

Regulatory Impact Statement

6 NYCRR Part 495 Sulfur Hexafluoride Standards and Reporting

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The New York State Department of Environmental Conservation (DEC or the Department) is adding a new regulation, Part 495, “Sulfur Hexafluoride Standards and Reporting” to Title 6 of the New York Codes, Rules, and Regulations (NYCRR). This regulation aims to reduce sulfur hexafluoride (SF₆) and other fluorinated

greenhouse gas (GHG) emissions and support the requirements of New York’s Climate Leadership and Community Protection Act, Chapter 106 of the Laws of 2019 (Climate Act) to reduce statewide GHG emissions.

1. Statutory Authority

The statutory authority to promulgate this rulemaking is found in the Environmental Conservation Law (ECL) at Sections 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 71-2103, 71-2105, 75-0101, 75-0105, 75-0107, and 75-0109. Furthermore, this rulemaking also addresses the Department’s statutory responsibility pursuant to Section 7(2) of the Climate Act to achieve the statewide GHG emission limits outlined in ECL Section 75-0107 and 6 NYCRR Part 496. The Climate Act further requires the Department promulgate regulations to achieve the statewide GHG emission limits and align with recommendations from the Climate Action Council Scoping Plan¹ (Scoping Plan). ECL Section 75-0109. As discussed in more detail in the Legislative Objectives below, the regulation reflects the findings and recommendations from the Scoping Plan.

ECL Section 1-0101. This section declares that it is a policy of New York State to conserve, improve, and protect its natural resources and environment and control air pollution in order to enhance the health, safety and welfare of the people of New York State and their overall economic and social wellbeing. This section further declares that the Department shall promote patterns of development and technology which minimize adverse impacts on the environment. This rulemaking regulates uses and emissions of fluorinated GHGs, particularly SF₆ in gas-insulated equipment (GIE) used in the electricity transmission and distribution sector, which minimizes the adverse impact on the environment from GHG emissions, thereby protecting the State’s natural resources and environment.

¹ Available at <https://climate.ny.gov>.

ECL Section 1-0303. This section defines the term “pollution.” Pollution is: “the presence in the environment of conditions and or contaminants in quantities of characteristics which are or may be injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout such areas of the state as shall be affected thereby.” This rulemaking will remove contaminants in the form of fluorinated GHGs and associated atmospheric concentrations of GHGs from the environment which are injurious to human, plant, and animal life or to property throughout the State.

ECL Section 3-0301. This section empowers the Department to develop programs to carry out the environmental policy of New York State set forth in section 1-0101. Section 3-0301 specifically empowers the Department to, among other things: provide for the prevention and abatement of air pollution; monitor the environment to afford more effective and efficient control practices; identify changes in ecological systems and to warn of emergency conditions; and adopt such regulations as may be necessary, convenient, or desirable to effectuate the environmental policy of the State. This rulemaking is necessary, convenient, and desirable to effectuate the State’s requirement of reducing GHG emissions, including SF₆ and other fluorinated GHGs.

ECL Section 19-0103. This section declares that it is the policy of New York State to maintain a reasonable degree of purity of air resources. In carrying out such policy, the Department is required to balance public health and welfare, the industrial development of the State, propagation and protection of flora and fauna, and the protection of personal property and other resources. To that end, the Department is required to use all available practical and reasonable methods to prevent and control air pollution in the State. This rulemaking meets this requirement by preventing and controlling SF₆ and other fluorinated GHG emissions in the State, while also balancing interests through the establishment of specific exemptions.

ECL Section 19-0105. This section declares that it is the purpose of Article 19 of the ECL to safeguard the air resources of New York State under a program which is consistent with the policy expressed in section 19-0103 and in accordance with other provisions of Article 19. This rulemaking serves to establish additional

controls on SF₆ and other fluorinated GHG emissions, consistent with the policy expressed in Article 19 of preventing and controlling air pollution, including GHGs.

ECL Section 19-0107. This section defines the terms “air contaminant” and “air pollution.” “Air contaminant” is defined as “a dust, fume, gas, mist, odor, smoke, vapor, pollen, noise or any combination thereof.” “Air pollution” is defined as “the presence in the outdoor atmosphere of one or more air contaminants in quantities, of characteristics and of a duration which are injurious to human, plant or animal life or to property or which unreasonably interfere with the comfortable enjoyment of life and property throughout the State or throughout such areas of the State as shall be affected thereby.” SF₆ GHGs are an “air contaminant” that causes “air pollution” as defined in the ECL because they are gases that are present in the outdoor atmosphere in quantities that engender and/or provoke climate change, which is injurious to life and property in New York State.

ECL Section 19-0301. This section declares that the Department has the power to promulgate regulations for preventing, controlling, or prohibiting air pollution. This section provides authority for the Department to establish this rulemaking because it furthers prevention and control of air pollution in the form of GHG SF₆ emissions and associated atmospheric concentrations of GHGs.

ECL Section 19-0303 also establishes procedures for adopting any code, rule, or regulation which contains a requirement that is more stringent than the Clean Air Act or regulations issued pursuant to the Clean Air Act by the EPA. This requires the Department to include analysis in the Regulatory Impact Statement (RIS) explaining State regulatory requirements that are more stringent than those found in the Clean Air Act or its implementing regulations. Federal regulatory requirements regarding SF₆ and the other affected GHGs are discussed further in the Federal Standards section of this RIS. The Federal Standards section, as well as elsewhere in this RIS, also explains how Part 495 will meet criteria in ECL Section 19-0303(4) if it was applicable to this rulemaking. Further, the cost-effectiveness of this regulation and whether reasonably available

alternatives exist is discussed in the RIS. The RIS thoroughly discusses the public health and environmental protection benefits of the this regulation.

ECL Section 19-0305. This section authorizes the Department to enforce the codes, rules, and regulations established in accordance with Article 19.

ECL Sections 71-2103 and 71-2105 set forth the civil and criminal penalty structures for violations of Article 19, as well as regulations promulgated thereunder.

ECL Section 75-0101. This section defines greenhouse gas as “carbon dioxide, methane, nitrous oxide, *hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and any other substance emitted into the air that may be reasonably anticipated to cause or contribute to anthropogenic climate change*” (emphasis added). Certain fluorinated GHGs are specifically referenced (hydrofluorocarbons, perfluorocarbons, and SF₆) and any others are generally referenced. Such GHGs are also a part of statewide greenhouse gas emissions, also defined in this section as “the total annual emissions of greenhouse gases produced within the state from anthropogenic sources . . .” The Climate Act defines “carbon dioxide equivalent” as a measurement of global warming potential (GWP) based on a twenty-year timeframe. ECL § 75-0101(2).

ECL Section 75-0105. This section requires the Department to consider—and grants the Department authority to establish—a mandatory registry and reporting system from individual sources to obtain data on GHG emissions. This rulemaking imposes registration and reporting requirements regarding sources of fluorinated GHGs and uses the EPA GHG reporting program as a model for addressing sources that cannot be directly monitored, i.e., through reporting on gas supplies.

Section 75-0107. This section outlines the statewide GHG emission limits and specifically requires a 40% reduction in statewide GHG emissions from 1990 levels by 2030, and an 85% reduction from 1990 levels by 2050. Based on current estimated methods and data, fluorinated GHGs represent 7% of statewide emissions,

and SF₆ specifically represents less than 1% of statewide emissions. These emissions are addressed in this this regulation and the Part 494 regulation. *See also* 6 NYCRR Part 496.

Section 75-0109. This section provides the Department broad and specific authority and direction to regulate and control GHG emissions, including SF₆, to ensure compliance with the Statewide GHG emission limits. This regulation is consistent with the Climate Act because it will reduce GHG emissions from SF₆ and avoid new sources and additional growth in SF₆ emissions, which is necessary to achieve the statewide GHG emission limits.

2. Legislative Objectives

Articles 1 and 3 of the ECL set out the overall State policy goal of reducing air pollution and providing clean, healthy air for the citizens of New York. They provide the Department and Commissioner the general authority to adopt and enforce measures to accomplish those goals, including the regulation of sources of air pollution.

“Climate change is adversely affecting economic well-being, public health, natural resources, and the environment of New York.” Climate Act § 1. “Action undertaken by New York to reduce greenhouse emissions will have an impact on global greenhouse gas emissions and the rate of climate change. In addition, such action will encourage other jurisdictions to implement complementary greenhouse gas reduction strategies and provide an example of how such strategies can be implemented.” *Id.* As acknowledged by the Legislature through its enactment of the Climate Act, significant reductions of GHG emissions, including SF₆, are necessary to mitigate the ongoing impacts of climate change on New York State. *Id.*

Fluorinated GHGs are among the most powerful forces of global climate change. The primary focus of this rule is SF₆, which is the most potent GHG currently known with a GWP 18,300-25,200 times that of carbon

dioxide, according to the most recent IPCC Assessment Report.² It is also one of the longest-lived GHGs, persisting in the atmosphere for 1,000 years once emitted. All fluorinated GHGs have high GWP values, and some persist for hundreds, thousands, or even tens of thousands of years. This means that even if these GHGs are emitted at low volumes, they are accumulating in the atmosphere, and they will continue to impact the climate for centuries. In the case of SF₆, the abundance has increased more than 40% from 2011 to 2019.³ Finally, because this gas persists in the atmosphere much longer than can be modelled, the costs to society from SF₆ emissions cannot be fully estimated (see Costs section).

Climate Action Council Scoping Plan

The Climate Act created the Climate Action Council to develop a Scoping Plan with recommendations for how the State would achieve the 2030 and 2050 statewide GHG emission limits and net zero goal.⁴ The Department is specifically directed to promulgate regulations that, “reflect, in substantial part, the findings” of the Scoping Plan.⁵ Recommendations regarding SF₆ emissions were identified in the Scoping Plan’s “Electricity” chapter. Specifically, Strategy E7, “Invest in Transmission and Distribution Infrastructure Upgrades” states, “DEC should adopt regulations to reduce SF₆ emissions and establish a timeline for phasing out new SF₆ equipment. New York should also collaborate with other U.S. Climate Alliance states to align policies across the country to drive a market shift toward SF₆ alternative technologies nationwide. This will help New York’s power grid remain one of the cleanest, lowest emission grids in the country.” Additionally, there are a number of recommendations regarding hydrofluorocarbons (HFCs) in the “Building” and “Waste” chapters. Some uses and supply of HFCs may be addressed in the reporting requirements in this rule. Finally,

² Intergovernmental Panel on Climate Change. 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [MassonDelmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. In Press: Cambridge University Press.

³ Ibid.

⁴ ECL § 75-0103(11).

⁵ ECL § 75-0109(2)(c).

the recommendation in the “Industry” chapter, Strategy I5, “Establish Greenhouse Gas Registry and Reporting System”, states, “DEC should promulgate regulations to establish new or expand the existing GHG reporting requirements, which may be a component of another regulatory program... [and] DEC should evaluate existing online reporting systems such as those established by EPA and the California Air Resources Board.”

3. Needs and Benefits

The primary need for this rulemaking is to protect the health and welfare of New York residents and resources by reducing GHG emissions. This regulation is also consistent with the requirements of the Climate Act, will implement specific recommendations of the Climate Action Council Scoping Plan, and is needed to achieve the 2030 and 2050 statewide GHG emission limits. This rulemaking also fulfills the Department’s obligation to promulgate such regulations as described in ECL Section 75-0109 and Section 7(2) of the Climate Act. Additional background on the needs and benefits of Part 495 is presented below. This includes a description of stakeholder outreach on this regulation, recent state and federal actions on SF₆, a description of the key components of this regulation, and an analysis of expected SF₆ emission reductions.

Climate change has adverse impacts on human health and the environment. These impacts include increased heat illnesses and mortality, respiratory illnesses from increased formation of ground level ozone, and the introduction or spread of vector-borne illnesses.⁶ Climate change adversely impacts New York State’s shoreline, drinking water sources, agriculture, forests, and wildlife diversity.⁷ Climate change trends such as rising temperatures, rising sea levels, and increased frequency of intense precipitation events have already been observed. These trends are expected to continue throughout the century. Thus, mitigation of climate change and the regulation of GHGs such as SF₆ benefits New York’s human health and environment generally.

⁶ e.g., As described in the Intergovernmental Panel on Climate Change Sixth Assessment Report (<https://www.ipcc.ch/assessment-report/ar6/>) and US Fourth National Climate Assessment (<https://nca2018.globalchange.gov/>).

⁷ e.g., As described in the most recent New York State Climate Assessment (<https://nysclimateimpacts.org/>).

Stakeholder Outreach

Pursuant to ECL Section 75-0109, the Department conducted pre-proposal stakeholder outreach for Part 495. Notifications regarding requests for feedback or public meetings were distributed via the Environmental Notice Bulletin (ENB), and to an email distribution list with representatives of regulated entities, community organizations, environmental groups, health professionals, labor unions, municipal corporations, trade associations, and other stakeholders.

Initial outreach efforts concentrated on discussions with regulators in other states with enacted SF₆ regulations and with original equipment manufacturers (OEMs) of gas insulated equipment. Eight meetings with individual OEMs were held between January 30, 2023, and February 15, 2023. Meetings were also held with staff from California Air Resources Board (CARB) and Massachusetts Department of Environmental Protection to discuss their SF₆ regulations and lessons learned.

Additional outreach was conducted through the Fall of 2023. Two pre-proposal informational webinars were held to disclose initial leanings and request feedback from stakeholders. The webinars were announced via email distribution list and posting in the May 3, 2023 ENB. The webinars were held on May 23, 2023 and May 24, 2023. A meeting with potential regulated entities, requested via the Environmental Energy Alliance of New York, was held Jun 28, 2023. Lastly, the Department issued a Request for Feedback regarding suppliers and users of fluorinated GHGs along with a suggested 30-day comment period in the September 20, 2023 issue of the ENB, which was also sent directly to various stakeholders via email and posted on the Department's website. In addition to previous pre-proposal stakeholder outreach regarding Part 494 and Part 495, the Department sought additional comment through this Request for Feedback on requirements for suppliers of fluorinated GHGs to register, retain records, or report annually on sales in New York State. The Department also requested comment on limiting the use and sale of SF₆ to known and essential uses.

Recent State and Federal Action

Fluorinated GHGs are inconsistently covered by international, national, and state-level policies. Many but not all fluorinated GHGs are regulated under the Clean Air Act, such as hazardous substances or volatile organic compounds, and some are included in annual reporting under the EPA's mandatory GHG reporting program (GHGRP; 40 CFR Part 98). SF₆ emissions have been addressed by a voluntary program administered by the EPA and through regulation in California and Massachusetts. The EPA established its SF₆ Emission Reduction Partnership for Electric Power Systems in 1999. The voluntary initiative includes anonymized reporting of SF₆ stocks and emissions by utilities with a goal of implementing cost-effective mitigation measures. Nationally, several utilities have seen substantial opportunity to reduce SF₆ use and have phased out installation of new SF₆ GIE. While SF₆ emissions and emission rates have declined 80% and 89 percent respectively, total installed SF₆ capacity has risen by roughly 85 percent. This increase in SF₆ stocks creates the opportunity for increasing emissions. In addition to voluntary reporting under the partnership program, EPA's GHGRP requires reporting for entities with nameplate capacity exceeding 17,820 pounds or emissions exceeding 25,000 metric tons of carbon dioxide equivalent (MTCO_{2e}). Information reported as part of the GHGRP are publicly available and in 2019 included RG&E, National Grid, NYSEG, LIPA, NYPA, and ConEd.

California began regulating SF₆ emissions in 2011 and issued a revised regulation that became effective January 1, 2022. The initial 2011 regulation required reporting by all GIE owners and established a maximum allowable emissions rate, determined by dividing annual SF₆ emissions by the system nameplate capacity. The emission rate was established as ten percent in 2011 with an annual reduction of one percent until 2020 when it reached one percent. The rule was revised after reported data showed that statewide SF₆ capacity grew by one to five percent annually with an anticipated continuation of this trend. This created the possibility that, as capacity grew, the maintenance of a one percent emissions rate would allow an emissions increase. The newly enacted regulation includes several revisions with the most notable being the establishment of a timeline for phase-out of

acquisitions of SF₆ GIE. The phase-out timeline was developed in consultation with manufacturers and utilities to represent the expected availability of non-SF₆ GIE technologies.

Massachusetts promulgated its SF₆ regulation in 2014, which established reporting and leak rate limit requirements similar to California's original 2011 SF₆ rule. Regulated entities are separated into two categories: those that install and assume operation or control of SF₆ GIE after January 1, 2015, and those that are subject to federal reporting requirements. The latter requirement covers the state's two largest utilities. All GIE installed after January 1, 2015 are required to be certified by the manufacturer of having a maximum annual leak of 1%, maintain records of the amount of SF₆ added to each GIE, and report to the state if the average annual leak rate exceeds 1%. All GIE owned, leased, operated, or controlled by entities other than the two largest utilities prior to January 1, 2015 are not subject to the regulation. Separate rules apply to the two federal reporting entities, National Grid and Eversource. Maximum annual leak rates were established at 3.5% in 2015, decreasing annually to one percent in 2020. In addition to leak rates, a mass-based emissions ceiling was established for each entity. This is to address the possibility of increased system capacity leading to increased total emissions despite adherence to maximum leak rates. Mass limits were established based on reported 2015 total SF₆ stocks.

Most recently, the European Commission and Parliament released a negotiated, provisional agreement on October 5, 2023 that will update the EU's "f-gas" regulation.⁸ The EU regulation was first adopted in 2006 and covers multiple types of fluorinated greenhouse gases (f-gases) including SF₆. Among other requirements, the updated regulation establishes a phase-down schedule for SF₆ GIE similar to that adopted in California and in this regulation.⁹

⁸ Press Release "Commission welcomes agreement on new legislation to prevent 500 million tonnes of emissions from fluorinated gases and ozone depleting substances" https://ec.europa.eu/commission/presscorner/detail/en/ip_23_4781 (Accessed November 6, 2023).

⁹ Page 102-106, Annex. Outcome of Proceedings, General Secretariat of the Council. Council of the European Union. dated October 19, 2023. <https://data.consilium.europa.eu/doc/document/ST-14409-2023-INIT/en/pdf> (Accessed November 6, 2023).

Key Components of the Regulation

This regulation is comprised of several key components that are described below.

Subpart 495-1: Gas-Insulated Equipment

Subpart 495-1 to regulate GIE broadly aligns with CARB's Regulation for Reducing Sulfur Hexafluoride Emissions, with a few exceptions noted below. The general structure of this Subpart requires entities that own SF₆ GIE to maintain an inventory of GIE devices and SF₆ containers which serve as the basis of an annual reporting program and the tracking of baseline and annual GIE and SF₆ capacities. Beginning in calendar year 2028, regulated entities will be required to submit information that will enable enforcement of the regulation and help inform the state's efforts to calculate GHG emissions. For entities that currently own GIE, the first data year of reporting will be 2027.

Sulfur Hexafluoride Phase-Out

A key component of this regulation aimed at reducing SF₆ emissions is a phase-out schedule for the acquisition and installation of new SF₆ GIE. The phase-out schedule does not impact existing and installed SF₆ GIE but prohibits the installation of new SF₆ GIE following the effective phase-out date. Prohibiting new installations is the most effective way of fully mitigating SF₆ emissions from GIE, which typically have a 40-year lifespan. The phase-out schedule is organized by several criteria that align with the development and release schedule of SF₆ alternative GIE. The criteria used are configuration (above or below ground), voltage capacity (kV), and short-circuit rating (kA). The first phase-out date is January 1, 2027 and the final phase-out date is January 1, 2033. The schedule aligns with CARB's regulation with the exception of the earliest phase-out dates, which are further in the future, to provide regulated entities additional time for planning.

GIE Emissions Limit

The GIE emissions limit requires regulated persons to limit the average of the three most recent years' system-wide emissions of GHGs from GIE to a 1% rate beginning 2030. The emissions limit is calculated by

applying 1% to the baseline systemwide installed SF₆ nameplate capacity in the first reporting data year (or 2027). Since emissions limits are calculated as a percentage of the total system SF₆ capacity, removal of SF₆ devices could negatively impact an entity's total allowable emissions. California's regulation includes a mechanism, Early Action Credits, to address this that encourages GIE owners to place SF₆ alternative equipment into service prior to the applicable phase-out date for those devices. It functions by adding credits equivalent to the average potential SF₆ charge of replaced devices to the entity's capacity during the calculation. The credits are then retired when the applicable phase-out date is reached. The Department considers this approach to be potentially burdensome for both the regulated entities and the Department due to the necessary approval processes, reporting, and tracking. In lieu of Early Action Credits, the Department is using a static baseline system SF₆ capacity that is equivalent to average system capacity in the first reporting data year (or 2027). This addresses any impact of early adoption, creates a marginally higher effective emissions rate limit, and allows greater flexibility for regulated entities to regulate emissions. As in the CARB regulation, annual emissions and the GIE emissions limit includes carbon dioxide equivalent (CO₂e) emissions from alternatives to SF₆ that are also GHGs. As CARB has described this requirement, the intent is to ensure there is an accurate accounting of GHGs. There is no prohibition on the adoption of any non-SF₆ GIE.¹⁰

One additional difference from CARB and Massachusetts regulations is that the onset of the emissions limit is delayed rather than phased in. Both states used a step-down approach to reach the one percent emissions rate. This regulation instead delays implementation of the one percent rate until 2030 to enable greater flexibility to regulated entities for managing emissions.

¹⁰ e.g., CARB 2020. Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response Public Hearing to Consider Proposed Amendments to the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear Public Hearing Date: September 24, 2020 Agenda Item No.: 20-9-2.

Phase-Out and Emergency Event Exemptions

There are three types of exception processes in which SF₆ GIE may be used after the phase-out date. More specifically, there is a phase-out exemption process, and exceptions for GIE failures and emergency events. The phase-out exemption allows persons to apply for an exemption if certain criteria are met regarding the availability, and suitability of SF₆ alternative GIE. The GIE failure provision allows GIE owners to use SF₆ GIE to replace SF₆ GIE that has failed after the phase-out dates without receiving an exemption, if certain conditions are met. The emergency event mechanism allows compliance entities to report emissions related to device failures that were out of the control of the GIE owner and request that they be excluded from an assessment of their annual emission limit.

Subpart 495-2: The Use and Supply of Regulated Substances and Pre-Charged Equipment

The second Subpart of this regulation adopts provisions from a California regulation¹¹ related to the general use of SF₆ as well as certain GHG reporting requirements in place at the federal level and in California. The Department has adopted the same requirements as have been in place in California since 2009, with the primary goal of limiting the use of SF₆ as it is an extremely powerful pollutant. As in California, SF₆ sale and usage is limited to certain essential uses. A secondary goal is to avoid SF₆ usage in areas where new alternatives are being developed and SF₆ is not required, i.e., in the use of SF₆ as a tracer gas in research activities. The California regulation also included complementary reporting requirements as in the EPA GHGRP for suppliers of SF₆ and substitutes and it is implemented through the state's mandatory GHG reporting platform. This regulation includes requirements that incorporate California and EPA terms such that the information requirements are not expected to be novel or burdensome on any entity. This regulation requires entities that distribute or otherwise supply fluorinated GHGs into New York State to maintain certain records and report overall sales volumes on an annual basis. The critical difference between the New York State GHG reporting

¹¹ Regulation for Reducing Sulfur Hexafluoride Emissions, Subarticle 3, sections 95340-95346, of title 17 of the California Code of Regulations.

program and those in other jurisdictions is that this establishes a threshold such that reporting is only required for GHGs that exceed a GWP20 of 10. This is consistent with the threshold for the update to the Part 494 regulation that covers suppliers of HFCs and substitutes as well as equipment containing SF₆ in certain sectors. There may be overlap between the suppliers covered by Part 494 and 495 regulations and so this rule is written to enable the Department to develop a single, unified reporting system.

Regulatory Emissions Analysis

This regulation is intended to address the current emissions of SF₆, avoid increases in SF₆ emissions associated with ongoing adoption of new SF₆ GIE or in non-essential uses, and to avoid emissions of other fluorinated GHGs that may be used as substitutes for SF₆. The reporting requirements in the second Subpart of this rule are critical for the Department's enforcement and for the assessment of annual statewide emissions under the Climate Act. The Department also expects that the collection and communication of fluorinated gas emissions will lead to voluntary emission reductions through improved leak management or through the adoption of sustainable alternatives.

Based on publicly available data, the Department has estimated SF₆ emissions in the State to be 7.36 metric tons per year, or 134,799 or 185,625 metric tons of carbon dioxide equivalent emissions if using the 20 or 100-year GWP, respectively.¹² This is equivalent to the carbon dioxide emissions from combusting 6,877-9,471 gallons of gasoline per year.¹³ Absent this rule, these emissions are expected to increase through 2050, which will be inconsistent with the requirements of Climate Act. In its most recent rulemaking,¹⁴ CARB estimated that SF₆ GIE emissions would have increased 27% by 2036 if their regulation only maintained an emissions limit and did not also adopt a phase-down schedule because GIE continued to be added to the system.

¹² DEC 2022 Statewide GHG Emissions Report, converted to CO₂e using IPCC's AR6 values, op cit

¹³ EPA Carbon Footprint Calculator, assuming 19.6lbsCO₂/gal <https://www3.epa.gov/carbon-footprint-calculator> (last visited October 31, 2023).

¹⁴ CARB. 2021. Updated Informative Digest. Proposed Amendments to the Regulation for Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear.

With the phase-down schedule, they estimated that their regulation will mitigate the growth of SF₆ adoption and keep emission levels flat through the expected lifespan of the equipment, or through 2075.

4. Costs

This regulation may marginally increase the costs of GIE to electric utilities or other users and to suppliers of fluorinated GHGs, but it is designed to minimize costs by providing adequate time for new alternatives to reach price parity. In the case of GIE owners, including State and municipally owned utilities, the regulation does not directly impose costs on these entities or require that they replace existing equipment. Instead, GIE owners may incur an incremental additional cost to an otherwise planned equipment replacement or expansion and this may be passed on to ratepayers. Current market prices for SF₆ alternative GIE are roughly 50 to 100% higher than legacy SF₆ equipment. However, given the phase-down occurring in other states and countries, the Department anticipates that the demand for non-SF₆ equipment will increase and the costs will decrease over time and before the phase-out dates, as manufacturing is scaled up and R&D costs are recouped. Additionally, dry-air or vacuum type SF₆ alternative GIE are shown to have lower life-time operation and maintenance costs, in part due to the high cost of SF₆ gas for servicing and refilling lost SF₆.¹⁵ In the extensive cost modeling conducted by CARB,¹⁶ they found that total cost savings for non-SF₆ equipment would grow to nearly match upfront costs by the final year of the model, or 2036. Because these cost savings (or avoided costs) would then continue every year through the lifetime of the non-SF₆ GIE, the transition away from SF₆ will save money for the utilities and ratepayers. Notably, the avoided costs include the costs of complying with the regulation. This potential cost saving is higher in this regulation as entities are not required to report if GIE emissions fall below 7,500 MTCO_{2e}. That said, the Department expects that the costs of reporting under either Subpart of this rule are

¹⁵ <https://www.epa.gov/eps-partnership/alternatives-benefits-calculator>.

¹⁶ As summarized in CARB 2020 Final Statement of Reasons. op cit.

minimal, as the information is already collected and reported to EPA. There are no additional costs anticipated to the Department for implementing this regulation.

The societal benefits from the mitigation of SF₆ and other fluorinated GHG emissions far outweigh the costs from participating in reporting programs or from the adoption of alternative technologies. The Department recently issued an update to the State’s Value of Carbon guidance to enable State agencies to estimate the societal damages of SF₆ emissions alongside other GHGs. Table 1 below provides an estimation of annual damages if SF₆ equipment leakage and the resulting emissions remained at current levels through 2050. The total cumulative, or net present value, of emissions for 2024-2050 would result in damages costing \$326.62 million to \$3.69 billion dollars, or \$889.58 million dollars at the central 2% discount rate. Avoiding these emissions in the future will represent a significant benefit to society.

Table 1. Annual and Cumulative Societal Costs from SF6 Emissions (NYS Value of Carbon, 2020 dollars)

Year	SF6 (metric tons)	1% (million \$)	2% (million \$)	3% (million \$)
2024	7.366053	-\$136.54	-\$35.09	-\$13.25
2025	7.366053	-\$137.90	-\$35.61	-\$13.52
2026	7.366053	-\$139.42	-\$36.20	-\$13.82
2027	7.366053	-\$140.94	-\$36.78	-\$14.11
2028	7.366053	-\$142.46	-\$37.36	-\$14.41
2029	7.366053	-\$143.98	-\$37.94	-\$14.70
2030	7.366053	-\$145.51	-\$38.53	-\$15.00
2031	7.366053	-\$147.07	-\$39.14	-\$15.32
2032	7.366053	-\$148.64	-\$39.76	-\$15.64
2033	7.366053	-\$150.21	-\$40.37	-\$15.96
2034	7.366053	-\$151.77	-\$40.99	-\$16.29
2035	7.366053	-\$153.34	-\$41.60	-\$16.61
2036	7.366053	-\$154.79	-\$42.20	-\$16.93
2037	7.366053	-\$156.24	-\$42.80	-\$17.26
2038	7.366053	-\$157.69	-\$43.40	-\$17.58
2039	7.366053	-\$159.15	-\$44.00	-\$17.91
2040	7.366053	-\$160.60	-\$44.60	-\$18.23

2041	7.366053	-\$162.09	-\$45.22	-\$18.58
2042	7.366053	-\$163.57	-\$45.84	-\$18.93
2043	7.366053	-\$165.06	-\$46.47	-\$19.27
2044	7.366053	-\$166.55	-\$47.09	-\$19.62
2045	7.366053	-\$168.04	-\$47.71	-\$19.97
2046	7.366053	-\$169.54	-\$48.35	-\$20.33
2047	7.366053	-\$171.04	-\$48.99	-\$20.69
2048	7.366053	-\$172.53	-\$49.63	-\$21.05
2049	7.366053	-\$174.03	-\$50.27	-\$21.41
2050	7.366053	-\$175.53	-\$50.91	-\$21.77

It is important to note that the damages estimated in Table 1 do not include the damages from other fluorinated GHGs or damages that will continue to accrue from past SF₆ and other fluorinated GHG emissions. This also does not include the damage from other fluorinated gases that may be directly or indirectly reduced by this rule. Finally, as discussed in the Value of Carbon guidance, SF₆ and some other fluorinated GHGs persist in the atmosphere longer than the period covered by the models, i.e., 1,000 years rather than 300 years. This means that the estimate of cumulative damages is an underestimate.

5. Paperwork

This rule imposes minimal additional paperwork on regulated entities, but it is not expected to be unduly burdensome as the majority of records are already subject to federal requirements. Stakeholders demonstrated in outreach meetings that much of this information is tracked and readily available.

6. Local Government Mandates

This rulemaking does not create any mandates for local governments as compared to other entities. Municipally owned electric utilities are not affected by reporting requirements of the regulation as their emissions are below the threshold of 7,500 MTCO_{2e} due to their relatively small SF₆ capacity.

7. Duplication

This rule does not conflict with any other existing federal or State regulations or statutes. This action is designed to align with federal policy, other non-overlapping State regulations, and to ensure consistency with a global phasedown of the regulated substances as much as practicable.

8. Alternatives

While a no action alternative was evaluated, the Department considers the no action alternative infeasible because of the requirements of the Climate Act including the mandate to reduce statewide GHG emissions to 85% below 1990 levels, the goal to achieve net zero emissions, and the direction to promulgate regulations that reflect the recommendations of the Climate Action Council's Scoping Plan. In view of these ambitious and time-sensitive mandates, other alternatives such as to delay this rulemaking or the prohibitions therein are also not feasible given the measured and lengthy phase-out period already included in this rule. The Climate Act requirements and Scoping Plan recommendations were discussed with stakeholders and certain model regulations in the federal and California code of regulations were also provided as an alternative version of this regulation (see Stakeholder Outreach, above). The Department then considered stakeholder feedback in developing this regulation. This resulting rule includes, for example, an extension of SF₆ GIE phase-out dates and it does not require utilities to notify the Department of emergency events, per stakeholder feedback on California regulations.

9. Federal Standards

This rule adopts federal minimum standards where applicable such as by adopting either the exact same standards as EPA, standards that are in line with the federal law, or standards in line with other US Climate

Alliance states. Additionally, information to be collected are designed to align with records that are maintained per EPA regulations and voluntary programs.

10. Compliance Schedule

Notwithstanding the following compliance schedule, pursuant to ECL Article 19, Part 495 will be effective 30 days after filing the Notice of Adoption with the Department of State. This regulation adopts a compliance schedule under Subpart 495-1 for owners of GIE containing GHGs to maintain an annualized inventory of equipment and insulating gas starting in 2027, for owners with annual GHG emissions above 7,500 MTCO_{2e} to report on this inventory starting one year later, and then for the phase-down in the availability of SF₆ GIE based on certain characteristics through 2033. Furthermore, starting in 2030, GIE owners must maintain total GIE GHG emissions below an emissions limit that will be determined by the owner's baseline capacity. Under Subpart 495-2, the State restricts the use of SF₆ to certain essential uses and establishes a registration requirement on suppliers (manufacturers, producers, and distributors) of fluorinated greenhouse gases, both starting the effective date of the Part. In 2026, these suppliers will begin reporting annually on total volumes supplied to the State.