
EPA has partnered with the electric power industry to identify and highlight cost-effective methods of reducing SF₆ emissions to the atmosphere. Utility experience shows that implementing and following best practices leads to emission reductions. Utilities continue to improve practices related to gas handling and prevent emissions.

Establish lifecycle approach for SF₆ management through company policies, protocols, and standard operating procedures.

This approach helps track SF₆ inventory and costs, detect and repair leaks, and properly handle, recover and recycle SF₆. Established policies can be continually improved upon and expanded to incorporate other options for reducing SF₆ emissions.

Successful company policies and programs:
- Cover all practices
- Allow for innovation
- Designate responsible parties
- Train & empower employees

Establish procedures for gas inventory, accounting, and tracking.

Tracking procedures include:
- Labeling and inventory of gas cylinders
- A variety of SF₆ tracking software tools are available on the market that:
  - Automatically scan cylinder barcodes
  - Track real-time leak rates
  - Inventory of all SF₆ equipment

Tracking leak history of equipment identifies priorities for repairs and replacements.

Ensure good management of SF₆ acquisitions and gas inventory.

Utilities are consolidating storage inventory and selecting a single vendor. Vendors can support best practices by:
- Optimizing cylinder size
- Customizing the cylinder delivery system
- Minimizing cylinder handling
- Limiting inventory
- Maximizing gas utilization from every cylinder

Train employees annually in SF₆ handling and in using the necessary equipment.

Training enables employees to follow procedures properly, understand the environmental and health impacts of SF₆, and learn about emission reduction options.

Partners can:
- Require on-the-job training for field employees who handle SF₆
- Maintain in-house certification requirements for gas handling

Recycle SF₆ gas at equipment servicing or disposal.

Using gas cart recovery equipment to off-load and transfer SF₆ for maintenance and recycling reduces emissions. It is critical to follow correct procedures when using service carts and to ensure that gas carts are properly maintained.

How can I verify that residual SF₆ is removed from equipment?
- Use mass flow scales or weight scales
- Refer to temperature/pressure curves
- Use properly functioning recovery equipment, gauges, and scales

Implement leak detection and repair strategies.

Leak detection with soap and water solutions, bagging, or thermal imaging to detect minor, chronic leaks without taking equipment out of service. Leak detection teams regularly inspect equipment to identify SF₆ leaks and prioritize repair or replacement. Technologies are available to provide real-time monitoring of SF₆ leaks and to identify components that require the most immediate repair.

Leak repair is most efficient when the equipment is tested before and after repairs, using proper SF₆ recovery procedures. Effective leak repair requires advanced planning, prioritization to target worst performers, and evaluation of whether the best approach is to replace GIS.

Upgrade equipment to reduce SF₆ use and leaks.

New equipment designs use less SF₆ and tighter seals to reduce leaks. Other alternative designs use alternatives to SF₆, like fluoronitrile or fluoroethane, or vacuum based technology with C₆F₅ or “Clean Air” as a base gas. While new equipment requires new maintenance procedures, training, and management adjustments, a systematic approach to anticipating equipment replacement can significantly reduce emissions.

Medium-voltage alternatives have existed for the past decade; high-voltage alternatives are increasingly available.

Decommission equipment properly.

Proper decommissioning using SF₆ recovery systems is important to prevent emissions. For closed-pressure systems, utilities can purify used SF₆ onsite or off-site or send non-reusable gas for destruction.

For more information, please see Overview of SF₆ Emissions Sources and Reduction Options in Electric Power Systems. Established in 1999, the SF₆ Emission Reduction Partnership for Electric Power Systems is a collaborative, voluntary effort between EPA and the electric power industry to identify, recommend, and implement cost-effective solutions to reduce or eliminate SF₆ emissions. The SF₆ emissions of Partners have reduced by 74% since 1999.