Comments of the
Semiconductor Industry Association (SIA)
To the
Environmental Protection Agency (EPA)
On the
Notice of Proposed Rulemaking: "Phasedown of Hydrofluorocarbons: Review and Renewal of Eligibility for Application-Specific Allowances"
(89 FR 75898, September 16, 2024) [EPA–HQ–OAR–2024–0196]
October 31, 2024

The Semiconductor Industry Association (SIA)[1] appreciates the opportunity to submit the following comments to the Environmental Protection Agency (EPA) on the Notice of Proposed Rulemaking "Phasedown of Hydrofluorocarbons: Review and Renewal of Eligibility for Application-Specific Allowances" [89 Fed. Reg. 75898, September 16, 2024].

SIA previously provided comments on July 2, 2021 to the initial Notice of Proposed Rulemaking on the "Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act" and on December 19, 2022 on "Phasedown of Hydrofluorocarbons: Allowance Allocation Methodology for 2024 and Later Years." SIA appreciates EPA's continued efforts on this topic, and the semiconductor industry looks forward to ongoing engagement with EPA.

I. Decisions to renew or not renew each of the six applications that currently receive application-specific allowances (ASAs)

A. ASA framework

SIA appreciates and supports EPA's determination that the etching of semiconductor material or wafers and the cleaning of CVD chambers within semiconductor manufacturing application specific allowances are extended through 2030. The semiconductor industry continues to represent a fraction of overall U.S. HFC use. The semiconductor industry represents only 15.7% of total U.S. EPA 2025 Application Specific Allowances and less than 0.9% of the total U.S. HFC Consumption Allowances. Additionally, due to the typical use of HFCs within plasma processing equipment and the industry's implementation of greenhouse gas best practices, such as point-of-use abatement technologies, the semiconductor industry's use of HFCs does not represent its emission of HFCs.

The industry anticipates further growth (as documented in previous comments and included within the Appendix to these comments). This industry growth depends on the

[1] SIA has been the voice of the semiconductor industry for over 45 years, representing 99 percent of the U.S. semiconductor industry by revenue and nearly two-thirds of non-U.S. chip firms. Semiconductors are one of America's top export industries and a key driver of America's economic strength, national security, and global competitiveness. The semiconductor industry directly employs over 300,000 workers in the United States, and U.S. semiconductor company sales totaled $264 billion in 2023. Through this coalition, SIA seeks to strengthen leadership of semiconductor manufacturing, design, and research by working with Congress, the Administration, and key industry stakeholders around the world to encourage policies that fuel innovation, propel business, and drive international competition. Additional information is available at www.semiconductors.org.

continued use of HFCs because, as acknowledged by EPA, alternatives are not available.[2] As noted within Table 19 (Atmospheric, Flammability, and Human Health Characteristics of HFCs and Potential Substitutes in Semiconductor) within the Technical Support Document (TSD) to these proposed rule changes, some HFC alternatives may have technically infeasible safety and health concerns. Table 19 is included within the Appendix for reference. If HFC replacements become feasible in the future, upgrading hundreds of legacy processes – even after a replacement technology can be proven – would be economically infeasible due to process, equipment, and infrastructure constraints. This will result in a long-term need for HFCs by the semiconductor industry.

The ''American Innovation and Manufacturing Act of 2020'' requires the Administrator to "allocate the full quantity of allowances necessary, based on projected, current, and historical trends" for "the etching of semiconductor material or wafers and the cleaning of chemical vapor deposition chambers within the semiconductor manufacturing sector." The current mechanism established to allocate allowances, based on a three-year rolling historical average, will not enable the semiconductor industry to receive necessary allowances as required by the AIM Act, failing to take into account significant industry growth, increasing process complexity requiring greater materials intensity, and the natural cyclicality of the semiconductor industry which results in fluctuations in installed manufacturing capacity utilization.

- The U.S. semiconductor industry is projected to increase its manufacturing capacity by 203% by 2032, a tripling of capacity from 2022 levels and the greatest percent increase among major semiconductor manufacturing regions. By comparison, domestic chipmaking capacity increased a mere 11% from 2012 to 2022.[3] Since 2022, over 50 projects have been announced in the U.S. for new fabs, fab expansions, or fab modernizations, with expected investment totaling more than $400 billion.[4] Global chip sales are projected to exceed $1 trillion by 2030,[5] up from $527 billion in 2023.[6]

- New, expanded, and modernized fabrication capacity will generally result in an increase in manufacturing with higher process complexity (e.g., increasing number of mask layers, combination and amount of process recipes, advanced manufacturing techniques, etc.). For example, the U.S. global share of manufacturing capacity for logic chips <10nm is projected to increase to 28% by 2032, up from 0% in 2022.[7]

---

[2] From U.S. EPA Draft Review of Applications in the AIM Act Proposed Rule—Phasedown of Hydrofluorocarbons: Review and Renewal of Eligibility for Application-specific Allowances Technical Support Document (August 2024): "Based on information available to EPA at this time, EPA is proposing that a safe or technically achievable substitute will not be available during 2026 through 2030 for HFC use in the etching of semiconductor material or wafers and the cleaning of CVD chambers within the semiconductor manufacturing sector."

[3] SIA / Boston Consulting Group (SIA/BCG), "Emerging Resilience in the Semiconductor Supply Chain," May 2024. Available at: https://www.semiconductors.org/emerging-resilience-in-the-semiconductor-supply-chain/

[4] SIA, "The CHIPS Act Has Already Sparked $450 Billion in Private Investments for U.S. Semiconductor Production," updated August 2024. Available at: https://www.semiconductors.org/the-chips-act-has-already-sparked-200-billion-in-private-investments-for-u-s-semiconductor-production/

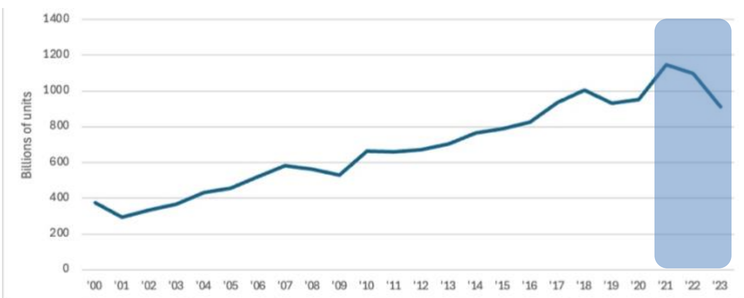
[5] McKinsey & Company, "The semiconductor decade: a trillion-dollar industry," April 2022. Available at: https://www.mckinsey.com/industries/semiconductors/our-insights/the-semiconductor-decade-a-trillion-dollar-industry

[6] SIA, "2024 State of the Industry," Sept. 2024. Available at: https://www.semiconductors.org/wp-content/uploads/2024/09/SIA_State-of-Industry-Report_2024_final_091124.pdf

[7] SIA/BCG, "Emerging Resilience."

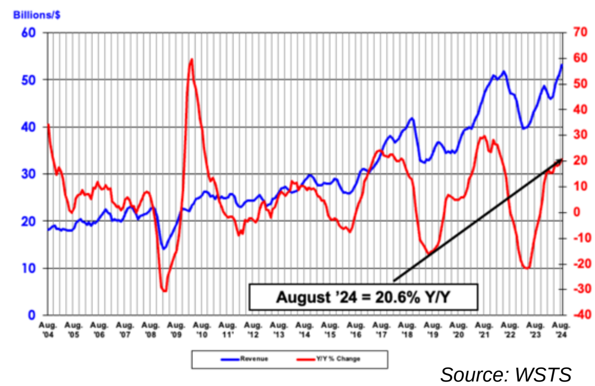
- The semiconductor sector is known for its cyclical nature. Between 1990 and 2023, the industry experienced seven downturns.[8] While the overall global industry growth trend is upwards as shown in Figure 1 and Figure 2 (blue line), downturns distort the results of the calculation formula and do not reflect projected rebounds and the aforementioned planned capacity growth. Most recently, the semiconductor downturn of 2022 and 2023 (as highlighted in blue in Figure 1) is expected to be erased this year, with the most recent data showing sales hit highest-ever recorded global numbers in August 2024, representing a 20.6% year-over-year increase (Figure 2).[9] Figure 2 (red line) also demonstrates the industry's cyclicality over the past 20 years.

Figure 1: Total Global Semiconductor Shipments, 2000-2023



Source: WSTS

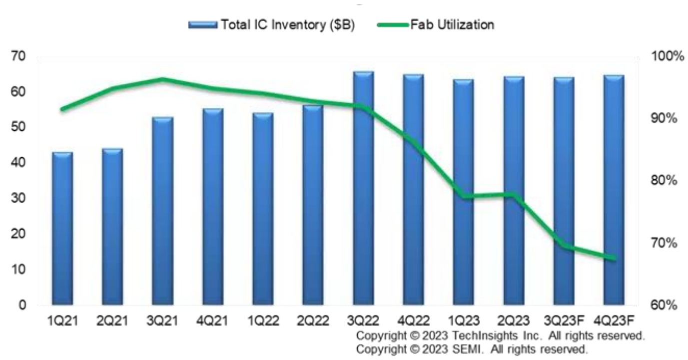
Figure 2: Worldwide Semiconductor Revenues Year-to-Year Percent Change



Source: WSTS

- Market cyclicality often results in fluctuations of installed manufacturing capacity utilization to adjust to given market demand. Fab utilization of at least 80% is typically considered the long-term model of "full" utilization. When market demand runs high, such as in a cyclical market upturn, fabs will typically run above 80%, with some fabs running as high as between 90-100%. As demonstrated in Figure 3, fab utilization in 2021 nearly reached 100%. Through the following downturn, however, fab utilization fell below 70% by the end of 2023.[10]

Figure 3: Total IC Inventory Versus Utilization



Source: SEMI/TechInsights

[8] Deloitte, "2024 semiconductor industry outlook: Trends and predictions for a cyclical industry," 2024. Available at: https://www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/semiconductor-industry-outlook.html
[9] SIA, "Global Semiconductor Sales Increase 20.6% Year-to-Year in August," Oct. 2024. Available at: https://www.semiconductors.org/global-semiconductor-sales-increase-20-6-year-to-year-in-august/
[10] SEMI, "Global Semiconductor Manufacturing Industry Set for Q4 2023 Recovery, SEMI Reports," Nov. 2023. Available at: https://www.semi.org/en/news-media-press-releases/semi-press-releases/global-semiconductor-manufacturing-industry-set-for-q4-2023-recovery-semi-reports

Accordingly, due to an overall down-cycle in the calculation period for the 2025 semiconductor ASAs (as highlighted in blue in Figure 1), the industry's ASAs decreased 20% overall from 2024, with some individual companies seeing reductions over 75%. Of the ten highest 2025 ASA-holding semiconductor companies, 7 companies saw decreases to their ASAs – 6 of which reduced by greater than 20%. One company had ASAs reduced to a level at which the company could only purchase a single gas cylinder with their ASAs.

The three-year ASA calculation formula does not support the expansion of domestic semiconductor manufacturing as Congress requires and does not consider increased HFC needs with increasing semiconductor device complexity, nor does it account for the cyclical nature of the industry that can result in fluctuations of installed manufacturing capacity utilization.

SIA continues to urge EPA to evaluate the potential for a semiconductor industry allowance framework that supports developments in device complexity, typical industry fluctuations, and overall industry capacity growth.

The semiconductor industry may meet criteria for two of the newly defined unique circumstances: economic disruption outside the immediate control of the entity applying for ASAs and building a stockpile of a specific HFC. Due to the cyclical nature of semiconductor manufacturing, such unique circumstances – as well as additional examples described in Section II.A of these comments – are likely. The future success of the semiconductor industry within the U.S. will require an ASA framework that considers company-specific ASA projections and allows for flexibility beyond those provided through current and proposed unique circumstances.

SIA requests a meeting with EPA to further discuss the industry's difficulties in securing sufficient ASAs for current manufacturing and projected growth and the need for an alternative semiconductor ASA framework.

B. HFC gas reclaim

EPA invited comment regarding why reclaimed HFC gases could not be used within semiconductor manufacturing. EPA correctly notes "HFCs purchased for use in semiconductor manufacturing is produced at around 95–97 percent purity and then typically is purified to 99.999–99.9999 percent purity before it is used by semiconductor manufacturers." SIA underscores the statements provided within the TSD to this proposed rule:

> "Neither the producers of HFCs nor the end users (i.e., semiconductor manufacturers) are capable of purifying HFCs to the necessary level. Supplying refined HFCs to end users can take up to one year, as purifiers require long lead times. There are few current domestic refiners that supply purified HFCs to semiconductor manufacturers (Electronic Fluorocarbons, 2021). The purification process also necessarily results in losses of HFCs. One refiner estimates that 1.06 kilograms of raw HFCs are required to produce 1.0 kilograms of semiconductor

grade HFC (Adams, 2021), which represents 5.7% in losses. Another HFC producer estimated HFC purification loss rates above 10% (EPA, 2021)."

In response to EPA's invitation for comment on this topic, SIA sought additional information and received the following feedback from a supplier:

"In examining the virgin supply chain, materials such as R-23 (CHF_3) typically begin with a lower purity level, around 95-97%. At this stage, R-23 contains a known set of impurities, each within a specific range. For instance, air content might range from 0.01% to 0.5%, while R-32 could be present from 0.2% to 1.0%, among other potential impurities. The purification and distillation processes are therefore calibrated to handle these predefined impurity levels. Through methods like adsorption, distillation, and neutralization to remove residual HF, these systems achieve a high throughput, purifying R-23 to a quality of 99.999% with stable metrology solutions for monitoring. In contrast, purifying R-23 from semiconductor fab recapture presents significant challenges:

<u>Recipe Variation</u>: A single fab might use R-23 in [many] different recipes. In many etching recipes, additional molecules such as CF_4 and C_4F_6 are introduced to adjust etching dynamics, causing the concentration of R-23 and other CF molecules to vary greatly from tool to tool.

<u>Material and Process Variability</u>: R-23 usage varies across tools and recipes due to differences in the materials and etch stop layers involved, leading to a diverse output of [various] fluorides in the chamber effluent.

<u>Dilution</u>: Etch recipes often include large amounts of argon to sustain plasma, and nitrogen is used in effluent lines to sweep impurities downstream, preventing line clogging. This results in [a very low concentration of R-23] in the effluent gas.

<u>Transportation</u>: Each fab would require compressors and preliminary purification systems to remove highly toxic substances before compression. Achieving cost-effectiveness would require compressing the diluted [R-23] to near the DOT's maximum filling pressure for transport, necessitating a substantial fleet of cylinders or vessels to move reclaimed material back to the primary purification site."

C. Achievable HFC substitutes

While SIA agrees with EPA's assessment that "…some HFC alternatives may have technically infeasible safety and health concerns", SIA additionally encourages EPA to consider gas use, gas utilization, and byproduct generation rates within its overall evaluation of HFC alternatives' technical feasibility. Within semiconductor manufacturing, gases have different utilization and byproduct emission factors when introduced into plasma etch or cleaning (*see* 40 CFR Part 98 Subpart I: Mandatory Greenhouse Gas Reporting: Electronics Manufacturing Tables I-3 through I-7).

II. Narrow revisions to the methodology used to allocate allowances to application-specific allowance holders for calendar years 2026 and beyond

A. Unique circumstances

SIA supports the addition of a unique circumstance for economic disruption as a means of securing allocation changes based on shifts in demand, and requests further clarity on the scope and required documentation to qualify for the use of this circumstance. It is important that the allowance of economic circumstances is sufficiently broad to support the critical needs of the semiconductor industry, which can include variable volume requirements.

As identified in Section I, the semiconductor industry is cyclical in nature resulting in volatile demand planning and fluctuations in installed manufacturing capacity utilization. Companies also typically manufacture a mix of products which can result in shifts over time. Based on these factors, a three-year historical consumption rate at an individual corporate basis and at an industry average are insufficient predictors of required allocations. Likewise, the existing provision for increased allocation based on additional capacity is insufficient to capture these concerns, as product mix, production recipes, and utilization rates of existing capacity may vary. There are several conditions that may result in significant shifts in HFC needs including but not limited to:

- Cyclical changes in semiconductor demand,
- Shifts in market share based on competitiveness of product mix,
- Changes in product mix which drive consumption changes (based on the number of layers, process recipes, etc.),
- Ramp of new technology nodes (each generation will have variation in the number of layers and process recipes and the volume demands will change as the nodes ramp up, run at peak output, taper off, and eventually reach end of life),
- Periods of capacity investment, including expanding regional infrastructure to support resilient U.S. supply chains incentivized by the CHIPS Act, as described in Section I.

Based on the above considerations, SIA requests that EPA provide increased flexibility into the process for securing demand allocations by allowing for more agility in the review process and a variety of forms of supporting evidence. As mentioned above, SIA requests a meeting with EPA to further discuss the industry's difficulties in securing sufficient ASAs for current manufacturing and projected growth and the need for an alternative semiconductor ASA framework.

B. Accounting for inventory in allocation decisions

Where drawdown and growth in inventory may have their place in calculating the amount of HFC's used, implementation of such provisions can have unintended consequences. For example, an entity may have been drawing down inventory in prior years and now needs to re-build inventory. The past drawdowns in inventory were not included as usage and were, therefore, not included when calculating the number of allowances to be given. This has resulted in awarding fewer allowances than would have been given if inventory drawdown was considered. To now reduce the usage calculations when the company grows inventory would further decrease allowances. SIA agrees with EPA that provisions to not incorporate growth in inventory for only a single year and to not include small amounts of growth in inventory (20% or less).

EPA should also consider clearly defining what is to be included when calculating the amount of HFCs in inventory. The current rule requires holders of application specific allowance to report the quantity (in kilograms) of inventory on the last day of the previous six-month period of each regulated substance or held under contract by another company for the reporting company's use [40 CFR part 84.31(h)(1)(iv)]. EPA has indicated during Q&A at webinars on submitting application-specific allowance holders biannual reports that the amount in inventory is preferred to be the amount in storage and was not intended to include the amount currently in-use in the manufacturing process (such as cylinders in gas cabinets connected to process tools). EPA further stated that if a company had previously included the amount of material in-use in the manufacturing process, they should continue to calculate inventories in the same manner. This results in inconsistent reporting such that EPA should consider adding a definition for Inventory that reflects the quantity (in kilograms) of inventory stored in containers, including heels, and does not include containers in service.

C. Small use and irregular HFC purchasing

For small users of HFC or users with irregular purchasing, EPA is proposing to allocate the highest verified purchase amount in the last three years. These provisions would apply if (1) the entity has small purchases of HFCs (< 100 kg) during at least one of the last three years - where their purchase history would result in a 200% or higher AAGR of use for the company over the past three years, or (2) the entity has a growth rate that cannot be calculated because it had zero purchases in one of the last three years for reasons other than newly using HFCs. SIA believes there are some semiconductor facilities that may fall within the small use or irregular purchasing definition; and while a provision for additional flexibility for such operations is helpful, they may still be insufficient for developments in device complexity and typical industry fluctuations. SIA requests that EPA consider a minimum application-specific allocation value (for example: 5,000 MTEVE) for any semiconductor ASA allowance holder.

\+ + +

SIA appreciates the opportunity to comment on this proposal, and we look forward to continuing to work with EPA on this rulemaking.

SEMICONDUCTOR INDUSTRY ASSOCIATION

APPENDIX

Technical Support Document, Table 19: Atmospheric, Flammability, and Human Health Characteristics of HFCs and Potential Substitutes in Semiconductor Manufacturing

Chemical	ODP[a]	100-year GWP[b]	Flammability[c]	Human Health[d]	Description of Use and Challenges
HFC Currently in Use					
HFC-23 (CHF_3)[e]	0	14,800	Nonflammable	• Asphyxiant • Short-term exposure may adversely impact cardiovascular system, potentially resulting in cardiac disorders	Used in etching of SiO_2 and SiNX. Used minimally in chamber cleaning.
HFC-32 (CH_2F_2)[f]	0	675	Mildly flammable	• Asphyxiant	Used in etching of SiO_2 and SiNX. Used minimally in chamber cleaning.
HFC-41 (CH_3F)	0	92	Flammable	• Asphyxiant	Used in high-aspect hole etching. Not used in chamber cleaning.
Commercially Available and Technically Proven Alternatives					
SF_6	0	22,800	Flammable[g]	• Asphyxiant	Used in etching of Si, SiO_2 and SiNX, and chamber cleaning.
NF_3	0	17,200	May cause or intensify fire; oxidizer[h]	• No relevant toxicity concerns	Used in etching of Si and Si_3N_4, and chamber cleaning.
Saturated PFCs (CF_4, C_2F_6, c-C_4F_8)	0	7,390-12,200	Flammable[g]	• Asphyxiants • Short-term exposure may adversely impact cardiovascular system, potentially resulting in cardiac disorders[i]	Used in etching of Si, TiN, organics (e.g., CF_4, c-C_4F_8) and chamber cleaning (e.g., C_2F_6); Difficult to abate and issues with utilization rate.
HFC-125 (CF_3CHF_2)[j]	0	3,500	Nonflammable[g]	• Asphyxiant	Used minimally in high aspect hole etching.
HFC-134a (CH_2FCF_3)[j]	0	1,430	Flammable[g]	• Asphyxiant • Short-term exposure may adversely impact cardiovascular system	Used minimally in high aspect hole etching.
Unsaturated PFCs (C_4F_6, C_5F_8)	0	<2	Highly Flammable[k]	• Asphyxiants • C4F6: fatal if inhaled[k]	Used in high aspect hole etching. Not widely adopted.
Not Technically Proven Alternatives					
Trifluoroiodomethane (CF_3I)	0	0.4	No data[i]	• Suspected of causing genetic damage to human germ cells[i]	Used for etching of SiO2 and SiNx. Not widely adopted.
Carbonyl Sulfide (COS)	0	27	Highly Flammable	• Inhalation or absorption through skin may be fatal	Etching for NAND and DRAM; Issues with safety and ease of use; Very flammable and toxic.
HFO-1336mzz(E) ($CF_3CH{=}CHCF_3$)	0	18	Nonflammable	• No relevant toxicity concerns	Studied as replacement to CF_4 in etching; Not technically proven.
PFC-1216 (C_3F_6)	0	<1	Flammable[g]	• Asphyxiant • Suspected carcinogen[k]	Studied for use in etching SiO_2; Not technically proven.
Chlorine trifluoride (ClF_3)	0	0	May cause or intensify fire; oxidizer[h]	• No relevant toxicity concerns	Chamber cleaning in low pressure systems; Extremely flammable.
Hexafluoroisobutylene (HFIB) ($CH_2{=}C(CF_3)_2$)	0	~3	Not classified[k]	• Suspected of causing genetic damage to human germ cells • Toxic if inhaled[k]	Studied for use in etching of trench holes, trench gates, etc. of Si substrates; Not technically proven.[l]
Fluorine (F_2)	0	0	May react with combustible materials to cause fire.	• Inhalation may be fatal • Contact with skin may cause injury • Chronic absorption through skin may cause osteosclerosis and ligament calcification • Vapors are extreme skin and eye irritants	Explored as replacement to NF_3 in chamber cleaning; Very aggressive and low selectivity; Challenges with transport, storage, and use due to high reactivity and toxicity.[m]

Adapted from UNEP (2022), unless otherwise specified.
[a] WMO (2022).
[b] IPCC (2007). Values are numerically equal to the exchange values listed in the AIM Act.
[c] NOAA CAMEO Chemicals Database, unless otherwise specified.
[d] NOAA CAMEO Chemicals Database, International Labour Organization ICSCs, and T3DB, unless otherwise specialized.
[e] Classified by ASHRAE Standard 34 as a Class A1 refrigerant, meaning it does not propagate a flame and has lower toxicity (ASHRAE, 2022).
[f] Classified by ASHRAE Standard 34 as a Class A2 refrigerant, meaning it has lower flammability and lower toxicity (ASHRAE, 2022).
[g] May burn but does not readily ignite.
[h] Nonflammable but increases flammability of other substances. Vessels may explode when heated.
[i] Human health impacts were assumed to be the same for all saturated PFCs.
[j] Bartos and Burton (2000); Tsai (2005); Hudson and Roberts (2017).
[k] ECHA (2024).
[l] Choi et al. (2023).
[m] Cigal et al. (2016).

Background on Semiconductor Growth Projections and HFC Usage

As discussed in SIA's past comments and in Section I of this comment, the semiconductor industry is expected to experience significant growth. Due to factors such as innovation in artificial intelligence, communications, medical technology, automotives, energy, aerospace, computing, data centers, and virtually all sectors of the economy, demand for semiconductors is projected to increase in coming years. According to estimates from McKinsey, the industry is expected to almost double in revenues, from $527 billion in 2023 to over $1 trillion in 2030, a compound annual growth rate more than 9 percent.

As described in Section I (*see*: SIA/Boston Consulting Group, "Emerging Resilience in the Semiconductor Supply Chain"), increased manufacturing capacity will be built to meet this increased market demand, with the U.S. projected to triple its capacity between 2022 and 2032. Given these trends, EPA should consider this projected growth – and the likely increase in the use of inputs such as HFCs – to meet the requirement of the AIM Act to provide "the full allocation of allowances necessary" for the use of HFCs in semiconductor manufacturing.

As the U.S. is poised the increase semiconductor manufacturing, the use of HFCs is likely to increase due to advances in manufacturing processes. Because of the increasing complexity of semiconductor devices, with billions of transistors imprinted on a surface of a square centimeter, fabrication of these advanced devices requires an increasing number of mask layers per wafer and a resulting increase in the process steps that require F-GHG. This trend will likely continue in the future. As a result, we anticipate this increasing manufacturing process complexity will necessitate an increase in the use of industrial gases such as HFCs. As stated in our 2021 comments, HFC use by SIA member companies in 2020 was 2 times 2019 levels.[11]

Although the use of HFCs in semiconductor manufacturing applications is critical to the industry and downstream manufacturing in the United States, HFC usage and emissions from semiconductor manufacturing is extremely small. The U.S. semiconductor industry, in conjunction with international partners, has a long history of leading greenhouse gas emissions reductions through industry established best practices.[12] Based on 2021 data, the entire electronics industry's HFC emissions – of which the semiconductor industry is a subset – were only 0.23% (i.e., 0.4 $MMTCO_2e$ vs. 175.0 $MMTCO_2e$) of all U.S. HFC emissions (including those due to ODS substitutions).[13]

SIA calls on EPA to set allocations that consider the projected growth of semiconductor manufacturing in the U.S. along with the increasing manufacturing complexity and accompanying usage of HFCs and other F-GHGs, rather than relying solely on historical

[11] SIA PFC survey

[12] World Semiconductor Council, "Best Practice Guidance for Semiconductor Process Greenhouse Gases Emission Reductions," 2023. Available https://www.semiconductorcouncil.org/wp-content/uploads/2024/10/WSC-Best-practices-2023-v.5-All-edits-16-October-2023.pdf

[13] EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021,"

trends. The goal of the CHIPS Act is to increase U.S. production of semiconductors and enhance the economy and strengthen national security by building a resilient semiconductor ecosystem in the U.S., and the goals of the AIM Act can be achieved only by considering these growth trends and assure the semiconductor industry has “the full allocation of allowances [of HFCs] necessary” to meet its needs.