sophie Kasakove, “Three Weeks After Hurricane Ida, Parts of Southeast Louisiana Are Still Dark,” *The New York Times*, September 18, 2021.

11 Paul Cobler and Camila Maia, “Texas’ power grid weathered another winter storm. Is it ready for the future?” *The Texas Tribune*, 29 January 2026.

12 Bill Magness, “Review of February 2021 Extreme Cold Weather Event — ERCOT Presentation,” *Texas Legislative Hearings*, March 2021.

13 Rachel Treisman, “A typhoon just lashed Guam. What does federal relief look like for a U.S. territory?,” *npr*, May 24, 2023.

14 John O’Connor, “GPA: Power restoration efforts may be finished by next week,” *Marianas Variety*, July 7, 2023.

15 Jeffrey Marqusee, Sean Ericson, and Don Jenket, “Emergency Diesel Generator Reliability and Installation Energy Security,” *National Renewable Energy Laboratory*, April 2020.

16 Association of Defense Communities, *Defining Homefront Readiness: The Role of Military Families in National Security*, 2025.

17 Gregory Illich and Robert Seyller, “Guardsmen deliver water to communities throughout Texas following record-breaking winter storm,” *Texas Military Department*, February 24, 2021.

3 The Defense Industrial Base. The DIB is the network of more than 100,000 companies that provide defense-related materials, products, and services to the U.S. government. Defense agencies spent \$423 billion on contracts in FY24. The vulnerability of defense manufacturing to power disruption is not theoretical—it is the lived experience of the U.S. during previous global conflicts.¹⁸ During World War I, the lack of electricity infrastructure limited the output of steel, chemical munitions, and other critical materials. During World War II, surging wartime demand caused electricity shortages, and the Roosevelt Administration used emergency authorities to build new utility infrastructure to sustain defense production (see Text Box 1). If the United States had to fight a major war today, the power grid would face demands on every front simultaneously. It would need to keep the lights on for civilians, deliver uninterrupted electricity to critical military installations, and support a surge in wartime manufacturing. All while absorbing unprecedented commercial demand from energy-intensive industries like artificial intelligence, data centers, and semiconductor manufacturing that are themselves important to national security and vulnerable to grid disruption. The 2026 National Defense Strategy calls for “supercharging the U.S. defense industrial base,” a call with significant implications for power-hungry regions like Virginia.¹⁹

TEXT BOX 1.

The Original Emergency Interconnection Authority Federal Power Act Section 202(c)

When Congress passed the Federal Power Act (FPA) in 1935, it granted the federal government authority to require utilities to interconnect and share power during times of national emergency. Section 202(c) was precisely the kind of authority that wartime planners in World War I had lacked and had urgently sought. During World War II, the government invoked this authority more than twenty times to interconnect utility systems and build new transmission lines to address defense-driven demand. During the Korean War, it was used again to serve defense industries in the northern Midwest.

This legal architecture for wartime energy coordination was built by policymakers who had lived through the shortages of World War I and were determined not to repeat them. Whether this architecture, designed for isolated regional utilities, is sufficient for a globally networked military and a vastly more complex modern grid is a question deserving renewed attention.^{20,21,22}

18 Leah Emanuel et al., *Powering the Fight: Lessons from the Grid at War*, *Converge Strategies*, November 2025.

19 Department of War, *2026 National Defense Strategy*, January 2026.

20 Benjamin Rolsma, “The New Reliability Override,” *Connecticut Law Review*, 2025.

21 U.S. Department of Energy, *DOE’s Use of Federal Power Act Emergency Authority*.

22 Ashley J. Lawson, *Federal Power Act: The Department of Energy’s Emergency Authority*, CRS Report R48568, *Congressional Research Service*, updated February 25, 2026.

The Backbone of our Defense Footprint. The transmission system is the connective tissue linking generation to the defense footprint. A resilient transmission system provides defense in depth by creating multiple pathways for energy to flow, accessing diverse generation sources across broad geographies, and enabling the kind of regional power sharing that proved decisive in the two world wars. Interregional transmission can blunt the effects of adversary attacks or extreme weather by ensuring sufficient supply to restore systems that may be disrupted, while local and regional transmission investments can harden the grid around critical defense loads.

Intensifying Threat Landscape. The Commission on the National Defense Strategy concluded that “the threats the United States faces are the most serious and most challenging the nation has encountered since 1945 and include the potential for near-term major war.”²³ The 2025 Annual Threat Assessment states that adversaries would plan to strike civilian critical infrastructure in advance of or during conflict to prevent the U.S. military from deploying and to sow societal panic.²⁴ Against this backdrop, the transmission grid is not merely a utility concern; it is a strategic asset that underpins the full spectrum of America’s defense.



SOURCE: Seaman Apprentice Oliver McCain Vieira

23 Jane Harman et al., *Commission on the National Defense Strategy*, RAND National Security Research Division, July 2024.

24 Office of the Director of National Intelligence, *Annual Threat Assessment of the U.S. Intelligence Community*, March 2025.

SECTION 3

The Defense and Energy Landscape of the Commonwealth of Virginia

With jurisdiction over utility systems and lifeline infrastructure that military installations rely on, states have an increasingly important role in safeguarding transmission infrastructure. An extended transmission outage affecting key defense areas such as Northern Virginia or Hampton Roads could simultaneously disrupt military command and control, degrade force deployment capabilities, and idle critical defense manufacturing, with impacts extending far beyond the Commonwealth's borders.

3.1 The Defense Landscape

A transmission-system disruption in the key defense areas profiled in this section would likely affect multiple interconnected operations and missions. This is the type of regional, multi-installation risk that requires a resilient bulk power system to mitigate.

3.1.1 Northern Virginia

Northern Virginia is the administrative and strategic center of the American defense establishment.²⁵ The region hosts DoW senior leadership and major commands. Critical missions and installations located in Northern Virginia include:

The Pentagon, which serves as the headquarters of DoW and houses the Secretary of Defense, the Joint Chiefs of Staff, and the military department secretaries. It is the central node of the national command authority and the hub for the military's global operations.

²⁵ This report focuses primarily on Arlington, Fairfax, and Prince William counties since these counties are the top locations for defense spending in Northern Virginia according to the Office of Local Defense Community Cooperation.

◀ Dominion Energy transmission lines span the James River near Surry, Va.

SOURCE: Parker Michels-Boyce for the Virginia Mercury



Regional installations “rely upon services provided by the communities that originate outside the fenceline” and concluded that “the high degree of interdependency...reinforces the need for coordinated resiliency planning across jurisdiction lines.”

– THE NORTHERN VIRGINIA REGIONAL COMMISSION’S 2023 MILITARY INSTALLATION RESILIENCE REVIEW (MIRR)

Fort Belvoir, one of the largest, most mission-diverse installations in the U.S. Army. It hosts over 100 tenant organizations, supports around 51,000 military and civilian personnel, and is central to intelligence, logistics, and information technology.²⁶

Joint Base Myer-Henderson Hall, which includes Henderson Hall, Fort Myer, and the Pentagon in Virginia. Henderson Hall is a U.S. Marine Corps installation that serves as a primary support base for Headquarters Marine Corps and personnel in the National Capital Region. Fort Myer is home to the 3rd U.S. Infantry Regiment, known as “The Old Guard,” it is the oldest active-duty infantry unit.

Marine Corps Base Quantico, home to the Marine Corps Combat Development Command. This is where future operational concepts are developed, shaping how the Marine Corps trains and equips its forces. It is also home to the FBI Academy, and to Marine Helicopter Squadron One (HMX-1), which provides helicopter transport for the President. Quantico encompasses more than 55,000 acres and supports approximately 28,000 military and civilian personnel.²⁷

Defense Communities. More than 100,000 military and civilian personnel live and work across the counties that comprise Northern Virginia. DoW payroll spending in the region was over \$5 billion for 2023.²⁸ The Northern Virginia Regional Commission’s 2023 Military Installation Resilience Review (MIRR) found that regional installations “rely upon services provided by the communities that originate outside the fenceline” and concluded that “the high degree of interdependency... reinforces the need for coordinated resiliency planning across jurisdiction lines.”²⁹ Northern Virginia’s defense communities are primarily served by Dominion Energy.

²⁶ Military Installations, [Fort Belvoir](#).

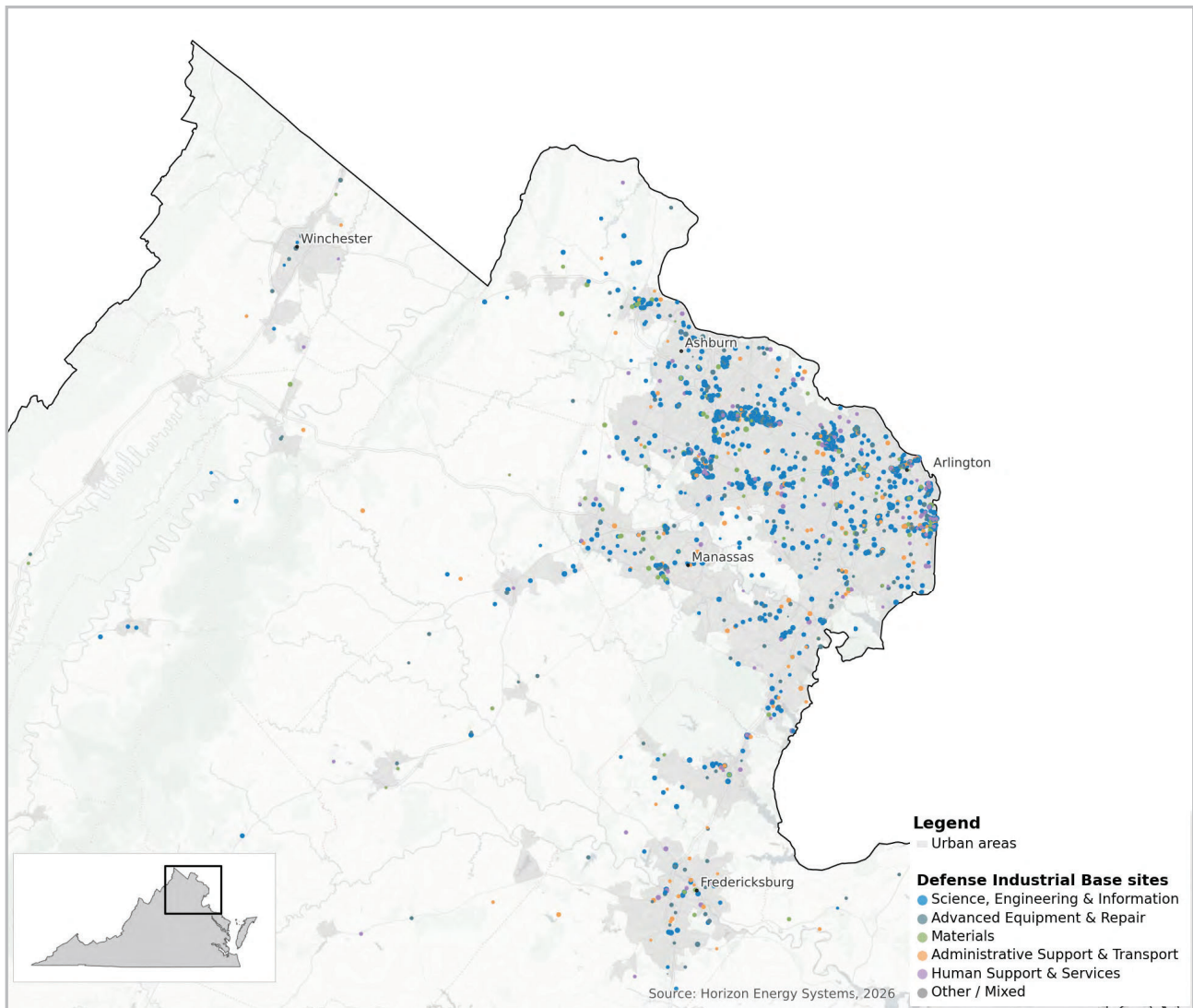
²⁷ Military Installations, [The Marine Corps Base Quantico](#).

²⁸ OLDCC, [Defense Spending by State, Fiscal Year 2023](#), *The U.S. Department of Defense*.

²⁹ Northern Virginia Regional Commission, [Military Installation Resilience Review](#), May 2023.

Defense Industrial Base. Northern Virginia also hosts one of the densest DIB concentrations in the country, including headquarters or major offices of General Dynamics, Northrop Grumman, Leidos, SAIC, Booz Allen Hamilton, and CACI. These firms provide cybersecurity, intelligence analysis, systems integration, IT, and other key capabilities integral to DoW, with contracts exceeding \$34 billion.³⁰ All depend directly on a reliable electricity supply. The figure below shows DIB locations in Northern Virginia. The DIB locations on the map are color coded according to their industrial category (i.e., NAICS) and vary in size based on the volume of defense spending received.

Figure 2. DIB Locations by NAICS Code and Contract Size



30 OLDCC, Defense Spending by State, Fiscal Year 2024, The U.S. Department of Defense.

3.1.2 Hampton Roads

Hampton Roads is the operational heart of the U.S. Navy's Atlantic fleet and the center of the nation's naval shipbuilding industrial base.³¹ Key installations include:

- **Naval Station Norfolk**, the world's largest naval station and the home port of the U.S. Navy's Fleet Forces Command.
- **Naval Support Activity Hampton Roads**, which supports the largest concentration of fleet headquarters and communication facilities outside of Washington, D.C., including the U.S. Second Fleet, Naval Submarine Forces Atlantic, and U.S. Marine Corps Forces Command.
- **Joint Expeditionary Base Little Creek-Fort Story**, the world's largest amphibious operations base. Little Creek supports Naval Special Warfare Group Two, the command headquarters for the East Coast-based Navy SEAL teams, and Naval Beach Group Two, which moves personnel and equipment from ship to shore during amphibious operations. Fort Story is the Army's only training facility for logistics-over-the-shore operations. The joint base supports approximately 18,000 personnel.³²
- **Joint Base Langley-Eustis**, which hosts Air Combat Command, the primary provider of combat air forces to combatant commanders, and the 1st Fighter Wing, operators of approximately half of the U.S. Air Force's F-22 Raptor fighter aircraft. The installation is also home to the 480th Intelligence, Surveillance, and Reconnaissance (ISR) Wing, which provides globally networked ISR for the Air Force.³³ The joint base supports approximately 18,000 personnel.³⁴
- **Naval Air Station Oceana**, the Navy's East Coast master jet base and home to Commander, Strike Fighter Wing Atlantic. It hosts the Navy's largest aircraft wing, and mans, trains, and equips F/A-18 Super Hornet squadrons for carrier-based operations. The installation supports approximately 15,000 personnel.³⁵
- **Norfolk Naval Shipyard**, the oldest and largest shipyard in the Navy, building, modernizing, and repairing the Navy's ships and employing approximately 12,000 personnel.³⁶
- **Naval Weapons Station Yorktown**, which provides ordnance receipt, storage, and issuance through Navy Munitions Command Atlantic and supports approximately 4,000 personnel.³⁷

31 This report focuses primarily on the cities of Chesapeake, Hampton, Newport News, Norfolk, Portsmouth, Virginia Beach, and York County, since they are the top locations for defense spending in the Hampton Roads Region according to the Office of Local Defense Community Cooperation.

32 Joint Expeditionary Base Little Creek: Story, Military Installations.

33 Joint Base Langley-Eustis, 480th ISR Wing.

34 Joint Expeditionary Base Little Creek: Installation Details, Military Installations.

35 Naval Air Station Oceana, Military Installations.

36 Norfolk Naval Shipyard, Military Installations.

37 Naval Weapons Station Yorktown, Military Installations.

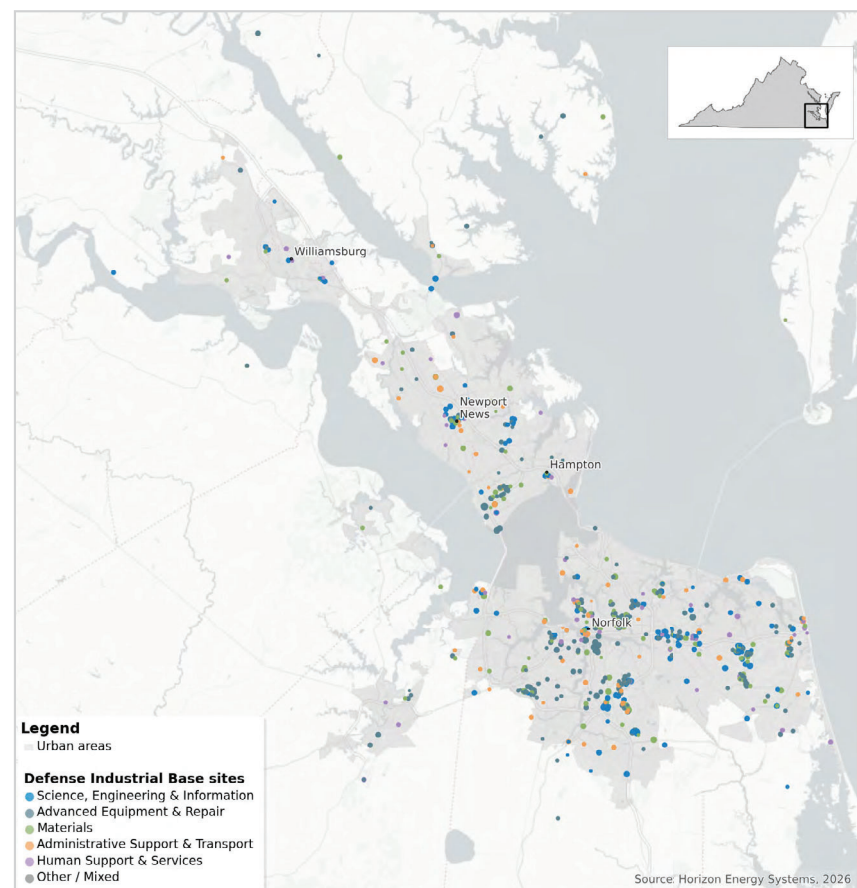
Defense Communities. More than 175,000 military and civilian DoW personnel live and work across the Hampton Roads region. DoW payroll spending within Hampton Roads was over \$10.3 billion in 2023.³⁸ Military Joint Land Use Studies in 2019 and 2021 found utility interdependencies that are similar to those in Northern Virginia. The installations and defense communities in the Hampton Roads region depend on civilian utility systems—such as water, natural gas, and telecommunications—that in turn rely on the power grid.³⁹ Similar to Northern Virginia, defense communities in the Hampton Roads region are primarily served by Dominion Energy.

Defense Industrial Base. The Hampton Roads region hosts a large DIB, with a heavy focus on naval maintenance, repair, modernization, waterfront construction, logistics, training systems, and fleet support for the Navy’s Atlantic forces. Newport News Shipbuilding (Huntington Ingalls Industries), for example, is the sole designer, builder, and refueler of nuclear-powered aircraft carriers and employs more than 25,000 workers. In total, DoW contract spending across the Hampton Roads region

is close to \$12 billion. **As in Northern Virginia, the defense industrial base in the Hampton Roads region depends on the power grid and is vulnerable to power disruptions.** A sustained power disruption could delay aircraft carrier and submarine deliveries by months, cascading through naval readiness and U.S. strategic posture.

The figure to the right shows DIB locations in the Hampton Roads region. The DIB locations on the map are color coded according to their industrial (i.e., NAICS) category and vary in size based on the volume of defense spending received.

Figure 3. DIB Locations by NAICS Code and Contract Size



38 OLDCC, *Defense Spending by State, Fiscal Year 2023*, The U.S. Department of Defense.

39 Hampton Roads Planning District Commission (HRPDC), *Norfolk and Virginia Beach Joint Land Use Study*; HRPDC, *Portsmouth & Chesapeake Joint Land Use Study*.

TEXT BOX 2.

Defense as an Economic Power

The economic benefit that Virginia receives from military activities and presence is not guaranteed. The military is currently undergoing the largest force structure change in 20 years, with DoW merging major commands, relocating missions, and reducing senior leadership positions. States and communities that make themselves more attractive to defense investment stand to gain significantly. Those that fail to act risk losing missions, personnel, and the spending they generate.

Grid reliability is a factor in those decisions. DoW basing decisions consider utility infrastructure and energy resilience of potential locations, and a more resilient grid directly supports the uptime requirements that critical missions must meet.⁴⁰

Defense communities in the Hampton Roads region alone represent an estimated 1,700 MW of electricity demand, and the personnel, families, and industries that depend on that power contribute billions to local and state economies. **Most state energy offices** focus on job creation, affordability, and industrial competitiveness without treating defense energy as part of that mission, while state defense agencies rarely engage on energy issues.

The result is a gap in dialogue and investment. Closing that gap represents an opportunity, one Virginia has already begun to recognize in its *Growing the Military Mission in Virginia* strategy, which called for working with Dominion Energy to increase power capacity and create cost savings.⁴¹

3.2 The State of Virginia's Grid and Drivers of a Changing Energy Landscape

Several trends are reshaping Virginia's power system at once, each with significant implications for grid reliability. The subsections that follow offer a high-level overview of the reliability pressures, demand growth, extreme weather, generation mix transition, and evolving grid standards that are occurring simultaneously.

3.2.1 Reliability is at Risk

NERC's 2025 Long-Term Reliability Assessment, which is the most recent available at the time

40 U.S. DoD Inspector General. Evaluation of DoD Roles and Processes Leading up to the July 2023 Basing Decision for the U.S. Space Command, 2025.

41 Virginia Department of Veterans and Defense Affairs, *Growing the Military Mission in Virginia: Strategy to Action Plan Report*, 2023.

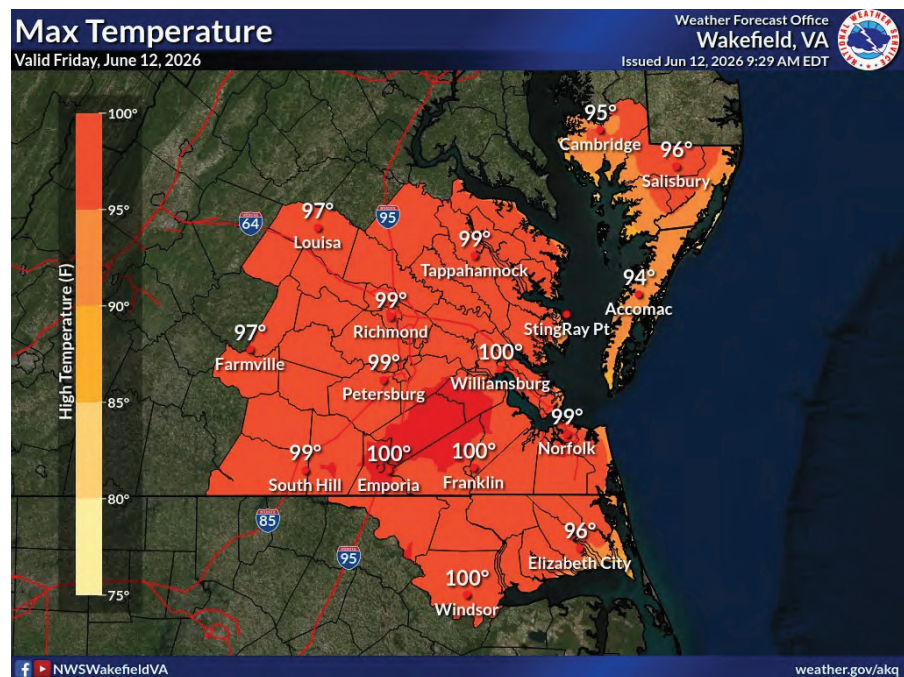
of this study, classifies PJM as “elevated risk” through 2028, and “high risk” beginning in 2029.⁴² This classification is driven predominantly by demand growth outpacing resource additions. By 2029, PJM’s expected unserved energy reaches more than 67,500 MWh per year, with close to 10 hours of expected load loss annually. Virginia’s position as a net electricity importer—Dominion imported power during 87 percent of hours in 2024—compounds this risk.

3.2.2 Demand Growth is Extraordinary

PJM projects the Dominion zone will reach approximately 51,000 MW of peak demand by 2045, which is more than double the record set during Winter Storm Enzo in January 2025.⁴³ As of July 2025, Dominion had approximately 17,000 MW of data center capacity under firm contract and a total pipeline of 47,000 MW. Defense loads are served through standard utility tariffs and are not prioritized in Dominion’s interconnection queue. Large-load customers increasingly receive dedicated tariff and queue treatment. Defense entities do not currently have an equivalent planning channel.

3.2.3 Extreme Weather is Intensifying

Virginia’s 2023 Hazard Mitigation Plan identifies flooding, hurricanes, and winter weather as the Commonwealth’s top three hazards. Hampton Roads faces some of the highest rates of relative sea-level rise on the East Coast. Northern Virginia’s climate projections show cooling degree days nearly doubling, and days above 90°F potentially tripling. As DOE’s Electricity Advisory Committee has warned, extreme weather events can also create windows of opportunity for adversarial attacks on critical infrastructure.⁴⁴



⁴² NERC, 2025 Long Term Reliability Assessment, January 2026.

⁴³ PJM, 2026 PJM Load Forecast Report, 23 January 2026.

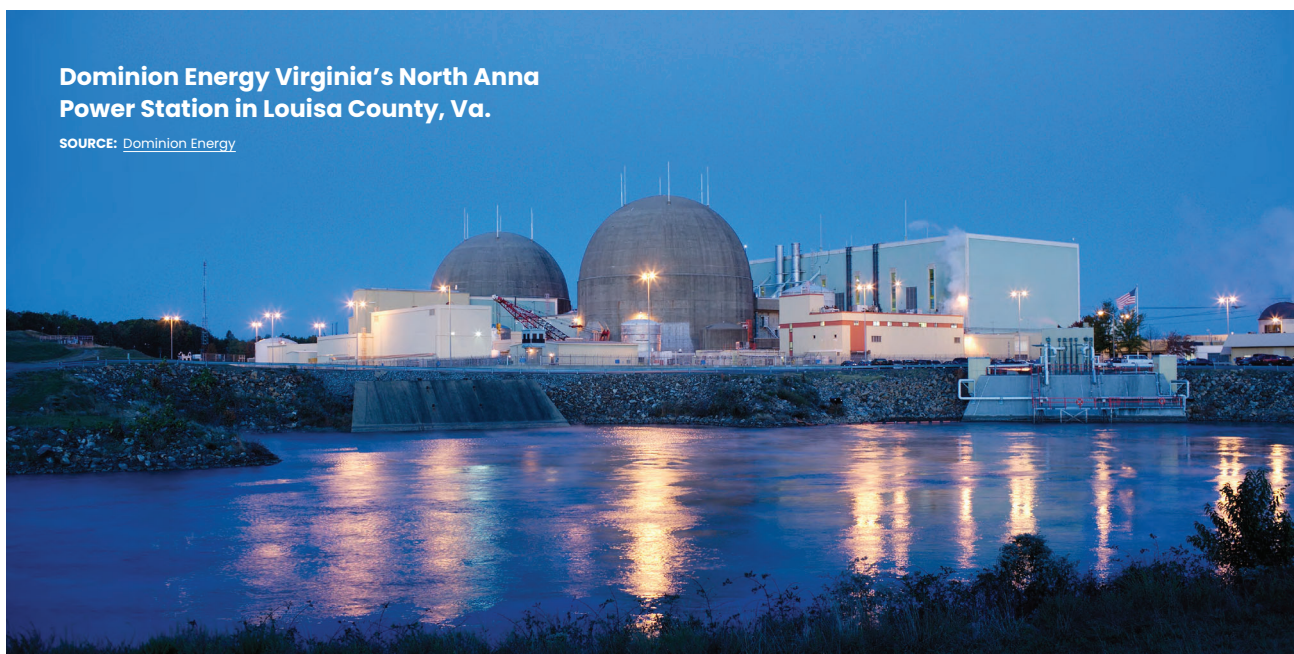
⁴⁴ Electricity Advisory Committee, Strengthening the Resilience of Defense Critical Electric Infrastructure: Recommendations for the U.S. Department of Energy.

3.2.4 The Generation Mix is in Transition

Dominion’s current generation portfolio remains anchored by natural gas and nuclear, with smaller shares from coal, renewables, and pumped storage. The Virginia Clean Economy Act requires 100 percent clean energy by 2045. Dominion’s 2025 IRP Preferred Plan projects 17.5 GW of solar, 3.4 GW of offshore wind, 2 GW of battery storage, six small modular reactors (1,944 MW), and 8.5 GW of new natural gas.⁴⁵ The 2,600 MW Coastal Virginia Offshore Wind project is under construction and expected to begin delivering power in 2026. Federal tax legislation enacted in July 2025 eliminated credits for wind and solar placed in service after December 31, 2027, adding economic uncertainty. The existing North Anna and Surry nuclear stations provide approximately 3,350 MW of baseload power that does not depend on weather or fuel chains. Their operating license timelines and any new small modular reactor (SMR) development will be directly consequential for defense grid reliability.

3.2.5 Transmission Planning is Evolving

FERC Order 1920 now requires long-term, scenario-based regional transmission planning and mandates state engagement on how regional benefits are calculated and costs allocated. NERC has adopted newer planning standards, including TPL-008-1 for extreme-temperature planning and BAL-007-1 for near-term energy reliability assessments. Frameworks such as these create opportunities for defense-informed investments to be elevated in grid planning processes.



⁴⁵ Dominion Energy, [Virginia Electric and Power Company's 2025 Update to the 2024 Integrated Resource Plan](#), 15 October 2025.

SECTION 4

Case Study: Transmission Resilience Under Increased Load Scenarios

To assess the durability of Virginia’s grid infrastructure, the project team ran a scenario-based transmission reliability study, similar to those conducted by transmission planners across the nation. This analysis aims to determine whether Dominion Energy’s transmission system can reliably deliver power to Virginia’s defense footprint under a range of plausible stress conditions.

The study relies on publicly available data and applies planning-style steady-state modeling. The scenarios focus on the ability of the planned transmission system and generation fleet to deliver power. It does not assess the full range of operational measures or procedures that may be used to manage stressed system conditions. These scenarios do not replace or invalidate the utility’s own contingency analysis and reliability forecasting; they serve instead as a targeted stress test of specific load conditions.

4.1 Methodology

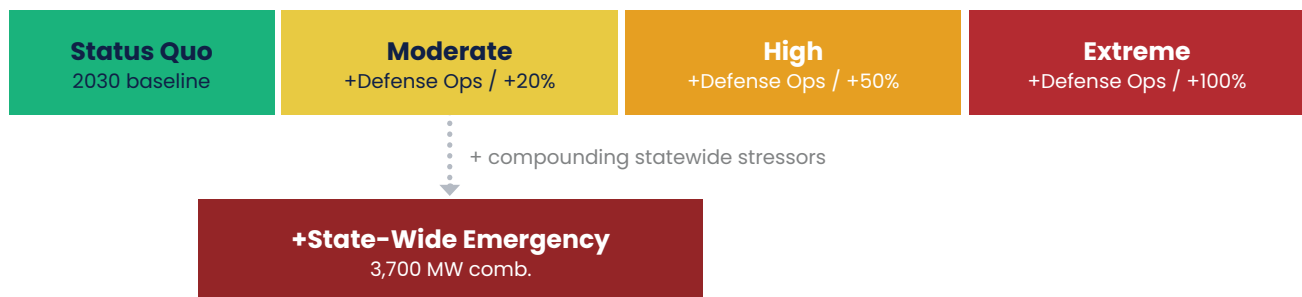
The study used alternating current (AC) power flow modeling to assess grid performance under stressed conditions that could materially affect military readiness and national defense. The AC modeling captures electrical flows, equipment limitations, and potential reliability violations at a specific snapshot in time, using real-world equipment ratings and other physical parameters as inputs. The study area covered Dominion’s Virginia service territory, which serves approximately 2.8 million customers, including major load centers and most of the state’s military installations.

- ◀ **The final piece of the underwater hull of the future aircraft carrier USS John F. Kennedy (CVN 79) is lowered into place at Huntington Ingalls Industries Newport News Shipbuilding.**



Models were built from a 2030 Status Quo baseline. Three scenarios apply progressively larger load increases at locations tied to Virginia’s defense footprint. A fourth scenario layers compounding stressors on top of the Moderate load condition to simulate a State-Wide Emergency that stresses the system beyond load increase (see Figure 6).

Figure 4. Overview of Study Scenarios



4.1.1 Analytical Framework

All models were derived from the PJM 2023 Regional Transmission Expansion Planning (RTEP) heavy summer case.⁴⁶ This case was selected to examine peak-load conditions, when transmission capacity is often most constrained. The base model, originally developed for the 2028 planning year, was modified to reflect Dominion’s 2030 load, resource, and transmission assumptions.⁴⁷ The following table describes the modifications made to the 2028 PJM RTEP model to create the 2030 Status Quo model.

⁴⁶ The 2023 RTEP was used because the PJM 2024 RTEP study models were still in development at the time of this study.

⁴⁷ When temperatures are extremely high, there is a limit to the amount of power that transmission lines can transmit.

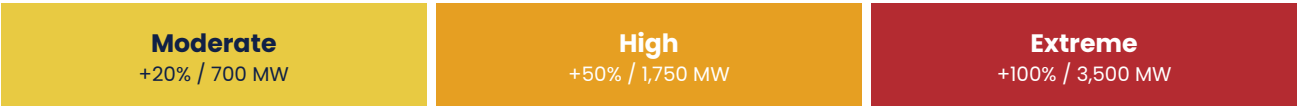
Table 1. Modifications to 2028 PJM RTEP model to create 2030 Status Quo study model

Modification	Description
Load	Load in the Dominion area was scaled to match the latest load forecast for 2030 provided in the PJM 2025 RTEP.
Generation	To accommodate increased load, the output of existing generators in the Dominion area was increased.
Retiring Generators	Generators with retirement dates of 2030 and earlier were removed from the model.
Transmission Projects	Transmission projects with in-service dates of 2030 and earlier were included in the model.

4.1.2 Increased Load Scenarios

Geospatial analysis linked more than 20 Virginia defense installations to electrical nodes in the model. Load at each bus represents an aggregation of multiple customers rather than any single facility, capturing on-base demand as well as surrounding communities and defense industrial facilities.⁴⁸ This yielded an estimated baseline defense footprint load of approximately 3,500 MW, roughly 60 percent in Hampton Roads and 40 percent in Northern Virginia.

Load at these locations was scaled to represent plausible levels of increased defense activity:



These levels reflect combinations of higher operational tempo, platform electrification, expanded data and cyber operations, defense industrial growth, and regional load growth. Where local generation headroom was insufficient, neighboring areas picked up the remainder proportionally.

4.1.3 Compounding Extreme Conditions

The State-Wide Emergency condition adds a 10 percent statewide load increase on top of the Moderate scenario, totaling roughly 3,700 MW of additional load above the Status Quo. This simulates a wide-area heavy summer stress event coinciding with heightened defense activity.

⁴⁸ Load aggregation at selected electrical nodes is consistent with modeling in PJM’s RTEP cases.

SECTION 5

Case Study Results: A System Near Its Limits

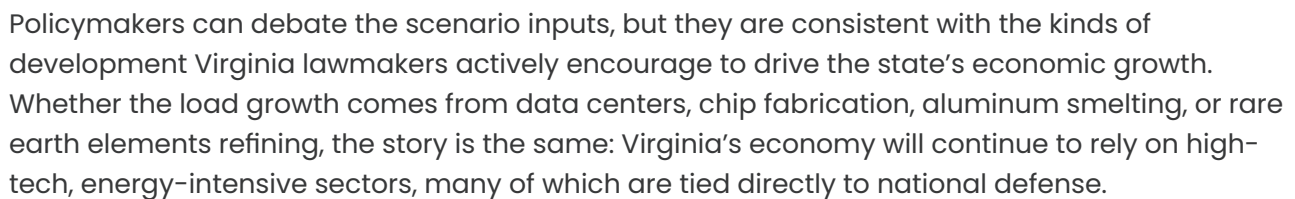
The analysis indicated a clear and sobering finding: **Virginia's transmission system can reliably support only a 5 to 10 percent increase above the 3,500 MW defense baseline.** This equates to just 175–350 MW of additional capacity. Beyond that threshold, transmission upgrades are required to maintain compliance with NERC standards and the higher resilience requirements in accordance with DoW's mission assurance efforts. All three Heightened Defense Operations scenarios required transmission upgrades.

▼ **U.S. Marines with Charlie Company,
1st Recruit Training Battalion**

SOURCE: Sgt. Yvonna Stark



Figure 5. Locations of Power Flow Violations Identified in the Case Study



UNLEASHING VIRGINIA

5.1 Increased Load Scenarios

In Short, transmission investment is required at every scenario level. This is not a future problem contingent on extreme assumptions. It is a present vulnerability that grows with every increment of load growth.

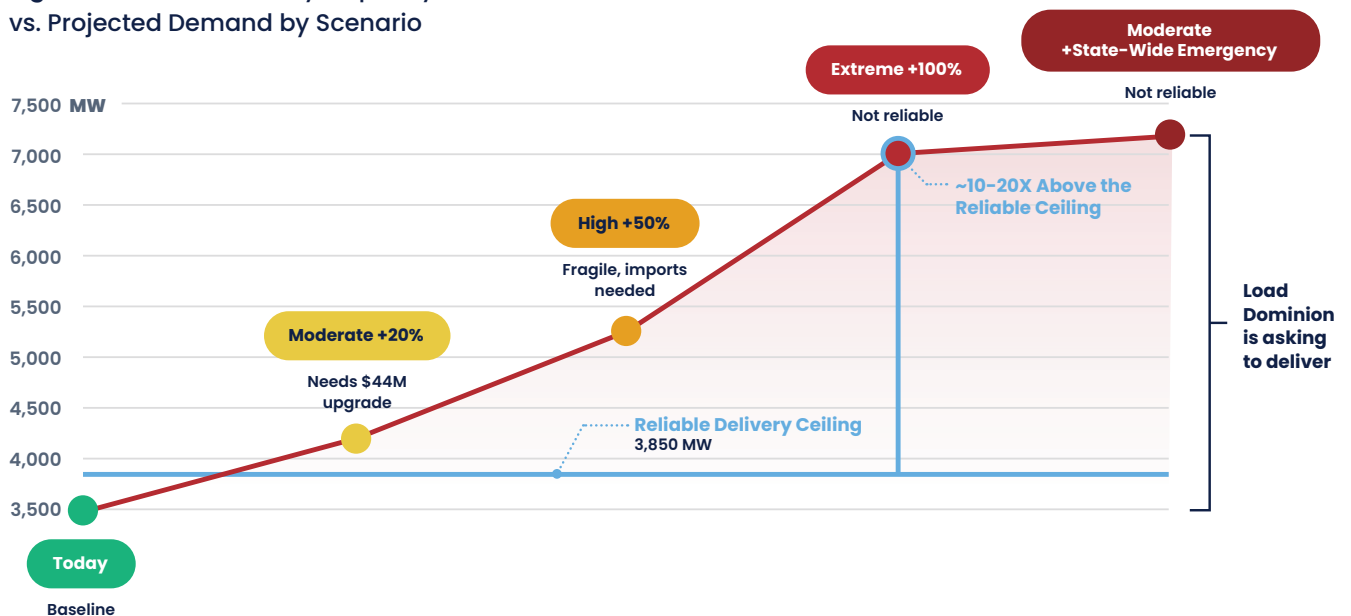
Today 5 – 10%	Moderate +20% / 700 MW	High +50% / 1,750 MW	Extreme +100% / 3,500 MW	+State-Wide Emergency 3,700 MW comb.
------------------	---------------------------	-------------------------	-----------------------------	---

The increased load scenarios considered three conditions for growing demand over the established baseline in the Dominion power system. The analysis of the scenarios demonstrated that Virginia could support only a marginal increase in load by current planning assumptions, indicating that considerable transmission investments are required to maintain transmission reliability.

Why It Matters Today

Dominion's transmission system can reliably support only a 5 to 10 percent increase above the 3,500 MW defense baseline. This equates to just 175–350 MW of additional capacity.

Figure 6. Reliable Delivery Capacity vs. Projected Demand by Scenario



5.1.1 Moderate Scenario 20% Load Increase Over Baseline

KEY SCENARIO FACTORS

Cyber operations surge + Fleet readiness + Training exercises + Summer heat wave

KEY SCENARIO FINDINGS

Adequate generation resources exist within Virginia to accommodate approximately 700 MW of additional load.

SCENARIO IMPACT

Without upgrades, the transmission system cannot deliver that power to defense locations.

700 MW

LOAD INCREASE

< 30 mi

NEW / UPGRADED LINES

\$44M

ESTIMATED COST

SCENARIO FACTORS

A period of heightened geopolitical tension drives increased operational tempo across multiple Virginia installations. Cyber operations at Fort Belvoir and intelligence processing at associated facilities surge, while fleet readiness activities at Naval Station Norfolk intensify and military training exercises increase electricity demand at Quantico and Fort Eustis. Simultaneously, a summer heat wave pushes regional cooling loads to seasonal highs.

SCENARIO FINDINGS

Adequate generation resources exist within Virginia to accommodate approximately 700 MW of additional load. However, without upgrades, the transmission system cannot deliver that power to defense locations. Minor local transmission reinforcements, totaling less than 30 miles of new or upgraded lines, with a preliminary cost estimate of approximately \$44 million, are required at multiple locations to resolve loading and voltage violations identified during the power flow assessment.

5.1.2 High Scenario 50% Load Increase Over Baseline

KEY SCENARIO FACTORS

Shipbuilding surge + New data centers + High-demand summer peak

KEY SCENARIO FINDINGS

Local transmission systems serving Virginia's defense footprint could not reliably deliver the power necessary to sustain defense operations.

SCENARIO IMPACT

This scenario required generation imports from outside Dominion's service territory to meet the increased demand.

1,750 MW

ADDITIONAL LOAD

79 + 12 mi

NEW / UPGRADED LINES

\$221M

ESTIMATED COST

SCENARIO FACTORS

The DIB in Hampton Roads increases production tempo to meet accelerated shipbuilding and weapons delivery schedules. Meanwhile, several new data center campuses begin operations in Northern Virginia and the greater Richmond area, with combined loads exceeding 1,000 MW. Dominion's system peaks on a High-demand summer day.

SCENARIO FINDINGS

Local transmission systems serving Virginia's defense footprint could not reliably deliver the power necessary to sustain defense operations. The load increase produced additional performance issues with transmission facilities at and near defense installations and defense industrial operations. This scenario required generation imports from outside Dominion's service territory to meet the increased demand. Preliminary estimates of the transmission investment required to accommodate a 50 percent load increase include constructing 79 miles of new transmission line and rebuilding 12 miles of existing lines for approximately \$221 million.

5.1.3 **Extreme** 100% Load Increase Over Baseline

KEY SCENARIO FACTORS

Multiple data centers + Defense manufacturing expansion + Sustained elevated ops + Record statewide heat

KEY SCENARIO FINDINGS

Virginia's in-state generation was insufficient to meet demand.

SCENARIO IMPACT

The 500 kV backbone responsible for bulk power delivery across state boundaries cannot reliably serve this demand. Both the local 115 and 230 kV systems and the high-voltage backbone are binding constraints.

2,800 MW

IMPORTED

922 mi

NEW + FULL REBUILD

\$3.9B

ESTIMATED COST

SCENARIO FACTORS

Multiple new large-scale data center campuses are operational across Virginia's defense communities. Defense manufacturing has expanded significantly in Hampton Roads and along the I-64 corridor. Military operations are at a sustained elevated tempo across all installations. A prolonged summer heat event pushes demand to record levels statewide.

SCENARIO FINDINGS

Virginia's in-state generation was insufficient to meet demand, and approximately 2,800 MW was imported from surrounding states. Critically, the 500 kV backbone responsible for bulk power delivery across state boundaries cannot reliably serve this demand. Both the local 115 and 230 kV systems and the high-voltage backbone are binding constraints. This scenario is achievable with the introduction of just four large data centers, each with a load of 400–900 MW, located near defense communities. 922 miles of new transmission and a complete rebuild of local systems would cost \$3.9 billion.⁴⁹

⁴⁹ This is only one-third of the cost designated for transmission line investments in the most recent PJM RTEP.

5.2 Compounding Extreme Conditions

5.2.1 State-Wide Emergency

KEY SCENARIO FACTORS

Heat dome + PJM alert + +10% peak load + Military heightened ops

KEY SCENARIO FINDINGS

Outages of key infrastructure near Virginia’s northern and southern borders caused severe stress and currently planned projects were insufficient to prevent reliability violations.

SCENARIO IMPACT

The 500 kV backbone showed vulnerabilities even under conditions designed for bulk power transfer.

2,800 MW

HAD TO BE IMPORTED

159 mi

**NEW TRANSMISSION
WOULD BE NEEDED**

\$786M

ESTIMATED COST

SCENARIO FACTORS

An extended heat dome settles over the mid-Atlantic during late July, pushing temperatures above 100°F for multiple consecutive days. PJM declares a hot weather alert. Dominion’s system load reaches approximately 10 percent above forecasted summer peak conditions. Simultaneously, military operations across Virginia’s defense footprint are at a moderately heightened level due to an ongoing international security situation.

SCENARIO FINDINGS

Approximately 2,800 MW had to be imported. Outages of key infrastructure near Virginia’s northern and southern borders caused severe stress and currently planned projects were insufficient to prevent reliability violations. The 500 kV backbone showed vulnerabilities even under conditions designed for bulk power transfer. 159 miles of new transmission would be needed at an estimated cost of \$786 million.

5.3 Summary of Findings

Table 2. Summary of Key Findings Across the Studied Four Scenarios

Scenario	Load Increase	Key Finding	Est. Transmission Investment
Moderate +20%	+700 MW	Local transmission upgrades required	~\$44M / <30 mi
High +50%	+1,750 MW	Local transmission inadequate; imports needed; system instability on generation loss	~\$221M / 91 mi
Extreme +100%	+3,500 MW	Local and 500 kV backbone both fail; 2,800 MW imports required; complete local system rebuild needed	~\$3.9B / 958 mi
State-Wide	+3,700 MW (combined)	Import pathways constrained; 500 kV backbone vulnerable; planned projects insufficient	~\$786M / 159 mi

SECTION 6

Case Study: Implications

No scenario discussed above is beyond the realm of possibility. It would take just four new data centers interconnecting to Virginia's system to achieve the Extreme scenario, and Virginia continues to add data-center load at a rapid pace.⁵⁰ These findings offer the foundation for the policy and planning recommendations outlined in Section 7.

- 1 The current grid has very limited margin for defense load growth.** A 5 to 10 percent increase over a 3,500 MW baseline amounts to 175–350 MW, which is less than the load of a single large data center. Any combination of higher military operational tempo, new defense industrial capacity, or adjacent commercial growth could exhaust it.
- 2 Transmission investment is required at every scenario level.** This is not a future problem contingent on extreme assumptions. It is a present vulnerability that grows with every increment of load growth.
- 3 The capacity to absorb new defense loads may constrain economic growth.** Virginia's defense load growth is tied to the expansion of commercial national security technologies, such as AI, data centers, and advanced manufacturing, many of which are strategically concentrated near existing defense facilities. The constraints on Virginia's bulk power system may require policymakers and investors to treat defense and civilian sectors as competitors for limited grid

⁵⁰ John Engel, "Dominion Energy Powers 'Data Center Alley.' Here's how they feel about growing demand," *Factor This*, 21 October 2024.

◀ **U.S. Air Force Senior Airman Daniel Stricker**

SOURCE: Airman Zeeshan Naem

capacity. Defense and industry planners who recognize this long-range vulnerability may take future missions or economic opportunities elsewhere.

4 Virginia’s constrained transmission import capability is a structural vulnerability.

The High, Extreme, and State-Wide Emergency scenarios all required substantial power imports from neighboring states. In each case, the transmission system was unable to reliably deliver those imports. This is consistent with the fact that Dominion imported power during nearly 87 percent of hours in 2024. During a regional emergency, neighboring states themselves may be under stress, making import pathways unreliable precisely when most needed.

5 The 500 kV backbone is a binding constraint. Under the Extreme and State-Wide Emergency conditions, the high-voltage backbone connecting Virginia’s borders to its eastern load centers, the very infrastructure designed for bulk power transfer, becomes a reliability concern. This finding underscores that local reinforcement around defense installations alone is not sufficient. Interstate and interregional transmission investment is needed to ensure access to diverse resources across broad geographies.

6 Results are a lower bound. The study did not model winter conditions (identified by NERC as the period of greatest risk in PJM), cyber or coordinated physical attacks, transient stability effects, or the full commercial data center pipeline. Each of these factors would compound the vulnerabilities identified here. As former Commander of U.S. Northern Command and North American Aerospace Defense Command, General Terrence O’Shaughnessy stated, “the homeland is no longer a sanctuary.”⁵¹ The analysis should be read accordingly.



CREDIT: J.M. Eddins Jr.

⁵¹ Kyle Rempfer, “‘The homeland is no longer a sanctuary’ amid rising near-peer threats, NORTHCOM commander says,” *Air Force Times*, August 27, 2018.

SECTION 7

What's Next

The gap between the energy requirements of Virginia's defense footprint and current grid capacity presents national security threats and critical constraints to the state's economic growth opportunities. Virginia's policymakers have pathways and tools to address the gap:

- The SCC regulates Dominion Energy's transmission investments.
- The Virginia General Assembly sets the energy policy framework.
- PJM's stakeholder processes are open to participation by state and regional organizations.
- The NIETC statute provides a federal pathway through which Virginia's defense corridors could receive designated priority.

- ◀ **Dominion Energy Virginia has established 43,000 acres of pollinator habitat along electric transmission rights of way.**

SOURCE: [Dominion Energy](#)

What has been missing is structured engagement between defense and energy stakeholders to align grid investments and national security interests. The following near-term actions would begin building that foundation.

- 1** **Revise Virginia’s state energy plans to address defense grid risk and opportunities for transmission expansion.** State energy plans should identify and prioritize energy infrastructure needs based on capacity constraints that create risk for Virginia’s defense and national security missions. It should direct the State Energy Office to coordinate with the DOE’s Office of Energy Dominance Financing and Grid Deployment Office on project eligibility and federal financing pathways. Most DOE-backed projects require coordination with federal partners, and the State Energy Office is well positioned to build and maintain those relationships.
- 2** **Direct the Virginia State Energy Office to engage grid operators under FERC Order 1920.** FERC Order 1920 requires transmission owners to conduct long-term scenario planning and strengthens the role of states in identifying transmission needs. Virginia should use updated state energy planning as the foundation for sustained engagement with PJM, submit defense-informed transmission needs to PJM’s RTEP process, tag Virginia projects of “national interest” within that process, and begin exploring cost allocation for projects based on their contribution to national defense.
- 3** **Align Virginia’s grid requirements with the NIETC designation process.** The National Interest Electric Transmission Corridor (NIETC) statute provides a federal pathway for designating Virginia’s defense corridors as national priorities. Virginia’s State Energy Office should proactively identify corridors that could qualify based on capacity constraints with a clear national security nexus. This study’s findings provide a strong starting foundation. Governor Spanberger can also elevate energy planning with neighboring state counterparts through interstate compacts, which can create legal frameworks to jointly plan, permit, and sometimes co-finance cross-state transmission lines. Interstate coordination can strengthen the case for NIETC designation, federal financing, and FERC-required project siting approvals.
- 4** **Consider whether utilities should incorporate defense footprint forecasting into their IRPs.** The SCC directed Dominion to extend IRP planning horizons to 20 years and incorporate scenario modeling for large, anticipated loads. Stakeholders could explore whether Dominion should develop dedicated scenarios that account for the energy demands of Virginia’s military installations, defense communities, and industrial base. Virginia’s concentration of defense assets does not currently receive scenario treatment comparable to data centers. Utilities could consult with the Virginia Department of Military Affairs, regional commissions, and senior DoW mission commanders in developing defense footprint load forecasts. A designated Energy-Defense Liaison within the Virginia government is another option for addressing persistent communication gaps and ensuring that defense energy needs are considered during power grid planning processes.

- 5 Engage DoW on shared infrastructure investments to enhance mission assurance.** Cost allocation will be a persistent challenge, given Virginia ratepayer concerns about rising electricity rates. While the DoW has limited tools for directly financing grid enhancement, existing programs can validate needs and help defray the costs of targeted upgrades. The Office of Local Defense Community Cooperation (OLDCC) could fund a statewide or regional readiness review to validate and extend this study's findings, including threat vectors this study deliberately excluded. That review could provide the basis for unlocking DoW funds through programs such as the Defense Community Infrastructure Program (DCIP), which Congress has typically funded at approximately \$125 million annually. Virginia state officials and energy planners could engage senior DoW leaders on opportunities to fund the lower-cost transmission upgrades identified in this study and align DCIP grants with other public and private financing pathways.

What's Next

There are no quick wins. Addressing Virginia's grid vulnerabilities will require a new model of collaboration between the DoW, utilities, state regulators, and regional organizations. The concepts presented here are intended to catalyze conversation among key decision makers, both for national defense and for Virginia's economic future.



Converge Strategies, LLC provides consulting services focused on the intersection of energy resilience and national security.

www.convergestrategies.com



Energy Strategies is an independent energy consultancy providing clients with technically grounded analysis and objective guidance.

www.energystrat.com

A blue-tinted photograph of a US Navy ship, the USS Donald Cook (DDG 75), at a port. Several large American flags are being waved in the foreground by people, including a man in a white jacket and a man in a white baseball cap. The ship's mast and radar equipment are visible in the background.

At Norfolk, Virginia (VA), family members wave American flags as they anxiously wait for their loved ones aboard the US Navy (USN) Arleigh Burke Class Guided-missile Destroyer USS DONALD COOK (DDG 75) to pull into port.