

Technology with new eco-efficient gas mixture

High-voltage gas-insulated switchgear (GIS)



Technology breakthrough in eco-efficient GIS as an alternative to sulfur hexafluoride (SF₆) to substantially lower environmental impact.

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* GWP: The global warming potential describes how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide. GWP is expressed as a factor of carbon dioxide.

** According to Hodge and Sterner scale.

ABB breakthrough technology

High-voltage GIS with an eco-efficient gas mixture with the potential to lower carbon dioxide (CO₂) equivalent emissions by up to 50 percent over the product lifecycle.

The fluoroketone-based SF₆ alternative gas mixture is a chemical compound developed for switchgear applications in collaboration with 3M. It has a dielectric performance similar to SF₆ when utilized in indoor applications, but with very low GWP*.

The new gas mixture also has an adequate current interruption performance but in this respect SF₆ is superior.

Therefore the new gas mixture is first deployed for applications with a nominal voltage up to 170 kV where typically short circuit currents are below 50 kA.

The new gas mixture is the only one available so far that has been type tested according to IEC stan-

dards and which meets performance criteria and has a GWP ≤1 (e.g. equal or less than CO₂). In a gas-to-gas comparison to SF₆, the new gas mixture has almost 100 percent lower GWP. The gas mixture is practically non-toxic** and has ozone depletion potential of 0.

World's first GIS installation with eco-efficient gas mixture

ABB has commissioned the world's first GIS installation with a new eco-efficient gas mixture as an alternative to SF₆ gas for ewz, a power utility in Switzerland.

The 170/24 kV substation deploys the first breakthrough GIS with eco-efficient gas mixture with a global warming potential of less than 1 as an alternative to SF₆ gas.

This technology will provide long-term operational experience to pave the way for more eco-efficient switchgear in the future.

Why ABB GIS with eco-efficient gas mixture?

- GWP of new gas mixture is almost 100 percent lower than GWP of SF₆
- Carbon dioxide (CO₂) equivalent emissions can be lowered by up to 50 percent through the lifecycle of the high-voltage GIS. The CO₂ emissions consist of approximately 50 percent from raw materials, manufacturing and energy losses, and 50 percent from SF₆ emissions based on a 30-year service life
- Regulatory procedures for SF₆ such as maintaining inventory, special requirements in gas handling, filling and decommissioning of the equipment will be avoided
- Savings can be made in SF₆ related taxes which are applicable in some countries
- The new gas mixture is the only one available so far that has been type tested according to IEC standards which meets performance criteria and has a GWP ≤1

Lifecycle analysis (LCA)

According to ISO 14040, the LCA takes among others three major contributors into consideration:

- Materials
- Insulation gas leakage (SF₆ losses)
- Energy losses (at 50 percent rated current flow over 30 years)

Boundary conditions:

- Lifetime of equipment: 30 years
- Assumed gas leakage rate: 0.1 percent p.a. accumulated over a period of 30 years, 1 percent loss during handling, 1 percent loss during decommissioning

Global Warming Potential

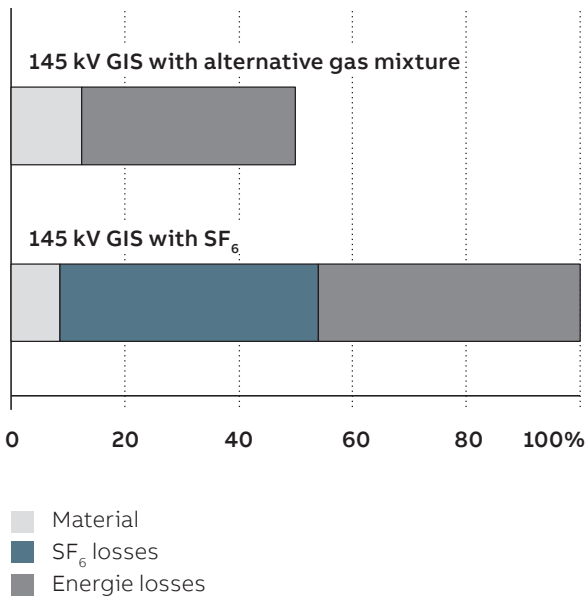


ABB GIS with eco-efficient gas mixture

