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## Environment & Energy Committee

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### HB 2379

**Brief Description:** Inventorying and incentivizing the reduction of the potential emissions from sulfur hexafluoride.

**Sponsors:** Representative Smith.

#### Brief Summary of Bill

- Requires the Department of Ecology to include in its biennial greenhouse gas emissions report an assessment of the total volume of sulfur hexafluoride (SF<sub>6</sub>) stored in gas-insulated electrical equipment in the state.
- Expands the definition of "energy transformation project" under the Washington Clean Energy Transformation Act to include investments in leak detection and repair, equipment refurbishment, new equipment, gas recycling, improved gas handling, and other projects and programs that reduce emissions of SF<sub>6</sub> from gas-insulated electrical equipment during the equipment's useful life and when retired from service.

**Hearing Date:** 1/16/20

**Staff:** Nikkole Hughes (786-7156).

#### Background:

##### Applications of Sulfur Hexafluoride in the Electricity Industry.

The electric transmission and distribution grid relies on switchgear to protect electrical equipment against overload and short-circuit currents, as well as to interrupt the load current. Since the 1950s, sulfur hexafluoride (SF<sub>6</sub>) has been the insulator of choice for transformers and switchgear because of its dielectric (insulating electricity) and arc-quenching (extinguishing an electric arc) properties. The high density of SF<sub>6</sub> also makes it preferable for smaller, decentralized electrical equipment in dense urban settings. Electrical equipment that uses SF<sub>6</sub> is typically referred to as "gas-insulated equipment" or "gas-insulated switchgear."

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*This analysis was prepared by non-partisan legislative staff for the use of legislative members in their deliberations. This analysis is not a part of the legislation nor does it constitute a statement of legislative intent.*

Sulfur hexafluoride is a greenhouse gas (GHG) that, according to the U.S. Environmental Protection Agency (EPA), is at least 22,800 times more potent than carbon dioxide in trapping heat over 100 years and can remain in the atmosphere for up to 3,200 years. Fugitive emissions of SF<sub>6</sub> can escape from gas-insulated transformers and switchgear through seals, especially from older equipment. The gas can also be released during equipment manufacturing, installation, servicing, and disposal. Operationally, SF<sub>6</sub> must be kept at minimum functional pressure in order to maintain the required dielectric properties for a circuit breaker to operate. If the pressure of the gas decreases due to leaking or loss, equipment operators must purchase additional gas to replace the emitted SF<sub>6</sub>.

Reduction of SF<sub>6</sub> emissions from gas-insulated equipment can be achieved through leak detection and repair, equipment refurbishment, the retirement of old and leaky equipment, gas recycling, and improved gas handling. At present, there is no alternative to SF<sub>6</sub> on the market that could directly replace it while fulfilling all its dielectric and interruption properties at the highest voltage levels, though according to the EPA, vacuum and other non-SF<sub>6</sub> gas insulating technologies are available for low- and medium-voltage systems and are actively being developed for high-voltage systems.

#### Federal Data on Sulfur Hexafluoride Emissions.

The EPA tracks emissions of SF<sub>6</sub> through the U.S. GHG Reporting Program, the U.S. GHG Inventory, and the voluntary SF<sub>6</sub> Emission Reduction Partnership for Electric Power Systems.

#### *The U.S. Greenhouse Gas Reporting Program.*

The U.S. GHG Reporting Program (GHGRP) requires reporting of GHG data and other information from large GHG emission sources, fuel and industrial gas suppliers, and carbon dioxide injection sites in the U.S. A total of 41 categories of reporters are covered by the GHGRP, including users and manufacturers of electric transmission and distribution equipment.

Electrical transmission and distribution equipment manufacturers and refurbishers are required to report their emissions under the GHGRP if their combined purchases of SF<sub>6</sub> and perfluorocarbons exceed 23,000 pounds per year. Electrical power systems are required to report if their total nameplate capacity of SF<sub>6</sub> and perfluorocarbon-containing equipment exceeds 17,820 pounds. In 2016, the Electrical Equipment Production and Use sector represented approximately 1/24th of 1 percent of total U.S. GHG emissions.

According to the 2011-2017 GHGRP Industrial Profile for Electrical Equipment Production and Use, the emissions reported by this sector decreased by 37 percent between 2011 and 2017, from 4.27 million metric tons of carbon dioxide equivalent (MMT CO<sub>2</sub>e) to 2.67 MMT CO<sub>2</sub>e. The use, rather than the production, of electrical equipment makes up the vast majority of these emissions.

The GHGRP has an "offramp" provision that exempts facilities from reporting under certain conditions. If reported total GHG emissions are below 15,000 metric tons of CO<sub>2</sub>e for three consecutive years or below 25,000 metric tons of CO<sub>2</sub>e for five consecutive years, the facility may choose to discontinue reporting. Since 2011, 38 facilities have elected to discontinue

reporting. According to the EPA, the departure of reporting facilities likely contributed to over half of the decrease in emissions between 2014-2015.

#### *U.S. Greenhouse Gas Inventory.*

The U.S. GHG Inventory estimates the total GHG emissions across all sectors of the economy using national-level data and incorporating GHGRP data when feasible. The processes and industries covered by the Electrical Equipment Production and Use Sector in the GHGRP are also covered by the GHG Inventory, but the emissions data are not identical due to methodological differences.

According to the 2019 GHG Inventory report, emissions of SF<sub>6</sub> from equipment manufacturing and from electrical transmission and distribution systems were estimated to be 4.3 MMT CO<sub>2</sub>e in 2017, an 81 percent decrease from the estimate for 1990.

#### *The Sulfur Hexafluoride Reduction Partnership for Electric Power Systems.*

The SF<sub>6</sub> Reduction Partnership for Electric Power Systems (Partnership) was established by the EPA in 1999 for the purpose of reducing or slowing the growth of SF<sub>6</sub> emissions from users of electrical equipment. From 1999 to 2010, facilities representing between 48-51 percent of total U.S. transmission miles reported their SF<sub>6</sub> emissions to the EPA under the Partnership. The SF<sub>6</sub> emissions of Partnership members have been reduced by 74 percent since 1999. As of 2019, five Washington entities, including the Bonneville Power Administration, were participating in the Partnership.

#### State Data on Sulfur Hexafluoride Emissions.

The Department of Ecology (Ecology) is required to report to the Governor and the Legislature on the state's total GHG emissions every two years, using 1990 as a baseline and delineated according to major source sector. Ecology uses the same emission calculation methods as the GHGRP.

The following facilities are required to report their annual emissions to Ecology:

- facilities that emit at least 10,000 metric tons of CO<sub>2</sub>e per year in the state; and
- suppliers of liquid motor vehicle fuel, special fuel, or aircraft fuel that provide products equivalent to at least 10,000 metric tons of CO<sub>2</sub>e per year in the state.

In 2017, reporting facilities emitted approximately 48,000 metric tons CO<sub>2</sub>e of SF<sub>6</sub>.

#### Washington Clean Energy Transformation Act.

The Washington Clean Energy Transformation Act (CETA) requires that all retail sales of electricity to Washington customers be GHG neutral by January 1, 2030, and that nonemitting and renewable resources supply 100 percent of all retail sales of electricity to Washington customers by January 1, 2045.

Through December 31, 2044, an electric utility may satisfy up to 20 percent of its 2030 compliance obligation with an alternative compliance option, including the option of investing in energy transformation projects. Investments in energy transformation projects must use criteria to be developed by Ecology and must demonstrate certain quality standards. Energy transformation projects must be associated with the consumption of energy in Washington and

must not create a new use of fossil fuels in Washington that results in a net increase of fossil fuel usage.

**Summary of Bill:**

Biennial Greenhouse Gas Emissions Report.

The biennial greenhouse gas emissions report developed by the Department of Ecology (Ecology) must include an assessment of the total volume of sulfur hexafluoride (SF<sub>6</sub>) stored in gas-insulated electrical equipment in the state. The report must delineate the total volume of SF<sub>6</sub> stored in gas-insulated electrical equipment used for electricity generation, transmission, and distribution. The report must also provide the amount, in metric tons, of potential carbon dioxide equivalent emissions represented by the total volume of SF<sub>6</sub> stored in gas-insulated electrical equipment in the state.

"Gas-insulated electrical equipment" means all electrical power system equipment insulated with SF<sub>6</sub> gas, including, but not limited to, switches, stand-alone gas-insulated equipment, and any combination of electrical disconnects, fuses, electrical transmission lines, transformers, or circuit breakers used to isolate gas-insulated electrical power system equipment.

Washington Clean Energy Transformation Act.

The definition of "energy transformation project" is expanded to include investments in leak detection and repair, equipment refurbishment, new equipment, gas recycling, improved gas handling, and other projects and programs that reduce emissions of SF<sub>6</sub> from gas-insulated electrical equipment during the equipment's useful life and when retired from service.

**Appropriation:** None.

**Fiscal Note:** Requested on January 10, 2020.

**Effective Date:** The bill takes effect 90 days after adjournment of the session in which the bill is passed.