

**New Policy**

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## **REDUCING SF<sub>6</sub> EMISSIONS FROM GAS-INSULATED SWITCHGEAR**

**Policy summary:** Through a pilot program, followed by possible regulatory action, this policy aims to minimize emissions of sulfur hexafluoride (SF<sub>6</sub>) 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 SF<sub>6</sub>.

Economy-wide GHG emissions reduced 2020	0.2 million metric tons CO <sub>2</sub> e; 0.2%
Net cumulative \$ costs statewide 2011-2020 (2008 \$'s) <sup>69</sup>	\$0.9 - \$1.5 million

**Clean energy economy impacts:** There would be an expected increase in in-state employment for companies engaged in SF<sub>6</sub> leak detection and repair and potential for technological innovation, company formation, and jobs in solid-state (non-gas insulated) switch gear.

**Rationale:** SF<sub>6</sub> is a GHG that is 23,900 times more potent than CO<sub>2</sub> and has an atmospheric life of 3,200 years. One pound of SF<sub>6</sub> has the same global warming impact as 11 tons of CO<sub>2</sub>. Approximately 80 percent of SF<sub>6</sub> consumption and emissions are estimated to result from the leakage and handling losses from GIS. Mitigation options for this equipment focus on reducing leakage and handling losses. Best practices include SF<sub>6</sub> leak detection and repair, and recovery and recycling.

**Design issues:** California Air Resources Board (CARB) has proposed a regulation<sup>70</sup> requiring GIS owners to reduce SF<sub>6</sub> emissions from electrical equipment throughout California 1 percent per year over a 10-year period. The initial allowed annual emission rate would be set at 10 percent of the total amount of SF<sub>6</sub> that could leak; with the allowed annual rate declining to 1 percent in 2020. Massachusetts could use CARB's regulations as a model.

A number of Massachusetts utilities participate in EPA's voluntary "SF<sub>6</sub> Emission Reduction Partnership for Electric Power Systems,"<sup>71</sup> including: National Grid, NSTAR, and Western Massachusetts Electric Company. EPA does not publish any state- or utility-specific data from its voluntary program. On November 8, 2010, EPA signed final regulation 40 CFR 98 "Mandatory Reporting of Greenhouse Gases," Subpart DD "Use of electric transmission and distribution equipment,"<sup>72</sup> which requires reporting emissions from GIS, beginning with 2011 emissions reported by March 31, 2012.

As part of its development of a SF<sub>6</sub> emissions reduction program, CARB distributed a survey<sup>73</sup> requesting information from stakeholders on SF<sub>6</sub> emissions from the electricity sector "to

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<sup>69</sup> In 2008 dollars, not discounted.

<sup>70</sup> <http://www.arb.ca.gov/regact/2010/sf6elec/sf6elec.htm>

<sup>71</sup> <http://www.epa.gov/electricpower-sf6/>

<sup>72</sup> <http://www.epa.gov/climatechange/emissions/subpart/dd.html>

<sup>73</sup> <http://www.arb.ca.gov/cc/sf6elec/survey/sf6survey.doc>

determine SF<sub>6</sub> GHG emission reduction potential and to assist ARB staff in developing appropriate control strategies.” After consideration of any 2010 SF<sub>6</sub> emission data MassDEP receives by April 15, 2011 as part of the first mandatory Massachusetts SF<sub>6</sub> emission data reporting, MassDEP could consider whether a survey similar to CARB’s would provide useful information for designing a regulation.

**GHG impact:** 0.15 million metric ton reduction in CO<sub>2</sub>e in 2020.

**Costs:** According to CARB’s analysis of a similar policy, the expense of compliance ranges from savings of \$1/metric ton CO<sub>2</sub>e (in the case of SF<sub>6</sub> recycling) to a cost of \$55/metric ton CO<sub>2</sub>e (in the case of GIS repair and replacement), depending on the measure necessary to meet the emission limits in any given year. Entities are assumed to use the cheapest methods first and progressively move to more expensive methods to achieve further reductions. Some entities may not incur a cost for reducing SF<sub>6</sub> emissions for some or all years to 2020, if their leak rates fall below a year’s allowed limit. CARB estimates the cost effectiveness of the policy at about \$18 per metric ton CO<sub>2</sub>e reduced in the later years of the policy when the allowed leakage rate has declined to 1 percent. Similar cost effectiveness may be achieved in Massachusetts if the baseline practices and electric infrastructure profiles are comparable.

**Equity issues:** Full implementation of this policy may impose additional compliance costs on utilities, which could be passed on to customers — although that additional cost would be miniscule. CARB’s analysis of the proposed regulation estimated the incremental cost that could be passed on to electricity ratepayers at \$0.000016 to \$0.000025 per kilowatt-hour as a result of the policy. This represents an increase of less than 0.02 percent relative to average residential electricity rates in Massachusetts, or about 1.5 cents for the average monthly residential electricity bill.

**Legal authority:** MassDEP would need to promulgate a regulation to create an enforceable SF<sub>6</sub> control program. MassDEP presently has the authority to regulate such air pollutants under Massachusetts General Law Chapter 111, Section 142; and its authority over GHG emissions is amplified by the Global Warming Solutions Act.

**Implementation issues and uncertainty:** The policy promotes greater implementation of current industry best practices that are generally low-cost. The maximum emission rate set in California by CARB 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.