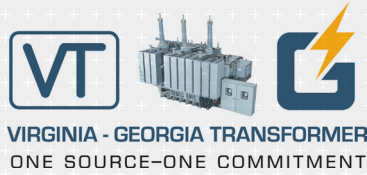


North American Transformer Production is Key to Reliable Electric Grid



The federal government is reporting that our national security is at risk, and the vulnerability is one that most Americans wouldn't expect – the United States electrical grid.

While the grid has received increased attention in recent months due to the attacks on substations in places like North Carolina and Washington state, the Department of Commerce published an investigative report [1] that shows the country's power supply faces an even larger problem: the United States does not produce enough transformers to meet demand.

The 2021 investigation revealed the country's growing reliance on transformer imports has led to a significant decline in domestic transformer production. Large power transformer imports [2] account for approximately 65 percent of the total U.S. annual usage. This dependency on imports could threaten national security through bottlenecks, supply chain disruptions, and trade disputes. If exacerbated, these issues could result in outages across the grid.



The consequences of an excessive reliance on energy and infrastructure imports have been made especially clear to the European Union throughout the ongoing Russian invasion of Ukraine. According to the International Energy Agency, the EU imported 45 percent of its natural gas from Russia in 2021. The 2022 sanctions imposed against Russian oil and gas have left European parliaments scrambling to find alternatives to fill the Russian energy gap as their citizens grapple with soaring costs and government restrictions on energy use. Although maintaining close international relations through trade is necessary for success in an increasingly interconnected world, an overdependence on key imports can lead to trouble.

While there are domestic shortages of all sizes of transformers, the type most critical to the U.S. power supply is the large power transformer. The Department of Commerce reported that the U.S. imported more than 80 percent of its total large power transformers in 2020.

There are only six companies capable of manufacturing large power transformers in the United States. These companies face challenges competing on the global market and must account for rising labor costs, training and retaining skilled employees, and sourcing the necessary transformer materials in an increasingly uncertain geopolitical landscape.

According to a separate report [4] by the Department of Energy, North America needed 1,300 large power transformers in 2020, and demand will more than double by 2027. This sharp increase in demand is partly driven by the need to rebuild the electrical grid and other infrastructure. The Department of Commerce noted in 2021 that the average age of a transformer in the U.S. is 38 years old, and 70 percent of all transformers are older than 25. In 2023, the average transformer is approximately 40.

Even as a recession looms on the horizon and many domestic competitors are scaling back their operations, Virginia Transformer sees growth as the way forward. They understand the resiliency and reliability of the North American electrical grid is paramount, and they are committed to their goals of enabling U.S. manufacturing and keeping America's lights on.

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Investment in domestic production of transformers is vital to maintain the reliability and resiliency of the electrical grid. While many transformer manufacturers are turning to inexpensive overseas labor and materials, one company is stemming the tide and bringing transformer manufacturing jobs back to North America.

Virginia Transformer is the largest U.S.-owned and -operated producer of small to extra-large transformers in the United States. Based in Roanoke, Va., the company has expanded significantly over the past 50 years, with five manufacturing facilities located across the United States and Mexico. Due to its consistent growth and repeated investment in domestic manufacturing, Virginia Transformer has the shortest lead times in the industry.

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Per the Department of Commerce investigative report, some of the most common issues affecting the domestic transformer manufacturing industry are labor availability, lack of skilled labor, and employee retention. Virginia Transformer addresses these challenges by providing extensive training programs to both new hires and long-term employees. This continuous educational investment in their workforce ensures that all employees at Virginia Transformer are highly trained and prepared for their roles across the company.

To help meet North America's rising energy demands, Virginia Transformer recently constructed an additional manufacturing facility in Chihuahua, Mexico. The plant began production in October 2022 and features four production lines for pad-mounted transformers, along with additional lines for dry-type transformers and integrated power modules. It can currently manufacture transformers up to 100 MVA, with the capacity to produce larger units in the future. Virginia Transformer's other facilities have been substantially upgraded with new equipment such as robotic carts, advanced testing labs, winding mushrooms, and other technology to increase production and further shorten lead times.

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Reference

- [1] Publication of a Report on the Effect of Imports of Transformers and Transformer Components on the National Security: An Investigation Conducted Under Section 232 of the Trade Expansion Act of 1962, as Amended
- [2] A large power transformer is generally considered to be greater than 60 MVA
- [3] A large power transformer is generally considered to be greater than 60 MVA
- [4] Electric Grid Supply Chain Review: Large Power Transformers and High Voltage Direct Current Systems
- [5] Ziegler, Steffen, Morello, Tim, Ferraro Parmalee, Lisa, Predictive Maintenance and Remaining Useful Life for Underground Cable Systems, Transformer Technology – Power Systems Technology, October 2022
- [6] Ziegler, Steffen, Morello, Tim, Ferraro Parmalee, Lisa, Deep Learning Characterization of PD Defects, An Important Step Toward Predictive Maintenance of Underground Cable Systems, Transformer Technology - Power Systems Technology, January 2023