



March 19, 2026

***Via USTR Portal***

Mr. Joseph Sullivan  
Senior Director for Policy  
Office of the U.S. Trade Representative  
700 16<sup>th</sup> Street NW  
Washington, D.C. 20006

**Re: Request for Comments on the Design of Plurilateral Agreement on Trade in Critical Minerals and Policy Actions to Strengthen the Resilience of Critical Mineral Supply Chains**

Dear Mr. Sullivan,

The Semiconductor Industry Association (SIA) welcomes the opportunity to respond to the Office of the U.S. Trade Representative's (USTR) *Request for Comments on the Design of Plurilateral Agreement on Trade in Critical Minerals and Policy Actions to Strengthen the Resilience of Critical Mineral Supply Chains*, Docket Number USTR-2026-0034, the "Request".

SIA has been the voice of the U.S. semiconductor industry for nearly half a century. Our member companies represent more than 99% of the U.S. semiconductor industry by revenue as well as major non-U.S. chip firms. Our members are engaged in the full range of research, design, manufacture, and back-end assembly, test, and packaging of semiconductors. SIA's members design and produce all major advanced and mature-node semiconductor types, including logic, memory, analog, microprocessors, and optoelectronics. The semiconductor industry is critical to U.S. economic security, national security, and industrial competitiveness across a range of critical downstream sectors including artificial intelligence (AI) and high-performance computing, automotive, aerospace and defense, 5G/6G communications, medical technology, and advanced manufacturing. Few industries rely on such a wide swath of rare earth elements and critical minerals. We support President Trump's goal of diversifying critical technology sector upstream supply chains and reducing geographic dependencies for critical material inputs.

More information about SIA and the semiconductor industry is available at [www.semiconductors.org](http://www.semiconductors.org).

As noted in the U.S. Department of Commerce's 2023 Assessment of the U.S. microelectronics industrial base, semiconductor manufacturing "requires hundreds of different materials with stringent quality requirements", and "maintaining a healthy domestic semiconductor manufacturing base requires a robust material supply chain that is resilient to regional or

company-specific shocks.”<sup>1</sup> Semiconductor device production – from chip design, fabrication, assembly, test, and packaging – requires hundreds of different material inputs, including raw wafers, specialty chemicals, and bulk gases.<sup>2</sup> The equipment used for chip design and manufacturing also rely on an array of critical mineral inputs – such as neodymium, samarium, dysprosium and terbium for equipment parts and components. The material inputs, and the highly engineered precision equipment used to process them, and the tools used to manufacture semiconductors utilize almost every non-radioactive element on the periodic table, at often extremely high-purity levels. Reliable access to critical mineral inputs underpins the semiconductor industry’s ability to fabricate the backbone of our digital economy. SIA appreciates the opportunity to share our views and stands ready to work constructively with USTR to inform the development of trade policy that supports and enhances the resilience of critical mineral supply chains and the semiconductor industry.

## **I. INTRODUCTION AND BACKGROUND**

Strengthening U.S. semiconductor supply chain capabilities is critical to maintaining U.S. technological leadership globally and is a top priority for SIA and our members.

The semiconductor supply chain is highly complex and specialized. Semiconductor manufacturing consists of hundreds of steps to produce a single wafer (i.e., a thin, round slice of a semiconductor material varying in size between 6 and 12 inches in diameter) and ultimately between 1,000 and 1,500 steps to turn the silicon into the final chip, depending on the complexity of the chip. Patterned layers are added on and into the wafer creating interconnected electrically active regions on the surface, ultimately forming the complete semiconductor. Different critical minerals and elements are utilized at each step of the production process – both in “front-end” wafer fabrication, and “back-end” assembly, test, and packaging (ATP) – typically requiring over 300 different inputs, including raw wafers, commodity chemicals, specialty chemicals, and bulk gases.

Semiconductor manufacturers and semiconductor equipment manufacturers typically do not directly procure raw minerals from producers, but rather from specialized materials suppliers that further refine the minerals into highly processed chemicals or materials or as component parts, such as batteries and motors for machine tools. Semiconductor manufacturing demands ultra-high purity materials, extremely tight tolerances, and strict batch-to-batch consistency. In practice, many critical minerals are only usable by semiconductor manufacturers or our suppliers once they have undergone multiple additional processing steps.

In addition, the semiconductor industry often makes up a small percentage of global consumption for a critical mineral. The industry’s small market share often requires a reliance on similar or related product’s economies of scale to subsidize the production of

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<sup>1</sup> U.S. Department of Commerce, “Assessment of The Status of the Microelectronics Industrial Base in the United States,” December 2023. <https://www.bis.gov/media/documents/section-9904-report-final-20231221.pdf>

<sup>2</sup> SIA and Boston Consulting Group, “Strengthening the Global Semiconductor Value Chain,” April 2021. [https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021\\_1.pdf](https://www.semiconductors.org/wp-content/uploads/2021/05/BCG-x-SIA-Strengthening-the-Global-Semiconductor-Value-Chain-April-2021_1.pdf)

semiconductor-grade materials. Below we highlight two examples of critical materials – polysilicon and gallium – which the semiconductor industry needs to produce chips.

### ***Polysilicon Case Study***

Semiconductor manufacturing begins with the production of the wafer. The production of semiconductor materials, such as semiconductor-grade polysilicon, is the first step of semiconductor device manufacturing. Silicon wafers are manufactured from ultra-pure polysilicon, which is mined and refined out of silicon dioxide, also known as silica, which is found in sand.

There are two main types of polysilicon, differentiated by their purity grade, which determines the product's end use. The semiconductor and solar industries are the two major consumers of polysilicon, accounting for 2.4% and 97.6% of annual consumption, respectively. Polysilicon used for semiconductors requires the highest level of purity, equal to or greater than 99.999999999% (11 nines, or "11"N). By contrast, polysilicon used in the solar industry is of a lesser grade, generally requiring 6N to 10N (99.9999% to 99.99999999%) purity to produce solar wafers.

Though the market for semiconductor-grade polysilicon is distinct from the market for solar-grade polysilicon, companies that manufacture semiconductor-grade polysilicon, particularly domestic producers, depend on high-volume production of solar-grade polysilicon to achieve economies of scale and capacity utilization rates necessary to produce the ultra-pure polysilicon for semiconductor manufacturing.<sup>3</sup> Industry experts estimate that the cost to produce semiconductor-grade polysilicon alone is 30 times greater than the cost of producing solar polysilicon.<sup>4</sup> Impacts to the market for solar-grade polysilicon affect the market for semiconductor-grade polysilicon. China is the leading global producer of polysilicon with a 94.7% total production capacity of which 98% is production capacity for solar-grade polysilicon.<sup>5</sup> However, Chinese producers currently lack the equipment and know-how to produce semiconductor-grade polysilicon at scale. While the fair market value for U.S.-produced solar-grade polysilicon is \$24/kg, we understand from SIA member companies that Chinese producers sell solar-grade polysilicon for one-fifth of this value.

For more information on the use of polysilicon in the semiconductor supply chain, see SIA's comments to the Commerce Department in response to 90 Fed. Reg. 15950.<sup>6</sup>

### ***Gallium Case Study***

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<sup>3</sup> "Transcript: Virtual Forum for Risks in the Semiconductor Manufacturing and Advanced Packaging Supply Chain", (Bureau of Industry and Security, April 8, 2021).

<sup>4</sup> TECHCET, "2025-2026 CMR™ Silicon Wafers, June 26, 2025. <https://techcet.com/product/silicon-wafers/>

<sup>5</sup> Johannes Bernreuter, "The Polysilicon Market Outlook 2029," June 24, 2025.

<https://www.bernreuter.com/polysilicon/industry-reports/polysilicon-market-outlook-2029/>.

<sup>6</sup> Semiconductor Industry Association, Comments in Response to "Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Polysilicon and its Derivatives", August 6, 2025. <https://www.semiconductors.org/wp-content/uploads/2025/08/Semiconductor-Industry-Association-SIA-Comments-Polysilicon-Section-232-Investigation.pdf>

Gallium is a base metal used to make compound semiconductor materials – primarily Gallium Nitride (GaN) and Gallium Arsenide (GaAs) – with wider band gap compared to silicon, enabling higher power density and more efficiency than traditional silicon metal-oxide semiconductor field-effect transistors (MOSFETs) and insulated gate bipolar transistors (IGBTs.) GaN processes power more efficiently than silicon-only solutions, reducing power loss by 80% in power converters and minimizing the need for added cooling components. Gallium-based semiconductors are used for critical applications such as AI servers, wireless communication, power electronics, aerospace and defense applications. Semiconductors and optoelectronic devices accounted for 73% and 26% of domestic gallium consumption in 2025, respectively.<sup>7</sup>

Unlike silica, gallium is not mined directly. Gallium occurs in trace amounts in bauxite (aluminum ore) and zinc ores and is extracted as a by-product of aluminum and zinc refining. Because it is a byproduct, gallium production is heavily tied to the demand and production levels of aluminum. Global bauxite mining is dominated by Guinea, Australia, China, Brazil and India.<sup>8</sup> However, China has a near monopoly on gallium refining due to government subsidies that fueled overproduction and drove competitors out of the market. In 2025, China accounted for 99% of the world’s low-purity primary gallium.<sup>9</sup> Beginning August 2023, China implemented export controls on gallium and imposed a total ban on U.S. shipments between December 2024 and November 2025. The ban is currently suspended, but stringent licensing requirements are still in place.

## **II. COMMENTS AND RECOMMENDATIONS**

SIA appreciates USTR’s consideration of trade policy tools and mechanisms to support and enhance the resilience of critical mineral supply chains and the downstream industries, such as semiconductors and semiconductor manufacturing and design equipment, that depend on them. We encourage USTR to prioritize critical minerals of importance to the semiconductor industry in any negotiations with trading partners.

**Section A** contains general comments, with particular focus on which critical minerals USTR should prioritize for the semiconductor industry. **Section B** contains our responses to specific questions posed to industry in the Request.

### **A. General Comments on the Request**

#### *Critical Minerals Important for Semiconductor Production*

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<sup>7</sup> U.S. Geological Survey, Mineral Commodity Summary—Gallium, February 2026.  
<https://www.usgs.gov/centers/national-minerals-information-center/gallium-statistics-and-information>.

<sup>8</sup> U.S. Geological Survey, Mineral Commodity Summary—Bauxite & Alumina, February 2026.  
<https://www.usgs.gov/centers/national-minerals-information-center/bauxite-and-alumina-statistics-and-information>.

<sup>9</sup> U.S. Geological Survey, Mineral Commodity Summary—Gallium, February 2026.  
<https://www.usgs.gov/centers/national-minerals-information-center/gallium-statistics-and-information>.

The semiconductor industry is reliant on an array of elemental and mineral inputs. Moreover, chip companies and equipment manufacturers are often not the primary customer of such materials, and are typically reliant on economies of scale of related materials, as illustrated in the polysilicon and gallium case studies in Section I.

Below is a non-exhaustive list of critical minerals important to chip production, and for which we encourage USTR to prioritize focus and action.

**Silicon**, specifically polysilicon, is the precursor material for silicon wafers, the substrate which most logic and memory chips are built on. See case study in Section I.

**Gallium** is used in compound semiconductors. See case study in Section I.

**Germanium** is often alloyed with silicon (SiGe) for high-frequency chips, transistors, and fiber optics. Due to its high electron mobility and infrared sensitivity, it is essential for advanced computing, wireless communications, and thermal imaging. Similar to gallium, germanium is not mined directly but recovered as a byproduct of zinc smelting and coal combustion. China is the leading producer and refiner of germanium at roughly 60%, followed by Russia, Belgium, Canada, and Germany. In 2023 China imposed export controls on germanium.

**Indium** is used in compound semiconductors such as Indium Phosphide (InP) and Indium Arsenide (InAs). Compound semiconductors are used in data centers, 5G/6G networks, and high-speed, low-energy electronics. Similar to gallium and germanium, indium is not mined directly, but is a byproduct of zinc smelter residues, with over 70% of supply sourced from China, and 20% sourced in aggregate from South Korea, Canada, and Japan.<sup>10</sup>

**Tungsten** is used to create vertical interconnect access, or via, to establish an electrical connection between two or more layers within a semiconductor die. China is the dominant global supplier. Over the past year, Tungsten powder prices have increased 3X, from \$418/kg to \$1,284/kg, due to China's expanded export controls.

**Copper** is critical to producing high-purity interconnects in the world's most advanced chips. Ensuring steady access to copper through a plurilateral critical minerals agreement will support U.S. efforts to build out capacity in strategic sectors such as semiconductor manufacturing.

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<sup>10</sup> <https://www.reuters.com/business/energy/indium-hits-highest-prices-decade-chinese-speculation-supply-risks-2026-02-09/>

**Fluorspar** is a critical industrial mineral ( $\text{CaF}_2$ ), used to produce high-purity hydrogen fluoride used in semiconductor production. It is also a key input for the next-generation refrigerants that keep data centers cool. Insufficient domestic quantities and long lead times for new mines mean that steady access to fluorspar from trading partners will allow the U.S. to build its leadership in producing advanced semiconductors and data centers.

**Rare earth elements (REEs)** are critical inputs into components used in a range of advanced information technology (IT) systems and infrastructure, including semiconductors, semiconductor manufacturing equipment, servers and mainframe computers, networking equipment, and the data centers powering AI. These include, among others: scandium, cerium, lanthanum, samarium, yttrium, neodymium, dysprosium, gadolinium, terbium, erbium, ytterbium, and praseodymium, which are used in semiconductor processing, optical components, ceramic capacitors, magnets, and other critical electronic components.

The following are rare earth elements important to the chips industry, with examples of how they are used in the semiconductor manufacturing process:

- **Scandium** is incorporated in an aluminum alloy (AlSc) thin film, which is used in radio frequency (RF) and bulk acoustic wave (BAW) filters that enable 5G, Wi-Fi 6/7, and other wireless communications. The U.S. is 100% dependent on scandium imports, with over 90% of scandium refining reliance on China. Recent Chinese export controls explicitly include scandium metal, oxides, and alloys.
- **Cerium** is used for wire bonds and chemical mechanical planarization during wafer processing. China leads the global cerium market, producing approximately 60% of the world's supply.
- **Yttrium** is used for wire bonds, fiber optic transceivers, light-emitting diodes, in dielectrics to make ceramic capacitors, and to coat components of semiconductor manufacturing equipment for enhancing plasma resistance. China dominates the global yttrium market, producing over 97% of the world's supply, primarily from ion-absorption clays in southern provinces like Fujian and Jingxi. Yttrium saw close to a 1,500% price increase throughout 2025 as a result of Chinese export control measures, indicative of the current prohibitively high cost of a number of critical minerals.<sup>11</sup>

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<sup>11</sup> <https://www.bloomberg.com/news/articles/2025-11-18/rare-earth-yttrium-surges-to-record-as-rally-approaches-1-500>

- **Lanthanum** is used for wire bonds, fiber optic transceivers, and in crystal polish materials. China is the world's leading producer and exporter of lanthanum, controlling between 70-90% of global production and refining.
- **Neodymium, Samarium, Dysprosium and Terbium** are critical materials used in permanent magnets, which are core components used in semiconductor manufacturing equipment. China is the only country in the world that can domestically carry out the entire chain from ore mining and beneficiation, through separation, refining and smelting, and alloy production, to magnet manufacturing.

### *Pricing Considerations*

While SIA strongly supports price transparency and predictability in critical minerals markets, any pricing mechanism must reflect the full lifecycle costs of bringing a material to usable form. It is also important that any increased costs are born across the entire supply chain, rather than being concentrated at specific segments. This means accounting for compliance, purification, and the rigorous qualification requirements specific to advanced semiconductor manufacturing. Mechanisms that focus narrowly on upstream commodity prices risk distorting downstream markets and undermining the investment certainty that semiconductor manufacturers depend on.

This is particularly important given that USTR is explicitly considering price mechanisms at different nodes of the value chain. As detailed above, semiconductor manufacturing demands ultra-high purity materials, extremely tight tolerances, and strict batch-to-batch consistency. In practice, many critical minerals are not usable by semiconductor manufacturers or our suppliers until they have undergone multiple additional processing steps — steps that upstream pricing models typically fail to capture. Any government-endorsed price mechanism should therefore align with actual delivered usability, not just nominal commodity value.

Equally critical is the ability to forecast input costs across multi-year investment cycles. When price mechanisms induce supplier shifts, the consequences for advanced manufacturers are substantial: new sources require extensive materials testing, tool and process recalibration, and reliability validation that plays out over months or years. These transition costs are capital-intensive, time-consuming, and often irreversible. A pricing mechanism that drives frequent supplier turnover does not lower costs — it raises them, ultimately passing the burden to manufacturers and consumers (including the federal government) alike.

Pricing efforts should also not operate in isolation but be part of a tightly aligned, whole-of-government approach that integrates voluntary, market-based tools alongside any regulatory mechanisms. This includes long-term offtake agreements, public-private co-investment vehicles such as those established under the CHIPS Act, stockpiling where appropriate, and demand aggregation among allied economies. These complementary tools can achieve supply chain resilience goals without introducing the pricing distortions and transition risks described above.

For price floors specifically, governments and the market need to assess how to credibly set a price floor, which would likely include purchase guarantees among the trade partners. Historically, governments have only been successful in setting price floors where the

government itself is the largest or sole purchaser. In the absence of such a guarantee, there is little preventing a foreign actor from offering a price below the price floor rates, which would diminish the purpose of a government-imposed price floor. Tariffs, and component tariffs, could potentially adjust a mismatch between price floor upstream companies and companies outside the price floor, but it would have to be dynamic and coordinated amongst a critical mass of trading partners. In the absence of such activity, downstream U.S. consumers, such as those in the domestic semiconductor manufacturing sector, would face a competitive disadvantage against foreign competitors who purchase these inputs at lower prices.

Additionally, it will be important for trading partners to adopt a similar price floor for whatever products are selected, in combination with the implementation and enforcement of anti-dumping measures. This is both for purposes of higher market power for the product, but also to prevent intentional or unintentional undercutting. If the United States were to set its own price floor for a product without partner buy-in, competitor companies could buy these products below the price floor and pass those savings through in lower prices for end products. The EU's CBAM model for carbon pricing adjustments could offer a template, but this would be challenging to administer and circumvention is possible.

## **B. SIA Responses to Specific Questions from the Request**

### **(a.) Prioritization of Critical Minerals and Trading Partners for Agreement Scope**

- 1. What factors should be considered in prioritizing certain critical minerals, as defined by the U.S. Geological Survey, to be included within the scope of a plurilateral agreement? In particular, how should each critical mineral be evaluated for the U.S. government's prioritization and scoping decisions?***

**Response:** SIA proposes aligning to the needs of downstream strategic industries, like the semiconductor industry, and prioritize cross-cutting minerals that are essential across multiple strategic industries, including semiconductors, defense systems, energy, batteries, and advanced manufacturing to ensure comprehensive national security resilience. USTR should also consider supply chain concentration by assessing single points of failure and high regional dependencies for mining and refining. Clear definitions, scope, and understanding of market concentration across mined, refined, and processed forms and derivatives will be crucial in understanding dependencies and vulnerabilities. Availability of alternative sourcing, processing, recycling, and substitution pathways should also be considered. Furthermore, the cost and timeline to derisk each critical material should be taken into consideration.

- 2. How can critical minerals be effectively grouped, (e.g., by common market dynamics or supply chain structures, common market participants, or geographical features) such that each group is amenable to similar sets of interventions to improve resilience? If so, what criteria should be used to group such critical minerals together (e.g., by common market dynamics or supply chain structures, common market participants, natural co-occurrence, or geographical features)?***

**Response:** Some analysis of key challenges is needed at the mineral level first, once challenges are comprehended and a playbook is developed, minerals could be grouped by similar challenges (e.g. market dynamics) aligned with a particular mitigation approach. For example, for several key minerals, China has a high concentration of market share and excess capacity to flood the market with supply posing challenges for economically viable diversification efforts. Minerals that share this risk profile could be grouped together, as they will need a similar mitigation approach. Alternatively, identify downstream strategic sectors (batteries, semiconductors, etc.), align groupings of critical minerals to the needs of those industries. For the semiconductor industry, critical minerals could be grouped based on position in the supply chain (e.g., inputs for front-end, back-end, design tools, manufacturing equipment etc).

**4. *Which trading partners should be considered for participation in a plurilateral agreement, and why?***

**Response:** Japan, Taiwan, Malaysia, Singapore, and South Korea, and some European partners (e.g. Germany, France, Italy, Netherlands, UK) are significant producers of critical engineered materials and parts of semiconductor manufacturing equipment used in the production of semiconductors. Producers in these countries rely on critical mineral inputs sourced from elsewhere. Australia, Canada, India, and Mexico have active mining and refining capabilities for critical minerals used in semiconductor production and should also be included. Collaboration with Vietnam and Indonesia, including public-private investment into developing local refining and processing infrastructures, would also contribute to increasing processing capacity outside of China and ensure supply chain resilience. In addition, historically allied countries, including G7 parties and OECD member economies, as well as jurisdictions with geological reserves, established mining capabilities, and geopolitical significance, such as certain Latin American and African countries - should be considered.

**5. *What qualities should trading partners exhibit to be considered for inclusion in a plurilateral agreement in trade on critical minerals?***

**Response:** Trading partners should also be evaluated based on transparency, adherence to market-based principles, regulatory predictability, strong intellectual property (IP) protections, and demonstrated commitment to supply chain resilience and responsible sourcing, including credible compliance regimes, information sharing, and cooperation on enforcement and anti-circumvention efforts.

**(d.) Establishment of Common Standards to Address Regulatory Arbitrage**

**1. *How should a plurilateral agreement on trade in critical minerals address any regulatory arbitrage among the parties, and between the parties and non-parties?***

**Response:** Regulatory arbitrage poses a direct threat to the integrity of any plurilateral agreement. If parties to the agreement face significantly higher compliance costs than non-parties — whether from environmental standards, labor requirements, chemical handling regulations, or export controls — investment and production will migrate toward less-regulated jurisdictions, undermining the agreement's core objectives. To prevent this, governments should set minimum standard requirements within the trade agreement aligned with OECD guidelines, and supporting standard schemes like the Responsible Minerals Initiative. Audit conformance (RMAP & other industry standards).

**2. *Are there any specific regulatory requirements or standards that a plurilateral agreement would need to address in order to stabilize markets for critical minerals?***

**Response:** For downstream manufacturers, regulatory divergence creates an additional layer of risk: supplier qualification instability. Semiconductor manufacturing requires ultra-high purity materials with strict batch-to-batch consistency. When regulatory differences across jurisdictions cause supplier shifts — even among allied/partner nations — semiconductor manufacturers face extensive re-qualification processes that are capital-intensive, time-consuming, and often irreversible. The agreement should therefore seek to harmonize baseline standards across parties, particularly in areas directly affecting material quality and supply chain traceability, while establishing clear border measures for non-parties that do not meet equivalent standards.

SIA recommends that any standards established under the agreement be developed in close consultation with downstream industries, not just with mining and processing stakeholders. Standards that are technically misaligned with end-use manufacturing requirements risk creating compliance burdens without delivering meaningful supply chain benefits.

To stabilize critical minerals markets and reduce arbitrage, the agreement should prioritize harmonization in the following areas:

- Purity and quality standards: Semiconductor-grade critical minerals must meet specifications that go far beyond raw commodity standards. The agreement should establish minimum purity and processing benchmarks at each node of the value chain, ensuring that pricing mechanisms reflect the cost of achieving these standards — not just upstream extraction costs.
- Environmental and permitting standards: Disparate environmental regulations are one of the most significant sources of regulatory arbitrage today. Parties should commit to baseline environmental and permitting frameworks that prevent production from shifting to lower-standard jurisdictions, while also streamlining permitting timelines in member countries to improve supply competitiveness.
- Traceability and chain-of-custody requirements: Semiconductor manufacturers increasingly face customer, investor, and regulatory pressure to verify the provenance of critical minerals. A common traceability framework across parties

would reduce compliance costs, improve supply chain transparency, and make it harder for non-compliant non-party material to enter the supply chain through third-country processing.

- Export control alignment: Differences in export licensing regimes among parties can create arbitrage opportunities and supply disruptions. The agreement should encourage alignment of export control frameworks for critical minerals among parties, consistent with existing multilateral arrangements.

(e.) Rules to Govern Investment in Critical Mineral Supply Chains

1. **Are there any commitments related to investment screening mechanisms that should be included in a plurilateral agreement on trade in critical minerals in order to adequately address risks associated with critical mineral supply chains?**

**Response:** Investment screening should be coordinated, not just national. The agreement should establish a baseline screening standard that all parties commit to, paired with information-sharing obligations and cross-party notification when investments involve entities connected to nations of concern. Screening frameworks must account for downstream impact, not just upstream asset control. For semiconductor manufacturers, foreign ownership or influence over processing and refining facilities — not just mines — directly affects material purity, consistency, and supply reliability. Investment screening criteria should explicitly consider risks at every node of the value chain, including mid-stream processing steps that are often overlooked but are critical to producing semiconductor-grade materials.

3. **How should a plurilateral agreement take into consideration any critical mineral asset or extraction and mining or processing facility in the territory of a party that is partially or fully owned by a non-party, and similarly, any critical mineral asset or extraction and mining or processing facility in the territory of a non-party that is partially or fully-owned by a party?**

**Response:** The agreement should actively attract allied/partner-nation private capital, not just block non-party capital. Investment rules that only restrict are insufficient. The agreement should include affirmative mechanisms — such as right of first refusal provisions, co-investment frameworks, and streamlined approval pathways for party-nation investors — that make it faster and more financially attractive for allied private sector actors to develop critical mineral assets before non-party actors can.

Public-private co-investment tools like the CHIPS Act should be explicitly interfaced with the agreement. Existing U.S. investment vehicles — including those established under the CHIPS and Science Act and the Defense Production Act — represent significant capital that could be leveraged to build out allied critical mineral supply chains. The plurilateral agreement should be designed to complement and amplify these domestic programs, not operate in parallel with them.

(f.) Implementation and Enforcement of a Plurilateral Agreement

1. **How should the United States evaluate the appropriate phase-in time for price-related and other measures for each critical mineral, or group of critical minerals?**

**Response:** Phase-in timelines must reflect semiconductor supply chain qualification realities. Qualifying a new source of a critical mineral for semiconductor use is not a matter of weeks — it requires extensive materials testing, process recalibration, and reliability validation that can span years. Phase-in periods must be mineral- and value-chain-node-specific, with meaningfully longer timelines for processed and refined materials that feed directly into semiconductor fabrication. USTR should establish a formal mechanism for semiconductor manufacturers to provide input on phase-in readiness before measures take effect.

2. **How should a plurilateral agreement address concerns about the development of a gray or black market of raw critical minerals and products containing critical minerals?**

**Response:** Price differentials between party and non-party materials create gray market risk at the processing stage. Semiconductor-grade critical minerals undergo multiple purification steps across jurisdictions, making origin increasingly difficult to verify as processing advances. Any significant price differential will create strong incentives for mislabeling or transshipment. The agreement must pair price mechanisms with batch-level traceability requirements — the kind of documentation semiconductor manufacturers already collect for quality assurance — to make gray market activity detectable.

3. **How should a plurilateral agreement protect against circumvention and to ensure that the benefits of the agreement accrue predominantly to the parties to the agreement?**

**Response:** Anti-circumvention rules must account for the multi-stage nature of semiconductor mineral processing. Unlike bulk commodities, semiconductor-grade materials pass through numerous processing and purification stages before reaching a fab. Rules of origin based on simple transformation tests are insufficient. The agreement needs technically sophisticated, value-addition-based rules of origin that reflect the full processing depth required to produce semiconductor-grade material.

4. **How should the parties to a plurilateral agreement monitor and enforce any breaches of the agreement?**

**Response:** Downstream manufacturers should be formal participants in breach monitoring. Semiconductor manufacturers are often best positioned to detect supply anomalies — unexpected quality variations, sourcing shifts, or documentation irregularities — that may signal circumvention. The agreement should establish formal industry reporting channels that allow downstream manufacturers to flag concerns, paired with protections against commercial retaliation for doing so.

Dispute resolution must be fast enough to matter. Semiconductor supply disruptions cascade quickly — a material shortage can halt production within weeks. Standard trade dispute timelines are wholly inadequate for this reality. The agreement must include an expedited resolution track for supply disruptions, with interim relief measures available while formal proceedings are underway

(g.) Mechanisms for Coordination Among Parties to the Agreement

**1. How could a mechanism be designed to enable the parties to a plurilateral agreement to respond to externalities, dynamic market changes, or market crises?**

**Response:** The agreement needs a standing coordination body capable of near-real-time response to supply crises. Semiconductor supply chains are acutely vulnerable to rapid disruption — a shortage in a single critical mineral can halt fab production within weeks. A coordination mechanism must be able to convene quickly, share supply and demand data across parties, and authorize emergency measures — such as strategic reserve releases or expedited export approvals — without requiring lengthy consensus processes that render the response too late to matter.

Pooling of industry demand: Many applications within the semiconductor supply chain are quite fragmented and low volume across multiple supply chain tiers. It is important to have mechanisms to aggregate demands instead of requiring a single or handful of large investors. Set expectations on trade partners to prepare response to externalities and reduce vulnerabilities.

**2. How could a plurilateral agreement support coordination of public and private scale-up support (e.g., offtake agreements, financing)?**

**Response:** Coordination mechanisms should actively facilitate long-term offtake agreements between allied producers and semiconductor manufacturers. Long-term offtake agreements are the most effective market-based tool for semiconductor supply chain stability — they provide the forward demand signal that justifies upstream capital investment while giving manufacturers the input cost predictability needed for multi-year fab planning. The agreement should create frameworks that actively support and where appropriate co-guarantee such agreements among party-nation participants. Non-prescriptive list of examples of mechanisms that parties may choose from, include: build minerals reserve, ensure certain percentage of local sourcing (mining/ extraction/ refinery), provide financial support or other incentive of private sector stockpiling, establish a risk-sharing mechanism, and use/enforce anti-dumping rules.

**3. How could a plurilateral agreement mitigate any disruptions to critical minerals supply chains, within or outside of the agreement, that arise from factors such as natural disasters, geology, or technological changes?**

**Response:** The largest disruption risk to minerals supply chains is geo-political export/import restrictions, by encouraging geo-diversification this risk is reduced. It is recommended that business continuity and disaster recovery plans are expected from mining and refining sites to address potential disruption risks. It is also recommended that market studies are done periodically to sense technology changes, and other market shifts.

**4. How could a plurilateral agreement mitigate any market instability resulting from any other factors?**

**Response:** The agreement's scope must be able to evolve as semiconductor technology changes. The minerals critical to semiconductor manufacturing today may not be the same as those critical in five years as chip architectures, memory technologies, and advanced packaging continue to evolve. The agreement must include a structured, industry-informed review mechanism to add or reprioritize minerals without requiring full renegotiation, ensuring the agreement remains aligned with where semiconductor technology is heading, not just where it has been.

In addition to purchase commitments, granting the U.S. government and industry customers, including semiconductor manufacturers, priority access to a subset of critical minerals can help promote U.S. manufacturing and domestic innovation while safeguarding critical supply chains in the face of potential disruptions. Similar provisions already exist in framework agreements between international industry partners and the United States Government.<sup>12</sup>

**(i.) Relevant Legal Authorities of the Potential Parties**

**2. What are legal procedures, tools, or authorities by which other jurisdictions could substantially replicate the expected economic effects of a price mechanism?**

**Response:** The CHIPS and Science Act and allied equivalents represent the most relevant contemporary reference point. Unlike historical commodity agreements, the CHIPS Act's public-private co-investment model is designed around the needs of downstream manufacturers, not just upstream producers. A plurilateral critical minerals agreement should be explicitly modeled to interface with and amplify these existing frameworks rather than operate independently of them.

The agreement should establish a clear legal basis for downstream manufacturer participation in governance. Currently, most trade agreement legal frameworks center on governments and upstream industry. For a critical minerals agreement to work effectively for the semiconductor industry, the legal architecture must provide a formal role for downstream manufacturers in monitoring, standard-setting, and dispute

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<sup>12</sup> <https://www.nist.gov/news-events/news/2025/12/department-commerce-awards-chips-incentives-subsidiary-korea-zinc-crucible>

resolution — not just as commenters, but as recognized participants in the agreement's governance structure.

(j.) Additional Considerations

**2. What other trade-related measures should be considered to ensure that there is adequate supply of all forms of critical minerals available to the parties to the agreement, including scrap and recyclable materials, and to prevent non-market policies and practices from undermining that supply?**

**Response:** SIA recommends including programs to support minerals recycling infrastructure, R&D, and incentivize minerals circularity. Scrap and recyclable materials are an underutilized lever for semiconductor supply chain resilience. Semiconductor manufacturing generates recoverable volumes of critical minerals through fab waste streams, end-of-life equipment, and process byproducts. The agreement should include provisions that incentivize and streamline the recovery and reintroduction of these materials into qualified supply chains, including harmonized standards for recycled material purity that meet semiconductor-grade specifications — which current recycling frameworks largely fail to address. However, policy needs to be considered carefully to promote increase availability of recycled materials while avoiding placing constraints on manufacturers that cause heavy burdens and may impact business competitiveness. Furthermore, investment in research and development for technologies that either eliminate the use of critical minerals or reduce their consumption is also crucial, as is R&D for mining and refining technologies.

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We appreciate the opportunity to comment on this Request for Comments. Given the complexity and breadth of the topics covered in USTR's Request, the short 21-day comment period posed a challenge to developing thoughtful, comprehensive, and representative responses to the detailed questions. SIA and our member companies would have benefitted from additional time. We respectfully request that USTR offer at least 60-day comment periods for future consequential requests for comment, consistent with Executive Order 13563.<sup>13</sup>

SIA looks forward to continued partnership with USTR and other agencies in providing support and feedback regarding trade policies relevant to the semiconductor industry. Should you have any additional questions or would like to discuss these comments further, please contact SIA via [jkellon@semiconductors.org](mailto:jkellon@semiconductors.org).

Uploaded to [www.comments.ustr.gov/s/](http://www.comments.ustr.gov/s/) USTR-2026-0034

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<sup>13</sup> Executive Order 13563, "Improving Regulation and Regulatory Review", January 18, 2011. <https://www.federalregister.gov/documents/2011/01/21/2011-1385/improving-regulation-and-regulatory-review>

