

Regulatory Impact Statement

6 NYCRR Part 494, Hydrofluorocarbon Standards and Reporting

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The New York State Department of Environmental Conservation (DEC or the Department) is amending Title 6 of the New York Codes, Rules, and Regulations (NYCRR) Part 494, “Hydrofluorocarbon Standards and Reporting” (Part 494). These amendments will further reduce hydrofluorocarbon (HFC) 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 greenhouse (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 Leadership and Community Protection Act of 2019 (Climate Act) to achieve the statewide GHG emission limits outlined in ECL Section 75-0107 and 6 NYCRR Part 496. The Climate Act (ECL Section 75-0109) 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). As discussed in more detail in the Legislative Objectives

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

below, the amendments to Part 494 substantially reflect 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 impact on the environment. This rulemaking regulates HFC emissions and ozone-depleting substances (ODS), which minimizes the adverse impact on the environment from HFC emissions and ODS, thereby protecting the State's natural resources and environment.

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 HFC and ODS emissions 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 HFCs.

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 HFC and ODS emissions in the State, while also balancing interests through the establishment of specific exemptions and variances.

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 HFCs and ODS 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." HFC is an "air contaminant" that causes "air pollution" as defined in the ECL because it is a gas that is 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. ODS is an "air contaminant" that causes "air pollution" as defined in the ECL because it is a gas that is present in the outdoor atmosphere that damages the ozone layer and provokes 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 regulation because it furthers preventing and control of air pollution in the form of HFC emissions and associated atmospheric concentrations of GHGs as well as ODS emissions.

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 U.S. Environmental Protection Agency (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 HFCs 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 494 would meet criteria in ECL Section 19-0303(4), if it was applicable to this rulemaking. Further, the cost-effectiveness of the revisions and whether reasonably available alternatives exist is discussed in the RIS. The RIS thoroughly discusses the public health and environmental protection benefits of the revisions.

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). HFCs are explicitly listed as a GHG and thus part of statewide GHG 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 on HFC sources.

ECL Section 75-0107. This section outlines the statewide GHG emission limits and specifically requires a 40 percent reduction in statewide GHG emissions from 1990 levels by 2030, and an 85 percent reduction from 1990 levels from 2050. Today, HFCs comprise 5.6% of statewide GHG emissions regardless of accounting system.² *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 HFCs, to ensure compliance with the Statewide GHG emission limits. The amendments and this rulemaking are consistent with the Climate Act because they will reduce GHG emissions from HFC sources, 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.

² The Climate Act accounting system as promulgated in 6 NYCRR Part 496 differs from the United Nations system in that it 1) uses a 20-year GWP, 2) includes certain out-of-state emissions, and 3) refers to gross rather than net emissions. See Table ES.2 2019 New York State GHG Emissions, by IPCC Sector. DEC (2022) Summary Report. New York State 2022 Statewide GHG Emissions Report.

“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 HFCs, are necessary to mitigate the ongoing impacts of climate change on New York State. *Id.*

There are two additional characteristics of HFCs that affect the implementation of the Climate Act and legislative intent. As discussed, HFCs comprise 5.6% of statewide GHG emissions regardless of accounting system. The Climate Act requires that GHGs be assessed “over an integrated twenty-year time frame after emission,” which can be accomplished by using a 20-year GWP from the Intergovernmental Panel on Climate Change (IPCC). The IPCC provides a selection of metrics to enable policymakers to compare the potential impacts of multiple GHGs, and as it recently stated, “it is a matter for policymakers to decide which emissions metric is most applicable to their needs.”³ Most HFCs have a much higher GWP value using the 20-year metric because they are shorter-lived than other GHGs. When applying the 20-year GWP, HFC emissions in 2019 were 20.89 million metric tons (mmt) carbon dioxide equivalents (CO₂e), or 5.6% of the 376.18mmt gross

³ Page 101. IPCC, 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 [Masson-Delmotte, 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.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 2391 pp.

GHG emissions in that year as covered by the statewide GHG emission limits.⁴ If using the United Nations accounting system, HFC emissions in 2019 emissions were 9.32mmt CO₂e or 5.6% of total 165.03 net emissions.

Another key characteristic of HFC emissions is that they have an outsized impact on the Climate Act's statewide GHG emission limits. The statewide GHG emission limits are based on a 1990 baseline, but HFCs were not in widespread use in 1990 and emissions were minimal. As a result, the State must reduce other GHGs more than the prescribed 40% or 85% to make up for the growth in HFC use and emissions. Without this regulation, HFCs could represent 9.4% and 41.9% of the 2030 and 2050 Climate Act emission limits, respectively (Regulatory Emissions Analysis, below). Reducing HFC emissions and eliminating HFC sources is imperative to meeting the statewide GHG emission limits required by the Climate Act.

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.⁵ The Department is specifically directed to promulgate regulations that, "reflect, in substantial part, the findings" of the Scoping Plan.⁶

Recommendations regarding HFC emissions were identified in two sectoral chapters of the Scoping Plan. The Buildings chapter (Chapter 12) reflected on the ongoing use of HFCs as refrigerants in use in residential and commercial spaces, particularly as a component of building decarbonization or electrification.

⁴ 6 NYCRR Part 496.

⁵ ECL § 75-0103(11).

⁶ ECL § 75-0109(2)(c).

The Waste chapter (Chapter 16) addressed HFC emissions associated with the disposal of substances and equipment at end of life. A primary objective of this regulation is to implement a specific recommendation related to Part 494. The Scoping Plan Strategy B12, “Advance a Managed and Just Transition from Reliance on Hydrofluorocarbon Use,” recommends that the Department “[e]xpand the scope of 6 NYCRR Part 494, which prohibits certain HFCs in refrigerator/freezers, chillers, commercial refrigeration, and aerosols/foams/solvents end uses, including through the establishment of a GWP threshold that decreases over time as low and ultra-low GWP options become available and addressing leakage in existing equipment during the transition. DEC should align New York policy with anticipated federal (EPA) policy measures to meet HFC reduction requirements as well as with other U.S. Climate Alliance states, to send a strong market signal to manufacturers and industry while mitigating costs of the transition.”

The amendment to Part 494 also integrates other recommendations from the Scoping Plan Strategy B12 as well as Strategy W5 “Refrigerant Leak Reduction and Destruction” to the extent that they are relevant to this rulemaking. In some cases, other regulatory programs at the Department may be more appropriate for managing HFC emissions from waste management. As a summary, the Scoping Plan Strategies B12 and W5 include the following recommendations specifically related to the promulgation of regulations by the Department. In other words, the Climate Act directs the Department to promulgate regulations that substantially reflect these recommendations.

- Expand the scope of 6 NYCRR Part 494 (see above; Scoping Plan Strategy B12).
- [Ensure] proper disposal of HFCs already in use in existing equipment (Scoping Plan Strategy B12).
- Require reclamation or destruction of refrigerants from appliances at end-of-life, with verification and reporting, and require leak detection for certain commercial refrigeration equipment (Scoping Plan Strategy B12).

- Address leaks at end-of-life by requiring reclamation or destruction of refrigerants from appliances and institute requirements for verification and reporting (Scoping Plan Strategy W5).
- Ban the sale of virgin high GWP refrigerants for servicing with an exception for reclaimed refrigerants (Scoping Plan Strategy W5).
- Create a registry and reporting requirements (to track sales, stockpiles, and leaks) for large refrigeration and heating, ventilation, and air conditioning (HVAC) systems and refrigerant wholesalers and distributors (Scoping Plan Strategy W5).

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. The amendments are also consistent with the requirements of the Climate Act, will implement specific recommendations of the Scoping Plan, and they are 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 the Part 494 amendments is presented below. This includes a description of stakeholder outreach on the regulation to-date, recent State and federal actions on HFCs, a description of the key components of the regulation, and an analysis of expected HFC 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.⁷ Climate change adversely impacts New York State's

⁷ 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/>)

shoreline, drinking water sources, agriculture, forests, and wildlife diversity.⁸ 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 HFCs benefits New York's human health and environment generally.

Stakeholder Outreach

Pursuant to ECL Section 75-0109, the Department conducted pre-proposal stakeholder outreach on the amendments to Part 494 in three periods, May-July 2022, February-April 2023, and September-October 2023 with additional consultations throughout 2022 and 2023. Notifications regarding requests for feedback or public meetings were distributed via the Environmental Notice Bulletin, key lists including Climate Action Council and Climate Justice Working Group, 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. In addition to the outreach conducted specifically for this regulation, there was extensive consultation on policy to reduce HFC emissions during the development of the Scoping Plan, including the 180-day public comment period on the draft Scoping Plan from January 1 to July 1, 2022.

The Department issued a notice regarding its intent to amend the Part 494 regulation on May 25, 2022, along with a Request for Feedback with a suggested 30-day comment period. On February 7, 2023, the Department issued a notice inviting additional feedback via pre-proposal webinars on February 8 and 10, 2023. This was followed by a webinar for manufacturers on February 27, 2023. On February 22, 2023, the Department also announced a pre-proposal webinar specifically for local governments, which was held on March 7, 2023. On

⁸ e.g., As described in the most recent New York State Climate Assessment (<https://nysclimateimpacts.org/>)

September 11, 2023, the Department issued a notice inviting additional feedback with a suggested 30-day comment period on topics specifically related to reporting. Between May 25, 2022 and October 17, 2023, the Department has also provided the following opportunities for information sharing and feedback:

- 6 public talks, including with professional societies such as NY chapters of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)
- 28 meetings with manufacturers, other regulated entities, and their trade groups
- 11 meetings with representatives from the retail food industry, which included 2 open office hours
- 15 meetings with non-governmental interest groups

As part of ongoing technical review of HFC alternatives, the Department also worked with the consultant, effecterra, to convene a panel of experts in 2023 to review natural refrigerant technology and safety standards, New York State and City building codes, the New York building sector, and international market and policy trends. The resulting synthesis report, “New York State Assessment of Natural Refrigerants,” supported the proposed regulation, provided additional information for stakeholders when reviewing the proposed regulation, as well as useful case studies and resources. The report can be requested by contacting the Office of Climate Change at climate.regs@dec.ny.gov or accessed via the internet.⁹

Recent State and Federal Action

In evaluating the needs and benefits of this regulation, the Department has also considered the impact of recent State, federal, and international policies on HFCs. The original Part 494 regulation was adopted in part to

⁹ https://drive.google.com/file/d/14udH0WJhMqdeez6sj_PeTkCIORGLdHXS/view or

https://www.linkedin.com/posts/effecterra_new-york-state-assessment-of-natural-refrigerants-activity-7112918498481225728-1IqD

(last visited October 31, 2023)

backstop HFC controls in the EPA Significant New Alternatives Program (SNAP) that had been partially vacated in 2017 and 2019.¹⁰ Since that time, other U.S. Climate Alliance states (USCA) and the EPA have begun developing additional HFC policies. To-date, over a dozen USCA members have adopted the Part 494 “SNAP” controls in law. California and Washington later expanded their SNAP regulations to cover more sources and adopt low GWP thresholds.¹¹¹². Washington, New Jersey¹³ and other states are also considering or have adopted aspects of California’s Refrigerant Management Program¹⁴ and Small Cans of Automotive Refrigerant regulation.¹⁵ As recommended by the Scoping Plan, the amendments to Part 494 consider all of these policies and, to the extent practicable, allow for consistency amongst USCA states.

EPA has undertaken multiple recent rulemakings to address HFCs as required under the 2020 American Innovation and Manufacturing Act (AIM Act).¹⁶ One of the legislative objectives of the AIM Act is to enable U.S. manufacturing to align with the international phase-down of HFC consumption¹⁷ under the Kigali

¹⁰SNAP Rules 20 and 21; *Mexichem Fluor, Inc. v. Env'tl. Prot. Agency*, 866 F.3d 451 (D.C. Cir. 2017); *Mexichem Fluor, Inc. v. Env'tl. Prot. Agency*, 760 Fed.Appx. 6 (Mem) (D.C. Cir. 2019).

¹¹ California Code of Regulations Title 17 Sections 95371 to 95379.

¹² Washington Administrative Code Title 173 Chapter 443.

¹³ New Jersey Administrative Code Title 7 Chapter 27E.

¹⁴ California Code of Regulations Title 17 §§ 95380 to 95398.

¹⁵ California Code of Regulations Title 17 §§ 95362 to 95369.

¹⁶ 42 USC § 7675.

¹⁷ Consumption is defined as the international trade (i.e., import) and production of substances. 42 USC § 7675(b)(3).

Amendment to the Montreal Protocol, which was ratified by the United States in 2022.¹⁸¹⁹ This is also a goal of Part 494 and consistent with the recommendations of the Scoping Plan. The Kigali Amendment established a timeline for the global phase down of HFCs over time, as was successfully achieved by the original Montreal Protocol phasedown of ODS such as chlorofluorocarbons and hydrochlorofluorocarbons.

The AIM Act directed EPA to undertake three policies. First, the Allocation Rule²⁰ implements the AIM Act and Kigali phasedown in the international supply of bulk substances, referred to as HFC “consumption”. Specifically, HFC consumption in the US must be reduced 85% by 2036 compared to a 2011-2013 baseline, with interim step-downs of 40% by 2024, 70% by 2029, and 80% by 2034.²¹ Importantly, the Kigali Amendment and EPA’s Allocation Rule do not regulate products that utilize HFC substances. As such, the AIM Act also provided EPA authority to regulate such products and directed EPA to consider petitions to prohibit the use of HFCs in new products.²² This resulted in the recently adopted Technology Transitions Rule²³ under subsection (i) of the AIM Act and regarding HFC leak repair and reclaim²⁴ per subsection (h) of the AIM Act. EPA has also continued to update the Significant New Alternatives Program and enable the use of new

¹⁸ For further background. Phasing Down HFCs: The AIM Act. U.S. Senate Committee on Environment and Public Works. Available at <https://www.epw.senate.gov/public/index.cfm/phasing-down-hfcs-the-aim-act> (last visited October 31, 2023).

¹⁹ <https://www.whitehouse.gov/briefing-room/statements-releases/2022/10/27/signed-instrument-of-ratification-of-the-kigali-amendment-to-the-montreal-protocol> (last visited October 31, 2023).

²⁰ 40 CFR Part 84 Subpart A.

²¹ 42 USC § 7675(e).

²² 42 USC § 7675(i).

²³ 40 CFR 84 Subpart B

²⁴ 40 CFR Subpart C

alternative refrigerants and substances aligned with the AIM Act phasedown.²⁵ This includes the approval of non-HFC substances below a 10 GWP threshold for various uses.

This regulation will align with federal actions taken to date and is designed to align with the phase-down of HFCs under the Kigali Amendment to the Montreal Protocol. Importantly, the analyses conducted to support the Scoping Plan found that the full suite of policies called for in the Scoping Plan would help reduce HFC consumption in New York in line with the AIM Act and Kigali Amendment. The Emissions Analysis and Costs sections below further highlight the importance of this regulation for achieving the Scoping Plan recommendations and Kigali Amendment. Additionally, this regulation will also encourage the reduction of emissions from other harmful substances. Specifically, the Department expects that the Global Warming Potential limits will also affect the emission of ODS that remain in use today. The refrigerant management provisions in this rule will also enable the Department to better estimate emissions of these substances.

Key Components of the Regulation

The needs and benefits of the Part 494 amendments are described in detail below, for each component of the regulation in the order that they appear in the Express Terms.

A. Prohibitions on New Products and Systems

The first major update to the Part 494 regulation is to backstop the prohibitions adopted in EPA's Technology Transitions rule. This regulation implements the same structure used by EPA. As with the EPA, Part 494 does not seek to regulate the sale of components used for the servicing of systems.

²⁵ e.g., SNAP Rules 25 (40 CFR 82 Subpart G Appendix X) and 26 (EPA-HQ-OAR-2023-0043-0001)

As the goals and requirements of the AIM Act differs from that of the Climate Act, DEC’s regulation deviates from the EPA rules in certain instances. Firstly, although EPA’s prohibitions are incorporated by reference where possible, any New York State reference to GWP will use a 20-year GWP metric as required under the Climate Act. Table 1 below provides GWP values for example refrigerants referenced by EPA in the Technology Transitions docket.²⁶ The GWP100 values are those cited by EPA and originate from the 2007 IPCC Fourth Assessment Report²⁷ (AR4) as cited in the AIM Act. The GWP20 values are calculated from the 2021 IPCC Assessment Report²⁸ (AR6) using blend composition gathered from public information.²⁹ The GWP20 values and thresholds in the Express Terms of this regulation reflect the GWP20 of the substances that would be compliant with EPA’s GWP Limits. For example, R-32 would be compliant with EPA’s 700 GWP Limit for air conditioning subsectors because it has a GWP100 value of 675. The comparable GWP20 limit for

²⁶ EPA-HQ-OAR-2021-0643-0066 Attachment 9. EPA (2022) “American Innovation and Manufacturing Act of 2020 – Subsection (i)(4) Factors for Determination: List of Substitutes. Draft Technical Support Document”

²⁷ Table 2.14. from Forster, P., V. Ramaswamy, P. Artaxo, T. Berntsen, R. Betts, D.W. Fahey, J. Haywood, J. Lean, D.C. Lowe, G. Myhre, J. Nganga, R. Prinn, G. Raga, M. Schulz and R. Van Dorland, 2007: Changes in Atmospheric Constituents and in Radiative Forcing. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

²⁸ Table 7.SM.6 from Smith, C., Z.R.J. Nicholls, K. Armour, W. Collins, P. Forster, M. Meinshausen, M.D. Palmer, and M. Watanabe, 2021: The Earth’s Energy Budget, Climate Feedbacks, and Climate Sensitivity Supplementary Material. In Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Masson-Delmotte, 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.)]

²⁹ See e.g., ASHRAE Refrigerant Designations, available at <https://www.ashrae.org/technical-resources/standards-and-guidelines/ashrae-refrigerant-designations> (last visited October 31, 2023).

R-32 used in this regulation would be 2690. Therefore, R-32 would be compliant with both an EPA GWP Limit of 700 and the GWP limit of 2690 used in this regulation.

Table 1. Global Warming Potential of example substances

Time Interval (years)	R-410A	R-134A	R-32	R-454B	R-513A	R-454A	R-152a	R-454C	HFE-569sf2	R-744	R-290	R-600
100	2088	1430	675	465	630	237	124	146	59	1	3	4
20	4715	4140	2690	1854	1823	943	591	580	219	1	0.072	0.022

The other differences between this rule and the EPA Technology Transitions rule relate to the GWP limit on specific types of products and systems. In the instances where the EPA adopted prohibitions on specific substances rather than a GWP Limit, the Department adopts the same prohibitions. For subsectors where EPA has not yet proposed a prohibition or the prohibitions are not aligned with the Scoping Plan and Climate Act, the Department adopts prohibitions that align with other state-level regulations. One objective of this rule is to alleviate confusion and uncertainty as to whether sectors that have not yet been subject to regulation by EPA are subject to the same global phasedown in HFC consumption and GHG emissions that underlie this regulation. Finally, where EPA’s final Technology Transition rule deviated from the standard in other US Climate Alliance states, DEC aligns with the USCA standard, including a size threshold of 50 rather than 200lbs and an allowance for retrofitting equipment until 2029.³⁰

³⁰ Washington State SNAP rule, op. cit.

The Department seeks to align with the Technology Transitions regulations regarding the types of equipment included in specific subsectors and subject to specific prohibition dates. For example, EPA created a new subsector for equipment used in “data centers” and this has been added to this rule. However, EPA extended the prohibition date for data centers beyond that established for similar subsectors that use the same equipment.

Another update to the EPA Technology Transition prohibitions is to address refrigeration equipment used in new facilities, which includes new construction as well as modifications of the intended use of a facility, to use the lowest GWP threshold available. The concept that new refrigeration facilities are able to comply with a prohibition on new equipment with greater than 50 pounds of refrigerant that can meet a GWP10 threshold was introduced in the Request for Feedback issued in 2022 (*see Stakeholder Outreach*) and is consistent with current technology options.

The primary addition to the EPA Technology Transition prohibitions is to establish the final prohibition date for products and systems, or a 10 or 20 GWP Limit in 2030 or 2034. As the Emissions Analysis below indicates, this is the most impactful component of the Part 494 amendment, and it is critically important to ensure that New York State achieves the statewide GHG emission limits mandated by the Climate Act. The prohibition date reflects the availability of 10 GWP options today, the Kigali Amendment phase-down timeline as adopted by the EPA Allocation Rule, pre-proposal stakeholder feedback on the availability of 10 GWP options in the future, the New York State Energy Research and Development Authority (NYSERDA) HFC Report³¹ and Integration Analysis for the Scoping Plan, and the Department’s natural refrigerant synthesis described above (*see Stakeholder Outreach*). Substances below a 10 GWP threshold are already available for

³¹ New York State Energy Research and Development Authority (NYSERDA). 2021. “Hydrofluorocarbon Emissions Inventory and Mitigation Potential in New York State,” NYSEDA Report Number 21-28. Prepared by Guidehouse, Inc.

use in all sectors but not in all equipment types within those categories. For example, EPA recently approved certain ultra-low GWP substances for use in all chillers, but they may not be appropriate for all types of chillers on the market today.³² In cases where a 10 GWP option is not yet available but the transition to 10 GWP is necessary to achieve the statewide GHG emission limits, the Department adopts a later phase-down. Finally, the exemptions included in the original Part 494 have been retained and expanded to include the exemptions also adopted in California and EPA, such as for very low temperature refrigeration applications.

B. Prohibitions on Bulk Substances and Containers

A new subdivision has been added to the prohibitions in Part 494 to address regulated substances in containers. The Department's 2022 Request for Feedback for this regulation included questions regarding the Scoping Plan recommendation to "ban the sale of virgin high GWP refrigerants". Since that time, the State of California passed legislation codifying GWP100 limits of 2200, 1500, and 750 on bulk substances, and these limits are incorporated by reference in this rule.³³ The Department is also adopting a prohibition for 2040 for bulk substances equivalent to a 500 GWP Limit. This timing considers the expected buildout of new HVAC equipment in the NYSERDA HFC Report³⁴, which aligns with the building electrification strategies outlined in the Scoping Plan. The NYSERDA HFC Report forecast significant growth in HFC emissions in the mid-2030's that was mitigated by policies to maximize the adoption of ultra-low GWP options before 2040.³⁵

³² EPA Rule 25, *op. cit.*

³³ California Health and Safety Code § 39735 and 39736

³⁴ *op. cit.*

³⁵ Comparing Reference Case 5 with Scenarios 6C through 8B

The Department’s 2022 Request for Feedback for this regulation also included the subject of “DIY cans” or canisters of automotive refrigerant. These canisters are the only form of refrigerant that the EPA allows for consumer sale, or for use by individuals that are not certified in the handling of ozone-depleting substances. This regulation would align with recent updates to regulations in California.³⁶ The California Air Resources Board amended their regulations in 2024 replacing a deposit program that has had limited success with a program to phase out the sale of virgin refrigerant.³⁷ Under the prohibition, manufacturers will increase the composition of certified reclaimed refrigerant in the containers from 10% in 2024 to 100% in 2027. The final 2027 stepdown has been adopted in this rule and regulated entities may phase this in as needed.

C. Data Collection from Manufacturers, Distributors, and Reclaimers

The administrative and record-keeping requirements of Part 494 have been revised and otherwise amended to ensure enforceability of the regulation, to align with related federal requirements, and support data collection under the Climate Act. Specifically, EPA is now using AIM Act regulations to partially replace the long-standing requirements for suppliers of HFCs and HFC-containing equipment in the Mandatory Greenhouse Gas Reporting rule (GHGRP; 40 CFR Part 98 Subparts OO and QQ).³⁸ Similarly, Part 494 and the

³⁶ California Code of Regulations Title 17 § 95362-95369

³⁷ California Air Resources Board. September 9, 2022 Second Public Workshop to Discuss Proposed Amendments to Small Containers of Automotive Refrigerant Regulation. <https://ww2.arb.ca.gov/our-work/programs/small-containers-automotive-refrigerant/small-containers-automotive-refrigerant-1> (last visited October 31, 2023)

³⁸ Amendments to Part 98. Revisions and Confidentiality Determinations for Data Elements Under the Greenhouse Gas Reporting Rule. EPA-HQ-OAR-2019-0424.

complementary requirements in a separate rulemaking³⁹ are intended to address data needs related to HFCs and other fluorinated GHGs. These data collection requirements are supported and envisioned by the Scoping Plan, which recommends the Department implement mandatory GHG reporting (Strategy I5: Establish Greenhouse Gas Registry and Reporting System), and the Climate Act, including a mandatory registry and reporting system from individual sources to obtain data on greenhouse gas emissions pursuant to ECL Section 75-0105(4).

For manufacturers, the primary updates are to a) require initial registration and b) expand the documentation needed to go along with the sale of new equipment and foam products. The Department has found that both of these revisions will be necessary to ensure compliance with regulatory requirements. In particular, there are varied federal requirements regarding labeling that results in insufficient and inconsistent information on the use of regulated substances. The Department seeks to establish a consistent level of information accessibility for the public and Department officials. For example, residential equipment may have clear labeling of the refrigerant on the equipment itself, but this information cannot be easily located online, and it is not commonly included in technical documentation or specification sheets. For foam products, chemical information may be available in a specification sheet, but the sheet cannot always be easily located and necessary information may be omitted. For the largest individual sources of emissions, i.e., field-charged equipment, refrigerants and charge size data must be made available to owner/operators in order to monitor any changes from the manufacturer's intended specifications and to enable their compliance as part of the Refrigerant Management Plan. The Department sought feedback on how to enable manufacturers and owner/operators to coordinate on these requirements. Importantly, although EPA's recent Technology Transitions regulation includes similar labelling requirements, it does not always require that all relevant and

³⁹ 6 NYCRR Part 495 "Sulfur hexafluoride standards and reporting" New York State Register January 4, 2023 Vol XLV Issue 1

necessary information be disclosed. For example, information as to whether a refrigerant charge exceeds EPA's 200lb threshold is not sufficient for jurisdictions or other interested parties that seek information on the actual charge size. The DEC and EPA requirements are not in conflict, and both this regulation and the EPA regulation allow entities to utilize a label as required by other laws if that meets the requirements. For many products, the existing labels used today will be sufficient.

A new section has been added to establish registration and record-keeping for distributors, wholesalers, and reclaimers of regulated substances that may be used or collected from sources in New York State. These requirements are intended to inform the agency on the availability of reclaimed refrigerant, develop enforcement programs regarding the sale of bulk refrigerant, and to support the implementation of the Refrigerant Management Program (discussed below). These requirements are reasonable as they represent records that are already maintained under EPA GHG, ODS, and HFC programs and are directly reproduced from the existing Refrigerant Management Program in California that is also being adopted in other states.

D. Variance Process

This regulation establishes a formal variance process as employed in the relevant California regulations⁴⁰ and as adopted in other states. The variance process would allow compliance entities to apply for temporary relief from certain requirements of the regulation if, in the Department's discretion, such person cannot comply due to impossibility, force majeure, or economic hardship. Unlike California, the Department limits the scope of the variance process to the emission sources covered by this regulation, and as such mitigation proposals would be limited to the direct emissions of regulated substances. Furthermore, the

⁴⁰ 95378 and "approval of exemptions" in 95397

Department includes variances based on economic hardship, as this is included as a type of exemption to leak repair requirements in California’s Refrigerant Management regulation. This variance is also applicable to prohibitions on new equipment, but it is limited to small businesses or retail food operations in Disadvantaged Communities in order to help prevent the loss of critical resources in those communities.⁴¹ With respect to the impossibility variance, the analysis of the required information and factors, including that granting such a variance will not increase the overall risk to human health or the environment, will not be based on a "no action" alternative. In other words, it is not intended that an impossibility variance would be denied based solely on the GWP of a substance, so long as a compliant substance is not currently or potentially available or a component needed for repair is not currently or potentially available.

E. Refrigerant Management Program

The Scoping Plan recommendations include developing a “registry and reporting requirements” for large HFC sources. California’s successful Refrigerant Management Program (RMP) has been in place since 2009 and based in part on the long-standing EPA ODS program (Clean Air Act Section 608; 40 CFR 82 Subpart F). The California RMP includes registration, reporting, record-keeping, and leak repair or replacement requirements for all refrigeration equipment containing more than 50lbs of refrigerant, phased-in over time. The RMP also includes requirements for distributors, wholesalers, and reclaimers as well as service providers. Multiple US Climate Alliance states have considered adopting this program. In particular, the State of Washington’s RMP program will begin in 2024 per recent legislation and New Jersey’s “GHG Monitoring and

⁴¹ ECL § 75-0109(3)(c) ("Ensure that activities undertaken to comply with the regulations do not result in a net increase in co-pollutant emissions or otherwise disproportionately burden disadvantaged communities as identified pursuant to section 75-0111 of this article").

Reporting Rule” went into effect in 2022, which has many similar elements. Both of these state programs go beyond the California RMP for refrigeration to also include chillers. All of these programs address equipment with more than 50lbs of refrigerant, or the threshold used in EPA’s Section 608 program. EPA proposed a new regulation under subsection h of the AIM Act that would apply the Section 608 requirements for maintenance and leak repair to HFC-containing equipment. The key differences between the state and federal programs is that the states require reporting of information that EPA requires as a record and that the states require continuous monitoring for leakage rather than waiting for a significant or chronic leak to occur.

The Department is adopting the same provisions in the California and Washington programs⁴², with the following exceptions. First, the Department’s rule omits requirements adopted in other states regarding “required service practices”⁴³ as these reflect existing federal requirements and do not reflect the full scope of the recommendations regarding servicing and disposal in the Scoping Plan. Additional policies may be needed to address servicing and disposal that are beyond the scope of this regulation. Secondly, the Department will not be imposing fees on the regulated entities.

A third difference from the California model is that the RMP requirements should apply equally to all stationary equipment with more than 50lbs of refrigerant, including but not limited to chillers. To do this, the Department must clarify the requirements for “split” systems for which there is additional refrigerant piping with a potential high probability of leakage. Manufacturer specifications cannot be used to determine the refrigerant charge capacity of such equipment. Instead, the Department requires that the charge size for split systems include annual leak rate. The leak rate can be estimated using default values or measured using EPA’s

⁴² This includes sections of Subpart 1 and Subpart 2

⁴³ See e.g., California § 95390

standard 12-month rolling average method. The leak rate defaults reflect a) standard EPA rates⁴⁴ or b) a modified EPA rate that reflects the number of piping connections included in a split-system. For the latter, the Department applies a sliding scale between the standard EPA leak rate for a packaged system (2%) up to the EPA leak rate for a field-installed system (10%).

F. Supermarket Refrigerant Program

A final key component of the regulation is to establish a program to address the single largest sources of emissions, or field-installed equipment used in large supermarket chains. Based on the (NYSERDA) HFC Model and the DEC Statewide GHG Emissions Report,⁴⁵ this equipment represents a quarter of all HFC emissions in the state.

Although other components of the regulation also address these emission sources, there are two key reasons that they may not drive the level of emission reductions required by the Climate Act. First, the prohibitions in this regulation are modeled after the EPA SNAP and Technology Transitions policies and are focused on newly manufactured or installed equipment. Such policies are not intended to affect existing equipment and they do not require that such equipment be replaced. As such, these policies cannot control when the transition to low GWP refrigerants will occur. It is typically assumed that commercial refrigeration equipment will be replaced in under 15-20 years, but there is no requirement for equipment to be replaced within that time.

The second reason why additional policy is needed is that the probability of leakage and the amount of refrigerant lost each year from these systems is known to be high and can never be eliminated. Based on the

⁴⁴ i.e., the maximum allowable leak rate under 40 CFR 82.157(a)(c)(2)

⁴⁵ DEC (2022) NYS Statewide GHG Emissions Report

EPA GreenChill website,⁴⁶ the application of best management practices can result in an average leak rate in each supermarket of 13% per year compared to the US average of 25% per year. Other organizations refer to 10% leak rate as an optimal goal.⁴⁷ Supermarket systems can contain more than 5000 pounds of refrigerant; emitting even 10% per year for 15-20 years represents a significant amount of GHG emissions. Table 2 compares annual emissions from a supermarket system with 2000lbs of refrigerant with the low leak rate of 10%. If the most common HFC refrigerant, R-410a, was used this would result in GHG emissions every year comparable to the combustion of approximately 50 million gallons of gasoline or 2 million passenger vehicle miles, if using EPA’s GWP100.⁴⁸ When using GWP20, the impacts are close to 5 million passenger miles per year. By contrast, using a 150 GWP refrigerant would significantly lower emissions, if such a refrigerant were available. Finally, using the currently available natural refrigerant, R-744, with a GWP of 1 would all but eliminate emissions – even if all of the refrigerant was lost (100% leak rate).

Table 2 Comparison of Refrigerant Emissions, 2000 Pound Supermarket System

Leak Rate	Refrigerant	Passenger Miles Equivalent	
		GWP100	GWP20
10%	Standard (R-410a)	2,000,000	5,000,000
	150 GWP	150,000	600,000
100%	Natural (R-744)	1000	1000

⁴⁶ Figure 6. Average Emissions Rates for Industry and for GreenChill Partners. <https://www.epa.gov/greenchill/partnership-accomplishments> (last visited October 31, 2023)

⁴⁷ <https://www.climatefriendlysupermarkets.org/refrigerant-management> (last visited October 31, 2023).

⁴⁸ EPA Carbon Footprint Calculator, assuming 19.6lbsCO2/gal and 21.6mpg. <https://www3.epa.gov/carbon-footprint-calculator> (last visited October 31, 2023).

The Supermarket Refrigerant Program is intended to ensure that the transition to low GWP refrigerants in this sector takes place as modeled in the Scoping Plan as well as to encourage businesses to adopt the lowest GWP options available, while minimizing negative impacts to Disadvantaged Communities. Under this program, all supermarket chains that have supermarket systems with greater than 200lbs of refrigerant must manage such facilities by 2035 to meet the low GWP standard that is available on the market today. The regulation provides supermarket chains with several methods to comply with this section of the regulation, specifically supermarket chains can 1) utilize refrigerants in their supermarket systems that meet a 10 GWP limit, 2) reduce leakage from equipment to a comparable GHG emission rate⁴⁹, or 3) reduce leakage so that all refrigeration equipment in the facility achieves a comparable emission rate. Such emission rate is modeled off and consistent with EPA's Green Chill program. In other words, the supermarket chains can replace their supermarket systems or achieve the same result through other improvements to the facility. As a fourth option, the affected businesses have the option of submitting a Transition Plan ahead of the 2035 deadline that, if approved by the Department, could allow for a five-year extension for a portion of covered facilities including facilities that have been recently renovated or those located in Disadvantaged Communities. The intent of the Transition Plan option is to help ensure that supermarket chains are able to undertake long-term capital planning and to specifically plan for the replacement of equipment in lower-income or otherwise vulnerable communities.

⁴⁹ A 150 GWP refrigerant would need to leak less than 0.6% per year to have a comparable emission rate of a R-744 system leaking 100% per year. The rule sets a leak rate of 5% per year per facility, based on the Green Chill Platinum standard.

Regulatory Emissions Analysis

The Department has used the Integration Analysis as described in Chapter 9 of the Scoping Plan to assess the emission reductions called for by the relevant recommendations in the Scoping Plan. Further description of the modeling conducted to support that portion of the Integration Analysis is available in the “Hydrofluorocarbon Emissions Inventory and Mitigation Potential in New York State” report published by the NYSERDA HFC Report.⁵⁰ Note that although the modeling is referred to as an HFC model, it includes other regulated substances subject to the regulation and used in the same products and systems.

One common piece of feedback received during pre-proposal outreach on this regulation and the draft Scoping Plan was that the NYSERDA HFC Report was conducted prior to implementation of the AIM Act, specifically the EPA 2021 Allocation Rule⁵¹ and the petitions⁵² submitted to EPA regarding Technology Transitions. EPA also finalized the Technology Transitions regulation⁵³ in October 2023 in response to these petitions.

In response to the request from stakeholders, the Department has modified the model used in the NYSERDA HFC Report to assess the potential emission reductions from this rulemaking and the EPA actions taken prior to this rulemaking. First, a new reference case was added to represent the EPA Technology Transitions rule, using the following inputs. Two additional refrigerants were added to the model that would comply with EPA’s 150 GWP and 300 GWP Limits for commercial refrigeration equipment, R-454B and R-

⁵⁰ New York State Energy Research and Development Authority (NYSERDA). 2021. “Hydrofluorocarbon Emissions Inventory and Mitigation Potential in New York State,” NYSERDA Report Number 21-28. Prepared by Guidehouse, Inc.

⁵¹ EPA-HQ-OAR-2021-0044

⁵² EPA-HQ-OAR-2021-0289

⁵³ EPA-HQ-OAR-2021-0643

454C.⁵⁴ Although these refrigerants are not available on the market today, EPA’s regulation would allow these to be used in addition to the ultra-low GWP alternatives that are available today (i.e., GWP10 or less) and so both options are included in the Technology Transitions scenario modeled here. EPA’s 700 GWP Limit for air conditioning end-uses would allow for the use of available substitutes such as R-32, R-454B, and R-513A and as such the reference case assumes that these will replace R-410a and R-134a in new equipment based on the EPA timeline. However, it is not assumed that ultra-low alternatives are available in HVAC sectors with the exception of centrifugal chillers, for which R-1234yf or R-1234ze have also been approved. The Technology Transitions scenario does not include an analysis of the interim update from December 2023,⁵⁵ a narrow exemption for residential and light commercial air conditioning and heat pump systems using components made prior to 2025 that is also adopted in this rule.

As a second step, the Department also modeled a new scenario to assess the additional emission reductions that may be achieved through the Part 494 amendments. The majority of new equipment is expected to be able to transition to a non-HFC alternative in line with the Kigali Amendment timeline, specifically the 2034-2036 reduction in HFC consumption to less than 80-85%. This timeline also reflects the 10 GWP limit timeline in the Department’s 2022 Request for Feedback and subsequent stakeholder outreach. For the Part 494 scenario, new equipment sales were modeled to transition fully to a relevant ultra-low GWP option following the prohibition dates in Subpart 494-1 of the Express Terms. This scenario also assumes that leak rates are reduced for all end-uses subject to the Refrigerant Management Program outlined in Subpart 494-2. The model leak rates for years prior to 2025 are the same values provided for public input in the 2022 Request for

⁵⁴ EPA indicated that R-454B and R-454C would be compliant and so these are used. EPA (2022) American Innovation and Manufacturing Act of 2020 – Subsection (i)(4) Factors for Determination: List of Substitutes. Draft Technical Support Document

⁵⁵ EPA-HQ-OAR-2021-0643

Feedback. For 2025-2050, the leak rates were reduced to a new potential leak rate unless the previous leak rate was already lower. The potential leak rates for the air conditioning subsectors follow the EPA’s emission thresholds for appliance maintenance and leak repair⁵⁶ or 2% for packaged and 10% for field-charged equipment. In some cases, the potential leak rates applied here are higher or lower than the “target leak rates” referred to in the Request for Feedback and that were used in the Integration Analysis for the Scoping Plan. However, the Department has not received feedback on the target leak rates and so applied the widely used EPA values.

As expected, EPA’s Technology Transitions Rule will significantly reduce emissions if it is implemented to meet the assumptions above (Table 3). However, it does not achieve all the reductions modeled in the Scoping Plan, address all Scoping Plan recommendations, or demonstrate that the State will achieve the 2030 and 2050 statewide GHG emission limits or net zero goal. If the State relies solely on the EPA Technology Transitions regulation, the proportion of HFCs in statewide GHG emissions will increase from 5.6% today to 15.8% of the emission budget in 2050. The Part 494 amendment will reduce annual HFC emissions another 8mmt CO₂e so that HFCs are less than 3% of the 2050 emission budget.

⁵⁶ 40 CRF 82.157

Table 3. Projected HFC Emissions and Statewide Emission Limit (mmtCO₂e GWP20)⁵⁷

Reference Case or Scenario	2030	% 2030 Limit	2050	% 2050 Limit
Original Part 494 regulation ⁵⁸	23.13	9.4%	25.78	41.9%
Final EPA Technology Transitions Rule	21.20	8.6%	9.71	15.8%
Part 494 Amendments	20.24	8.2%	1.67	2.7%
Scoping Plan Integration Analysis ⁵⁹	13.70	5.6%	1.21	2.0%

This assessment of HFC emissions supports the need for state policy in addition to the EPA Technology Transitions rule. The Part 494 additional prohibitions on new air-conditioning and refrigeration equipment by 2034 will particularly help ensure that the State achieves the 2050 limit. The Refrigerant Management Program requirements are expected to further reduce emissions starting in 2024 and through the expected life of the affected equipment until it is replaced starting in 2030 and 2034. Table 4 below provides the maximum avoided emissions expected from Part 494 by comparing the amended to the original Part 494 regulation. Further details on the value of these avoided emissions are described in the Cost section.

Table 4. Estimated Maximum Avoided Emissions, Including Refrigerant Management (mmtCO₂e GWP20)

2025	2030	2035	2040	2045	2050	Cumulative
0.99	2.92	6.25	13.31	18.90	24.23	284.07

⁵⁷ Estimated per 6 NYCRR Part 496

⁵⁸ Reference Case 5 in the NYSERDA HFC Report was modified to remove estimated leak rate reductions as these are not a requirement of 6 NYCRR Part 494

⁵⁹ Scenario 8B, NYSERDA HFC Report

This analysis does not cover all of the components of this rule that are expected to reduce emissions, such as the GWP limit on bulk substances, the 10 GWP limit on new refrigeration facilities, or the Supermarket Refrigerant Program. No assumptions were made regarding end-of-life loss rates or reclamation rates as these are not directly impacted by the EPA Technology Transitions regulation and there is insufficient information on the potential impact of state policies. The Department expects that the regulation will increase the demand for reclaimed refrigerant, which could lead to voluntary actions to improve refrigerant recovery and further reduce leaks. The Department seeks data or other documentation that may inform such an assessment as well as on any potential variation among subsectors or refrigerants, such as the leak rate of flammable refrigerants (ASHRAE A2, A2L, or A3). Importantly, the registration, reporting, and record-keeping requirements are expected to help improve the Department's assessment of GHG emissions and enable further analysis of all of the components of the Part 494 and the recommendations in the Scoping Plan. Finally, there are additional benefits of the regulation on other regulated substances outlined in the Cost section.

4. Costs

This regulation imposes limited additional costs to those that would be incurred from complying with federal requirements and the terms of the rule reflect statutory requirements under the Climate Act. There are no direct costs to consumers or additional costs beyond the federal requirements. Generally, any cost associated with implementing the AIM Act is incurred nationwide, particularly the direct costs of specific EPA regulations under the AIM Act. This would include compliance costs under EPA's regulations implementing the AIM Act. Future updates to AIM Act rules are also costs established at the federal rather than State level. The assessment of costs and benefits below considers both the general impact of the AIM Act and specific differences between this regulation and current EPA regulations. Importantly, unlike this regulation, the AIM Act does not itself

regulate all HFC emissions or guarantee that emissions will be reduced as required by the Climate Act. The Department provides information on the societal benefits of the regulation in terms of the expected change in annual HFC emissions in New York compared to the original Part 494 regulation. This assessment aligns with the analyses conducted for the Scoping Plan. There are no additional costs anticipated to the Department for implementing this regulation.

The EPA has conducted analyses of the costs and benefits as part of each AIM Act rulemaking, but the assessment of the full HFC phasedown under the AIM Act is most applicable to this regulation. As EPA noted in the Technology Transitions rulemaking, “[b]ecause the phasedown in HFC consumption and production has already been codified under the Allocation Framework Rule...associated costs (or cost savings) estimated for this rule are not considered additional.”⁶⁰ To estimate potential costs and benefits, the Department refers to the most recent analyses conducted by the EPA in support of the Allocation Rule⁶¹ as these analyses considered the full HFC phasedown. EPA concluded that the full HFC phasedown will have a net benefit of \$265.8 or 269.9 billion, when applying a 3 or 7% discount rate. This includes a net present value of costs at -\$9 billion (3%) or -\$4.8 billion (7%), with the negative values representing overall savings, and a climate benefit of \$260.9 billion. If the costs are allocated to New York State based on population size, this would result in \$288-540 million in savings. The majority of potential cost savings are incurred from the adoption of low GWP options in commercial and industrial sectors that also provide substantial energy cost reductions, particularly in cooler climates like that in New York State. For Part 494, the majority of costs are duplicative to those assessed by EPA as Part 494 a) is designed to align with the international Kigali Amendment phase-down and b) represent

⁶⁰ EPA-HQ-OAR-2021-0643

⁶¹ 2024 Allocation Rule RIA Addendum; EPA-HQ-OAR-2022-0430

refrigerant management practices that save money. A comparable assessment of climate benefits for New York State is below.

The Supermarket Refrigerant Program represents a potential source of additional costs in New York State. As with the EPA Technology Transitions regulation, the prohibitions in this rule primarily apply to newly manufactured or installed products or systems. There is no prohibition on the use of existing products or systems, with the exception of the Supermarket Refrigerant Program which, dependent on the compliance option chosen by supermarket chains, may require certain systems to be replaced, potentially before the end of its useful life. In most cases, the affected equipment will need to be replaced before the 2035-2040 timeline in this rule in line with the AIM Act phasedown. In the event that equipment is replaced early, the upfront costs are expected to be high. During pre-proposal outreach for this regulation, some stakeholders alleged capital costs exceeding \$1 million per store, in part due to the need to remodel the facility. A remodel may be required if the facility uses a supermarket system, with piping and cases located throughout the facility, and if that system a) cannot use a compliant refrigerant or b) if system leakage cannot be reduced to meet a comparable emission rate. However, EPA estimated an incremental cost of \$35,000 per store⁶² to transition to a 10 GWP refrigerant, when considering cumulative energy and other savings. The potential cost savings are much greater though as EPA's calculation does not consider the decreasing availability or increasing costs of HFC refrigerants under the Kigali Amendment phase-down. EPA also recently found that the price of commonly used HFCs has already increased 77%.⁶³ Any refrigerant that contains an HFC, including blends that meet the

⁶² “The incremental capital cost for CO2 transcritical systems is estimated to be \$35,000 for a large (60,000 sq. ft.) supermarket, but total annual savings per supermarket are about \$14,600, including refrigerant savings due to avoided HFC refrigerant leaks (approximately \$2,000) and energy savings due to increased efficiency (approximately \$12,600).” Pg 47 *ibid*

⁶³ Cited in EPA (2022) Analysis of the U.S. Hydrofluorocarbon Reclamation Market.

EPA’s 150 GWP Limit, will be affected by price impacts under the Kigali phasedown. Additionally, EPA is already anticipating the effects of HFC supply constraints and requires that supermarket systems be serviced by reclaimed refrigerant.⁶⁴ Ultimately, the actual cost per store or per supermarket chain will be highly variable and depend on many factors including refrigerant supply, technology options (including lower cost alternatives to supermarket systems), and their own capital planning through 2040.

In order to estimate full societal costs, EPA developed social cost metrics for each of the HFCs, and the Department has integrated EPA’s modeling into the NYS Value of Carbon guidance. The difference between the federal Social Cost of Carbon and the NYS Value of Carbon is that the State provides additional, lower discount rates. Table 5 below provides the Value of Carbon estimate for each year, 2025-2050. It is State policy that agencies report social costs at a 1, 2, and 3% discount rate. Based on the Department’s analysis, the rule has a present value of \$10.9-55.2 billion, with a value of \$21.9 billion at the central 2% discount rate. The annual benefits are provided in Table 5. As in the case of the EPA Allocation Rule, the Department has estimated emission reductions in reference to a current policy baseline. In this case, emission reductions are estimated relative to the original Part 494 regulation. Overall, in addition to the cost savings discussed herein, this regulation provides a benefit to New York State, and encourages early action to reduce GHG emissions.

Table 5. Annual Difference in Emissions (mt) Between Original and Amended Part 494 and Societal Benefit (NYS Value of Carbon, 2020 million dollars)⁶⁵

Year	HFC-125	HFC-134a	HFC-143a	HFC-32	1%	2%	3%
2025	-66.7	-37.5	-34.2	19.2	\$142.52	\$57.11	\$29.62

⁶⁴ Subsection h, op. cit.

⁶⁵ HFC-152a is included in the analysis but omitted from the table as annual emissions are estimated to be less than 0.01mt

2026	-100.1	-105.8	-20.7	36.7	\$185.68	\$76.77	\$40.88
2027	-155.5	-191.7	-11.6	58.7	\$269.90	\$113.79	\$61.55
2028	-212.7	-284.7	-2.4	81.2	\$361.59	\$154.55	\$84.49
2029	-271.6	-378.8	6.9	104.3	\$458.29	\$197.98	\$109.11
2030	-332.2	-476.1	16.0	93.2	\$567.94	\$247.74	\$137.58
2031	-390.6	-572.2	25.7	89.3	\$674.96	\$297.23	\$166.36
2032	-449.7	-670.2	35.4	84.5	\$786.70	\$349.47	\$196.97
2033	-510.4	-747.1	45.2	79.2	\$893.25	\$399.86	\$226.72
2034	-586.3	-854.1	56.1	-19.8	\$1,053.47	\$475.58	\$271.58
2035	-664.4	-980.3	66.2	-120.1	\$1,232.06	\$560.53	\$322.14
2036	-731.7	-1014.6	87.4	-235.3	\$1,339.84	\$615.02	\$355.93
2037	-834.7	-1134.9	80.6	-340.7	\$1,591.32	\$733.21	\$425.65
2038	-956.8	-1473.6	73.9	-442.0	\$1,986.17	\$919.99	\$536.48
2039	-1241.0	-1797.1	67.0	-532.1	\$2,599.96	\$1,207.12	\$704.93
2040	-1345.0	-2047.8	60.1	-642.3	\$2,949.94	\$1,377.06	\$807.60
2041	-1759.2	-2476.7	53.1	-662.6	\$3,808.05	\$1,782.27	\$1,047.19
2042	-1862.7	-2584.6	45.9	-772.9	\$4,098.84	\$1,928.21	\$1,137.77
2043	-1918.5	-2645.8	38.9	-903.7	\$4,306.87	\$2,036.92	\$1,207.25
2044	-1964.3	-2700.6	31.2	-1035.7	\$4,502.39	\$2,140.59	\$1,274.18
2045	-2003.7	-2726.1	22.5	-1226.0	\$4,692.27	\$2,242.58	\$1,340.67
2046	-2064.7	-2803.9	14.7	-1838.7	\$5,049.69	\$2,431.93	\$1,463.25
2047	-2120.9	-2859.0	0.8	-1951.3	\$5,281.04	\$2,556.48	\$1,544.18
2048	-2163.3	-2915.5	0.4	-2093.6	\$5,475.63	\$2,666.19	\$1,617.54
2049	-2213.9	-2974.2	0.1	-2642.8	\$5,793.36	\$2,840.95	\$1,733.37

2050	-2247.7	-3098.2	-0.3	-2699.3	\$6,000.40	\$2,958.64	\$1,812.41
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5. Paperwork

The rule will impose minimal additional paperwork on manufacturers, owners and operators of equipment, distributors and wholesalers, and reclaimers but it is not expected to be unduly burdensome as the majority of records are already subject to federal requirements. The additional requirement to provide information on the composition of regulated substances in products and systems is also not expected to be burdensome as sufficient flexibility is given to utilize existing formats, such as safety data sheets.

6. Local Government Mandates

This rulemaking will not create any mandates for local governments as compared to other entities.

7. Duplication

This regulation does not conflict with any other existing federal or State regulations or statutes. The action is designed to align with federal policy, other non-overlapping State regulations, and international treaties 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 Scoping Plan. Other alternatives such as to delay this rulemaking or the prohibitions therein are also not feasible given the statutory directives to promulgate regulations that achieve the statewide GHG emission limits. Another infeasible alternative may be to

promulgate a regulation that only adopts the prohibitions from EPA in the Technology Transitions Rule, and to not seek additional emission reductions. As demonstrated in the Regulatory Emissions Analysis, this would not achieve the Department’s requirements under the Climate Act, including the achievement of the statewide GHG emissions limits.

9. Federal Standards

This regulation will adopt federal minimum standards where applicable such as by adopting either the exact same standards as EPA, standards that are in line with the federal AIM Act, or standards in line with other US Climate Alliance states. Additionally, information to be collected as part of the Refrigerant Management provisions in Subpart 494- 2 of the rule are designed to align with records that are maintained per EPA regulations under 40 CFR Part 82.

The climate crisis and the Climate Act dictate that New York State must reduce HFC emissions to achieve necessary reductions of GHGs to achieve the required statewide GHG emission limits.

10. Compliance Schedule

Notwithstanding the following compliance schedule, pursuant to ECL Article 19, Part 494 will be effective 30 days after filing the Notice of Adoption with the Department of State. This regulation will adopt a compliance schedule that prohibits specific substances in certain new products and systems and given certain exemptions. The regulation also prohibits the sale of bulk regulated substances on a graduated timeline not listed here between 2025 and 2040

Effective date of this Part or January 2026: First step-down in GWP per EPA or US Climate Alliance state rules; New refrigeration facilities limited to GWP of 10

January 2027: Prohibition on virgin refrigerant in small containers of automotive refrigerant

January 2028: Use of 100% reclaim in new residential and light commercial air conditioning and heat pumps, stand-alone refrigeration equipment

January 2034: Final stepdown for air conditioning and refrigeration end-uses to a GWP of 10
This regulation will also adopt a compliance schedule for registrations, reporting, record-keeping, leak management, and planning

Effective date of this Part: Start of labeling requirements and leak detection and repair requirements

June 2025: Initial registration of suppliers, large commercial equipment, supermarket chains; Installation of automatic leak detection devices

March 2026: Start of annual reporting by suppliers and large commercial equipment

June 2026: Initial registration of medium-sized commercial equipment

March 31, 2027: Start of annual reporting by medium-sized commercial equipment

June 2028: Initial registration of small-sized commercial equipment

January 2035: Final phasedown of supermarket chains without an approved Transition Plan