

Gas Insulated Substation FAQs

A substation with Gas Insulated switchgear (GIS Substation) is another design option that gives Dominion Energy flexibility when designing substations.

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

1. WHAT IS A GIS SUBSTATION?

GIS is a type of electrical substation configuration 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 less land than an air-insulated substation needs.

2. WHERE IS GIS TECHNOLOGY BEING USED?

Currently, Dominion Energy operates 12 GIS facilities across its footprint. 11 additional GIS facilities are under construction. 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 is used in the offshore substations supporting our Coastal Virginia Offshore Wind (CVOW) project.

3. WHEN IS GIS TECHNOLOGY BEING USED?

GIS typically requires less land than a traditional open-air substation. It can be considered when space constraints and available land to construct an open-air substation are limited.

4. HOW DOES IT WORK?

GIS uses 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. 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 Energy builds, monitors, and maintains our GIS systems to the highest industry standards to prevent and mitigate releases of the gas.

Dominion Energy partners closely with trusted 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 Energy complies with all federal, state, and local regulations and laws. As part of this compliance, 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 IS GIS NOT ALWAYS THE BEST OPTION?

GIS has a higher upfront cost than an air-insulated substation, so it's only used where its key benefit of a smaller footprint is truly needed. While each project is different, current general estimates show that a completed GIS substation costs approximately 2 to 3 times more than an air-insulated substation.

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. Building a GIS substation could require longer lead times for materials and alter engineering designs, thus increasing timelines.

Assessments with large load customers could involve them covering the delta of costs if they request a GIS substation when one is not deemed necessary by Dominion Energy's design solution. Technical requests beyond Dominion Energy's recommended design solution are addressed situationally.
