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**Before the
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“CHIPS and Science Implementation and Oversight”

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Chair Cantwell, Ranking Member Cruz, and members of the Committee, thank you for this opportunity to update you on the Commerce Department’s (Commerce, or the Department) efforts to unleash the next generation of American innovation, protect our national security, and preserve our global economic competitiveness through implementation of the “CHIPS and Science Act”, which Congress passed and President Biden signed into law over one year ago.

Thanks to the bipartisan support for the CHIPS and Science Act from members of this Committee and across the Congress, the Department is making substantial progress on some of our nation’s most pressing economic and national security priorities, including those related to our supply chains, manufacturing, innovation, and workforce.

The research, innovation, and manufacturing sparked by this law can solidify America’s position as the world’s technological superpower, securing our economic and national security future for the coming decades. As global competition becomes increasingly about technology and semiconductors (chips), rather than just tanks and missiles, the countries that invest in research, innovation, and their workforces will lead in the 21st century. The CHIPS and Science Act will help enable us to seize that leadership with its strong support for the National Institute of Standards and Technology (NIST) and its important mission focused on developing the measurement science and standards critical to U.S. leadership in emerging technologies like biotechnology, quantum science, cybersecurity, and artificial intelligence. Over the past year, NIST has made significant advances in each of the areas highlighted by the Act, including the release of the NIST Artificial Intelligence Risk Management Framework, the update of NIST’s Cybersecurity Framework, funding for additional regional cybersecurity workforce partnerships, and enhanced leadership in international standards development through the launch and implementation of the United States Government National Standards Strategy for Critical and Emerging Technologies. Furthermore, I appreciate this Committee’s support for strengthening and updating the research infrastructure at NIST and it continues to be a priority of the Department.

CHIPS Incentives and Research and Development (R&D) Implementation

Within the CHIPS and Science Act, the CHIPS program’s success will be judged on at least two key criteria: one, whether this program enabled us to build a reliable and resilient semiconductor industry including a robust workforce and strong innovation ecosystem that protects America’s technological leadership for the coming decades; and two, whether the Department was a good

steward of taxpayer dollars. The United States government is making a public investment in private industry without recent precedent, and taxpayers deserve transparency and accountability.

Today, I would like to provide the Committee with an update on the Commerce Department's efforts toward implementing this historic legislation. The National Institute of Standards and Technology at the Department of Commerce is overseeing \$50 billion to revitalize the U.S. semiconductor industry, including \$39 billion in semiconductor incentives and \$11 billion in research and development. Since August 2022, when the CHIPS and Science Act became law, the Department has created and staffed two new offices, the CHIPS Program Office (CPO) and the CHIPS R&D office, hiring over 150 employees to develop, implement, and oversee the programs. Both offices have attracted top-notch talent across sectors, including from private industry, national security, finance, and the Federal government.

In February, the Department launched the first funding opportunity, seeking applications for projects to construct, expand, or modernize commercial facilities for the production of leading-edge, current-generation, and mature-node semiconductors. This includes both front-end wafer fabrication and back-end packaging. In June, the Department opened this funding opportunity to semiconductor materials and manufacturing equipment facilities for which the capital investment equals or exceeds \$300 million. Last week, the Department released a second funding opportunity which seeks applications for smaller-scale projects involving the construction, expansion, or modernization of semiconductor materials and manufacturing equipment facilities for which the capital investment falls below \$300 million. In the coming months, the Department intends to announce an additional funding opportunity for R&D facilities.

Across all of the funding opportunities, applicants will be evaluated based primarily on the extent to which the application addresses the program's economic and national security objectives, but they will be based on commercial viability, financial strength, project technical feasibility and readiness, workforce development, and broader impacts, like the ability of the new facilities to support the R&D programs like the National Semiconductor Technology Center (NSTC).

To guide its investments, the Department has released two "Vision for Success" papers outlining its strategic objectives. The first vision statement focused on the Department's investments in commercial fabrication facilities. If those investments are successful, then by the end of the decade the United States will have at least two new large-scale clusters of leading-edge logic fabs; be home to multiple high-volume advanced packaging facilities; produce high-volume leading-edge dynamic random-access memory (DRAM) chips on economically competitive terms; and have increased production capacity for the current-generation and mature-node chips most vital to U.S. economic and national security.

The Department has also released a vision statement for its investments in facilities for semiconductor materials and manufacturing equipment. In investing in the upstream supply chain, the Department aims to strengthen supply chain resilience, including by addressing chokepoint risks flowing from geographic concentration; advancing U.S. technology leadership; and supporting vibrant U.S. fab clusters.

Since the launch of the first funding opportunity, the response has been overwhelmingly positive – the Department has received more than 500 statements of interest (SOIs) from companies in 42 states. These SOIs represent potential applicants seeking CHIPS incentives for commercial fabrication facilities, packaging facilities, material suppliers and equipment manufacturers, and R&D facilities. Additionally, the Department has received over 100 pre-applications and full applications, demonstrating that as applicants become eligible to file a pre-application or full application, they are moving through the process and directly engaging with the CHIPS Incentives Program. It is clear that the private sector is eager to continue investing in America and is ambitious about scaling up semiconductor production across the country.

In addition, recognizing the national security imperative of investments in the domestic semiconductor industry, the Departments of Commerce and Defense in July announced a Memorandum of Agreement (MOA) to expand collaboration to strengthen the U.S. semiconductor defense industrial base. The agreement will increase information-sharing between the Departments to facilitate close coordination on the CHIPS for America’s incentives programs, including collaboration on potential investment applications to ensure that our departments are making complementary decisions that maximize federal investments under the CHIPS Incentive Program and the Department of Defense’s (DoD) Defense Production Act and Industrial Base Analysis and Sustainment funds. This alignment of priorities and decision-making will help ensure that our respective investments position the U.S. to produce semiconductor chips essential to national security and defense programs.

The Department’s commitment to national security in the CHIPS program is also reflected in our effort to implement strict guardrails to ensure that the investments made in research and innovation are not used to benefit foreign countries of concern, which includes China. Last month, the Department issued a final rule that meets the national security goals of the CHIPS and Science Act. The rule, “Preventing the Improper Use of CHIPS Act Funding,” seeks to impose two main categories of guardrails: 1) limiting the expansion of semiconductor manufacturing in foreign countries of concern, and 2) limiting joint research or technology licensing efforts with foreign entities of concern that relate to technology or products that raise national security concerns. The rule will help ensure CHIPS investments enhance global supply chain resilience and promote U.S. leadership in designing and building important semiconductor technologies.

Our CHIPS projects cannot succeed without investing in the workers who will build, operate, and maintain fabs. Last February, I called for America to double the semiconductor workforce overall including by tripling the number of graduates in semiconductor related fields and training 100,000 new technicians. Since then, the Department has worked closely with the semiconductor industry, labor unions, education providers, and other community partners to develop a strong vision for workforce development. This includes carefully assessing the workforce development plans in applications, working with recipients and education and training partners once awards are made, and supporting investments that expand the workforce pipeline including women and people of color.

Finally, the CHIPS and Science Act also created a 25% investment tax credit for companies making qualified investments in facilities with a primary purpose of producing semiconductors or semiconductor manufacturing equipment. We welcome the Department of the Treasury's work to implement this tax credit, including the release of a proposed rule in March 2023. This tax credit will be an important complement to Commerce's incentive funds.

Our success will be short-lived if we focus only on manufacturing. The \$39 billion in incentives will bring semiconductor manufacturing back to the United States, but a robust R&D ecosystem will keep it here. That is why, with the support of Congress, the Department is investing \$11 billion to build a strong semiconductor R&D ecosystem to generate the ideas and the talent necessary to support these efforts.

The heart of these investments is the National Semiconductor Technology Center, which is an ambitious public-private partnership where government, industry, customers, suppliers, educational institutions, entrepreneurs, and investors converge to innovate, connect, and solve problems. The Department envisions a network of several centers around the country, solving the most impactful, relevant, and universal R&D challenges in the industry. Their work—fueled by industry support—will generate new devices, processes, tools, and materials for our manufacturing ecosystem. Most importantly, the NSTC will ensure that the United States leads the way in the next generation of semiconductor technologies—everything from quantum computing, materials science, and Artificial Intelligence (AI) to future applications not even contemplated yet.

Recently, the Department announced leaders to serve on a selection committee that, acting independently of the Department, will select the board of trustees that will form a non-profit, which the Department anticipates will serve as the operator for the NSTC. I am pleased to inform the Committee that, together with our partners at DoD, the Department of Energy, and the National Science Foundation, the Department of Commerce is in the process of establishing the NSTC consortium. The Department anticipates that the NSTC consortium will be operated by the new, purpose-built, non-profit entity.

In addition to the NSTC, the Department received funding for three programs that are also focused on research and development—the National Advanced Packaging Manufacturing Program, the CHIPS R&D Metrology Program, and the Manufacturing USA institute(s). We anticipate that the four R&D programs will share infrastructure, participants, and projects and operate in coordination with each other. The CHIPS R&D programs will be informed by the needs of the entire American semiconductor ecosystem including the recipients of CHIPS manufacturing incentives. In turn, the technological and workforce advancements made by CHIPS R&D programs will benefit the U.S. semiconductor sector and supply chain—and help incentivize recipients and others to overcome manufacturing hurdles, compete in global markets, and meet the goals of the CHIPS and Science Act. We will continue to work with partners across the interagency including the National Science Foundation, which oversees \$200 million for CHIPS workforce, the DoD, Department of Energy, and others to achieve these goals.

Instead of aiming for self-sufficiency or looking to close the United States off from global markets or competition, the Department is working to strengthen our position as a global leader

in a fiercely competitive and global industry. As CHIPS for America invests across the supply chain, the Department is prioritizing robust international engagement. Through bilateral and multilateral dialogues, and business-to-business and government-to-business forums, the Department is working with like-minded partners to strengthen and diversify the global semiconductor supply chain. The Department's CHIPS-related international engagement to date has included engagements with the Republic of Korea, Japan, India, and the United Kingdom, and through the Indo-Pacific Economic Framework (IPEF), the U.S.-European Union Trade and Technology Council (TTC), and North American Leaders' Summit (NALS). The Department will continue coordinating closely with U.S. partners and allies to advance these shared goals, advance our collective security, and strengthen global supply chains.

We also welcome the work of the Department of State in implementing the International Technology Security and Innovation Fund ("ITSI Fund"), which was created under the CHIPS and Science Act and provides the Department of State with \$500 million overall - to deepen U.S. cooperation with like-minded countries, on both semiconductor and secure Information and Communications Technology lines of effort, to ensure that the technologies of the future will reinforce our shared economic and national security. The Department applauds the State Department's announcement in June that it is directing funds from the ITSI Fund to support projects this year and next year at the Organisation for Economic Co-operation and Development (OECD) to create an information exchange network of officials involved in semiconductor industry policymaking, a government-to-government repository of information on active and planned semiconductor production facilities, and other efforts to work collaboratively to develop strategies that increase the resilience of global semiconductor supply chains.

Regional Technology and Innovation Hubs (Tech Hubs) Implementation

In addition to revitalizing America's domestic semiconductor manufacturing sector and research and development ecosystem, the CHIPS and Science Act enabled the development of centers of innovation and job creation through the Regional Technology and Innovation Hub Program (Tech Hubs), administered by the Economic Development Administration (EDA). The Tech Hubs program aims to strengthen economic and national security by enabling the industries of the future to start, grow, and remain in regions throughout the United States. In these Hubs, institutions of higher education, state and local governments, economic development organizations, labor and workforce partners, and others in the region will come together to supercharge ecosystems of innovation for technologies that are essential to our economic and national security.

In May, the Department launched the first Notice of Funding Opportunity (NOFO) to open applications for strategy development funding and Tech Hubs Designations. Later this year, the Department will launch a second NOFO for applicants designated as a Tech Hub to apply for implementation funding. Through these two phases, EDA will award \$500 million appropriated through the Consolidated Appropriations Act, 2023. Successful proposals will demonstrate a region's commitment to its primary technological strength and the potential for Tech Hubs investments to enable the region's primary innovative industry to become a global leader in that critical technology area within a decade. EDA received 378 applications in response to the first

NOFO by the August 15 deadline. Each applicant selected their region’s core technology industry that fits among 10 Key Focus Areas (e.g., AI, high-performance computing, quantum information science and technology, robotics, etc.) identified in the CHIPS and Science Act.

Through the Tech Hubs program, the Department is committed to strengthening economic and national security by advancing the capacities of regions to manufacture, commercialize, and deploy these technologies, guided by the following priorities: 1) making more U.S. regions strong competitors in the global innovation economy; 2) building strong communities that share in the prosperity technological innovations bring; 3) spurring the creation of new good jobs and other opportunities for workers at all skill levels; and 4) strengthening and making more resilient the supply chains that our innovative technology-centric industries rely on to stay secure and competitive.

Distressed Area Recompete Pilot Program (Recompete) Implementation

As part of the Department’s commitment to creating good-paying jobs and ensuring that no community is left behind, another key element of the CHIPS and Science Act is the Distressed Area Recompete Pilot Program (Recompete). In June of this year, Commerce announced that Recompete will invest \$200 million in projects that spur economic activity in geographically diverse and persistently distressed communities across the country. Specifically, this program targets areas where prime-age (25-54 years) employment significantly trails the national average. The program aims to close this gap through EDA’s place-based approach and delivering large, highly flexible grants based on community-driven strategies to address unique workforce and economic development needs of individual communities or regions.

The Department is running Recompete through two phases. As part of our June announcement, the Department launched the first phase, a Notice of Funding Opportunity (NOFO), which invites applicants to apply for (1) Strategy Development Grants, (2) approval of a Recompete Plan, or (3) both. In Phase 2, regions with approved Recompete Plans will be invited to apply for implementation funding. EDA anticipates making 4-8 implementation awards between \$20 million and \$50 million, each. Eligible applicants include local and state governments, Tribal governments, political subdivisions of a State or other entity, non-profits, Economic Development Districts, and coalitions of any of these entities that serve or are contained within an eligible geographic area. To support applicants in determining if they are in an Eligible Area, EDA, in partnership with Argonne National Laboratory, has released the Recompete Eligibility Mapping Tool. Announcement of Phase 1 winners and the release of the Phase 2 NOFO is expected later this year, and applicants with approved Recompete Plans will be invited to submit a Phase 2 application. Working with our state and local partners, Recompete will target areas of our country most in need of economic resources, assets, and options to ensure that they get the investments they deserve.

NIST for the Future Implementation

The Department appreciates the reauthorization of NIST through the inclusion of Title II of Division B, commonly known as the “NIST for the Future Act”, in the CHIPS and Science Act of 2022. NIST is essential in the development, manufacture, and adoption of technologies critical

today and those yet to be imagined, enabling both economic and national security for the Nation. NIST's mission focuses on driving U.S. innovation and supporting U.S. businesses and U.S. economic security in Critical and Emerging Technologies (CETs), including artificial intelligence, quantum information technologies, biotechnology, communication, and networking technologies. In addition to NIST's ongoing research role with CETs, NIST is leading the execution of the U.S. Government's National Standards Strategy for Critical and Emerging Technology and the development of Federal standards policy to ensure continued U.S. global economic competitiveness and technology leadership. I would also like to highlight that NIST's laboratory and extramural programs, such as the Manufacturing Extension Partnership (MEP) and Manufacturing USA, help U.S. industry develop and implement new technologies, develop robust supply chains, refine their systems for efficiency and effectiveness, and increase engagement of underserved communities in workforce development programs.

The CHIPS and Science Act authorized a pilot program of awards that will allow MEP centers to provide services focused on resiliency of domestic supply chains, workforce development, and adoption of advanced technology upgrades at small and medium-sized manufacturers. In June, we awarded roughly \$400,000 to MEP Centers in every state and Puerto Rico. The more than \$20 million in funding is being used to develop programs to make domestic supply chains more resilient and efficient. The new awards will focus on providing supplier scouting services, establishing new service offerings to improve existing supply chain networks, filling gaps in the supply chain by connecting original equipment manufacturers with small and medium-sized manufacturers, and creating a complete map of U.S. supplier capability and capacity.

Manufacturing USA will announce a funding opportunity in the fall for a new Commerce-sponsored Manufacturing USA institute. Manufacturing USA was appropriated \$14 million in one-time supplemental funds in support of CHIPS and Science Act responsibilities. The Workforce, Education and Vibrant Ecosystems (WEAVE) funding opportunity was announced in August and will be open to existing Manufacturing USA institutes. These will be public service awards to engage with HBCUs and minority-serving Institutions and to assist in transitioning Institute-developed technologies into the public, such as through testbeds and other types of technologies that can address scale up.

NOAA Ocean Acidification Activities

The CHIPS and Science Act strengthens the National Oceanic and Atmospheric Administration's (NOAA) mission of science, service, and stewardship. NOAA is building a climate resilient nation by expanding NOAA's authoritative climate products and services in coordination with its federal partners; fostering environmental stewardship and optimizing advances in science and technology to create value-added, data-driven economic development; and improving capabilities and knowledge sharing, expanding opportunities, and honing service delivery.

Reauthorized and expanded by the CHIPS and Science Act, NOAA's Ocean Acidification Program coordinates research, monitoring, and activities to understand where and how fast the ocean's chemistry is changing, as well as the impacts these changes have on marine life, people, and economies. NOAA is working with other agencies and partners on these efforts, including in

the stewardship of data necessary to make decisions to mitigate and adapt to the impacts of ocean acidification.

Public Wireless Supply Chain Innovation Fund Implementation

The CHIPS and Science Act also funded the Public Wireless Supply Chain Innovation Fund. The \$1.5 billion Innovation Fund supports the development of open and interoperable wireless networks. This grant program will help drive wireless innovation, foster competition, and strengthen supply chain resilience. It will also help unlock opportunities for innovation and competition in a market historically dominated by a few suppliers, including high-risk suppliers that raise security concerns.

In April, the Department announced its first funding opportunity under the Innovation Fund, making \$140.5 million available to demonstrate the viability of new approaches to wireless, such as open radio access networks (Open RAN). The Department received more than 120 applications for the first round of funding. And in early August, the Department announced nearly \$5.5 million in awards from the first round of grants, which will support R&D and testing activities related to energy efficiency, the performance of interoperable equipment, and spectrum sharing testing. These are just the first steps the Department will take to promote the development and adoption of open, interoperable, and standards-based networks, and the Department will continue to make awards under the first funding opportunity through the fall.

A Strong Position to Lead Globally

The CHIPS and Science Act is central to the Biden Administration's efforts to revitalize American manufacturing and innovation and to lead globally. To effectively lead globally, the United States needs bold domestic investments and innovation ecosystems that bring manufacturing in critical technologies and industries back home. Moreover, without manufacturing strength in the United States and the innovation that flows from it, we risk again experiencing the devastating impact of supply chain shortages that we did during the height of the COVID-19 pandemic.

Over one year removed from the enactment of the CHIPS and Science Act, the Commerce Department's bold, strategic, and targeted investments are bolstering our economic and national security, making our semiconductor supply chain more resilient, promoting American manufacturing and innovation, and helping more workers and businesses compete and win in the 21st century global economy. The investments in critical technologies and regions unleashed by this law are essential to maintaining American technological leadership in the world in the 21st century global economy.

This testimony captures only some of the Department's activities to date under the CHIPS and Science Act. While the Department has made significant progress in implementation, more work remains to realize the promise of this historic law, and Congress is an important partner in these efforts. Thank you for the opportunity to testify, and I welcome your questions.
