Vint Hill Expansion Project
Gas Insulated Substation FAQs

To meet Prince William County's growing energy demands and comply with federal reliability mandates, Dominion Energy proposes to upgrade equipment at the existing Vint Hill Substation located at 13405 Vint Hill Road in Nokesville, Virginia. This project will add 500 kilovolt (kV) equipment and new 230 kV infrastructure. 500 kV transformers and related equipment are set to be installed, as well as Gas Insulated Substation (GIS) technology.

You may have questions about GIS technology. Here are answers to frequently asked questions.

1. WHAT IS A GIS SUBSTATION?

A GIS is a type of electrical substation that uses safe, tested, and effective technology. The major electrical equipment is enclosed in a sealed environment, and sulfur hexafluoride (SF6) gas is typically used as the insulating medium.

GIS technology typically requires one-third of the land an air-insulated substation needs.

2. WHERE IS GIS TECHNOLOGY BEING USED?

Dominion Energy has significant experience developing and operating GIS substations across our service area, and has become a trusted industry leader in the use of the technology. The first GIS facility was opened in 1983 at Bath County Pump Storage Station in Warm Springs, Virginia.

Currently, Dominion Energy operates 12 GIS facilities across its footprint. 11 additional GIS facilities are under construction, and many more are in early stages of development. In Northern Virginia, several GIS facilities are in operation, including the Brambleton Substation in Aldie; the North Alexandria Substation in Alexandria; and the Tysons Substation in Tysons.

GIS technology can also be found in the offshore substations supporting our Coastal Offshore Wind (CVOW) project.

3. WHY IS GIS TECHNOLOGY BEING USED FOR VINT HILL?

GIS requires only one-third of the land required for a traditional open-air substation. Utilizing GIS allows Dominion Energy to keep the new substation infrastructure wholly on company-owned property. This avoids the need for any new permanent electrical easements.

4. HOW DOES IT WORK?

GIS will use sulfur hexafluoride (SF6) to insulate components and extinguish arcs during circuit breaker switching operations.

The equipment is fully enclosed in grounded housing, and all internal components—circuit breakers, disconnect switches, voltage and current sensors, and busbars—are insulated by SF6.

SF6 is widely considered to be the best medium to insulate electrical equipment, which helps to ensure safe and reliable operations of our equipment and the electric grid.

5. IS THE INSULATING GAS SAFE?

Yes. Sulfur hexafluoride (SF6) is a non-toxic and non-flammable gas. It is not released into the atmosphere during normal operations. The system is sealed, secure, and specifically engineered to ensure safety for both the public and our crews.

Safety is the foundation of how our facilities are designed and built. Our GIS systems are constructed and maintained to meet the highest industry standards.

6. WHAT DOES DOMINION ENERGY DO TO PREVENT AND MITIGATE EMISSIONS?

As SF6 is a greenhouse gas, Dominion builds and maintains our GIS systems to the highest industry standards to prevent and mitigate releases of the gas.

Dominion Energy partners closely with the highest quality equipment suppliers to reduce the opportunity of leaks in GIS systems and other equipment that use SF6. GIS suppliers are required to guarantee a leak rate of less than 1 percent per year. SF6 emissions from Dominion Energy equipment typically come in well below this threshold.

Dominion Energy closely tracks any changes in gas levels in GIS systems. Field technicians are supplied with gas leak detection tools to identify any issues with equipment, and each substation has gas handling equipment in the unlikely event that a leak occurs.

Dominion is also proactive in replacing equipment before the end of its lifespan if there are concerns that leaks could occur.

The company tracks all SF6 containing equipment in annual reports to the U.S. Environmental Protection Agency and in our corporate reporting about total GHG emissions, including emissions of SF6.

7. WHY NOT ALWAYS USE GIS?

GIS has a higher upfront cost than an air-insulated substation, so it's only used where its benefits, or a smaller footprint, are truly needed. While each project is different, current general estimates show that a completed GIS station costs approximately 15% more than an air-insulated substation. At the same time, overall cost of ownership of GIS, based on equipment wear and maintenance costs, is about 20% less than air-insulated substations.

Dominion Energy evaluates the use of GIS on a project-by-project basis, taking into account impacts to the area, resiliency, cost and other factors.

To learn more about this project, please visit DominionEnergy.com/vinthill. You may also contact us by sending an email to powerline@dominionenergy.com or calling 888-291-0190.