Comments of the
Semiconductor Industry Association

on

Advanced Notice Regarding the Identification and Review of Controls for Certain Foundational Technologies

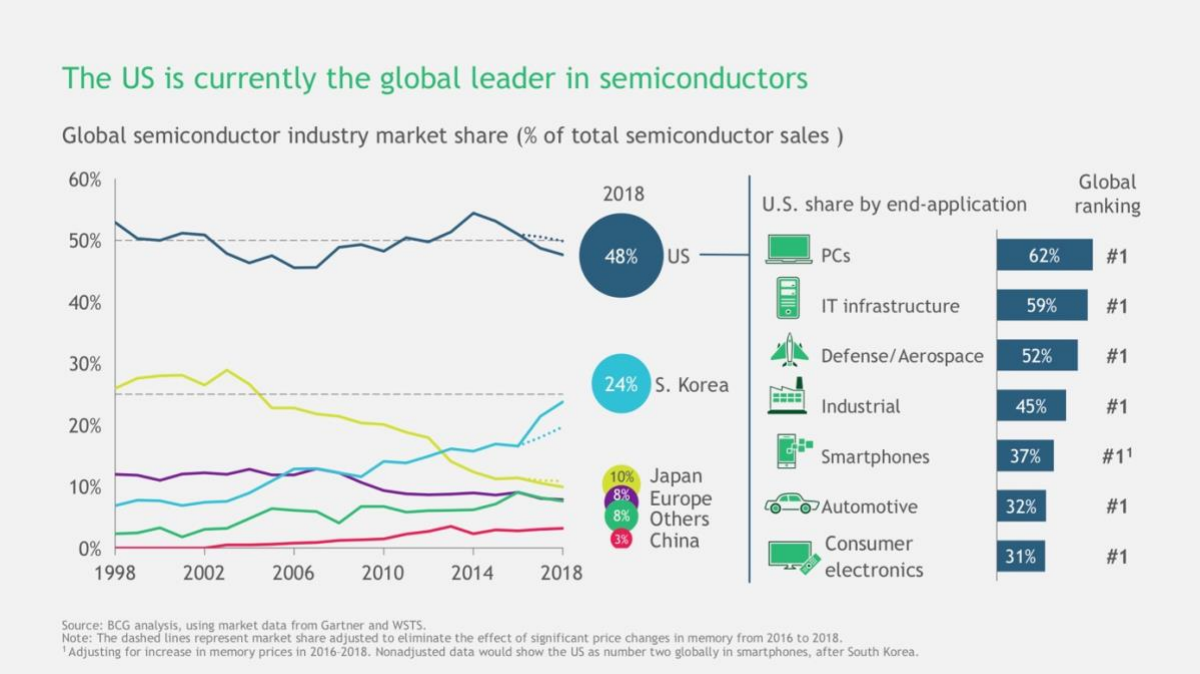
85 Fed. Reg. 52934 (Aug. 27, 2020)
85 Fed. Reg. 64078 (Oct. 9, 2020)
RIN 0694-AH80
Docket # 200824-0224

Submitted November 9, 2020

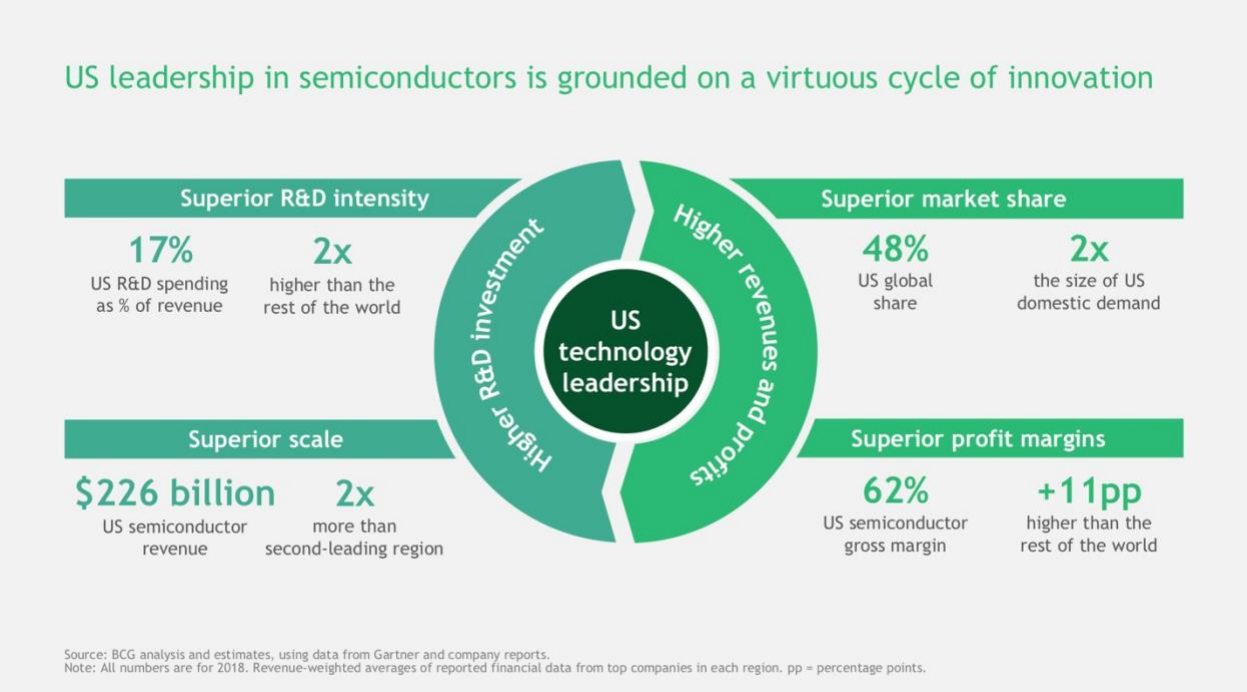
The Semiconductor Industry Association (SIA) is the trade association representing the semiconductor industry in the United States. SIA member companies are engaged in the research, design, and manufacture of semiconductors. The U.S. is the global leader in the semiconductor industry, and continued U.S. leadership in semiconductor technology is essential to America's continued global economic and technology leadership. More information about SIA and the semiconductor industry is available at www.semiconductors.org.

Introduction

Semiconductors are complex products critical to the functioning of everyday consumer electronics, communications, and computing devices in the automotive, industrial, financial, medical, retail, and all other sectors of the economy. They are also critical components for future technologies, such as artificial intelligence, quantum computing, and 5G/6G telecommunications. Few industries, if any, have a supply chain and development ecosystem as complex, geographically widespread, and intertwined as the semiconductor industry. Furthermore, the U.S. semiconductor industry is characterized by an ever-diversifying range of business models and relationships crossing national and regional boundaries. The United States is the world leader in the semiconductor market, with U.S. firms accounting for nearly half of all semiconductor device and equipment sales and an even higher percentage of critical design tools



Key to U.S. success in semiconductors is access to overseas markets. In fact, the U.S. semiconductor industry relies on overseas markets for more than 80% of its sales, which U.S. firms then re-invest back into their research and development efforts. They then use the results of these efforts to out-innovate their foreign competition. A report by the Boston Consulting Group (BCG) termed this phenomenon a "virtuous cycle" that is essential to maintaining U.S. leadership in semiconductor technology.[1]



[1] https://www.bcg.com/en-us/publications/2020/restricting-trade-with-china-could-end-united-states-semiconductor-leadership

Maintaining a strong U.S. semiconductor research, design, manufacturing and supplier base is, in itself, a national security issue. As stated in both the House and Senate versions of the 2021 National Defense Authorization Act: *"The leadership of the United States in semiconductor technology and innovation is critical to the economic growth and national security of the United States."*[2] Given how important the economic vitality of the U.S. semiconductor industry is to national security, it is critical to ensure that U.S. export controls are narrowly tailored and designed to achieve specific national security objectives and implemented in a multilateral manner, without undermining innovation and the technology base in the United States. It is important, therefore, that government and industry work together to ensure that U.S. policies are crafted in a manner to both enhance our national security as well as continue to allow the semiconductor industry in the U.S. to grow and innovate.

To that end, SIA has long been a partner of the U.S. Government to provide support regarding reforms and modernization of export control policy, particularly with respect to semiconductors. SIA appreciates the opportunity to provide its comments in response to the ANPRM regarding the identification and review of controls for certain foundational technologies. SIA supports the effort the Administration is undertaking to draw upon all available government, industry, and academic resources to identify and propose controls on uncontrolled foundational technologies essential to the national security of the United States, so long as the effort is consistent with the standards set forth in the Export Control Reform Act of 2018 (ECRA), 50 U.S.C. §§ 4801-4852.

Semiconductors are a key enabling technology of virtually all electronic and information technology products, and as such, are a "foundational" technology under the common understanding of the term. As set forth in these comments, however, semiconductors as a general category should not be designated specifically as stand-alone foundational technology for control outside of analysis of factors set forth in ECRA. Below are a series of comments and suggestions the SIA has developed for BIS to consider as they consider formulating foundational controls pertinent to the semiconductor industry.

[2] H.R. 6395 § 1824(b) and S. 4049 § 1098 (b). Similarly, the Department of Defense's "Microelectronics Innovation for National Security and Economic Competitiveness" strategy underscores the importance of U.S leadership in semiconductor technology to U.S. national security. See https://www.acq.osd.mil/se/initiatives/init_micro.html. As stated in a report by the President's Council of Advisors on Science and Technology: "Cutting-edge semiconductor technology is also critical to defense systems and U.S. military strength, and the pervasiveness of semiconductors makes their integrity important to mitigating cybersecurity risk." "Report to the President: Ensuring Long-Term U.S. Leadership in Semiconductors" (Jan. 2017), available at https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_ensuring_long-term_us_leadership_in_semiconductors.pdf.

Summary of SIA Comments

(1) Controls Should Not Interfere With Broader National Strategy Objectives

Export controls can play an important role in safeguarding U.S. national security and foreign policy objectives, but they should primarily be used in a narrow and targeted way to achieve a specific national security goal rather than as a tool of a broader industrial or protectionist economic and trade policy. When controls are used, they should not interfere with a comprehensive national strategy designed to enhance U.S. leadership in semiconductor technology.

- SIA Comment 1: Foundational semiconductor controls should not be a proxy for, or imposed in contravention of, a broader overall U.S. Government strategy for enhancing a robust U.S. semiconductor industry.

- SIA Comment 2: BIS should utilize end-use and end-user controls as part of, or instead of, list-based controls on foundational technologies.

- SIA Comment 3: Many policy concerns are better addressed through tailored BIS actions specific to transactions and companies rather than through industry-wide technology controls.

- SIA Comment 4: BIS should study export control history and the impact previous impositions of unilateral controls have had on the items at issue before imposing new controls.

- SIA Comment 5: Commerce and the other export control agencies need additional funding to conduct this effort properly.

(2) Foundational Technologies Should Be Narrowly Defined

Foundational technologies should be narrowly defined in accordance with the ECRA guidelines.

- SIA Comment 6: The foundational “technologies” identification and control effort should be limited to identifying and controlling foundational “technologies,” not “commodities” or “software.”

- SIA Comment 7: Any EAR definition of “foundational technologies” should be tied to the standards and terms in ECRA and the EAR.

- SIA Comment 8: Any controls proposed or imposed should be tailored to focus on core, well-defined technologies in a manner consistent with the structure of the EAR.

- SIA Comment 9: The standards set out in this comment should apply equally to tooling, testing, and certification equipment.

(3) USG Should Define National Security Risks

The U.S. government is best-positioned to identify and define the security risks that warrant controls on foundational technologies.

- SIA Comment 10: Proposed controls should be limited to addressing national security concerns, not trade policy issues.

- SIA Comment 11: BIS bears the burden of justifying how each technology proposed for control as "foundational" meets ECRA's standards.

- SIA Comment 12: The administration must identify the specific national security threats to be addressed by new foundational technology controls that are not already being controlled.

(4) Controls Should Be Multilateral or Plurilateral To the Extent Possible and Consistent With International Standards

As required by ECRA, controls on foundational technology should be multilateral or plurilateral in order to be effective and to minimize harm to the U.S. semiconductor industry.

- SIA Comment 13: The U.S. Government should work to develop plurilateral arrangements with semiconductor-producing nations for tailored controls when unilateral controls would be counter-productive and regime-based controls would be too difficult to achieve.

- SIA Comment 14: Foundational technologies identified for unilateral controls should be exclusively available in the United States.

- SIA Comment 15: Unless there is an emergency need, BIS should delay the imposition of any new controls until the technology can be controlled multilaterally or plurilaterally.

- SIA Comment 16: Unless for well-supported national security reasons, BIS should rescind any unilateral controls not agreed to by a regime or arrangement after three years of effort.

- SIA Comment 17: Proposed controls should be consistent with regime standards for control – or the regime standards should be changed to match any controls with a novel policy purpose before they are imposed domestically.

(5) USG Should Carefully Consider Economic Harm, Impacts on Research, and Foreign Availability

The government should take into account the factors enumerated in ECRA, including adverse impacts on the semiconductor industry in the U.S., industry efforts to conduct research to maintain technology leadership, and foreign availability.

- SIA Comment 18: Foundational technologies should not be identified and

restricted if a unilateral control would significantly harm research into the technology in the United States – and great weight should be given to industry and BIS Technical Advisory Committees' comments about such harms.

- SIA Comment 19: BIS should neither propose nor impose new foundational technology controls unless and until it has fully considered the impact such controls would have on the U.S. economy.

- SIA Comment 20: The U.S. Government should mine existing government resources to identify foundational technologies of potential concern.

- SIA Comment 21: Information about the status of foundational technology development in the United States and other countries is best provided by individual companies.

(6) Procedures for Development and Implementation

BIS should adopt a transparent process for identifying foundational technologies and consider implementation measures to narrowly focus controls on foundational technologies.

- SIA Comment 22: BIS should conduct the foundational technologies identification and control exercise with as much transparency, outreach, and certainty as possible.

- SIA Comment 23: Not all new foundational technology controls need to be imposed on exports to all destinations equally.

- SIA Comment 24: With respect to any new foundational technology controls, BIS should adopt (i) an intercompany exemption for affiliates and (ii) an intra-company deemed export exemption for bona fide full-time regular foreign national employees.

- SIA Comment 25: Substantial resources should be committed to regularly reviewing, revising, and updating the CCL consistent with the standards and requirements in ECRA.

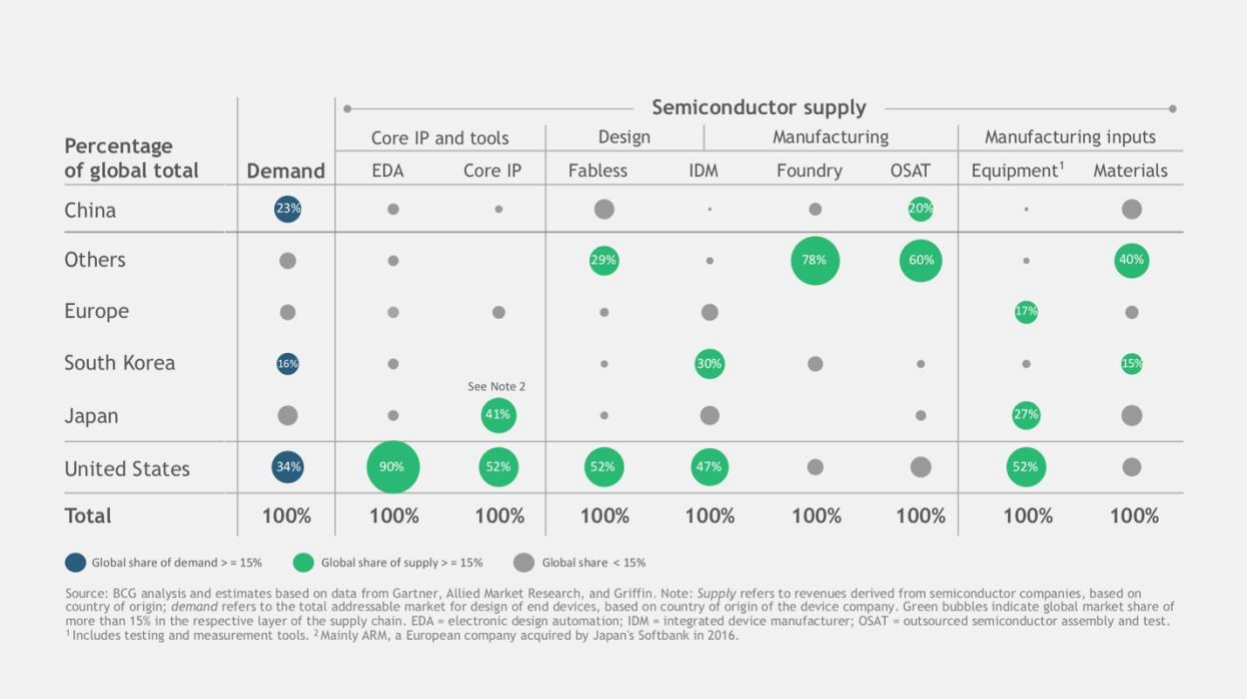
- SIA Comment 26: BIS should address in any proposed rules how companies should handle any newly controlled "foundational" technologies that are, at the time of the effective date, outside the United States or in the possession of foreign persons in the United States.

SIA's Comments on Foundational Technologies Are Both Different and Similar To Its Comments Regarding Emerging Technologies

The Export Control Reform Act (ECRA) standards for what should and should not be controlled as "foundational" technologies are identical to those identified as "emerging" technologies. Thus, for the sake of contributing to the official record on the government's consideration of the foundational technologies topic, most of our

comments below on process, definitions, and scope are similar to those in SIA's January 10, 2019 comments in response to BIS's requests for comments about "emerging" technologies. In essence, our comments in both documents acknowledge that the standards we propose would establish high standards for identifying and controlling emerging and foundational technologies. The standards are, however, no more than a distillation of the relevant standards in ECRA. We believe that Congress created the standards because, as stated several times in ECRA, unilateral controls should be rare and only in response to specific or emergency situations essential to U.S. national security. All other list-based controls are better addressed through the regular order and the well-tested process of working with our multilateral regime partners to develop and implement multilateral controls to (i) enhance their effectiveness and (ii) keep the United States on a level playing field with such countries, particularly with respect to widely available commercial technologies.

The main difference between the two sets of comments are that foundational technologies are, by definition, mature and likely to be ubiquitous (widely available, even if there are a small number of suppliers); in contrast, emerging technologies are less well-defined and may be more unlikely to be widely available. The semiconductor industry, in particular, is globally competitive with leading companies located around the world and dependent on a complex and globally integrated supply chain. As the chart from the BCG below indicates, while the U.S. has a strong position in the chip supply chain, it does not have a monopoly in any one segment of the semiconductor value chain – i.e. the design, manufacturing, or development of semiconductor technology.



It is important for the U.S. Government to recognize that any unilaterally imposed export controls of semiconductor technologies will primarily affect the operations of semiconductor companies in the United States, limiting their ability to export semiconductor technologies, but not necessarily preventing foundational semiconductor technologies going to countries of concern from other semiconductor-producing nations

that do not adopt similar controls.

Relevant Statutory and Regulatory Provisions

A. Statutory Standards Governing the Identification and Control of "Foundational" Technologies – and the Need to Define "National Security"

To guide our responses to BIS's requests, it is important to set out the statutory standards governing this effort because they set the guardrails for which technologies should and should not be identified and controlled as "foundational." Specifically, ECRA section 4817(a) requires the Administration to conduct an interagency effort to identify "foundational" technologies that "are *essential* to the national security of the United States" (emphasis supplied) and that are not now subject to a multilateral control on the Commerce Control List (CCL) of the Export Administration Regulations (EAR) or described on one of the other lists of technologies the U.S. controls for export. After a public notice and comment process, it requires the imposition of controls on their export, reexport, and in-country transfers consistent with the standards in the section and elsewhere in ECRA. *Id.* § 4817(b).

Although ECRA does not define "national security," BIS's notice includes illustrative examples of now-uncontrolled commercial technologies of national security concern to be addressed by the effort, specifically those that:

(i) could "support indigenous military innovation efforts" in China, Russia, and Venezuela;

(ii) are "being utilized or required for innovation in developing conventional weapons, enabling foreign intelligence collection activities, or weapons of mass destruction applications;" and

(iii) "have been the subject of illicit procurement attempts which may demonstrate some level of dependency on U.S. technologies to further foreign military or intelligence capabilities in countries of concern or development of weapons of mass destruction."[3]

These examples track ECRA's definition of a "dual-use" item, which is an item that has "civilian applications and military, terrorism, weapons of mass destruction, or law-enforcement-related applications."[4]

In deciding whether to identify such a technology as "foundational" and impose unilateral controls on its export, reexport, and in-country transfer, ECRA section 4817(a)(2)(B) requires the Administration to take in to account the:

(i) development of foundational technologies in foreign countries (i.e., their foreign availability);

[3] 85 Fed. Reg. at 52934.

[4] ECRA § 4801(2).

(ii) effect unilateral export controls imposed pursuant to this section may have on the development of such items in the United States; and

(iii) effectiveness of unilateral export controls imposed pursuant to this section on limiting the proliferation of foundational technologies to foreign countries.

In other words, every decision to identify and unilaterally control an item as "foundational" must be screened against these three standards, at a minimum. If an item is widely available outside the United States, it is not a good candidate for unilateral control under this ECRA section. If a unilateral control would harm development of the item in the United States, or would be ineffective at preventing its export to countries of concern, then it would equally not be a good candidate for a unilateral control under ECRA section 4817.

In addition, ECRA section 4817 is an element of the broader ECRA statement of policy for export controls in section 4811(1), which is that the United States should "use export controls only after full consideration of the impact on the economy of the United States and only to the extent necessary – (A) to restrict the export of items which would make a significant contribution to the military potential of any other country or combination of countries which would prove detrimental to the national security of the United States; and (B) to restrict the export of items if necessary to further significantly the foreign policy of the United States or to fulfill its declared international obligations."

As the association representing the fifth largest exporting industry in the United States, with a complex and globally integrated supply chain, SIA places great emphasis on Congress's next statement in ECRA section 4811(3) that "the national security of the United States requires that the United States maintain its leadership in the science, technology, engineering, and manufacturing sectors. . . . Such leadership requires that United States persons are competitive in global markets." This concept is fundamental to the ability of our member companies to continue investing in jobs and advanced research in the U.S. and should be a guiding principle for BIS and the other agencies as they study, identify, propose, and impose controls on technologies.

Finally, at the core of all these statutory requirements is effectively a requirement for the Administration to define for itself first what "national security" means in the context of the trade in technologies and other items that are not now controlled. Until it develops a common, whole-of-government definition or understanding, then it cannot properly know what changes to the EAR will further "national security" objectives. Thus, before beginning any interagency process that considers possible additional technologies or other items to add to the control lists, whether unilaterally or multilaterally, as "foundational," we respectfully request that the same agencies first define what the problem is that needs to be solved. This requires a common understanding within the Administration on what "national security" means in this context.

B. Unilateral List-Based Controls Must be *Tailored* to Address *Specific* National Security or Foreign Policy Concerns

ECRA sections 4811(5) states that "[e]xport controls should be coordinated with the

multilateral export control regimes. Export controls that are multilateral are most effective, and should be *tailored* to focus on those *core technologies* and other items that are capable of being used to pose a *serious* national security threat to the United States and its allies." (emphasis supplied). Subsection (6) goes on to state that "[e]xport controls applied unilaterally to items widely available from foreign sources generally are less effective in preventing end-users from acquiring those items. Application of unilateral export controls should be limited for purposes of protecting *specific* United States national security and foreign policy interests." (emphasis supplied).

C. Proposed Controls Should Be Consistent with the Standards for Control in the Multilateral Export Control Regimes

Consistent with the broader standards described above, ECRA section 4817(c) states that the Administration "shall propose that any technology identified pursuant to [this foundational technologies identification effort] be added to the list of technologies controlled by the relevant multilateral export control regimes." Although the provision allows for consideration of continued unilateral controls if the regime efforts are unsuccessful after three years, an implication of this provision is that the Administration should identify foundational technology controls with which the relevant multilateral regimes are reasonably likely to agree and that are consistent with the regimes' scopes of authority.

SIA's Specific Comments on Foundational Technologies

(1) Controls Should Not Interfere With a Broader National Strategy

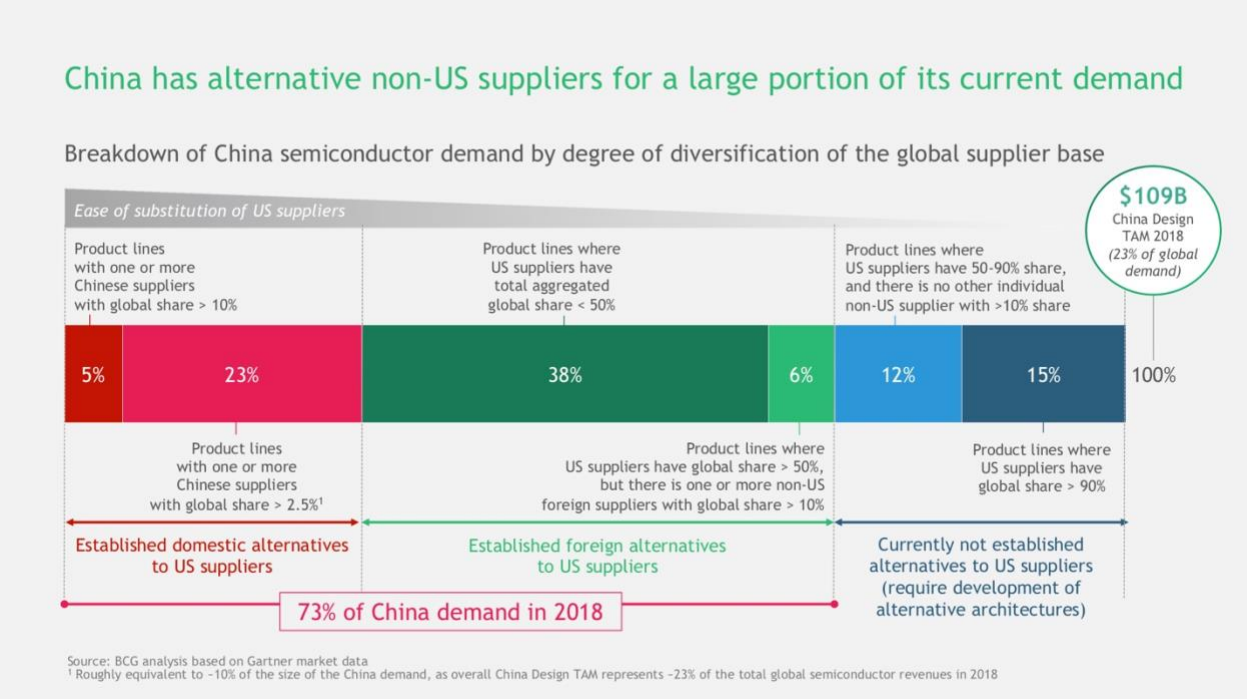
SIA Comment 1: Foundational semiconductor controls should not be a proxy for, or imposed in contravention of, a broader overall U.S. Government strategy for enhancing a robust U.S. semiconductor industry.

SIA respectfully requests the U.S. government consider its approach toward new controls on foundational semiconductor technologies as part of an overall analysis of its strategy for maintaining a healthy U.S. semiconductor industry. Export controls on specific technologies, when narrowly crafted to achieve a specific objective can play an important role in enhancing U.S. national security, but such action must not be used as a tool of industry protection – often, such goals of promoting the industry should be pursued through affirmative strategies and actions.

For instance, bipartisan legislation in Congress calls for incentives to promote domestic semiconductor manufacturing and invest in semiconductor research,[5] and the administration has also signaled the need to prioritize such incentives as a means of strengthening the U.S. semiconductor industry. Such an approach will likely advance

[5] See the "Creating Helpful Incentives to Produce Semiconductors for America Act" (CHIPS for America Act) (S. 3933, HR 7178); American Foundries Act (S. 4130). SIA's recommendations for strengthening the U.S. semiconductor industrial base is available in a white paper, "Strengthening the U.S. Semiconductor Industrial Base: Analysis and Recommendations" (available at https://www.semiconductors.org/wp-content/uploads/2020/06/Strengthening-the-US-Semiconductor-Industrial-Base.pdf).

U.S. national security interests in foundational semiconductor technologies far more than any other single action. In fact, excessive unilateral export controls likely will undermine U.S. technology leadership, particularly for technologies that are widely available outside the United States, and would create incentives for non-U.S. companies to develop competing products. In fact, the BCG found that 73% or more of U.S. semiconductors can be immediately substituted by foreign competitors with 10% or more market share.



The shorthand reference to our policy suggestion is that while export controls are an important tool for national security, the United States should place greater emphasis on a "run faster" strategy to maintain technology leadership – except with respect to items that are clearly identified as being directly related to a military-, intelligence-, or proliferation-related concern.[6] That is, to truly advance that which is "essential to national security" in the foundational semiconductor sector the U.S. government must primarily use other tools to ensure a strong domestic semiconductor research, design, and manufacturing presence.

Strengthening U.S. semiconductor competitiveness, including chip design and manufacturing, will help ensure America out-innovates the world in the strategic technologies of the future -- artificial intelligence, 5G, quantum computing, and more -- that will determine global economic and military leadership for decades to come. Producing more semiconductors domestically would also make America's semiconductor supply chains more resilient to future global crises and helps ensure the U.S. can domestically produce the advanced chips needed for our military and critical

[6] As set out in ECRA section 4817, the policy objective of the emerging and foundational technology identification and control efforts is advance U.S. national security interests. For this reason, we are not commenting in this document on how U.S. export controls should be used to advance foreign policy, including human rights, objectives. We will leave such comments to different documents to be prepared later.

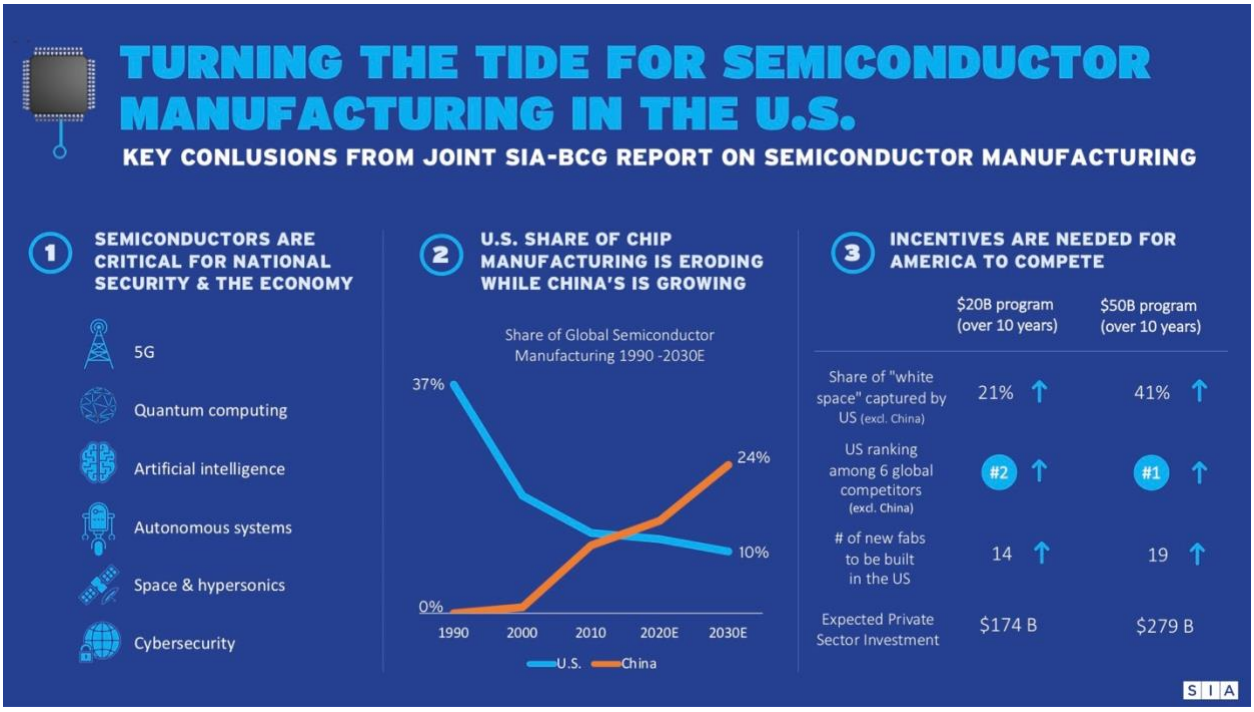
infrastructure.

Thus, rather than primarily considering new export controls over foundational technologies to enhance U.S. national security, the U.S. government should look to the reasons why the share of global semiconductor manufacturing in the U.S. has declined in recent decades. The answer is that competing governments offer large incentives for such manufacturing while, so far, the U.S. government has not. As described in more detail in the SIA-sponsored report *"Government Incentives and US Competitiveness in Semiconductor Manufacturing,"*[7] U.S.-headquartered companies account for 48 percent of the world's chip sales, but U.S.-based fabs – including those operated by companies headquartered abroad – account for only 12 percent of the world's semiconductor manufacturing capacity, down from 37 percent in 1990.

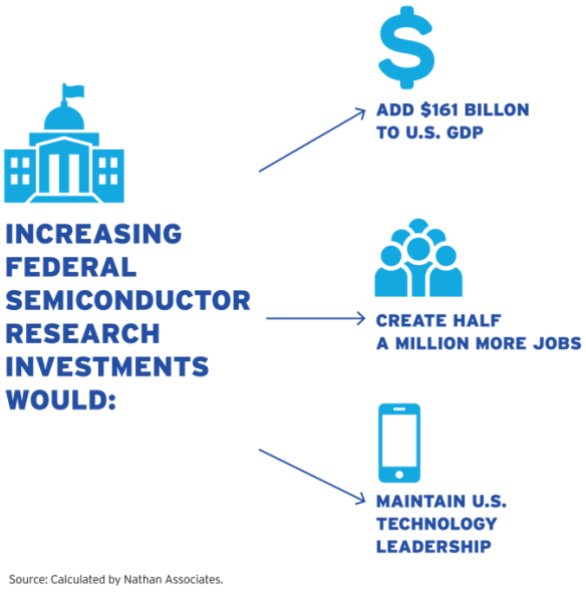
Seventy-five percent of the world's chip manufacturing is now concentrated in East Asia. China is projected to have the world's largest share of chip production by 2030 due to an estimated $100 billion in Chinese government subsidies. Depending on the type, a new fab in the U.S. costs approximately 30 percent more to build and operate over 10 years than one in Taiwan, South Korea, or Singapore, and 37-50 percent more than one in China. As much as 40-70 percent of that cost differential is directly attributed to government incentives.

For these and other reasons, **robust federal incentives for semiconductor manufacturing and investments in semiconductor research are needed to strengthen national security, attract substantial chip manufacturing to the United States, maintain U.S. technology leadership, and create tens of thousands of American jobs. The United States cannot "export control" its way into a healthy domestic economy.** This is why export controls should be left to addressing the specific national security and foreign policy objectives described in ECRA, as discussed below. As described in our September 2020 report in more detail, for example, federal manufacturing grants and tax relief totaling $20-50 billion could re-position the U.S. from an unattractive investment destination to the most attractive (excluding China) and create as many as 19 fabs in the U.S. over the next 10 years, a 27 percent increase over the current number of U.S. commercial fabs (70). Federal manufacturing incentives could create up to 70,000 high-paying jobs in the U.S., ranging from highly educated engineers to fab technicians and operators to material suppliers. The global semiconductor industry is expected to increase manufacturing capacity by 56 percent in the next decade. With a $50 billion federal investment, the U.S. is projected to capture nearly a quarter of new global capacity that is not yet in development, compared to only 6 percent with no government action.

[7] (September, 2020) https://www.semiconductors.org/wp-content/uploads/2020/09/Government-Incentives-and-US-Competitiveness-in-Semiconductor-Manufacturing-Sep-2020.pdf



Another SIA report highlights the benefits of increased federal investment in semiconductor research. The report, "Sparking Innovation: How Federal Investment in Semiconductor R&D Spurs U.S. Economic Growth and Job Creation,"[8] concludes that increased investments in semiconductor research provide an outsized return, increasing overall U.S. gross domestic product (GDP) by $16.50 for each dollar invested and generating a half million jobs. These investments, coupled with private sector investments of nearly 20 percent of revenues by U.S. semiconductor companies, keep the U.S. in the leadership position in semiconductor technology and positioned to lead on the technologies of the future, including AI, quantum computing, and 5G/6G telecommunications systems.



[8] Available at https://www.semiconductors.org/sparking-innovation/

In sum, we call on the U.S. government to adopt a whole-of-government effort to implement the national security objectives regarding foundational technologies.

SIA Comment 2: BIS should consider end-use and end-user controls as part of, or instead of, list-based controls on foundational technologies.

Instead of designating broad categories of technology such as semiconductors as "foundational," BIS should consider alternative means of controlling critical technologies. For example, BIS asks for "examples of implementing controls based on end-use and/or end-user rather than, or in addition to, technology based controls."[9] In response, we describe below how the section 744.21 military end-use and end-user controls should work with the foundational technologies exercise. The effort, however, should not be limited just to the three identified countries and the definitions in section 744.21. ECRA's authority is far broader. In particular, ECRA section 4813(a)(2) explicitly requires the creation of lists of end-users and end-uses that are determined to be a threat to U.S. national security and foreign policy interests. ECRA sections 4813(a)(2) and 4814(b)(2)(C) together preserve the authority of BIS to add entities to the Entity List that are engaged in or pose a significant risk of becoming involved in activities contrary to the national security or foreign policy interests of the United States.

As previous technology control identification efforts have demonstrated, detailed technical descriptions of specific new technologies for inclusion on control lists can sometimes end up doing more harm than good. If, for example, the exact same technology can be used for both nefarious and positive applications, then a list-based control will not accomplish its objective. One example is surveillance technology, which usually relies on the same technology (including semiconductors) used in massively widespread, benign commercial applications.

The solution for when list-based controls would be ineffective, or would do more harm than good, is to focus on the end-uses and the end-users of concern. When someone in government or elsewhere identifies concerns with such technology, the issue is generally more about *how* it is being used and *who* is using it than something inherently threatening in the technology. The EAR already has a well-developed structure to implement creative and tailored end-use and end-user controls. We encourage BIS to consider such ECRA-authorized approaches to addressing national security concerns when CCL-based controls over foundational technologies would result in doing more harm than good or would be ineffective.

SIA Comment 3: Many policy concerns can be better addressed through tailored BIS actions specific to transactions and companies rather than through industry-wide technology controls.

The EAR has many tools to address a novel national security issue that do not involve identifying new technology controls on the CCL. In particular, ECRA section 4817(b)(1) gives BIS the authority to impose interim controls "such as by informing a person that a license is required for export." If used judiciously, this plenary "is informed" authority

[9] Id.

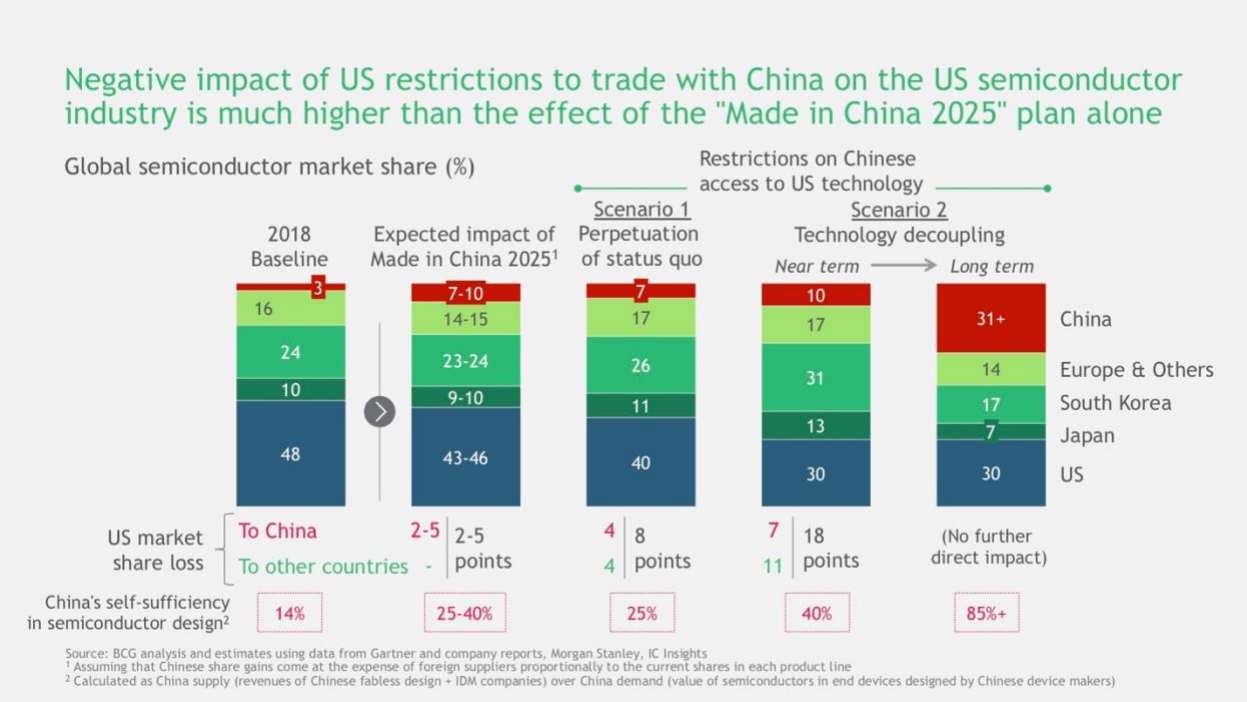
can be an effective tool at addressing a particular national security issue involving specific transactions *without having to impose controls on the broader area of technology involved.*

SIA Comment 4: BIS should study export control history and the impact previous impositions of unilateral controls have had on the items at issue before imposing new controls.

What is past is prologue in export control policy. History has shown that the U.S. government's excessive imposition of unilateral export controls over commercial technologies that are not unique to the United States and that are not tailored to address specific national security threats end up harming the very national security concerns the controls were designed to address.

For example, as a result of an apparent violation of then existing export controls over commercial satellite technology in the late 1990s, Congress required that *all* commercial satellite commodities, software, and technology, regardless of sensitivity, be controlled aggressively worldwide to the same degree as the most sensitive weapons and other military items subject to the ITAR. The imposition of such unilateral controls over all such commercial items created economic incentives for non-U.S. companies in allied countries to create or expand production of competing products with vastly fewer or no regulatory barriers to sell to non-embargoed destinations. As described by the departments of Defense and State in their 2011 space export control policy report (the "1248 Report") and related public advocacy for congressional authority to tailor non-sensitive commercial space export controls, the statutorily mandated non-tailored controls helped speed the significant loss of the U.S. commercial satellite space industry's worldwide market share. This loss harmed national security because it harmed the health of the U.S. defense and commercial industrial bases. BIS's notice, of course, did not ask about satellite technology. We raise this example only to request that BIS avoid taking actions against semiconductor and related technologies similar to what Congress required to be done to commercial space and satellite technologies – that is, impose non-tailored unilateral controls over commercial technology for which there is foreign availability.

In fact, a forward-looking study by the BCG found that dramatic increases in excessive unilateral export controls blocking U.S. semiconductor producers' ability to sell products to customers in China, and leading to complete "decoupling," would have a significant negative impact on the industry. It also found that current controls are already leading to an erosion of U.S. semiconductor sales in the China market. If the U.S. were to impose blanket export controls on all semiconductor sales to China, U.S. companies would see a reduction in nearly $83 billion in sales on an annual basis lowering U.S. market share from nearly 50% to 37%, with South Korea and eventually China replacing the United States as the global leader in semiconductor sales. Similar harms would result from even the threat of or uncertainty about possible such unilateral actions. When companies plan for the future and factor in the need for stable sources of supply, perceptions of what might happen are often as important as actual regulatory changes.



<u>SIA Comment 5:</u> Commerce and the export control agencies need additional funding to conduct this effort properly.

New export controls, even if properly tailored to address a specific national security threat, can end up undermining their stated goal if their implementation and enforcement are not well-funded and properly staffed. The effort to merely understand the content of, and read the referenced citations in, our and all the other comments and the details of all the related technology areas will require a massive commitment of existing and new BIS and other export control agency staff. Moreover, BIS will certainly need to engage government and industry experts to a significant degree to have confidence that it understands any technology it may be considering controlling. This takes time, and BIS and the other agencies will absolutely need to hire significant numbers of new engineers, scientists, and other experts.

The new rules that the Administration may consider as a result of this effort will certainly lead to an increase in the number of license applications and other requests -- primarily classification and advisory opinion requests -- submitted to BIS and its agency colleagues. Without a corresponding increase in resources to process the new applications and other requests, license applications may be unduly delayed, leading to unnecessary burdens and loss of competitiveness for U.S. industry. Similarly, without a corresponding increase in enforcement resources, the new controls are less meaningful and the playing field for compliant companies is not level.

As mentioned above, any systematic effort to mine already-existing government and industry sources of information on foundational technologies is certainly going to require a massive amount of additional resources. As described during legislative hearings leading up to ECRA, the issue to be addressed by the foundational technologies identification effort is significant and serious. A correspondingly significant and serious amount of additional resources is required to properly address the issue. Otherwise,

quick and seemingly easy new technology controls based on the responses of limited resources could do more harm than good for U.S. industry.

(2) Foundational Technologies Should Be Narrowly Defined

> **SIA Comment 6: The foundational "technologies" identification and control effort should be limited to identifying and controlling foundational "technologies," not "commodities" or "software".**

Although ECRA, of course, gives the Administration authority to impose controls over "commodities" and "software", the specific ECRA provision at issue in BIS's notice (i.e., section 4817) refers only to possible additional controls on foundational "technology." That is, section 4817 does not refer to "commodities" or "software." Section 4817's technology-centric structure is not an isolated reference but is rather a core element to its scope and purpose. See, e.g., ECRA sections 4817(b)(2)(A); (b)(2)(B); (b)(2)(C); (b)(3)(A); (b)(3)(B); (b)(3)(C); (b)(4)(A); (b)(4)(C); (c)(1); and (c)(2). No other ECRA section is so explicitly limited in its scope to "technology." All references in other ECRA sections are either to "items" or to a group of the three types of items as separate, such as in section 4825(b)(2)(A). For purposes of identifying that which is subject to the section 4817 standards, this distinction is legally relevant because ECRA section 4801(11) defines "technology" as including "information, in tangible or intangible form, necessary for the development, production, or use of an item." Section 4801(7) defines "item" as a "commodity, software, or technology." Thus, the three types of items do not overlap as a definitional matter. "Technology" is not a "commodity," for example. The EAR reinforces this point in its definition of "commodity," which is "any article, material, or supply *except technology and software.*" 15 C.F.R. § 772.1. The statement of policy in section also specifically distinguishes between controls on "commodities," "software," and "technology" as separate types of "items."

Thus, in light of these rather explicit statutory standards (which are identical to those that existed in the EAR before ECRA and now), we are concerned by BIS's statement in its notice that for "purposes of this ANPRM, the term foundational technologies includes not only 'technology' but also 'commodities' and 'software' as used in the EAR."[10] This statement is inconsistent with how ECRA has defined the scope of the foundational "technology" identification and control effort. This is the basis for our second comment: BIS should abide by the ECRA standards when proposing any new unilateral controls under section 4817 – i.e., that its scope be limited to identifying and controlling unilaterally "technologies," and not "software" or "commodities." We are, of course, not denying that BIS has the authority to control "commodities" and "software" for the reasons set out elsewhere within ECRA. We only ask that this effort be limited to identifying and controlling "technology" in light of the structure and wording in ECRA on the issue.

> **SIA Comment 7: An EAR definition of "foundational technologies" should be tied to the standards and terms in ECRA and the EAR.**

BIS asked in its notice for comments on "how to further define foundational technology

[10] 85 Fed. Reg. at 52934.

to assist in identification of such items."[11] SIA suggests that BIS adopt a definition for export control purposes based on and bounded by the statements of policy in ECRA for why the export control system exists and what it and this foundational technologies effort are statutorily designed to accomplish.

SIA Comment 7.a: In light of the foregoing, SIA's proposed definition is the following:

> **"Foundational technologies" are specific core "technologies" that the Bureau of Industry and Security has determined to be:**
>
> **(a) unavailable in or otherwise not being developed in foreign countries;**
>
> **(b) not within the scope of any existing multilateral controls;**
>
> **(c) essential to the national security interests of the United States; and**
>
> **(d) "required" for the "development," "production," "use," operation, installation, maintenance, repair, overhaul, or refurbishing of items that:**
>
> **(i) are conventional weapons, for intelligence collection, weapons of mass destruction, or terrorist applications;**
>
> **(ii) could support indigenous military innovation efforts in China, Russia, or Venezuela; or**
>
> **(iii) are the subject of illicit procurement attempts which may demonstrate some level of dependency on U.S. technologies to further foreign military or intelligence capabilities in countries of concern or development of weapons of mass destruction.**
>
> **Note 1: A "technology" must not be identified or controlled as "foundational" unless it is within the scope of policy statements in ECRA for which "technologies" should be controlled for export. In particular, a "technology" must not be identified as "foundational" if a unilateral export control over it would:**
>
> **(a) harm domestic research on the identified "technology;"**
>
> **(b) be ineffective at preventing countries of concern from developing it indigenously or otherwise acquiring**

[11] Id.

comparable "technology" from third countries;

(c) be imposed without a full consideration of the impact on the United States' economy of such a control; or

(d) be of a type that is not likely to be considered acceptable by the multilateral regime allies or that is inconsistent with the standards for the types of controls that are subject to the multilateral regimes.

Note 2: This definition does not apply to an exporter's determination of whether a "technology" is "foundational." Rather, it governs BIS determinations regarding whether a specific "technology" should be added to the Commerce Control List as a "foundational technology."

Each element in the proposed definition is taken from the standards in ECRA and BIS's notice. It also uses as many existing EAR definitions and concepts as possible to avoid confusion in its application. In addition, the proposed definition reinforces the core policy element of ECRA that unilateral controls are disfavored. This places on BIS the burden of demonstrating that each of the statutory standards for the imposition of such controls has been met. The definition also reflects logical and factual points, as discussed below, that the U.S. Government, rather than industry, should identify what the national security threat is that needs to be addressed through the use of unilateral controls.

SIA Comment 7.b: If, as stated in the notice, BIS is going to apply the identification and control effort to "items," not just "technologies, then our suggestion for a definition (for the same reasons) would be:

"Foundational items" are specific core "items" that the Bureau of Industry and Security has determined to be:

(a) unavailable in or otherwise not being developed in foreign countries;

(b) not within the scope of any existing multilateral controls;

(c) essential to the national security interests of the United States; and

(d) necessary for any of the following items, applications, or efforts:

(i) conventional weapons, intelligence collection applications, weapons of mass destruction, or terrorist applications;

(ii) indigenous military innovation efforts in China,

Russia, or Venezuela; or

(iii) illicit procurement that may demonstrate some level of dependency on the items to further foreign military or intelligence capabilities in countries of concern or development of weapons of mass destruction.

Note 1: An "item" must not be identified or controlled as "foundational" unless it is within the scope of standards in ECRA section 4817. In particular, such items must not be identified as "foundational" if a unilateral export control over it would:

(a) harm domestic research on the identified "item;"

(b) be ineffective at preventing countries of concern from developing it indigenously or otherwise acquiring comparable "items" from third countries;

(c) be imposed without a full consideration of the impact on the United States' economy of such a control; or

(d) be of a type that is not likely to be considered acceptable by the multilateral regime allies or that is inconsistent with the standards for the types of controls that are subject to the multilateral regimes.

Note 2: This definition does not apply to an exporter's determination of whether a "item" is "foundational." Rather, it governs BIS determinations regarding whether a specific "item" should be added to the Commerce Control List as a "foundational item."

<u>SIA Comment 8:</u> Any controls proposed or imposed should be tailored to focus on core, well-defined technologies in a manner consistent with the structure of the EAR.

The requirement in ECRA for "tailored" controls on "core technologies" demonstrates that Congress recognized the need for precise and clear definitions of the new terms to be used in the proposed new controls. By definition, the new controls will pertain to widely available technologies. There will thus be many competing or different understandings of the words used. For example, existing regulations already define and control "microprocessors" that possess specific functional or operational parameters, such as processing speed, clock frequency, component make-up, and component parameters. Thus, any proposed "foundational technology" control over a "microprocessor" should similarly be specific and detailed. Accordingly, SIA requests that any new definitions of semiconductor technology and its subcategories be specifically defined.

Another key element to ensuring that proposed controls are tailored is that they track the existing ECCN structure and EAR definitions, such as "technology," "development," and "required." These elements have been worked out and refined over decades of interaction with industry and our regime counterparts. Although complex, they are nonetheless a well-tested, coherent general structure of controls and definitions. They allow the government to accomplish its national security objectives in a way that can be understood and complied with by domestic and foreign industry. The existing definition of "technology," for example, prohibits controls from affecting non-technical or business information. The existing definition of "development" allows for the controls to apply to "know-how" and other pre-production technology that was at the center of the legislative discussions about FIRRMA and ECRA. The existing definition of "required" largely prevents inadvertent over-controls on technology that is merely capable for use with a sensitive item but does not warrant control because it was developed to be common to non-sensitive applications.

On this latter point, SIA strongly requests BIS to exclude from this and all other technology control efforts the use of open-ended and difficult-to-comply-with control parameter phrases such as "capable for use with." For export controls to further national security objectives, U.S. exporters and foreign reexporters need to understand the control parameters to be able to comply with them. If parameters require a level of knowledge about national security concepts or military applications not generally available to the public, then the control is a failure. For example, a control over semiconductors "capable for use with military item X" will mean nothing to a commercial company that does not know what is needed for military item X. Moreover, any semiconductor could, theoretically, be used with any application if the application is built around the semiconductor. Such uncertainty in control status generally creates unnecessary regulatory burdens for the U.S. companies and incentives for foreign customers to source from non-U.S. suppliers.

In addition, we respectfully ask BIS to recognize that semiconductors are components that are incorporated into products and systems made by original equipment manufacturers (OEMs). Often our devices are for mass market consumption and are commercial "off the shelf" products that enable functionality in a broad range of products. It is imperative that BIS identify core technologies and tailor controls on these technologies in a manner that minimizes impacts on broadly used commercial products.

SIA Comment 9: The standards set out in this comment should apply equally to tooling, testing, and certification equipment.

BIS asks for comments on "any enabling technologies, including tooling, testing, and certification equipment, that should be included within the scope of a foundational technology."[12] All comments set forth in this document pertaining to the standards for what should and should not be identified and controlled under ECRA section 4817 should apply equally with respect to such items. There is no legal or policy basis for

[12] 85 Fed. Reg. at 52934.

treating them any differently. The companies that are able to speak most directly to the impact unilateral controls would have on such equipment are the tooling, testing, and certification equipment companies. Given their expertise in the underlying technology, supply chains, foreign availability, and understanding of the implications from unilateral controls, their comments should be given great weight when considering potential foundational technology controls over such items – and the impact such controls would have in the economic health of U.S. companies that develop or produce such items.

Through our multiple interactions with Administration officials over the years, we understand why this question is being asked. In theory, if the United States controls more aggressively now EAR99 or AT-only controlled semiconductor design, production, test, and metrology equipment and software to China, then that slows the growth of an indigenous Chinese semiconductor capability, which is a *per se* national security issue for the United States. While this kind of an approach may have this impact in the short and medium term, the near- and long-term impact of such a policy – if implemented unilaterally –could simultaneously (i) harm the economic viability of a core element of the U.S. semiconductor industrial base, (ii) improve the ability of competitors outside the United States to compete, and (iii) create incentives for indigenous development and production of semiconductor equipment and software in China. The companies that would be affected by such unilateral controls can be speak more directly to these points. Given their understanding of the technologies and the market dynamics, we respectfully request the government to evaluate their comments and insight into foreign availability and potential economic harm to the U.S. industry before imposing more unilateral controls on their products.

(3) USG Should Define Security Risks

> **SIA Comment 10: Proposed controls should be limited to addressing national security concerns, not trade policy issues.**

We underscore the importance of ECRA's primary policy statement in sections 4811(1) and 4817 – *i.e.,* that this exercise and export controls are limited to achieving specific national security and foreign policy objectives. These standards are reflected in ECRA's definition in section 4801(2) of "dual-use" items, which are items that have both "civilian applications and military, terrorism, weapons of mass destruction, or law-enforcement-related applications." The export control system is not designed to be -- and has not been used as -- a tool of trade policy, industrial policy, trade protectionism, or otherwise as part of government efforts to pick economic winners and losers among American companies and their foreign competitors. We therefore urge the Administration to maintain this separation and to avoid creating even the impression that any export controls on particular technologies may be motivated by trade policy concerns unrelated to the ECRA's national security or foreign policy standards.

The Administration's 2017 National Security Strategy (NSS) asserts that economic security is an essential component of national security and recognizes that "a growing and innovative economy allows the United States to maintain the world's most powerful military and protect our homeland."[13] The NSS also recognizes the risk that significant

[13] https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf

government intrusion can disadvantage American companies against foreign competitors and hinder the private sectors' efforts to grow and innovate. For example, the NSS states that a "strong economy protects the American people, supports our way of life, and sustains American power. American workers thrive when they are free to innovate . . . [and] operate in markets free from excessive regulation and unfair foreign trade practices." (*see* NSS Pillar II p.17). Similarly, the first "priority action" states that "Departments and agencies will eliminate unnecessary regulations that stifle growth, drive up costs for American businesses, impede research and development, discourage hiring, and incentivize domestic businesses to move overseas." (*see* NSS, p. 20).

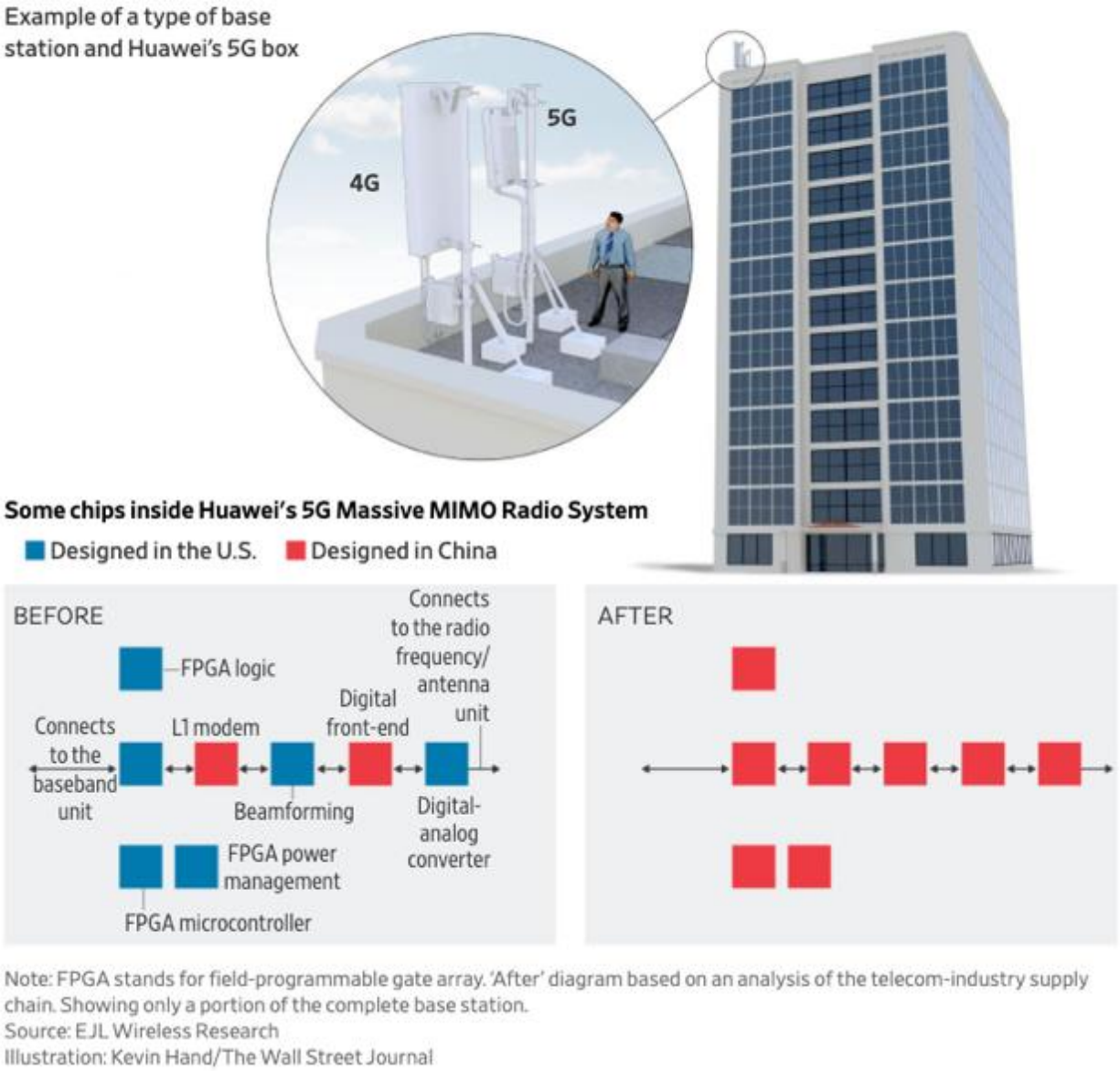
Inherent in the creation and imposition of unilateral export controls is the risk that the objectives articulated in the NSS, and reflected in Congress's statement of policy in ECRA, will be compromised if the scope of controls is not narrowly tailored to specific, clearly identifiable national security threats with clear justifications. In 2017, the Presidential Council of Advisors on Science and Technology stated that "[u]nilateral action [on, e.g., export controls] is increasingly ineffective in a world where the semiconductor industry is globalized."[14] If the scope of new foundational technology controls is too broad or vague, then those controls will stifle growth, drive up costs, impede research, and motivate domestic businesses to move technology development overseas. If the U.S. takes actions or sends signals that discourage multinational companies from using U.S.-developed or -made semiconductors for these and other commercial applications, our industry's economic output, and thus our national security, would be harmed.

To the extent that the semiconductor industry in the U.S. is blocked -- whether as a matter of law or perception -- from engaging in these high-growth markets, the success of U.S. companies and the jobs and research investments that depend on our ability to compete for business in these fields will be at risk. Member companies have reported that some multinational customers are "designing out" U.S. semiconductor technology from their products and shifting their supply chain because of a perception that U.S. companies may no longer be reliable suppliers as a function of new controls on technology. Since the submission of our comments on emerging technologies, such design-out efforts have intensified, specifically as a result of the new military end-use/user controls and the Huawei-specific expansion of the foreign-produced direct product rule. In fact, a report by the Wall Street Journal found that Huawei has already successfully designed out U.S. semiconductors in their 5G base station products.

[14] "Report to the President: Ensuring Long-Term U.S. Leadership in Semiconductors," January 2017, p.14.

Signal Change

Huawei reworked its 5G base stations to reduce their use of American technology after it was placed on the U.S. 'entity list' in May 2019.



Note: FPGA stands for field-programmable gate array. 'After' diagram based on an analysis of the telecom-industry supply chain. Showing only a portion of the complete base station.
Source: EJL Wireless Research
Illustration: Kevin Hand/The Wall Street Journal

Although this comment is not about either of these rules, they nonetheless support our core point that unilateral and overly broad controls will drive business away from companies in the U.S. and toward competition outside the United States. We anticipate comments of individual member companies and others will provide specific details regarding the economic and collateral impacts of the recent series of unilateral controls. As you will see, the impact on U.S. industry is in the billions of dollars -- income that is going to their competition outside the United States for their use in advancing their products.

Developers and vendors of commercial technologies will choose not to partner with U.S. semiconductor companies if their products and activities are -- or are anticipated to be -- subject to excessive, political or capricious controls. Foreign equipment manufacturers

may instead choose to source and "design in" semiconductor components from suppliers of other allied and like-minded countries, such as South Korea, Japan, Taiwan, and many in Europe. This is a basic fact of commercial business in all sectors. That is, foreign OEMs will generally choose suppliers from other allied countries where such technology is not subject to controls and the supply sources are more certain.

SIA Comment 11: BIS bears the burden of justifying how each technology proposed for control as "foundational" meets ECRA's standards.

Regardless of whether BIS analyzes possible controls over foundational "technologies" or foundational "items," the core element is that they are "foundational," which means they are basic, applied, and generally widely available, even if only produced by a limited number of suppliers. They are the technologies upon which other items are developed and produced. Thus, SIA asks BIS to explain in any proposed rule regarding such technologies how the control is justified given ECRA's general emphasis on not imposing unilateral controls over technology where there is comparable foreign availability. In addition, we ask BIS to describe how such a new control could be effective at preventing its proliferation to countries of concern if the technology is, by definition, generally available and common.

That is, for each technology (or item) identified in a proposed rule to be controlled as "foundational," BIS has the burden of providing sufficient information justifying why the proposal meets each of the relevant statutory standards that are duly reflected in our proposed definition. Thus, in each notice proposing or imposing a technology for control as "foundational," BIS should demonstrate (without revealing any classified information):

(i) why the technology (or item) proposed to be controlled is "essential" to U.S. national security;

(ii) what the specific weapons-, military-, or intelligence-related application the control is designed to address;

(iii) why the unilateral control would not harm domestic research;

(iv) why the rule would be effective at stemming the proliferation of the identified technology to countries of concern; and

(v) the results of BIS's full consideration of the impact on the U.S. economy that would result from the unilateral control.

In the absence of such information, SIA member companies and other stakeholders would not be able to provide useful comments consistent with the standards and goals of ECRA.

SIA Comment 12: The administration must identify the specific national security threats to be addressed by new foundational technology controls that are not already being controlled.

BIS asks in its notice for comments on the "criteria to determine whether controlled items identified in AT level Export Control Classification Numbers (ECCNs), in whole or in part, or covered by EAR99 categories, for which a license is not required to countries subject to a U.S. arms embargo, are essential to U.S. national security."[15] The following are responses to this request.

The International Traffic in Arms Regulations (ITAR) control articles the U.S. government has determined "provides a critical or military or intelligence advance such that" ITAR controls are warranted.[16] The EAR's 600 series ECCNs control all other items that are exclusively used for military applications that do not warrant ITAR control.[17] These ECCNs also include controls over technology required for the development or production equipment that is specially designed to develop or produce military items that are already export controlled.[18] The EAR also contains comprehensive controls on technology required for the production or development of commercial semiconductors, including various dual-use equipment required to develop or produce semiconductors. *See, e.g., id.* at ECCN 3E001.

BIS should outline the gaps that exist between (i) these and other existing specific and catch-all export controls and (ii) the threats motivating identification and unilateral control effort ECRA requires. The first rule of regulation writing is to identify what problem is to be solved. Respectfully, BIS has not stated what the national security threats need to be addressed by new controls over foundational technologies. Rather, BIS asks the public for descriptions of AT-only or EAR99 items that "are being utilized or required for innovation in developing conventional weapons, enabling foreign intelligence collection activities, or weapons of mass destruction applications."[19] It also asks for examples of foundational "technologies that have been the subject of illicit procurement attempts which may demonstrate some level of dependency on U.S. technologies to further foreign military or intelligence capabilities in countries of concern or development of weapons of mass destruction."[20]

BIS and other government agencies are better positioned to make these types of national security determinations. SIA's members do not have the national security expertise of the U.S. Government or access to its intelligence resources. We appreciate that the government cannot release classified information to the public regarding threat assessments, but this only reinforces our core point here – i.e., *the government* is in a better position to identify the problem to be solved by new controls over foundational technologies. Once the government identifies the threats that are not already being addressed by existing list-based, end-use, and end-user controls, then

[15] 85 Fed. Reg. at 52934.

[16] 22 C.F.R. § 120.3(b).

[17] 15 C.F.R. § 730.3.

[18] These comprehensive production equipment technology controls were created by the previous Administration to track equally comprehensive controls in the new B Group 600 series ECCNS that control *all* production equipment -- which includes semiconductor production equipment -- that have been specially designed for the development or production of a military item.

[19] 85 Fed. Reg. at 52934.

[20] Id.

government and industry technologists and other experts can work together to identify the specific chokepoint and enabling technologies that should be controlled to address the threat. Such partnerships, primarily through the standard notice and comment process, can develop and refine industry-standard definitions of key terms that will enable compliance with the controls and help advance the national security objectives of the controls.

(4) Controls Should Be Multilateral or Plurilateral To the Extent Possible and Consistent with International Standards

> **SIA Comment 13: The U.S. Government should work to develop plurilateral arrangements with semiconductor-producing nations for tailored controls when unilateral controls would be counter-productive and regime-based controls would be too difficult to achieve.**

From the 2017 and 2018 congressional testimony and hearings leading up to ECRA and its bookend legislation regarding foreign investment controls, we know the general policy concerns that led to the introduction of potential controls over "foundational" technologies. In essence, there was a view that the definition of "national security" in the technology transfer context needed to be expanded beyond its traditional direct connection to specific military or intelligence applications because China's technology acquisition strategies over semiconductor-related and many other types of items to enhance its economy and military to the determinant of the United States needed to be addressed. Also of concern were the civil-military fusion strategies that BIS described in its preambles to recent changes to EAR section 744.21.

Much commentary about addressing the concerns included comments about how the traditional multilateral regime process required too much consensus-building with regime members that were not producers of the technologies of concern. The threats and the technologies were evolving faster than they could be controlled by the regimes. Other comments focused on the harmful nature of unilateral controls, which would usually end up harming the very industries the controls were designed to address, for all the reasons described above. Rather than solving this problem directly, Congress moved the foundational technology policy issue from the foreign investment controls legislation to section 4817 of ECRA and left it up the BIS to find the solution. The middle ground between the traditional multilateral regime approach (which is cumbersome) and unilateral controls (which is harmful) would be for the United States to lead a robust plurilateral effort to do the following:

i. Assemble well-stated and well-supported unclassified versions describing what the national security threats are that are motivating the foundational and emerging technology control efforts.

ii. Present such information through regular diplomatic bilateral channels to the counterparts in the governments of countries with semiconductor technology-producing companies; this must include Taiwan, South Korea, Japan, the Netherlands, Germany, and the United Kingdom.

iii. Work to develop and articulate a common understanding among such countries of what the novel national security threats are.

iv. Once such an understanding is reached, have technical experts from the countries, supported with industry experts as needed, identify the specific technologies and other items that are not now within the scope of the multilateral regimes to be controlled to address the threats identified.

v. Once such lists are developed, the plurilateral group should present their proposals for early implementation and a vote by the Wassenaar Arrangement ahead of its traditional December plenary meetings.

vi. To the extent that the Wassenaar approach does not succeed or would still be too slow, then the United States should work with the smaller group of countries so that each of them can get the domestic legal authorities they need to impose harmonized export controls over specific items, end-uses, and end-users that are outside the traditional multilateral regime structure. This will be a difficult and time-consuming effort, we realize, but it is better than the harm of unilateral controls and the difficulty in achieving consensus of traditional multilateral controls.

vii. Such plurilateral arrangements should include a process of information sharing among the member states about particular license applications or issues so that there is no undercutting of other members with national decisions. In this way, the agreed-upon controls to address an agreed-upon threat can be tailored, effective, and quicker than otherwise would have happened.

Significantly more detail, planning, and government resources would be needed to put such a plurilateral plan in to action, but, for purposes of this comment, it is sufficient to set out the idea for BIS's consideration. Finally, any such plan should not have artificial deadlines that, if not met, would result in the imposition of unilateral controls. If such deadlines existed, the allies would likely not have an incentive to cooperate with the effort. They would likely wait for the U.S. to impose unilateral controls, which would then allow their domestic companies to fill behind sales no longer possible from U.S. companies.

SIA Comment 14: Foundational technologies identified for unilateral controls should be exclusively available in the United States.

Congress required the Administration to consider the foreign availability of "foundational" technologies, and whether unilateral controls would be effective. The obvious reason for this requirement is that the imposition of unilateral U.S. controls would be more harmful than helpful to the objectives of ECRA section 4817 if the technologies are readily available from non-U.S. sources. If export controls (including deemed export controls) prohibit or significantly limit a U.S. company's ability to export a commercial technology or hire the most capable researchers and engineers, then that company is placed at a significant competitive disadvantage to foreign companies that do not face such burdens. The control would be ineffective because it would not, in the

words of ECRA section 4817(a)(2)(B)(iii), "limit the proliferation of emerging and foundational technologies to foreign countries." Thus, to the extent a particular technology is the subject of comparable research and product deployment by entities outside the U.S., such technologies should not be the subject of new unilateral U.S. controls.

A key goal of the NSS is to put U.S. companies on a level playing field globally. Except when absolutely necessary for a clear and specific national security reason, and in cases where the controlled technology is not available from foreign sources, imposing unilateral controls would undermine U.S. economic security, and therefore national security more broadly. The global semiconductor industry is concentrated in a few major countries, with U.S.-headquartered companies commanding approximately 50 percent of global market share. Nonetheless, the industry is characterized by global competition, with leading companies located around the world and dependent on a complex and globally integrated supply chain. As a result, the U.S. industry does not have a monopoly in the design, manufacture, and development of semiconductor technology. It is important for the U.S. Government to recognize that any unilaterally imposed export controls will primarily affect the operations of semiconductor companies in the U.S., limiting their ability to export semiconductor technologies, but not necessarily preventing foundational technologies going to countries of concern from other leading nations.

For example, many SIA member companies have a global footprint that has evolved over decades. These global operations have evolved to include R&D-oriented activities, such as chip design, software creation, and several aspects of semiconductor product development. Many semiconductor companies augment their internal R&D activities with third-party engineering services firms, including non-U.S. firms. While much of this technology development is conducted in the United States, foreign nationals are involved in creating a company's intellectual property (IP). The ability to leverage the best and brightest scientists and engineers from around the world is an inherent part of the competitive advantage for the U.S. semiconductor industry in the United States.

When considering foreign availability for specific technologies, we note that commenters will rarely have complete information about the technical capabilities of their competitors and will not have proprietary information about the technologies that their competitors may be developing. Thus, the best way to address the issue of foreign availability is to ask companies which foreign competitors or entities could readily replace their position in the market should U.S. export controls be imposed on a particular technology. If the company or entity can identify one or more foreign competitors, and reasonably support their statement, then the comparable technology should not be subject to new unilateral controls. For example, semiconductor industry buyers want to ensure uninterrupted supply by having at least two different suppliers in different countries. In such cases, U.S. companies may know if one or more foreign competitors may step in to fill the gap even without having access to the competitors' blueprints and other technical data. If, on the other hand, a company can reasonably demonstrate that a particular technology is unique to the United States, then such technology is a worthy candidate for consideration. In any event, BIS has the burden of demonstrating that any proposed or final unilateral technology control is over technology exclusively available in the United States.

SIA Comment 15: Unless there is an emergency need, BIS should delay the imposition of any new controls until the technology can be controlled multilaterally or plurilaterally.

ECRA clearly emphasizes the well-tested policy conclusions that (i) multilateral controls are far more effective than unilateral controls and (ii) unilateral controls should be used only in exceptional cases because they generally harm U.S. companies more than their competitors without necessarily depriving a country of concern the technology at issue. Given the potential harm unilateral controls could impose on the U.S. semiconductor industry in light of rapid innovation cycles and worldwide capabilities and supply chains, we strongly request BIS to delay implementation of any controls over newly identified foundational technologies until *after* the relevant multilateral regime or plurilateral arrangement has also agreed to identify the same technology on its control list. Such a decision would be consistent with a core element of the NSS, which is to keep U.S. companies on a level playing field with its foreign competitors.

SIA Comment 16: Unless for well-supported national security reasons, BIS should rescind any unilateral controls not agreed to by a regime after three years of effort.

Should the Administration determine that a unilateral U.S. control is warranted based on a clear and specific national security rationale, we request that any new control be proposed to the relevant multilateral regime in the most immediate available regime cycle following the issuance of a final rule. In such cases where a U.S. unilateral rule is implemented, we note that, pursuant to ECRA section 4817(c)(2), if the "foundational technology" control is not adopted multilaterally three years after it is proposed, "the applicable agency head may determine whether national security concerns warrant the continuation of unilateral export controls with respect to that technology." In such cases, we strongly urge the Administration to immediately review any such export control that is not adopted multilaterally or plurilaterally within three years and to automatically withdraw it unless BIS can demonstrate a compelling reason to maintain it. While ECRA does not prohibit unilateral controls, it makes clear that Congress sought to discourage them unless absolutely necessary. As a result, if U.S. unilateral controls are not adopted on a multilateral basis, SIA believes that the burden should shift to BIS to articulate with specificity how continued unilateral controls continue to advance the policy and security goals, and control standards, of ECRA. In the absence of such a showing, we believe that the unilateral controls should be rescinded.

SIA Comment 17: Proposed controls should be consistent with regime standards for control -- or the regime standards should be changed to match any controls with a novel policy purpose before they are imposed domestically.

As discussed above, ECRA requires any new foundational controls to be submitted to the relevant multilateral regime so that they do not remain a unilateral control for long. Implicit in this statutory requirement is the requirement that such a control be consistent with the regime's policy for what should and should not be listed on the regime's control lists. In particular, the Wassenaar Arrangement was "established in order to contribute

to regional and international security and stability, by promoting transparency and greater responsibility in transfers of conventional arms and dual-use goods and technologies, thus preventing destabilising accumulations. Participating States will seek, through their national policies, to ensure that transfers of these items do not contribute to the development or enhancement of military capabilities which undermine these goals, and are not diverted to support such capabilities."[21]

Thus, if BIS is considering a new foundational control for national security reasons different than that which are within the scope of regime's organizational documents, the U.S. Government should work with the regime to revise and update the regime's mission statement. Otherwise, the control will always be a unilateral one. Efforts to revise a regime's mission would be useful to address the novel national security questions that are implicated by this foundational technologies identification effort. Such a change would not be unprecedented. For example, Wassenaar's charter was amended after 9/11 so that its mission also included the prevention of "acquisition of conventional arms and dual-use goods and technologies by terrorist groups and organisations, as well as by individual terrorists." Perhaps, now is a good time for the U.S. to lead an effort to decide whether the regime's[22] scope should be further modified.

(5) USG Should Carefully Consider Economic Harm, Impacts on Research, and Foreign Availability

> **SIA Comment 18: Foundational technologies should not be identified and restricted if a unilateral control would significantly harm research into the technology in United States – and great weight should be given to industry and BIS Technical Advisory Committees' comments about such harms.**

BIS asks for information about "the impact specific foundational technology controls may have on the development of such technologies in the U.S."[23] This request is consistent with ECRA sections 4811(1), 4811(3), and 4817(a)(2)(B)(ii), which essentially require BIS to ensure that any new unilateral controls not harm domestic research into the very technologies ECRA requires be protected. The U.S. semiconductor industry invests, on average, 18 percent of its revenue into research and development of semiconductor technologies. Such investments are among the highest amounts devoted to research of any U.S. industry sector. The R&D pace in the semiconductor industry also tends to be significantly faster than that of other industries. The ability of semiconductor companies to continue funding cutting-edge research, however,

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[21] https://www.wassenaar.org/app/uploads/2019/12/WA-DOC-19-Public-Docs-Vol-I-Founding-Documents.pdf Its foundational document goes onto state that the arrangement "will complement and reinforce, without duplication, the existing control regimes for weapons of mass destruction and their delivery systems, as well as other internationally recognised measures designed to promote transparency and greater responsibility, by focusing on the threats to international and regional peace and security which may arise from transfers of armaments and sensitive dual-use goods and technologies where the risks are judged greatest."

[22] The same comments are applicable to the other regimes. See

https://bis.doc.gov/index.php/policy-guidance/multilateral-export-control-regimes

[23] Id.

depends on their ability to access global markets and sell products and related technologies around the world. As the BCG report on decoupling states:

> Technology leadership has enabled US companies to establish a virtuous circle of innovation. From the massive R&D effort comes superior technology and products, which in turn lead to higher market share and, typically, higher profit margins, thus refueling the virtuous circle. (See Exhibit 4.) Two factors lie at the heart of this virtuous circle: R&D intensity and scale. Historically, US semiconductor companies have consistently invested about 17% to 20% of their revenues in R&D, significantly above the 7% to 14% invested by semiconductor companies in other regions. In fact, the level of R&D intensity for US semiconductor companies in 2018 was the second highest among all sectors of the US economy, behind only the pharmaceuticals/biotechnology sector….
>
> Open access to international markets is a critical requirement for scale, as the US domestic market accounts for less than 25% of global semiconductor demand. Approximately 80% of US industry revenues come from sales to export markets, including China, which accounts for approximately 23% of global demand. According to data from the US International Trade Commission, semiconductors were the fourth-largest US export product by value in 2018, after aircraft, refined oil, and crude oil. Global access also allows the US semiconductor industry to tap into highly specialized resources to manufacture increasingly complex products. For example, it takes about 1,500 steps using high-precision equipment in a $15 billion wafer fab to manufacture a leading-edge 7-nanometer chip. Although US companies can rely extensively on the domestic US semiconductor ecosystem for the design and equipment layers of the value chain, they also depend on foreign partners for various electronic materials; for the equipment used in certain processes; and for fabricating, assembling, and testing chips. No single company or country has the technical capability to control the entire supply chain.

As discussed above, the ability of U.S. semiconductor companies to leverage the best and brightest scientists and engineers from around the world is also an inherent part of their competitive advantage. If significant controls were to be imposed on the ability of such companies to develop newly controlled foundational technologies with such employees for the benefit of their U.S. employer, then the employees will usually choose to leave the United States and take their skills to foreign competitors. Moreover, the semiconductor industry is an intensely multinational effort because customers are all over the world. Having foreign national employees who often can better understand local needs and issues is also critical to the success of the U.S. companies. Last, there are many top semiconductor companies that are based outside the U.S. These companies will be hesitant to conduct research in the U.S. or perform joint development projects with U.S. companies and universities because of concerns that they will be limited from using the output from this research.

Thus, excessive unilateral technology controls that would harm, whether as a legal, practical, or economic matter, the ability of U.S. semiconductor companies to conduct research in the United States would be inconsistent with ECRA. Also, given that this is an economic and business standard, BIS should give great weight to statements by

those best positioned to comment on how or whether a unilateral control would affect them economically, such as the U.S. developers of a technology proposed for a unilateral control. Industry generally knows best what would impose unnecessary competitive harms on business, stifle growth, drive up costs, impede hiring of American workers, and create incentives to move work overseas. Finally, if a commenter states that a proposed unilateral control would harm it or the industry economically and BIS nonetheless proceeds with imposing the control, BIS should be required (i) to refute such statements with specificity and (ii) to revoke or amend the control if it receives sufficient additional information supporting the statements of economic harm.

SIA Comment 19: BIS should neither propose nor impose new foundational technology controls unless it has fully considered the impact such controls would have on the U.S. economy.

ECRA section 4811(1) states that "it is the policy of the United States . . . to use export controls only after full consideration of the impact on the economy of the United States. . . ." Similarly, ECRA section 4811(3) goes on to state that the impact of the implementation of new controls on foundational technologies on U.S. leadership and competitiveness "must be evaluated on an ongoing basis and applied in imposing controls…to avoid negatively affecting such leadership." These requirements are similar to the objectives of the section 4817 standards described throughout this comment, but have a procedural element to them that warrant a separate comment. SIA therefore respectfully requests that BIS clearly demonstrate that it has fully assessed the overall impact to the U.S. economy, and document how this was achieved, when it proposes any unilateral controls over foundational technologies that are essential to U.S. national security. An unsupported statement regarding the economic impact of a new control would not be sufficient to meet the "full consideration" requirements of ECRA.

SIA Comment 20: The U.S. Government should mine existing government resources to identify foundational technologies of potential concern.

In response to BIS's request for sources on foundational technologies and how to identify them, SIA suggests BIS benefit from the relevant resources at:

1. The U.S. Patent and Trademark Office (PTO)
2. The National Institute of Standards and Technology (NIST)
3. The Small Business Innovation Research (SBIR) Program
4. The Small Business Technology Transfer (STTR) Program
5. Standards bodies, such as IEEE or 3GPP
6. The Defense Advanced Research Projects Agency (DARPA)
7. Reports from market research firms such as Gartner

8. Interviews with Venture Capitalist and Entrepreneur seed money investment groups

9. Semiconductor Research Corporation[24]

Each of these resources, particularly PTO and NIST (which are part of the Commerce Department), exist in part to receive a regular and robust flow of information on many types of technology from U.S. and foreign sources. The development of a well-funded, properly staffed office within BIS to screen such information on a daily basis against national security concerns would be a significantly valuable addition to the foundational technology identification process. Indeed, ECRA specifically requires that the emerging and foundational technologies effort be an "*ongoing* interagency process." (ECRA § 4817(a)(1) (emphasis added)). Trying to do this statutorily mandated effort on an *ad hoc* basis will fail. Such controls will eventually become stale and counter-productive. BIS thus must come up with well-resourced *systems* to acquire and gather such information, which, by definition, evolves quickly or springs into existence later. BIS is the perfect agency to lead this effort because one of the core missions of the Commerce Department -- referred to by the Secretary as "America's Data Agency" -- is to collect, store, and analyze massive amounts of government and industry data for a variety of goals important to the United States. Indeed, Commerce leads the Federal Data Strategy to "leverage data as a strategic asset."[25] Given the massive scope of such data, we speculate that most of the answers to BIS's questions within the notice may already be within the government's various collections of information from industry.

SIA Comment 21: Information about the status of foundational technology development in the United States and other countries is best provided by individual companies.

Similarly, BIS asks for information about "the status of development of foundational technologies in the United States and other countries."[26] With respect to semiconductor items, individual member companies are in the best position to provide information about their products. We ask BIS to review carefully and give great weight to such information.

(6) Procedures for Development and Implementation

SIA Comment 22: BIS should conduct the foundational technologies identification and control exercise with as much transparency, outreach, and certainty as possible.

There is considerable concern in the investor and foreign business partner community that the United States will impose broad controls on whole categories of foundational technologies. Most do not appreciate that BIS's notice is a request for public input and information technologies for BIS to use in considering how to develop narrowly tailored

[24] See https://www.src.org.

[25] *See* https://strategy.data.gov.

[26] Id.

controls essential to national security. They also generally do not appreciate that there are specific statutory standards governing the effort and what may and may not be added to the control lists. Because perception can become reality with respect to economic decisions involving U.S. companies, we encourage the Administration to roll out proposed new controls in a transparent, ECRA-consistent manner and to reduce uncertainty among those who do not follow the nuances of this process.

SIA Comment 23: Not all new foundational technology controls need to be imposed on exports to all destinations equally.

Not all controls need to be imposed on exports and reexports worldwide. BIS has discretion when imposing unilateral controls on exports and reexports to specific countries or country groups. Thus, the impact of potential new controls can and should be tailored to specific issues posed by specific countries. *See* ECRA § 4817(b)(2).

SIA Comment 24: With respect to any new foundational technology controls, BIS should adopt (i) an intercompany exemption for affiliates and (ii) an intra-company deemed export exemption for bona fide full-time regular foreign national employees.

ECRA was established at the same time as the Foreign Investment Risk Review Modernization Act (FIRRMA). Indeed, ECRA section 4817 was deliberately created to work with FIRRMA to address congressional and Administration concerns about transfers of critical technology, including foundational and foundational technology, regardless of the nature of the underlying investment or transaction. As evidenced by FIRRMA's section 4565(a)(4)(B)(iii), however, these policy concerns do not pertain to transactions among affiliates. That is, FIRRMA explicitly excluded investments by foreign affiliates of U.S. companies from the scope of the new authorities it gave to the Committee on Foreign Investment in the United States (CFIUS).

Consistent with this carve-out in FIRRMA, we ask BIS to use the broad authority ECRA section 4817(b)(4)(B) gives it to create a similar intercompany exception for any new controls that would be imposed pursuant to this foundational technologies identification effort. We believe such an exception is reasonable because the risk of diversion from within a corporate family is generally low. Also, the risk of economic harm to a U.S. affiliate posed by a unilateral control on transactions with its foreign affiliates is quite high. We would expect that any such exception would exclude transactions involving affiliates in Country Group E countries or affiliates that are proscribed entities and would otherwise not affecting licenses required by ECRA section 4817(b)(2). Nonetheless, the broader policy point of excepting controlled transactions among affiliates in good standing from any new foundational technology licensing obligations, consistent with the approach Congress took in FIRRMA, remains the same.

In addition, we ask BIS to use its ECRA section 4817(b)(4)(B) authority to create, in connection with any new controls over foundational technologies, a license exception from the EAR's deemed export controls for foreign person bona fide full-time regular employees. Similar to the previous request, the FIRRMA debate that led to this foundational technologies effort did not identify concerns about release of technology to foreign person employees of U.S. companies. The concern was about what other

countries might do with such technology. We make this suggestion because a significant potential harm to many of our members from any new unilateral export controls will be, as a matter of law or perception, the loss of access to the best engineers and technologists from around the world. Such experts are critical to their success as U.S. companies, as discussed above. If the U.S. develops the reality or perception that the domestic intra-company sharing of technology in these areas becomes unilaterally burdensome or prohibited, then the best and brightest talent from the United States and abroad will simply take their skills to our foreign competitors.

> **SIA Comment 25: Substantial resources should be committed to regularly reviewing, revising, and updating the CCL consistent with the standards and requirements in ECRA.**

We realize this comment process is not about the CCL in general. Nonetheless, when doing the research to decide which new technologies should be added to the CCL as "foundational," BIS will inevitably be studying semiconductor technologies, and technologies that depend upon them, in ways otherwise unnecessary outside of this effort. It will, thus, likely develop new insights into the technology, the industry, and the foreign capabilities. We, therefore, respectfully request, at a minimum, that the CCL benefit from such work generally and, as appropriate, BIS propose the removal or revision of ECCNs affected by such research that have not otherwise have been reviewed for years or decades.

We also respectfully ask BIS to begin a broader systematic effort to review the CCL, particularly its Category 3, in light of ECRA's coming in to effect. By definition, none of the items controlled in the CCL were created under the standard in ECRA section 4811(1), which is that export control should be used "only after full consideration of the impact on the economy of the United States and only to the extent necessary." Absent research not made public, BIS does not have in its files any studies of any sort that analyze the "impact on the economy of the United States" of any of the EAR's controls or whether existing controls exist "only to the extent necessary." Moreover, ECRA section 4811(3) requires that the impact of the EAR's implementation on U.S. industry's "leadership and competitiveness **must be evaluated on an ongoing basis. . . ."** (emphasis supplied). Similarly, ECRA section 4811(7) mandates that an "**efficient process should be created to regularly update the controls, such as by adding or removing such items."** (emphasis supplied).

For BIS to be able to comply with these new statutory mandates, it and its sister agencies in the export control system -- primarily DTSA, ISN, DDTC, and NNSA -- must be appropriated and thereafter devote *substantial* additional technical, regulatory, legal, policy, and related staff resources to the CCL update effort. Sticking to the usual process of proposing a few changes to the multilateral regimes each year does not satisfy the new statutory requirements. Aside from the annual tweaks to the CCL through the regular regime-review process, BIS has not undertaken a "top-to-bottom" review of the CCL, largely because its technical resources were focused on reviewing and revising the lists of military items rather than commercial and dual-use items. Now that the military list review effort is essentially complete, we ask the current Administration to do what the previous Administration did not -- and what ECRA now mandates.

In addition, we suggest BIS consider creating in the EAR a process for affected exporters to petition for removal or modification of a control that is not consistent with ECRA's standards. This process could also allow for the submission of ECRA-relevant information that was not available to the government at the time it imposed the control, such as a change in foreign sourcing, technological advancements, or overwhelming commercial applications in situations where there not has not been a specific national security basis for the control articulated. If controlled technology that has lost its sensitivity as a result of, for example, widespread commercial availability, then SIA member companies fall behind their foreign competitors that are not subject to such controls either as a legal or a practical matter. For a strategic industry like semiconductors that evolves rapidly, the consequences of U.S. export controls falling behind include loss of U.S. leadership, negative impact on U.S. manufacturing, and, therefore, the weakening of the U.S. defense industrial base. BIS's CCL maintenance efforts, therefore, should be a high priority even if there were not a specific statutory mandate.

SIA Comment 26: BIS should address in any proposed rules how companies should handle any newly controlled "foundational" technologies that are, at the time of the effective date, outside the United States or in the possession of foreign persons in the United States.

If the foundational technologies control efforts develop as we hope, they will not result in new controls being imposed over any comparable technologies that are available outside the United States. If, however, controls are imposed over technology available outside the United States -- deliberately or inadvertently -- then BIS needs to address in its proposed rule what U.S. and foreign persons abroad should do with such technologies upon the effective date of a new control. Are they required to remove it from the possession of all foreign persons? Destroy it? Return it to the United States until authorized by a license? Are such instructions even practical? Whatever the answer, changing a company compliance program and business operations to suddenly control previously uncontrolled technologies overseas will be extraordinarily burdensome and difficult to accomplish quickly.

Even if such newly identified technologies are unique to the United States, it is almost certain that, given the nature of the technologies at issue, they will be in the possession of foreign persons in the United States, many of whom will have been the developers and inventors of the technologies. How are U.S. companies to address such internal deemed export controls on previously uncontrolled technologies, particularly if the source of such technologies are the very foreign persons now prohibited from possessing the technologies? As discussed above, one partial solution to this conundrum would be for BIS to create a deemed export exemption for foreign persons who are bona fide regular employees of U.S. person entities.

* * *

Thank you again for conducting this process to identify foundational technologies that are essential to national security that are not now controlled but should be pursuant to the standards in ECRA. If you have any additional questions or would like to discuss

these comments further, please contact Erik Pederson at epederson@semiconductors.org.

Uploaded to https://www.regulations.gov/comment?D=BIS-2020-0029-0005

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