

Reducing SF₆ Emissions from Gas-Insulated Switchgear

Policy summary: This policy aims to minimize emissions of sulfur hexafluoride (SF₆) from leakage of gas insulated switchgear (GIS) used in electricity transmission and distribution systems by setting limits on leakage rates (declining to 1 percent leakage allowed in 2020) and implementing best management practices for the recovery and handling of SF₆.

In 2013, Massachusetts finalized a regulation to implement this policy. The regulation requires large electric utilities to gradually reduce emissions beginning in 2015, such that the 1 percent leakage rate is achieved by 2020. Other key requirements ensure that all new SF₆-containing GIS meets the 1% leak rate, and that SF₆ is not released when GIS is discarded.

| | Savings from full policy implementation | % of 1990 level |
|-------------------------------------|---|-----------------|
| Economy-wide GHG reductions in 2020 | 0.4 MMTCO ₂ e | 0.4% |

Clean energy economy impacts: There could be an increase in in-state employment for companies engaged in SF₆ leak detection and repair, and potential for technological innovation.

Rationale: While emitted in relatively small quantities, SF₆ is a GHG that is 23,500 times more potent than CO₂ and has an atmospheric life of 3,200 years. One pound of SF₆ has the same global warming impact as 11 metric tons (24,251 pounds) of CO₂. Leakage from GIS is the largest source of SF₆ emissions in Massachusetts, with significant quantities also emitting from electronics manufacturing. Mitigation options for GIS focus on reducing leakage and handling losses, and replacing equipment. Best practices include SF₆ leak detection and repair, and recovery and recycling.

Policy design: Massachusetts' regulation is designed to allow flexibility for the regulated community with regard to how emissions are reduced. For example, emission rates may be averaged across a large number of GIS, GIS owners may choose between repair and replacement for problem GIS, and any disposal method is acceptable for used SF₆, provided that it is not released into the atmosphere. Additional information, including regulatory text, background documents, and reporting instructions, is available at the web address listed below.

GHG impact: This policy is expected to reduce 0.4 MMTCO₂e in 2020.

Costs: The background document published when the regulation was proposed includes the following discussion of costs: "GIS owners could incur some additional costs to comply with the regulation, especially in the later years during which emission rates must be reduced relative to current levels for GIS owners subject to an emission reduction requirement. To some degree, these costs would be balanced by savings associated with the reduced need to purchase SF₆. Not enough information is available about likely costs and savings in the later years to explicitly estimate the magnitude of any economic impacts associated with the regulation. MassDEP

notes that all known GIS owners are generally large businesses, such as power plants and electric utilities (either privately or municipal owned), and that California estimated the likely costs to electricity consumers of a similar but broader regulation to be less than \$0.000025 per kilowatt-hour (kWh). As typical retail residential electricity prices in Massachusetts have ranged from \$0.13 to \$0.18 per kWh, this would correspond to an increase of 0.02% or less.”

Legal authority: The Massachusetts Department of Environmental Protection (MassDEP) promulgated the regulation as 310 CMR 7.72, under the following regulatory authority: M.G.L. c. 111, sections 142A and 142B, and M.G.L. c. 21N.

Implementation: The policy promotes greater implementation of current industry best practices. The maximum emission rate set for the early years is already being achieved by Massachusetts utilities that have taken voluntary measures to reduce their emissions. Achieving the 1 percent limit in later years may require the use of relatively more expensive measures but these measures already exist.

Policy web site: <http://www.mass.gov/eea/agencies/massdep/climate-energy/climate/ghg/reducing-sf6-emissions.html>.