May 7, 2025

The Honorable Howard W. Lutnick
US Secretary of Commerce
1401 Constitution Avenue NW
Washington, DC 20230

RE: Notice of Request for Public Comments on Section 232 National Security Investigation of Imports of Semiconductors and Semiconductor Manufacturing Equipment
Docket No. 250414-0066

Dear Secretary Lutnick:

The National Foreign Trade Council ("NFTC") appreciates the opportunity to provide input as part of the Department of Commerce's ("the Department") investigation to determine the effects on national security of imports of semiconductors and their derivative products, and semiconductor manufacturing equipment, initiated under section 232 of the Trade Expansion Act of 1962, as amended (BIS-2025-0021, X-RIN 0694-XC121).

NFTC respectfully asks that any measures adopted by the Administration through this investigation take a "do no harm" approach to the ongoing reshoring projects for advanced semiconductors. We urge the Administration to prioritize the adoption of pro-growth, non-tariff measures that facilitate the expeditious onshoring of planned advanced semiconductor manufacturing investments. Such measures could involve permitting reform, removing regulatory barriers that throttle growth and innovation, pro-growth tax policy, and a focus on the removal of trade and export barriers to U.S.-made products around the world.

NFTC is deeply concerned that the imposition of any import barriers, including tariffs, would disrupt ongoing investment by companies already committed to onshoring and expanding the production of semiconductors in the United States. Any new import restrictions involve additional costs and introduces market uncertainty that undermines the ability of companies to continue to execute already ambitious onshoring plans, slow the deployment of leading-edge semiconductor manufacturing in the U.S., and threaten to reduce the productivity and competitiveness of U.S. fabs. The current tariff proposals are estimated to increase capex costs between 5% and 25%, depending on the company. NFTC implores the administration to ensure that import measures are carefully calibrated to provide maximum flexibility and realistic adjustment times for companies and their investors who have already committed to expanding U.S. semiconductor production.

Our comments address the potential impact of Sec. 232 tariffs and offer non-tariff alternatives regarding:

1. The ecosystem and global supply chain for **semiconductor manufacturing equipment** (SME);
2. **Semiconductors**, including the need to understand the complexity of the semiconductor value chain and items that are not available domestically and for which manufacturing cannot be onshored quickly;
3. **Derivative products**, which could include tens of thousands of downstream items that employ semiconductors for day-to-day function; and
4. **Other factors**, including recommendations for implementation.

We provide responses to BIS' questions in an Appendix to this letter.

Overview

The semiconductor sector is multifaceted, not monolithic. It comprises numerous segments, each of which is essential to the development and delivery of semiconductors used in a myriad of downstream applications. Segments of the semiconductor value chain include design, fabrication, and backend assembly, testing and packaging. While these aspects are interdependent and interlocking, they are also frequently conducted by different entities in geographically dispersed locations. The United States' semiconductor sector is competitive and in many of the segments. In its last comprehensive assessment of the microelectronics industrial base in the United States, BIS determined that "the United States is an essential leader in the global microelectronics sector…. accounting for approximately half of worldwide semiconductor revenue."[1]

The United States particularly dominates the high-value design segment of the global semiconductor sector. U.S. companies design most of the central processing units and graphics processing units used in the global marketplace. In addition to design activity, the U.S. is a global leader in electronic design automation (EDA) software. The fact that the U.S. government has consistently sought to exploit U.S.-controlled chokepoints in the global supply chain to advance its national security and foreign policy objectives through the deployment of increasingly complex and sophisticated export control rules underscores the criticality of U.S. leadership in key segments such as design.

In the last five years alone, over 100 projects across 28 states totaling over $540 billion in new investments have been announced across the U.S. semiconductor supply chain. This includes over 30 projects relating to upstream chipmaking materials, nine projects involving packaging, and 50 projects involving the establishment, expansion, or modernization of semiconductor fabrication facilities. Importantly, the latter includes new capacity across various semiconductor types (logic, memory, optoelectronics, RF, power, etc.) and technology nodes (foundational and leading-edge).[2] As a result of these investments, U.S. fabrication capacity is projected to grow by over 200% by 2032, higher growth than in any other region of the world and representing a tripling of capacity that will result in a marked increase in the U.S. share of

[1] https://www.bis.doc.gov/index.php/documents/technology-evaluation/3402-section-9904-report-final-20231221/file

[2] https://www.semiconductors.org/chip-supply-chain-investments/

global fab capacity and significantly boost the U.S. share of capacity in individual market segments, such as advanced logic chips, where the share will increase from 0% to 28%.[3] These investments are taking place in response to market signals, projections of growing demand, tax and other policy drivers, and interest among buyers for more diversified sources of supply. Tariffs are neither necessary to incentivize further investment nor can they reasonably be expected to generate further investments, in light of current industry realities.

Total self-reliance across all segments of the market is neither a desirable nor feasible goal. However, increasing the resilience of the U.S. economy by boosting domestic capabilities in areas where the United States currently has a relatively lower share of global activity is both achievable and desirable. It is imperative that the U.S. government adopt a holistic approach that looks first to non-tariff activities to achieve these important national and economic security goals.

Semiconductor Manufacturing Equipment (SME)

NFTC is concerned that the imposition of tariffs on SME runs counter to the administration's goal of building a more resilient domestic semiconductor manufacturing base. Imposing tariffs on inputs will increase the cost of building indigenous semiconductor supply chains. The business strategies of multinational companies depend on purchasing parts and components through a carefully thought-out supply chain process that includes critical inputs with sole global sources outside of the U.S. If the goal is to restore SME manufacturing, then the administration should not impose tariffs on SME components.

SME are complex devices that contain thousands of individual components, including steel, aluminum, and semiconductors that are already subject to previous tariffs pursuant to Sections 232 and 301. The imposition of additional Section 232 tariffs on semiconductors, SME, and their derivatives could result in a situation where SME companies are subject to multiple, stacking Section 232 duties. This is extremely complex from both a financial and compliance standpoint. Should BIS impose tariffs as a result of this investigation, NFTC proposes that the tariffs are configured so that there is no duplication of HTS codes across multiple 232 tariff annexes. Such a consideration is doubly important given the administration's recent decision to launch a 232 investigation on critical minerals.

Semiconductors

A fulsome understanding of the national security implications of semiconductor imports requires understanding the complexity of the semiconductor value chain, and inputs to chips are not available in the U.S.

U.S. businesses rely on both advanced chips (which typically feature transistor architectures of less than 28 nanometers (nm)) and legacy, or mature-node, chips (typically 28 nm and higher). Advanced chips are essential for keeping America on the frontier of downstream industries, such as AI and the hyperscale data centers on which AI computing is based, space and communications infrastructure, including satellite internet services that are increasingly important for national security and global connectivity, and drones, which have well-recognized security and commercial applications and rely on advanced chips for flight-critical operations.

[3] https://www.semiconductors.org/emerging-resilience-in-the-semiconductor-supply-chain/

Legacy chips also serve vital functions in these and other sectors, such as consumer electronics. Among other things, legacy chips drive efficiencies by performing operations where advanced chips are not necessary, often in the same hardware that also uses advanced chips.

Disruptions in the availability of legacy chips due to tariffs would negatively affect U.S. manufacturing and related downstream demand for a vast array of consumer goods. Most industrial machinery that is critical to U.S. manufacturing and jobs relies on legacy chips. Industrial products, in general, are developed on 10-20 year lifecycles, so access to quality and affordable legacy semiconductors is critical to ensure manufacturers looking to invest in the United States have access to the critical inputs for their manufacturing plans. In order to secure access to quality and affordable microelectronics for the industrial sector, manufacturers of motors, drives and other electronics critical to manufacturing align the need for components for new product design with the semiconductor manufacturers and their technology roadmaps. Any policy action should recognize the demand for the types of semiconductors used to advance manufacturing processes and technology. Impacts to the availability of legacy semiconductors used in industrial automation threatens the availability and quality of the industrial hardware needed to advance U.S. manufacturing. Furthermore, legacy chips also serve vital functions in other sectors, such as consumer electronics. Legacy chips drive efficiencies by performing operations where advanced chips are not necessary, often in the same hardware that also uses advanced chips.

The U.S. currently manufactures less than 10% of the world's chips. Investments in growing semiconductor manufacturing capacity, particularly legacy semiconductor capacity, do not address this lack of domestic capability. Conversely, legacy manufacturing capacity growth in China has outpaced the rest of the world. China's dominance in mature node (legacy) semiconductor manufacturing affects the global market. Even if tariffs could prevent Chinese device manufacturers from entering the U.S. market, these companies would likely increase their revenues internationally and continue to grow. This situation could diminish the relative competitiveness of U.S. device manufacturers in the global market. Consequently, using tariffs to promote the onshoring of semiconductor manufacturing to the United States is not a viable solution to the problem of China's overcapacity in mature node chips.

While the U.S. continues to grow its domestic semiconductor manufacturing capacity through new foundries and associated investments, it takes time to bring production online. It is also important to recognize that the U.S. lacks domestic sourcing capability for key inputs to the semiconductor supply chain, beginning with certain critical minerals and rare earth elements. The U.S. also does not produce polysilicon in quantities necessary to support commercial chip manufacturing at scale. Polysilicon is a key input for wafer fabrication, for which the U.S. is heavily dependent on global suppliers.

Moreover, the industry currently possesses limited capacity to manufacture substrates (also known as "wafers"), which are critical components that serve as the foundational platforms for constructing electronic circuits. As the fundamental building blocks of semiconductors, substrates are essential to the integrity and performance of electronic systems. In addition, the U.S. semiconductor industry lacks sufficient capability in semiconductor packaging – the crucial process of creating printed circuit board assemblies ready for integration into electronic devices.

To achieve a sufficiently robust semiconductor industry, the United States must address these critical gaps in its semiconductor ecosystem. In addition to substrates and packaging, the U.S. needs more supply of glass and laminate.

Derivative Products

NFTC specifically requests that SME and SME components are not listed in semiconductor derivative annexes. Given the ubiquity of semiconductors and their derivatives within SME and SME components, which themselves are subject to this investigation, including these derivative products in the SME value chain is counterproductive.

NFTC is concerned that tariffs on semiconductors and other ICT derivative products will significantly increase the cost of building AI datacenters. These datacenters, and the computing power that they contain are critical to U.S. national security objectives of maintaining AI dominance over China. For the most cutting-edge datacenters, the largest costs are GPU, CPU and TPU servers (HS Code 8471), accounting for 50% or more of the total cost of the datacenter build-out.

NFTC urges BIS to table any action targeting derivative products containing semiconductors as part of this investigation. Imposing a remedy on any product that contains a semiconductor will affect thousands of downstream products—some of which are complex ICT equipment, while others would include everyday products ranging from lamps to ice makers and electric toothbrushes.

It is not necessary to address derivative products as part of this investigation to protect national security. Semiconductors and derivative products containing semiconductors are substantially separate products and markets and there is little risk that importers could circumvent any 232 remedy semiconductors by importing entirely different downstream products that contain semiconductors.

Moreover, as noted above, the range of derivative products containing semiconductors is so broad that any universal remedy that applies across the board to all derivative products would be ineffective. It would make more sense and be a better use of the Department's resources to focus this investigation on semiconductors and semiconductor manufacturing equipment, develop non-tariff solutions to enhance domestic investment in those products and leave semiconductor-containing products out of the investigation entirely.

As the Department evaluates the impact of current trade policies, including foreign government subsidies and predatory trade practices, on imports of the vast array of downstream products that incorporate semiconductors, NFTC urges consideration of non-tariff actions. If required, however, tariffs or import quotas should be sequenced to take into account the feasibility and lead time necessary to actually onshore production without penalizing projects currently being undertaken.

We also urge against repeating the broad derivatives scope that was adopted for the recently adjusted Section 232 tariffs on aluminum products. Further, we request that the Department exclude any "used" downstream products incorporating semiconductors, as such goods are frequently sold through micro and small businesses, and the exclusion of such "used" goods would not substantially undermine the national security objectives of the Department. The further downstream a derivative product is, the harder it is for importers to have visibility into the information that U.S. Customs and Border Protection requires to enter the goods and

calculate the duty, such as having to report the weight and value of covered inputs and the country where these products were produced. These are not data elements that importers would normally have access to, and they are exceedingly difficult to replicate the further downstream the imported product is from the primary product.

Other factors – additional information

NFTC calls for strong leadership to make sure U.S.-made chips are globally competitive, not disadvantaged in the global market. China's semiconductor strategy is 10+ years in the making and gaining traction: indigenize the development and production of chips to ensure a robust supply locally, export more and isolate the U.S. 125% tariffs, Country-Of-Origin enforcement change, and other actions that directly target Made in America chips. Investments in U.S. semiconductor manufacturing are important for U.S. national security and economic growth; a positive agenda to strengthen investment and production is urgently needed. At that same time, even if the Administration decides that imposing tariffs is necessary from a national and economic security perspective, tariffs on semiconductors and SME must be strategic and prioritized.

The revitalization of the American manufacturing industry relies on industrial hardware, and software to support the automation needed to make many projects successful. The hardware includes electronic devices that govern, direct and move products through the manufacturing line from Programmable Logic Controllers (PLCs), essentially industrial computers, to motors and drives, all use electronics designed to support customer specifications. Different programming but the same hardware supports every industry from aerospace and defense to semiconductors and automotive. This hardware and the supportive software are critical to the next generation of manufacturing in the U.S., particularly as shop floors become more connected.

Other factors – recommendations

NFTC recommends that the U.S. government seek to avoid any disruptions in the availability of legacy chips, which would negatively affect U.S. manufacturing and related downstream economic activities. Using tariffs alone to promote the onshoring of semiconductor manufacturing to the U.S. will not be enough to solve the problem of China's geographic overconcentration in mature node chips. A positive agenda to strengthen investment and make U.S. manufactured chips an advantageous choice in global markets is needed. This agenda must address the following structural factors that constrain our ability to accelerate semiconductor manufacturing domestically:

- Construction of a semiconductor fabrication facility is a massively complex undertaking requiring thousands of pieces of highly specialized equipment and thousands of worker hours. In the United States, this process takes longer than almost anywhere else in the world.[4]

- Permitting inefficiencies are a key cause of construction delays. As far back as 2017, a report by White House advisors noted that "the combination of the current Federal and state permitting and review processes … can be slow, unpredictable, and lacking in transparency," and that "improving permitting could yield a step change in the pace of

[4]https://www.tomshardware.com/tech-industry/semiconductors/us-chip-fab-construction-is-among-the-slowest-in-the-world-a-complex-web-of-regulations-is-to-blame-according-to-study

U.S. semiconductor foundry innovation."[5] Five years and two administrations later, permitting issues were still creating bottlenecks for fab construction.[6] Permitting reform, including increased interagency cooperation to expedite federal and local government regulatory approvals for new wafer fabs and backend assembly, test and packaging facilities in the U.S. should be considered.

- Workforce shortages are another key factor slowing the growth of the semiconductor industry in the United States, with a projected labor shortage of up to 146,000 needed workers between 2024 and 2029.[7] Semiconductor industry representatives forecast that close to 60% of potential new jobs in the sector risk going unfilled at the end of this decade.[8]

Additional non-tariff mechanisms to bolster U.S. semiconductor manufacturing, including regulatory support and additional investment incentives should seek to address:

- Tax policy can have a significant positive impact on the semiconductor industry. For example, the investment tax credit established for advanced semiconductor manufacturing has proven successful and should be extended and expanded to sustain significant semiconductor manufacturing activity. Domestic manufacturing incentives could include preferential tax treatment for semiconductors, including PCB and PCBA manufacturing, and would be consistent with this Administration's goal of supporting a competitive business environment.

- Coordination with other economic security tools, such as export controls and alignment with other Sec. 232 investigations on related products, should seek alignment with broad policy goals and interagency processes.

- International cooperation with like-minded and trusted trading partners can take the form of including supply chain security agreements and/or the establishment of a new semiconductor-focused plurilateral group built around common economic and national security objectives of aligning export controls, addressing overcapacity and transshipment concerns, etc.

NFTC strongly believes that tariffs are unnecessary and counter-productive for addressing U.S national security concerns. Should the U.S. government decide that imposition of tariffs becomes necessary and inevitable, we respectfully ask that they be narrowly scoped to address specific harms caused by imports:

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[5]https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_ensuring_long-term_us_leadership_in_semiconductors.pdf

[6] https://www.csis.org/analysis/streamlining-permitting-process-fab-construction. *See also*, https://cset.georgetown.edu/publication/no-permits-no-fabs/

[7]https://www.mckinsey.com/industries/semiconductors/our-insights/reimagining-labor-to-close-the-expanding-us-semiconductor-talent-gap

[8]https://www.semiconductors.org/chipping-away-assessing-and-addressing-the-labor-market-gap-facing-the-u-s-semiconductor-industry/

- Tariffs should not apply on semiconductors for which adequate capacity does not exist in the United States. This applies with respect to current availability of semiconductor types and technology nodes, as well as quantity of available U.S. supply.

- Tariffs should not apply to semiconductors that are designed, fabricated, or packaged in the United States, nor to SME manufactured in the United States. Tariffs should similarly not apply on semiconductors sourced in jurisdictions whose governments are closely aligned with U.S. security and foreign policy interests.

- Tariffs should not apply on semiconductors produced by, or imported from, companies or countries that are making significant investments in U.S. semiconductor production or other segments of the U.S. semiconductor supply chain. Tariffs should reward and incentivize, rather than punish companies for making significant investments in bolstering and growing U.S. semiconductor manufacturing capacity:

We also respectfully offer the following recommendations to facilitate smooth implementation while mitigating harmful effects on industry:

- BIS should consider a delayed implementation date so that industry can adjust its supply chains before incurring additional costs.

- The Administration should coordinate its actions under other 232s on copper and critical minerals to ensure ready supply in the U.S. of these materials. For instance, the Administration should ensure that the various 232 tariffs are not "stacked" so that a finished product that relies on semiconductors and copper and critical minerals would not be paying the 232 tariffs three times.

- Antimony, gallium, germanium and indium are needed to produce semiconductors. One of the main sources of these critical minerals is the People's Republic of China. China imposed its own export control measures on some of these critical minerals. Adding 232 tariffs on these critical minerals makes it even more difficult to shift supply chains from China to other affordable options. Domestic manufacturing incentives could include preferential tax treatment for semiconductors including PCB and PCBA manufacturing, and would be consistent with this Administration's goal of supporting a competitive business environment.

- BIS should establish an exclusion process for any duties imposed pursuant to this investigation. Several critical inputs for SME have sole global sources that are outside of the U.S. An exclusion process ensures that national security interests are addressed within the practical realities of the domestic economy without undercutting the global competitiveness of U.S. companies.

- BIS should create a drawback process should tariffs are imposed as a result of this national security investigation. It would be detrimental to U.S. manufacturers and the workers and communities that depend on them if the tariff costs on imported semiconductors and SME made it more difficult for them to compete effectively in global markets. Duty drawback must be available for any tariffs resulting from this investigation, as this would help ensure that U.S. companies remain globally competitive.

- The customs clearance procedures should be clear and simple. Specific information requirements, such as the declaration of country of origin and content ratio as seen with tariffs on aluminum derivatives, may create confusion and pose a significant burden on companies without clear guidance and adequate time for companies to gather necessary information. Compliance challenges arising from complex customs procedures should be mitigated to the maximum extent possible, as they could cause an increase in operational costs and delays in procurement procedures, further reducing the competitiveness of related businesses.

About NFTC

The NFTC, organized in 1914, is an association of U.S. business enterprises engaged in all aspects of international trade and investment, including maintaining competitiveness and technological leadership. Our membership covers the full spectrum of industrial, commercial, financial, and service activities, accounting for over $6 trillion in revenue and employing nearly 6 million people in the United States.

Our goal is to always strengthen U.S. industries and their competitiveness, which underpin and protect national security and economic security interests. Robust trade relationships are central to economic and national security. NFTC's National Security Policy Initiative brings the voice of business to policymakers on global security issues affecting international trade. Our data driven recommendations support American competitiveness and technology leadership that is central to our national security.

Thank you for your attention. We welcome the opportunity to provide additional information and address any questions you may have. Please contact me at jchu@nftc.org or via mobile at (703)225-8519.

Sincerely,

Jeannette L. Chu
Vice President, National Security Policy and
Executive Director, Alliance for National Security and Competitiveness

Appendix

cc: Jeffrey Kessler
Under Secretary of Commerce for Industry and Security
Eric Longnecker, Deputy Assistant Secretary for Technology Security

Appendix to NFTC submission in response to
Notice of Request for Public Comments on Section 232
National Security Investigation of Imports of Semiconductors
and Semiconductor Manufacturing Equipment
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BIS-2025-0021
X-RIN 0694-XC121

NFTC understands and supports the national security concerns and objectives that are driving this investigation. To meet these important goals, it is crucial for the United States to remain a leader in semiconductor technology and innovation. Strengthening the U.S. semiconductor ecosystem will enhance the competitiveness of U.S. industry in the global marketplace. This investigation presents an opportunity for the U.S. government to gather data on securing critical supply chains without compromising U.S. innovation. Instead of broad import restrictions on the semiconductor supply chain, targeted policies, including exclusions, strategic trade agreements, and risk-based import controls can work synergistically to bolster national security while sustaining U.S. technology leadership and domestic growth.
We are pleased to provide observations and recommendations in response to the questions posed by BIS in the FR Notice. The responses below reflect input from NFTC members, in particular those members who design, develop, and manufacture SME in the U.S., in addition to others involved in the SME sector.

1. **The current and projected demand for semiconductors (including as embedded in downstream products) and SME in the United States, differentiated by product type and node size;**

At a high level, demand for SME in the United States is a function of production capacity growth over time. Table 1 below, from TechInsights, shows 300mm wafer capacity as % of global capacity for the United States. U.S. capacity share is projected to increase 4.2 points from 6.4% in 2024 to 10.6% in 2030, as a result of U.S. government incentives and continued onshoring efforts by downstream customers. For example, TSMC recently announced $100B of additional investment in Arizona, bringing its total U.S. commitment to $165B to support the strong demand from its customers.

Table 1: 300mm Wafer Capacity Share by Country

300mm Wafer Capacity Share	2023	2024	2025	2026	2027	2028	2029	2030
United States	6.9%	6.4%	6.7%	7.0%	8.0%	9.1%	10.1%	10.6%

2. The extent to which domestic production of semiconductors can or is expected to be able to meet domestic demand at each node size for each product type, and similarly the extent to which domestic production of SME can or is expected to be able to meet domestic demand;

Today, U.S. semiconductor manufacturing facilities take longer to launch at scale than foreign facilities and cost at least 10% more to operate. For example, the building phase alone of a new fab can take up to four years. Given the capacity of the facilities that are currently available and planned, and the lack of any U.S. facilities in multiple advanced chip production nodes, domestic manufacturing cannot offset reduced imports. Given the increasing domestic demand for semiconductor wafer capacity through 2030 shown in Table 1 above, we expect the demand for SME to also increase to meet domestic demand. Table 2 below shows survey results of SME suppliers' expectation of their revenue mix by region through 2027, conducted by SEMI in December 2024. SME spending in the U.S. is expected to increase 4 points from 10.5% in 2024 to 14.5% in 2027, above the 1.6 point increase in domestic 300mm semiconductor wafer capacity share during the same period. Multiple leading-edge foundry, logic, and DRAM fab projects in the U.S. are underway today and are expected to require significant SME going forward.

Table 2: SEMI Survey results of SME spending by region

Semi Equipment Spending Share	2023	2024	2025	2026	2027
North America	11.6%	10.5%	10.7%	13.3%	14.5%

Source: SEMI, December 2024 Survey of semiconductor equipment suppliers

The U.S. is the leader of SME globally and some of the largest SME firms in the world are American. Over the last several years, leading American SME companies have increased sales to domestic fab projects. According to Semiconductor Equipment Manufacturing International (SEMI), the domestic revenue mix in 2023 and 2024 for a leading American SME company is above the global average of equipment spending in North America in Table 2.

Each SME supplier's products are distinguished by proprietary technology and expertise tailored to the specific requirements of device manufacturers. Additionally, semiconductor manufacturers perform comprehensive optimization, considering the interactions of various materials and equipment during process development. Thus, establishing new capacity, particularly for advanced manufacturing, necessitates substantial time, resources, and coordination.

Moreover, the production of semiconductors and SME requires a comprehensive supplier ecosystem, including providers of wafers, chemicals, gases, parts, subsystems, and components. The majority of these supplies are obtained from outside the U.S. Furthermore, regardless of the location where SME final assembly occurs, the inputs and parts for SME are sourced globally.

3. The role of foreign fabrication and assembly, test and packaging facilities in meeting United States semiconductors demand, and similarly the role of foreign supply of SME in meeting domestic demand;

4. **The concentration of United States semiconductors imports (including as embedded in downstream products) from a small number of fabrication facilities and the associated risks, and similarly the concentration of United States SME imports from a small number of foreign source,;**

It is important to recognize that the semiconductor supply chain is inherently global, as companies worldwide have developed specialized technologies and supply networks over decades, contributing unique strengths to industry. Each supplier's products are differentiated by technology based on intellectual property (IP), technology, and know-how, and at times, tailored to individual specifications of device manufacturers. Additionally, semiconductor manufacturers conduct meticulous process flow optimization, including the interaction of various materials and equipment, during semiconductor process development. Therefore, bringing new capacity online, especially for advanced manufacturing, requires significant time, resources, and coordination. The increased costs and time associated with this type of re-optimization would make U.S. device makers less capable of investing in R&D, negatively impacting the competitiveness of U.S. chipmakers. Building new supply chains is complex. In fact, the long-term costs of duplicating existing supply networks in new locations may exceed the intended impact of tariffs themselves.

For these reasons, fostering international collaboration and leveraging the respective strengths of U.S. partners and allies remains crucial towards ensuring the resilience and competitiveness of the U.S. semiconductor industry. Establishing a new supply chain in a new location would lead to substantial financial challenges, reducing SME manufacturers' and device makers' capability to invest in R&D and hindering the progress of the U.S. semiconductor industry. Specifically, semiconductor device architecture inflections will enable AI compute advancement – investment in R&D will favorably position America in this "Must-Win" battle for U.S. leadership in AI.

5. **The impact of foreign government subsidies and predatory trade practices on United States semiconductor and SME industry competitiveness;**

The Chinese government provides substantial subsidies to its semiconductor-related industry and has been steadily strengthening its indigenous semiconductor ecosystem. For example, with respect to semiconductor manufacturing equipment, sales of Chinese companies are increasing year by year. The indigenous production of key parts for semiconductor manufacturing equipment is also advancing.

6. **The economic or financial impact of artificially suppressed semiconductor and SME prices due to foreign unfair trade practices and state-sponsored overcapacity;**

In the past, Chinese unfair trade practices and state support, such as subsidy policies leading to overcapacity and industry development without a need to turn a profit, have caused market disruption in sectors such as solar panels, flat panel display (FPD), steel, shipbuilding, and EVs. Chinese-made semiconductor manufacturing equipment has already begun to expand overseas. While it is important for the United States to address these unfair business practices, excessive measures should not undermine the competitiveness of the U.S. industry. Disruption in the existing supply chain, even in the short term, could significantly affect the growth and competitiveness of the U.S. semiconductor industry.

7. The potential for export restrictions by foreign nations, including the ability of foreign nations to weaponize their control over semiconductors and SME supply chains;

The following commodity supply chains can be weaponized and therefore impair domestic SME manufacturing:

Permanent Magnets	China	Heavily dependent on China for magnets for process controls and in OEM robotics/motors/pumps. China dominates the Rare Earth Element supply used for manufacturing magnets.
Yttria	China	Heavily dependent on yttria for process controls. China dominates yttria supply.
Aluminum	China	Government restrictive trade measures on aluminum are driving concerns. Providing tariff relief for "U.S.-Cast" derivative aluminum.

Additionally, the sourcing of the following raw and precursor materials pose a significant weakness to the resiliency of SME manufacturing capability in the U.S.:

- China: Rare earth elements and critical minerals.
- Russia: Iron and steel components, hard alloys, and titanium.
- Both China & Russia: Extruded aluminum, Cu and Cu-based alloys.

8. The feasibility of increasing domestic semiconductors capacity (in different product types and node sizes) to reduce import reliance, and similarly the feasibility of increasing domestic SME capacity to reduce import reliance;

Domestic semiconductor capacity can be increased by facilitating an investment ecosystem for greenfield and brownfield opportunities to expand, modernize and optimize production and support public-private partnerships like the SMART Manufacturing USA institute focused on digital twins in semiconductor manufacturing. The U.S. existing manufacturing base for legacy semiconductor manufacturing is ripe for optimization and process improvements through the application of the latest industrial technologies and process improvements to maintain their competitiveness in the markets they serve. Further, the opportunities to lead in the development of semiconductor manufacturing technology through the use of digital twins to design, test and optimize semiconductor manufacturing puts the SMART institute and the Manufacturing USA program in a key role in driving innovation.

9. The impact of current trade and other policies on domestic semiconductor and SME production and capacity, and whether additional measures, including tariffs or quotas, are necessary to protect national security;

NFTC strongly believes that tariffs or quotas would be counterproductive to the U.S.'s ability to maintain technological superiority over China and protect U.S. national security, as such tariffs or quotas would significantly increase costs for all manufacturers involved in the U.S. semiconductor ecosystem. This would reduce the capacity of U.S. device makers and SME manufacturers to invest in research and development, ultimately decreasing their competitiveness in the global market. It is preferable and crucial to promote the healthy

development of the U.S. semiconductor industry and ensure U.S. competitiveness by leveraging the capabilities of suppliers from U.S. partners and allies and deepening cooperation.

10. What product types and node sizes could be built only using SME from U.S. companies;

Certain SME and technologies from U.S. companies play a key role in the fabrication of chips. For example, the U.S.-made tools are most often essential for their advanced capabilities in deposition and etching, including conformal processes, at very small physical dimensions. These U.S.-made tools have played a key role in the manufacturing of the following chips:

1) High Performance Processors used in servers, supercomputers, and advanced AI applications,
2) Advanced Memory chips such as cutting-edge DRAM and 3D-NAND,
3) ASICs such as those used in high speed computing and cryptocurrency calculations,
4) RFICs used for 5G and 6G technologies as well as military communications,
5) Analog Mixed Signal devices used for a wide variety of applications and
6) FGMAs used in aerospace, defense, and complex computing systems.

The U.S.-made tools are most often essential for their advanced capabilities in deposition and etching, including conformal processes, at very small physical dimensions. All sub-5nm devices need these advanced tool capabilities, and most sub-16nm require some of these. In general, SoC applications at or below 5nm require domestic and foreign-made tools. It is important to align any potential tariff and non-tariff measures, including export controls, to ensure coherency among the various countries, to precisely address national security concerns while not adversely impacting technological competitiveness.

11. What SME is manufactured abroad and faces limited competition from U.S.-made products;

Today, makers of Lithography equipment face limited competition from U.S.-headquartered companies, though U.S. firms do contribute to finished products. For example, there is no U.S. equipment maker of Extreme Ultraviolet (EUV) lithography tools, which are made solely by ASML. The company sources and manufactures critical components of its tools in the United States, which are then assembled into final products in the Netherlands. Similarly, advanced Deep Ultraviolet (DUV) lithography tools are made by Nikon and Canon of Japan as well as ASML, again using U.S. content and technology. There is no significant U.S. competitor producing DUV lithography tools.

12. What SME parts or components are only available outside the United States;

Even though most of the critical components used in SME have at least one U.S. supplier, the U.S. semiconductor industry depends on foreign suppliers. The specific components that can only be sourced from outside the U.S. include:

1) High Performance quartz halogen lamps used in many types of thermal processing tools, such as RTP and deposition,
2) Photomultiplier tubes that are used in inspection tools,

3) Rotary Encoders used in almost all tools for micro-positioning and motion control, and
4) Soft magnetic iron and specialized electromagnets used in ion implantation, metrology, and inspection.

While there is some production capability for these components in the U.S., almost all of the production of these parts is from suppliers abroad.

13. Where the U.S. workforce faces a talent gap in production of semiconductors, SME or SME components;

Manufacturing semiconductors and downstream products is highly sophisticated, and it requires a well-trained workforce. Given the current gaps in the U.S. workforce, substantial government investment will be necessary to build up a U.S. workforce with the expertise necessary to sustain a robust U.S. semiconductor ecosystem centered on the manufacturing of semiconductors and SME. Without a significant increase in these kinds of workers in the U.S. economy, it will be extremely challenging to achieve a major increase in the domestic production of semiconductors and downstream products. NFTC recommends investing in Science, Technology, Engineering, and Mathematics ("STEM") training pipeline programs, advanced engineering programs for semiconductor design and manufacturing, and developing practical training programs for production operations. In parallel, we recommend launching a "train-the-trainer" program with technical experts from partner countries (e.g., Taiwan) to establish international engineering exchange initiatives to upskill the workforce in exchange for tariff relief or defense funding.

The talent gap is greatest in the need for trained and experienced Technicians, Field Service Engineers, Process Engineers, and other engineering positions, and this gap will continue to increase. Accordingly, the U.S. risks falling behind unless proactive incentives and workforce development programs are implemented, including:

- Job training programs through U.S. universities and community colleges, and
- Increasing the proportion of domestic students in STEM degrees at undergraduate and graduate level.

In addition to long-term talent development, the Administration can take actions to ensure that U.S. semiconductor companies can address short-term labor shortages through smart immigration policy that affords businesses access to highly skilled foreign workers, particularly those with specialized skills not available in the United States, as well as through efficient and predictable processing of "deemed export" license applications, which allow businesses to undertake valuable semiconductor supply chain activities here in the U.S. rather than being forced to offshore these activities due to the unavailability of qualified labor. Immigration policies to effectively retain international students trained in the U.S. would also help address talent gaps across the semiconductor ecosystem.

Taken together, the measures discussed above will accelerate knowledge transfer, close critical skills gaps, and continuously grow and retain the pool of qualified talent needed to support domestic and allied semiconductor production.