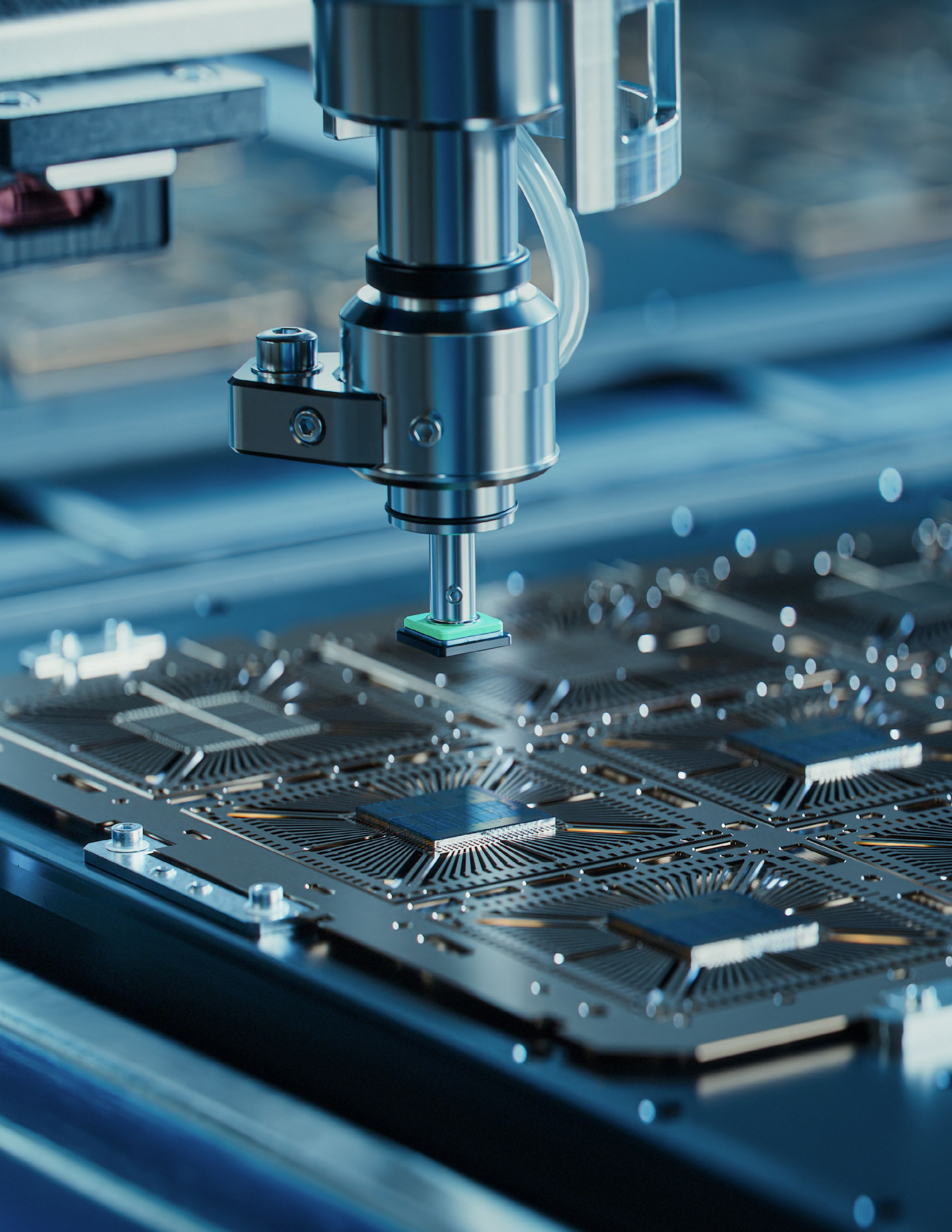
SEMICONDUCTOR INDUSTRY ASSOCIATION

STATE OF THE U.S. SEMICONDUCTOR INDUSTRY

2023



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INTRODUCTION

SEMICONDUCTORS FORM THE FOUNDATION OF THE DIGITAL ECONOMY, ENABLING INNOVATIONS THAT MAKE THE WORLD SMARTER, GREENER, MORE EFFICIENT, AND BETTER CONNECTED. WITH UP TO TENS OF BILLIONS OF TRANSISTORS ON A SINGLE CHIP, PRODUCING THESE COMPLEX DEVICES IS A MARVEL OF MODERN TECHNOLOGY, MADE POSSIBLE BY THE SYNCHRONOUS SYNERGY OF HIGHLY ADVANCED RESEARCH, DESIGN, AND MANUFACTURING.

In 2023, the semiconductor industry's importance to the world continues to grow, as chips become an even greater presence in the essential technologies of today—and give rise to the transformative technologies of tomorrow. In all, more than 1 trillion semiconductors were sold globally last year, a total so high that if you stacked them one on top of another, they would reach higher into the sky than the maximum cruising altitude for commercial aircraft.

As chip demand rises, countries around the world have been ramping up government investments to lure semiconductor production and innovation to their shores. In 2022, the U.S. government stepped up to meet this challenge, enacting the landmark CHIPS and Science Act to provide needed semiconductor research investments and manufacturing incentives. and reinforce America's economy, national security, and supply chains.

Since the CHIPS Act was introduced, companies from around the world have responded enthusiastically, announcing dozens of new semiconductor ecosystem projects in the U.S. totaling well over $200 billion in private investments. These projects will create tens of thousands of direct jobs in the semiconductor ecosystem and will support hundreds of thousands of additional jobs throughout the U.S. economy. Implementation of the CHIPS Act has begun in earnest in 2023, and SIA seeks to play a constructive role to ensure the new law returns maximum benefits for America's economy, national security, and supply chain resilience.

Although the future holds tremendous promise for the semiconductor industry, it also presents a range of challenges. U.S.-China tensions continue to impact the global supply chain, for example, spurring new government controls on sales of chips to China, the world's largest semiconductor market. And other significant policy challenges remain, including the need to enact policies to reinforce U.S. leadership in semiconductor design, strengthen the U.S. semiconductor workforce by reforming America's high-skilled immigration and STEM education systems, and promote free trade and access to global markets. In addition, while the global chip shortage has eased, macroeconomic headwinds and market cyclicality have caused a short-term downturn in sales, which is projected to linger throughout the year.

Despite these challenges, the long-term outlook for this foundational industry remains strong. That's because moving forward, the world will need more and better semiconductors to power everything from appliances and airliners to autonomous cars and artificial intelligence. For society to advance, so too must chip technology.

In 2023, with effective government policies and continued hard work and ingenuity in our industry, the semiconductor sector will continue to grow, innovate, and build a brighter future for the world.

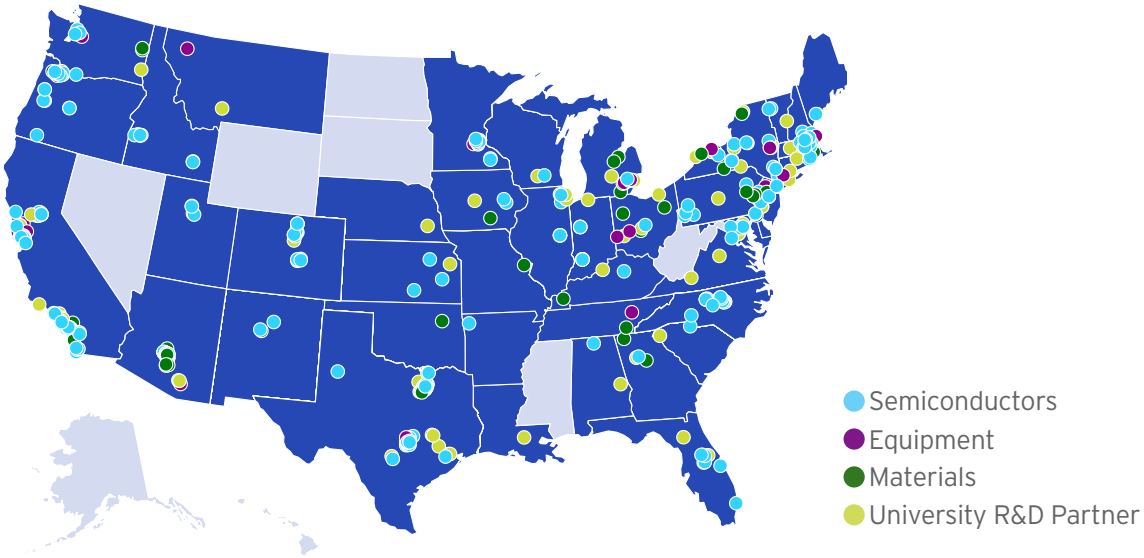
CHIPS IMPLEMENTATION

Enactment of the CHIPS and Science Act in August 2022 was an historic step toward reinvigorating semiconductor production and innovation in the U.S. This year, implementation of the new law has begun in earnest, and the U.S. Department of Commerce has made great strides in this process. The CHIPS Program Office (CPO) released its first Notice of Funding Opportunity (NOFO) in March, providing semiconductor companies with the information needed to submit applications to receive CHIPS incentives to construct or expand commercial fabrication facilities, including for leading-edge semiconductors, current-generation and mature nodes, and back-end manufacturing processes. The CPO released a second funding opportunity for projects over $300 million involving the manufacturing of semiconductor manufacturing equipment and materials in June. A funding opportunity for supply chain projects below $300 million is expected in the fall. A final NOFO for projects involving R&D facilities will be released in the fall.

CHIPS INVESTMENTS

The Commerce Department announced that as of May 2023, it had received over 400 statements of interest (SOIs) for CHIPS projects, reflecting the expansive interest in the CHIPS incentives program across the whole supply chain. Since the introduction of the CHIPS Act in 2020, dozens of projects across 20 states have been announced, resulting in well over $200 billion of investment. These projects will create tens of thousands of new, high-quality jobs in the U.S. semiconductor ecosystem alone, as well as hundreds of thousands of supported jobs throughout the broader U.S. economy. As the application process proceeds, the number of announced projects is expected to grow, supporting the semiconductor ecosystem nationwide.

U.S. SEMICONDUCTOR ECOSYSTEM



THE CHIPS ACT IN ACTION

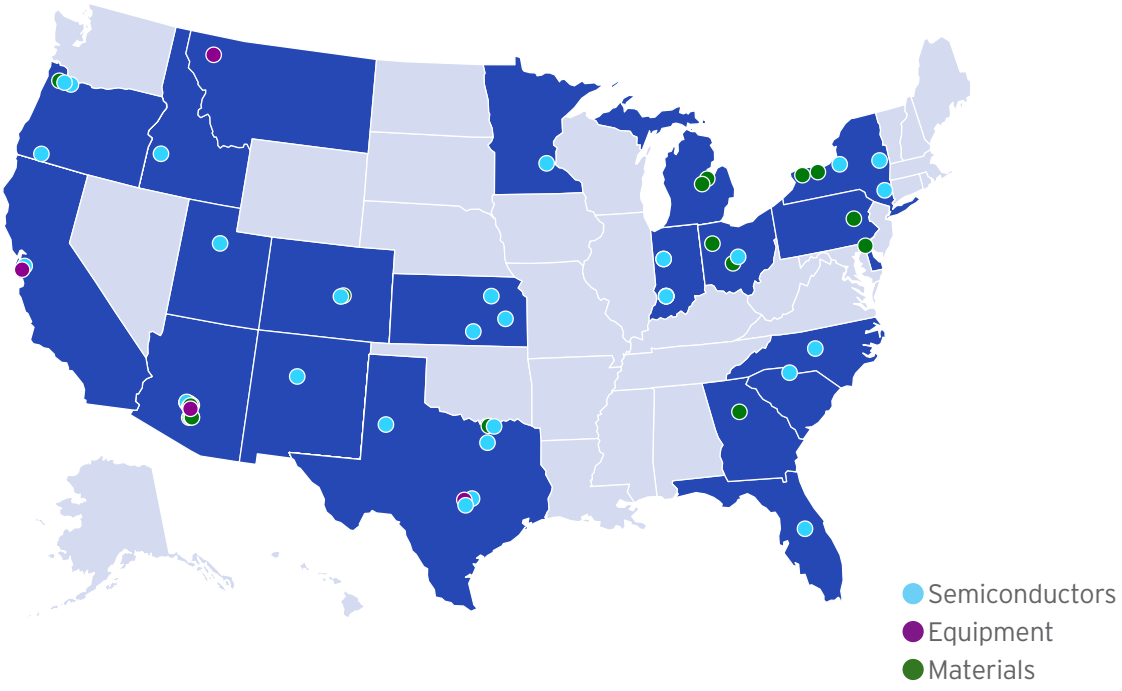
The Commerce Department has started issuing the key guidance documents that will shape the program. Commerce issued a proposed rule for implementation of the CHIPS "guardrails," which restrict certain expansions of semiconductor manufacturing in countries of concern and engagement in certain joint research and technology licensing efforts with entities of concern. The Commerce Department also released an environmental questionnaire, where applicants will provide the CPO with information regarding the environmental impacts of the proposed project, which will determine the level of necessary federal environmental review. Applicants will also be expected to provide Commerce with financial models that demonstrate the commercial viability of the project throughout the life of the facility.

To ensure the goals of the CHIPS Act are realized, applicants are crafting comprehensive workforce development plans to ensure these new and expanded facilities have the talent needed to succeed. State and local partners, including universities and community colleges, are engaging with applicants to support projects in their respective regions.

SIA supports continued efficient, effective, and transparent implementation of the CHIPS incentives program, and looks forward to further collaboration with the Commerce Department to ensure the success of the CHIPS Act.

THE CHIPS ACT IN ACTION

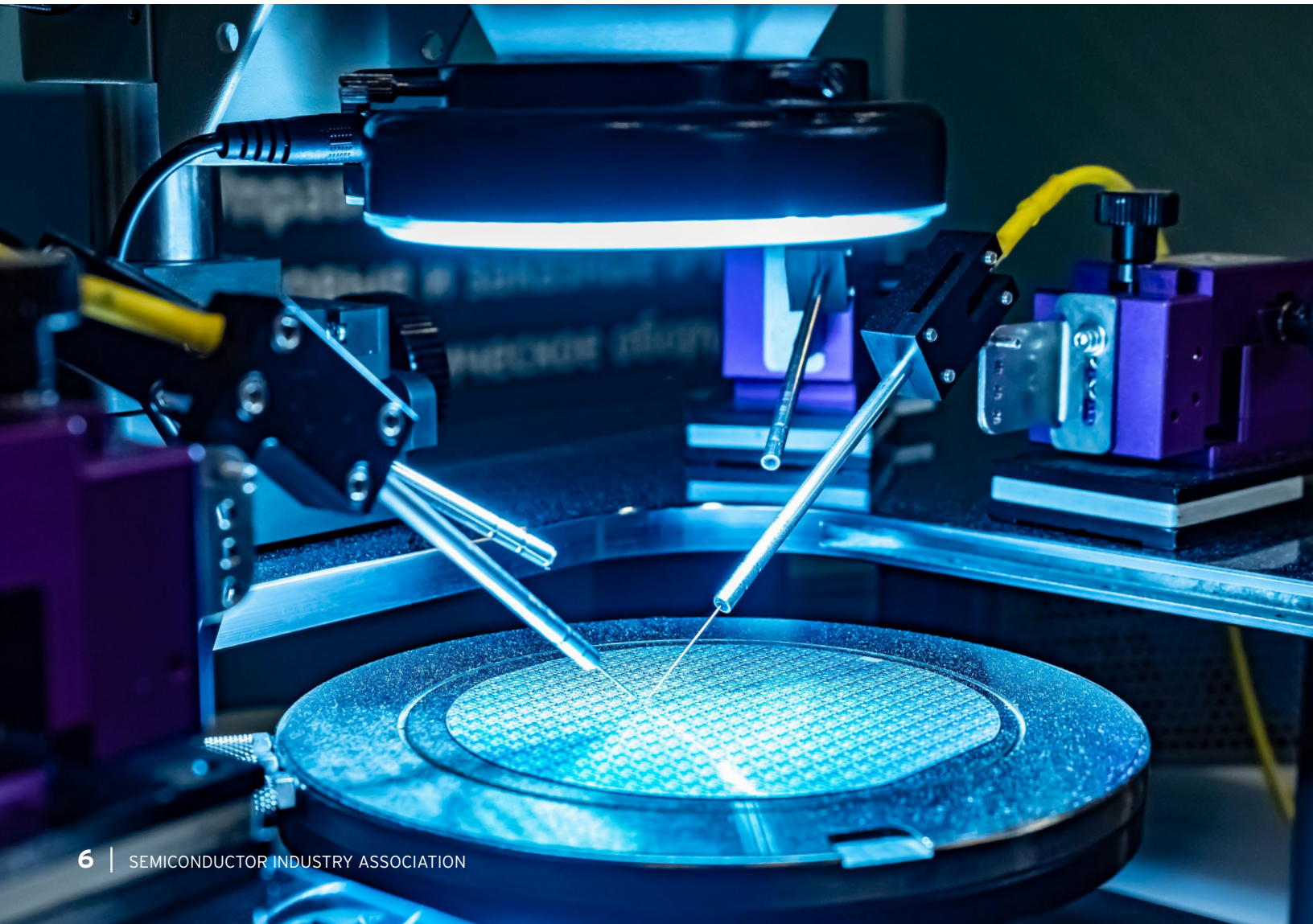
Semiconductor supply chain manufacturing investments announced from May 2020 to June 2023



INVESTMENT TAX CREDIT

The CHIPS Act established a 25% advanced manufacturing investment tax credit, to be implemented by the U.S. Department of Treasury and set forth in section 48D of the Internal Revenue Code. Coupled with the CHIPS grants, these incentives will lower the cost gap between investing in the U.S. and investing abroad, while generating greater benefits to the U.S. economy, national security, supply chain, and technology leadership.

To implement the advanced manufacturing investment tax credit, the Internal Revenue Service (IRS) and the Treasury Department issued a proposed rulemaking setting forth the parameters for claiming the credit, including provisions to recapture the credit if companies make significant investments or expansions of manufacturing facilities in China. The regulations are expected to be finalized later this year.



STRENGTHENING THE U.S. SEMICONDUCTOR WORKFORCE

The U.S. economy faces a significant shortage of skilled workers, which poses challenges to U.S. economic growth, technology leadership, and to national security. This shortage impacts the semiconductor industry and all technology reliant industries, including key technologies of the future – clean energy, medical technology, artificial intelligence, cybersecurity, next-generation communications, aerospace, automotive, and advanced manufacturing. Addressing this skilled workforce challenge must become a national priority. Semiconductor Industry Association (SIA) commissioned a report from Oxford Economics, a leading, independent economic advisory firm, to investigate the skilled workforce challenges facing the U.S. semiconductor industry in the context of economy-wide challenges.

The report projects the U.S. chip industry's workforce will grow by nearly 115,000 jobs by 2030, from approximately 345,000 jobs today to approximately 460,000 jobs by the end of the decade, representing 33% growth. The report estimates that roughly 67,000 risk going unfilled at current degree completion rates, or 58% of projected new jobs. These 67,000 unfilled jobs also represent approximately 80% of the project new jobs in technical fields (technicians, engineering, and computer science). Of this total workforce shortage, we estimate gaps of 26,400 technicians, 27,300 engineers, and 13,400 computer scientists by 2030. Among engineers, 9,900 are at the bachelor's level (35%), 12,300 are at the master's level (47%), and 5,100 are at the PhD level (18%).

Addressing the shortage of trained and educated workers – both throughout the broader economy and in the semiconductor industry in particular – should be a national priority. At stake is our continued economic and technology leadership, our global competitiveness, and our national security. The report recommends:

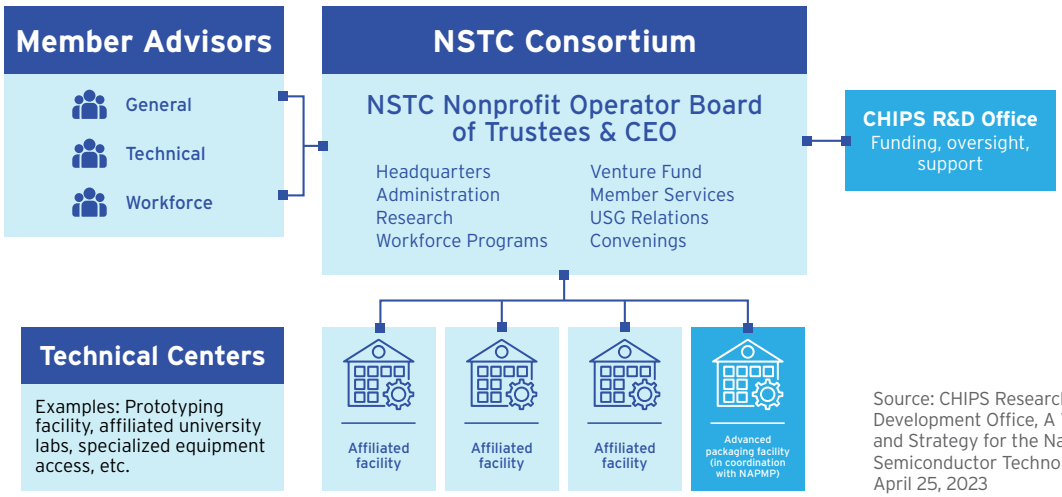
1. Strengthening support for regional partnerships and programs aimed at growing the pipeline for skilled technicians for semiconductor manufacturing and other advanced manufacturing sectors.
2. Growing the domestic STEM pipeline for engineers and computer scientists vital to the semiconductor industry and other sectors that are critical to the future economy.
3. Retaining and attracting more international engineering students within the U.S. economy.

THE NATIONAL SEMICONDUCTOR TECHNOLOGY CENTER

A core component of the R&D investments made by the CHIPS and Science Act is the National Semiconductor Technology Center (NSTC). The NSTC was authorized in the 2021 National Defense Authorization Act (NDAA) as a public-private consortium established jointly by the Secretaries of Defense and Commerce with the goal of conducting advanced semiconductor manufacturing, design, and packaging research and prototyping. Additional clarification was granted regarding the structure and technical goals of the NSTC in April 2023 in a white paper released by the National Institute of Standards and Technology.

Although the full scope and structure of the NSTC will be determined later in 2023, the Commerce white paper sets forth the overall direction of the NSTC. The NSTC consortium will be run by a new, independent, non-profit entity which will be governed by a Board of Trustees who will select and empower a CEO. The Board of Trustees will be determined by an independent selection committee. The NSTC will also convene a technical advisory board from industry, academia, and government to determine the technology agenda. There will be a uniquely identified headquarters which will serve as a prominent gathering place for the overall effort and will serve functions of executive leadership, government relations, and financial and legal operations alongside a geographically distributed network of research and engineering capabilities at connected technical centers.

OPERATING STRUCTURE



Source: CHIPS Research and Development Office, A Vision and Strategy for the National Semiconductor Technology Center. April 25, 2023

These technical centers will collectively provide access to a baseline of prototyping and scaling capabilities. Key areas of focus will include: leading edge, trailing edge, and legacy CMOS manufacturing; high quality processing of novel materials; power electronics materials and manufacturing; RF, analog, and mixed signal manufacturing; photonics materials and manufacturing; micro-electromechanical systems; bioelectronics; and design tool development. The NSTC will also seek to offer a cloud-based design enablement gateway to serve as a focal point for fabless R&D needs. Further decisions regarding the structure, geographic distribution, and technical focus will be determined throughout 2023 and 2024 as NSTC leadership is identified and empowered.

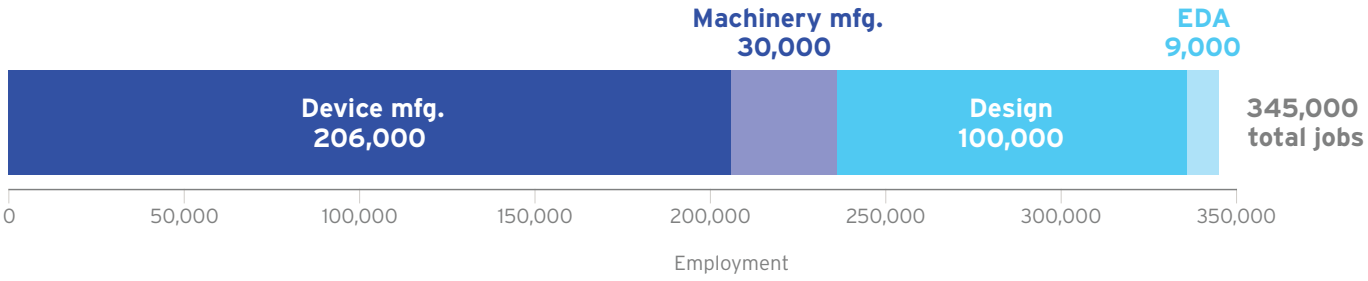
WORKFORCE AND MANUFACTURING INDUSTRIAL BASE

Having a competitive domestic workforce and manufacturing capabilities are critical to America's lead in semiconductors. In addition, a strong domestic semiconductor industry is essential to the U.S. economy. The semiconductor industry has a considerable economic footprint in the U.S. Roughly 345,000 people work in the industry, designing, manufacturing, testing, and conducting R&D on semiconductors throughout 49 states. Over 300 downstream economic sectors accounting for over 26 million U.S. workers are consumers of and are therefore enabled by semiconductors for their sectors.

The positive impact of the semiconductor industry on the American workforce.

The U.S. semiconductor industry is essential to the U.S. economy, providing inputs to nearly every industry in the U.S. stimulating jobs, and paying income to workers. In total, the U.S. semiconductor industry supported over 2.3 million U.S. jobs in 2022.

The industry directly employs more than 345,000 domestic workers in R&D, design, and manufacturing activities, among others. In addition, for each U.S. worker directly employed by the semiconductor industry, an additional 5.7 jobs are supported in the wider U.S. economy, either in the supply chains of the semiconductor industry or through the wage spending of those employed by the firms themselves of their supply chains.



Source: CES, QCEW, Oxford Economics

The U.S. semiconductor industry accounts for over a quarter of a million direct U.S. jobs and nearly 2 million additional indirect and induced U.S. jobs.

345,000
direct jobs in the U.S. semiconductor industry

ONE
U.S. semiconductor job supports

5.7
jobs in other parts in the U.S. economy...

...that's nearly

2,000,000 ADDITIONAL

American jobs

GOVERNMENTS RACE TO DEVELOP CHIP INCENTIVES

Supply chain resilience remains the top priority for the global semiconductor industry. Global governments continue to take proactive steps to build domestic chip ecosystems and increase market competitiveness. Governments in Asia, Europe, and the Americas are continuing to advance their own versions of the CHIPS and Science Act, creating ambitious packages of subsidies and tax incentives for semiconductor R&D and manufacturing. Coordinating with government efforts, companies have responded with large-scale investments in research and workforce development.

The European Union: In April 2023, the European Commission passed the "EU Chips Act," a plan to double the continent's share in global chip production by 2030 through mobilizing $47 billion in public and private investment . The plan was expanded from its original target of advanced chip manufacturing technology to include the entire value chain, including older chips and R&D facilities.

China: Semiconductors play a critical role in the Chinese government's agenda to develop its domestic integrated circuit (IC) industry. As part of its efforts, the Chinese government placed new income tax exemptions for advanced technology process nodes, established import duty exemptions for IC manufacturers, and resumed operations of the "Big Fund," China's $50 billion-plus state investment fund for chips. China also established a new National Science & Technology Commission led by the Party to coordinate its efforts in the industry.

Japan: In December 2022, the Japanese government announced $500 million in initial funding for Rapidus, followed by an additional r $2.3 billion allocation in April 2023 Rapidus is a state-organized joint chip venture with eight domestic partners that aims to achieve commercial production of 2nm chips by 2027. In February 2023, the Japanese government approved a $2.8 billion supplement to the annual budget to subsidize private investments in chipmaking equipment, raw materials, power chips, and microcontrollers.

South Korea: In March 2023, the Korean government passed the "K-Chips Act," providing 15% tax credits for large corporations and 25% for small and medium enterprises in key national strategic industries, including semiconductors. In April 2023, the Ministry of Trade, Industry, and Enterprise announced plans for the Industrial Transformation Super Project, which will allocate 70% of its R&D budget – approximately $4.7 billion – to core industrial sectors like semiconductors.

Taiwan: In January 2023, the Taiwanese government passed amendments to the Statute for Industrial Innovation, dubbed the "Taiwan Chips Act." The legislation will offer 25% tax reductions for R&D and 5% for new equipment purchases.

GOVERNMENTS RACE TO DEVELOP CHIP INCENTIVES

India: In September 2022, the Indian government revamped their $10 billion Production Linked Incentive (PLI) scheme to provide up to 50% co-funding for project costs of building semiconductor fabs and display fabs.

Southeast Asia: The governments of Malaysia, the Philippines, Singapore, Vietnam, and Thailand have introduced incentive packages to attract foreign semiconductor company investments.

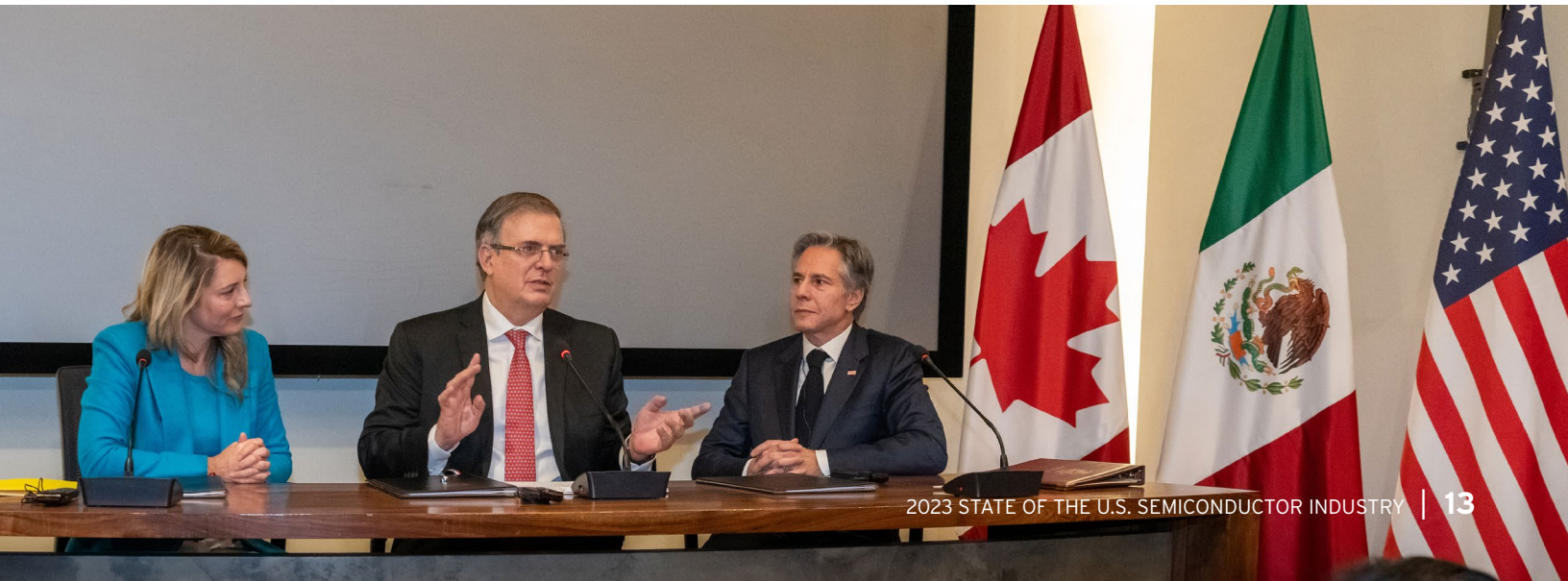
Over the past year, SIA staff have made several international trips to learn more about these programs and discuss deepening investment ties. In August 2022, SIA led a delegation of member company executives to participate in a conference in Mexico City to promote the growth of bilateral supply chains. In January 2023, SIA traveled to Southeast Asia, visiting Singapore, Vietnam, Thailand, the Philippines, and Malysia. SIA has visited India several times over the past year to encourage India's expanding role in the global semiconductor value chain and support the U.S.-India initiative on Critical and Emerging Technology (iCET). SIA team members have also made productive trips to Europe and Taiwan.

The scale of global incentives packages represents the strategic significance of semiconductors in national and economic security narratives. Healthy competition can innovate the industry and diversify the supply chain to become more resilient to exterior shocks and reduce market vulnerabilities. Governments around the world, however, should be exchanging information on their programs to strengthen their chip industries to promote efficiencies and avoid redundancies.

NORTH AMERICAN SEMICONDUCTOR CORRIDOR

The North American Semiconductor Corridor (NASC) is part of a major effort to rebalance and rebuild semiconductor supply chains in the western hemisphere. Core to this is the $52 billion CHIPS Act, which has already spurred more than $200 billion in new investment commitments. The United States, however, cannot do this on our own, and we need to work closely with partners and allies to strengthen global semiconductor supply-chain resiliency. The NASC was launched at the last North America Leaders' Summit on January 10, 2023. One of the key drivers behind the launch of North American Semiconductor Corridor was the COVID-19 induced global semiconductor shortage, while now easing, hit a number of industries hard. By building up the semiconductor industry within North America, the region can improve the resilience of its technology supply chains by having a greater share of the value-chain located within the region.

Each country brings advantages and strengths to the partnership. The hope of the NASC is to coordinate efforts across the region, especially in the area of workforce training and development, establishing linkages for research centers, coordinating government incentives for the semiconductor industry, and promoting environmental protections in the area of critical minerals necessary for the manufacture of semiconductors.



GLOBAL SEMICONDUCTOR MARKETS AND INTERNATIONAL PARTNERSHIPS

The Importance of Global Markets and International Cooperation

The semiconductor industry is one of the most globally integrated industries, spanning dozens of nations with thousands of suppliers. SIA and its members are committed to rebuilding American supply chains, further promoting more access to global markets, and facilitating increased global trade through deeper international collaboration with all key partners and nations. SIA is currently leading efforts to promote global industry cooperation and expand global markets through the World Semiconductor Council (WSC) and the World Trade Organization (WTO).

World Semiconductor Council (WSC)

Established in 1996, the World Semiconductor Council (WSC) is a forum that comprises the semiconductor industries of China, Chinese Taipei, the EU, Japan, Korea, and the U.S., to discuss shared industry and government initiatives and policies to ensure our industry remains healthy. Few industries have such a body, and from day one, the WSC has been a shining example of our industry's commitment to international cooperation and policies that foster fairness and openness in the semiconductor industry. For example, the WSC has successfully promoted a tariff-free global environment for the trade of semiconductor products, including adding Multi-Component and Multi-Chip and Multi-Component Packages (MCOs and MCPs) to the WTO's Information Technology Agreement. Most recently, the cooperation among WSC members was critical to keeping semiconductor operations up and running during COVID forced closures. This type of strong relationships and trust built through the WSC is essential in ensuring our global industry continue to prosper.

Information Technology Agreement

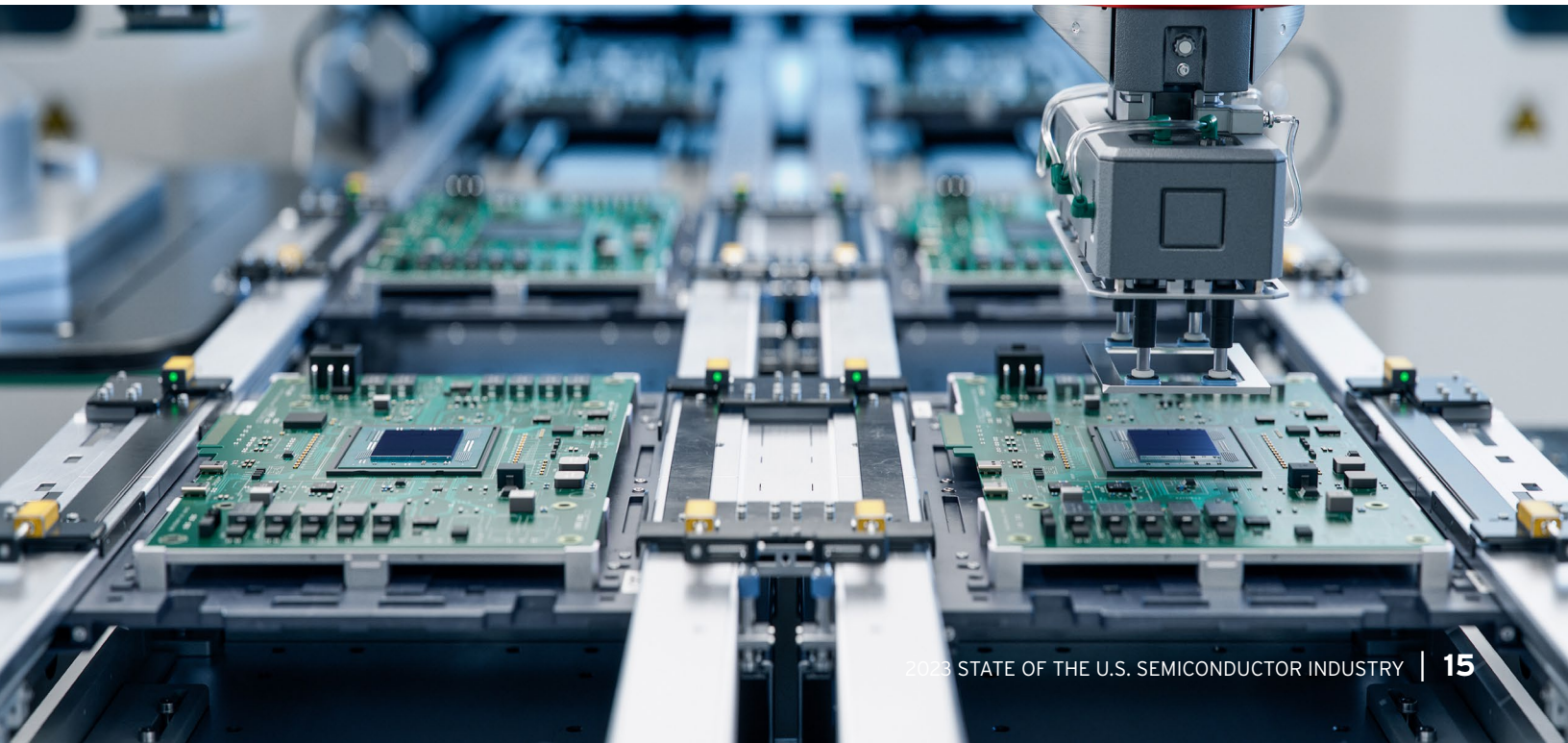
SIA, together with more than 40 other global associations from around the world, continues to call for the WTO to expand the Information Technology Agreement (ITA) again. The ITA was originally launched by the WTO in 1997 to eliminate tariffs on a broad swath of tech products from cell phones to computers. While ITA-2 (the previous round of product expansion) captured an impressive $1.3 trillion in tech trade in 2015, not a single additional product has been added to the agreement in the ensuing eight years, even though the tech sector is bursting with innovation and demand for digital technologies is growing exponentially. The global industry must work together to press for another product expansion to the WTO's ITA. This is more important than ever, as tariff elimination will make affordable and innovative products more accessible in the global market, including those that are essential to deal with climate change, facilitate remote work and learning, and save and extend lives.

GEOPOLITICAL TENSIONS & THE SEMICONDUCTOR INDUSTRY

U.S. and China are key players in the semiconductor global supply chain that drive industry innovation and market expansion. China is the single largest market for semiconductors accounting for 36% of sales for U.S. companies. Rising tensions in U.S.-China relations pose both short-term and long-term risks to supply chain resilience, market access, and ultimately the competitiveness of the U.S. semiconductor industrial base.

Both countries have announced unprecedented investments and policies to grow their domestic semiconductor ecosystems and ensure economic and national security. Semiconductors have played a central role in bilateral tensions, and given the recent economic and geopolitical challenges, have become the subject of various restrictive policies that have impeded the ability of U.S. companies to compete on a level playing field in the China market.

At the end of the day, a strong semiconductor industry is grounded in a virtuous innovation cycle that relies on access to global markets that can support the scale of R&D investments. Without access to these global markets, U.S. companies lose the scale necessary to finance both capital expansions and research and development here in the United States. At the same time, the industry understands the need for a narrowly tailored and multilateral approach to trade restrictions that can address the discrete national security concerns and supply chain vulnerabilities, while at the same time ensuring commercial competitiveness of the U.S. semiconductor industry.

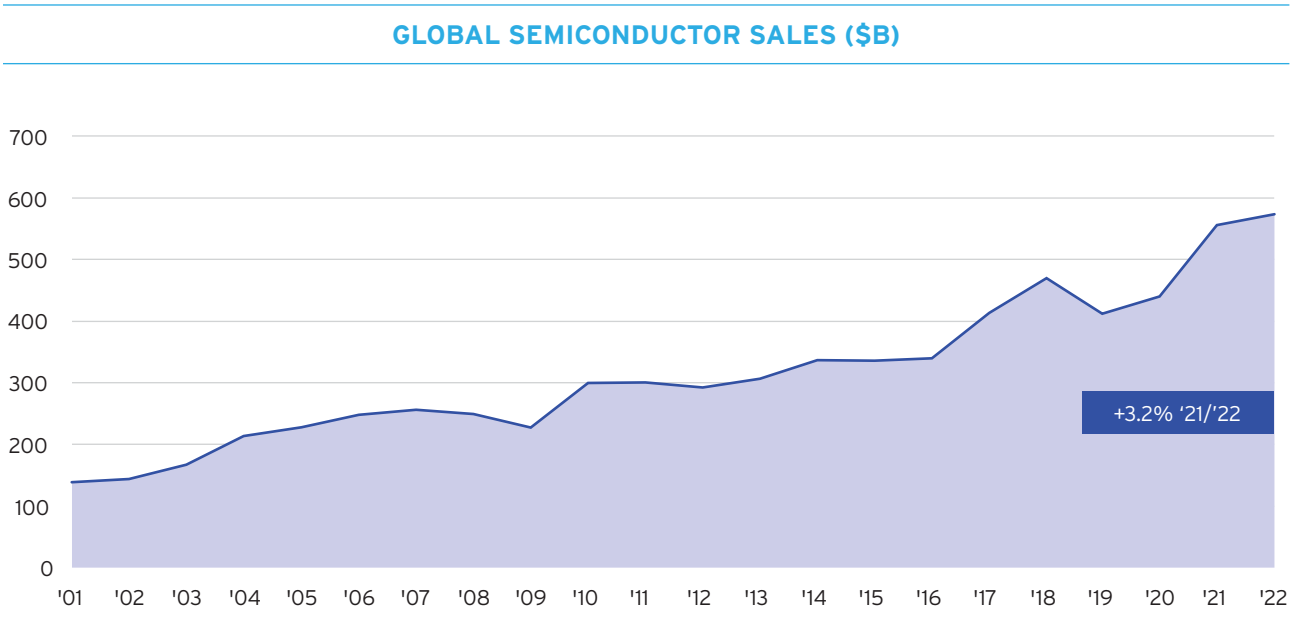


THE GLOBAL SEMICONDUCTOR INDUSTRY

Over the past three decades, the semiconductor industry has experienced rapid growth and delivered enormous economic impact. Chip performance and cost improvements made possible the evolution from mainframes to PCs in the 1990s, the Web and online services in the 2000s, and the smartphone revolution in the 2010s. These chip-enabled innovations have created incredible economic benefits. For example, from 1995 to 2015 an estimated $3 trillion in global GDP has been directly attributed to semiconductor innovation, along with an additional $11 trillion in indirect impact. Semiconductors have become essential to our modern world, which is why long-term market demand for semiconductors remains strong.

The 2022 market grew through the first half of the year but due to weaker than expected demand, sales dropped in the second half.

Following strong sales of $555.9 billion in 2021, global semiconductor sales in 2022 increased by 3.2% to $574.1 billion. Semiconductor sales were strong in the first half of 2022 following a period of tremendous growth through most of the pandemic. But macroeconomic factors such as inflation, decreased consumer spending and weakened demand for semiconductors led to a decrease in sales in the second half of the year. Estimates from The World Semiconductor Trade Statistics (WSTS) project worldwide semiconductor industry sales to decrease to $515 billion in 2023, a drop of 10%. The current short-term downturn, however, does not change the reality that long-term growth prospects for this foundational technology remain very promising.



SEMICONDUCTOR DEMAND DRIVERS

Over the next decade, further innovation in semiconductor technology will enable a host of transformative technologies including artificial intelligence (AI), autonomous electric vehicles, and the internet of things (IoT). Indeed, long-term growth drivers for semiconductor demand are firmly in place. But the relationship between semiconductors and the markets they serve is truly symbiotic, as innovations in semiconductors themselves help to spur further market demand and open up new markets entirely. For example, successive generations of cellular technology were made possible by advances in semiconductors themselves, leading to 5G. The demand drivers in 2022, however, experienced some unexpected shifts that in many ways are indicative of future growth trends for semiconductors in cars, innovation in AI, and 5/6G technologies.

Shifts in end-use market share reflect growing innovation and demand for semiconductors in the Automotive, Industrial and Consumer markets.

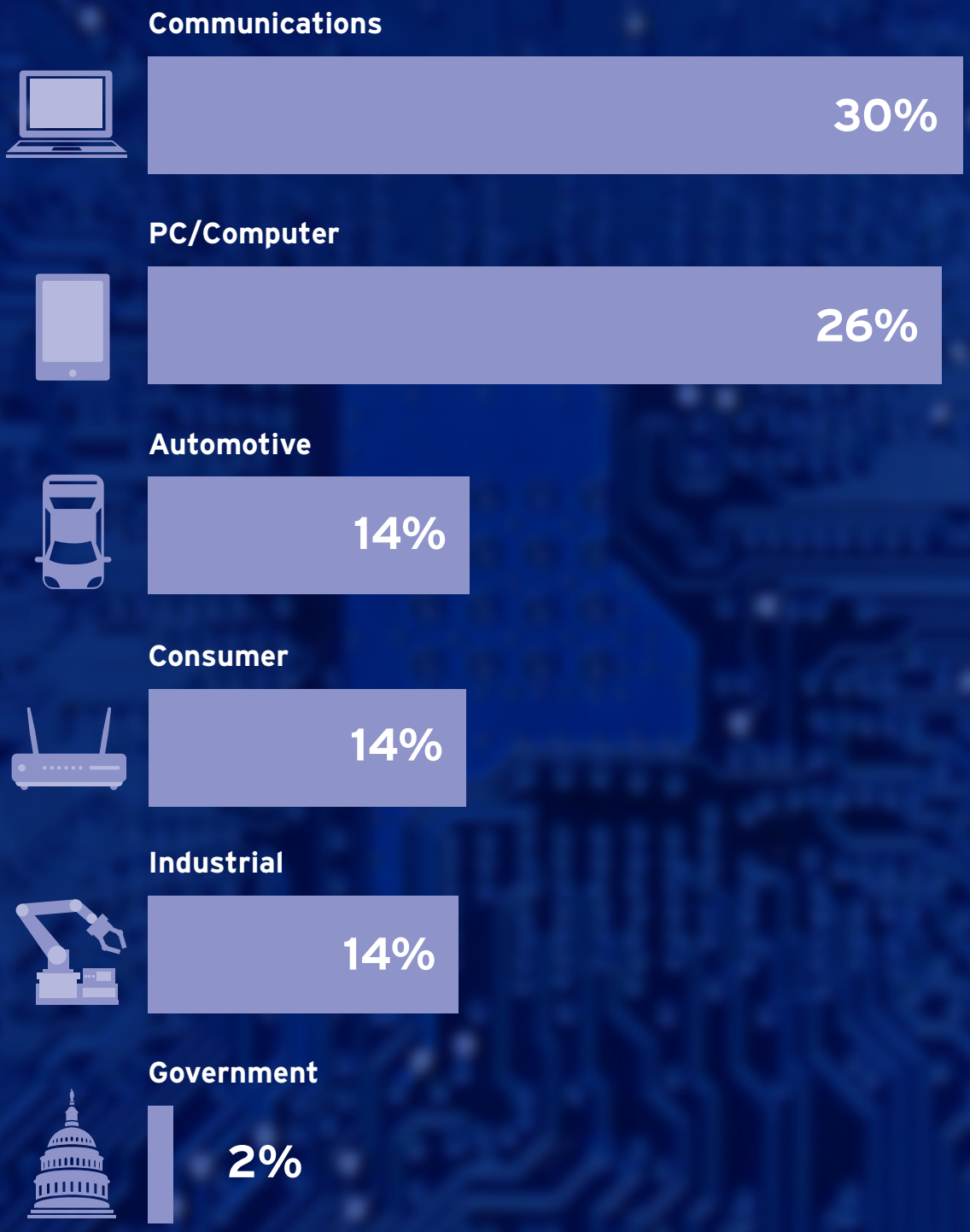
In 2022, end-use sales of semiconductors experienced shifts in market share for the industrial, consumer, and automotive industries. These industries historically made up a combined third of sales, however, the growth in market share signify changes in demand trends that will power the chip industry through the decade. Innovation in the automotive, industrial, and consumer electronics industries ensure that growth continues in the industry and could reach $1 trillion in sales by 2030. To meet increasing demand for chips, semiconductor companies have committed billions in new investments through the decade.

2022 DEMAND BY END-USE

End-Use Category	Communication	Computer	Industrial	Consumer	Automotive	Government
Annual Growth	1.0	-13.9	24.2	17.7	13.4	56.5
Total Value ($B)	**172.3**	**150.7**	**83.1**	**80.5**	**78.3**	**9.1**

SEMICONDUCTOR DEMAND DRIVERS

2022 TOTAL GLOBAL SEMICONDUCTOR DEMAND SHARE BY END USE



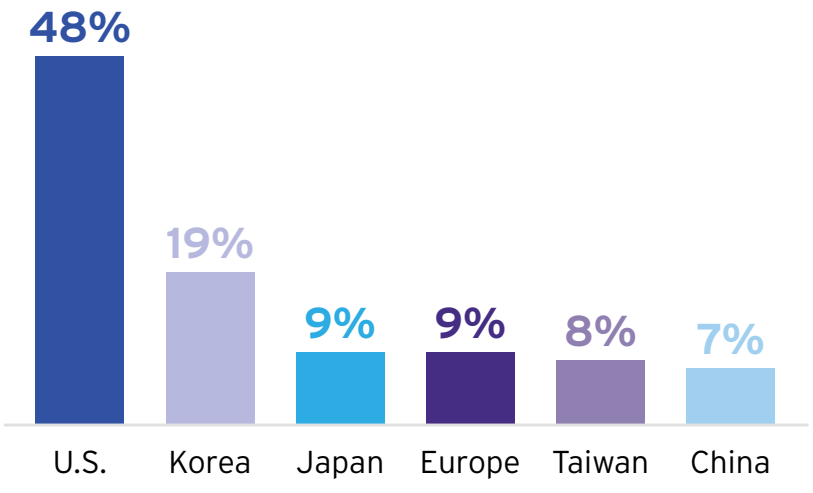
U.S. INDUSTRY MARKET SHARE

Semiconductors were invented in the United States, and the U.S. industry remains the global market share leader today. Throughout the industry's history, America's leadership position has been challenged by overseas competitors, but the U.S. has remained top thanks largely to its commitment to world-class innovation. With global competition for leadership in this strategic technology on the rise, it's never been more important to ensure U.S. chip companies can run faster than overseas competitors.

The U.S. semiconductor industry has nearly half the global market share and has displayed steady annual growth.

Since the late 1990s, the U.S. semiconductor industry has been the global sales market share leader with nearly 50 percent annual global market share. In addition, U.S. semiconductor firms maintain a leading or highly competitive position in R&D, design, and manufacturing process technology. Global sales market share leadership also allows the U.S. semiconductor industry to benefit from a virtuous cycle of innovation. That is sales leadership enables the U.S. industry to invest enormously into R&D which helps ensure continued U.S. sales leadership. As long as the U.S. semiconductor industry maintains global market share leadership, it will continue to benefit from this virtuous cycle of innovation.

2022 GLOBAL MARKET SHARE



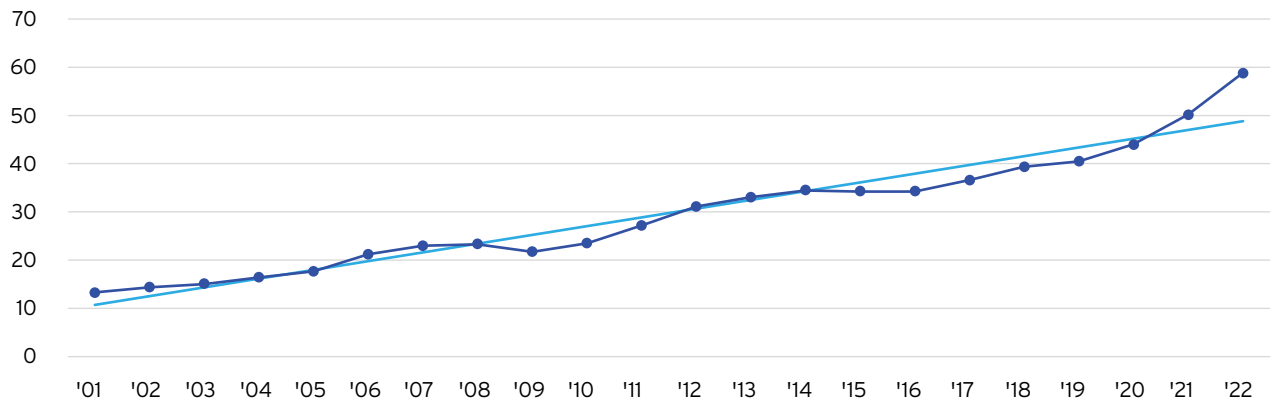
A VIRTUOUS CYCLE OF INNOVATION

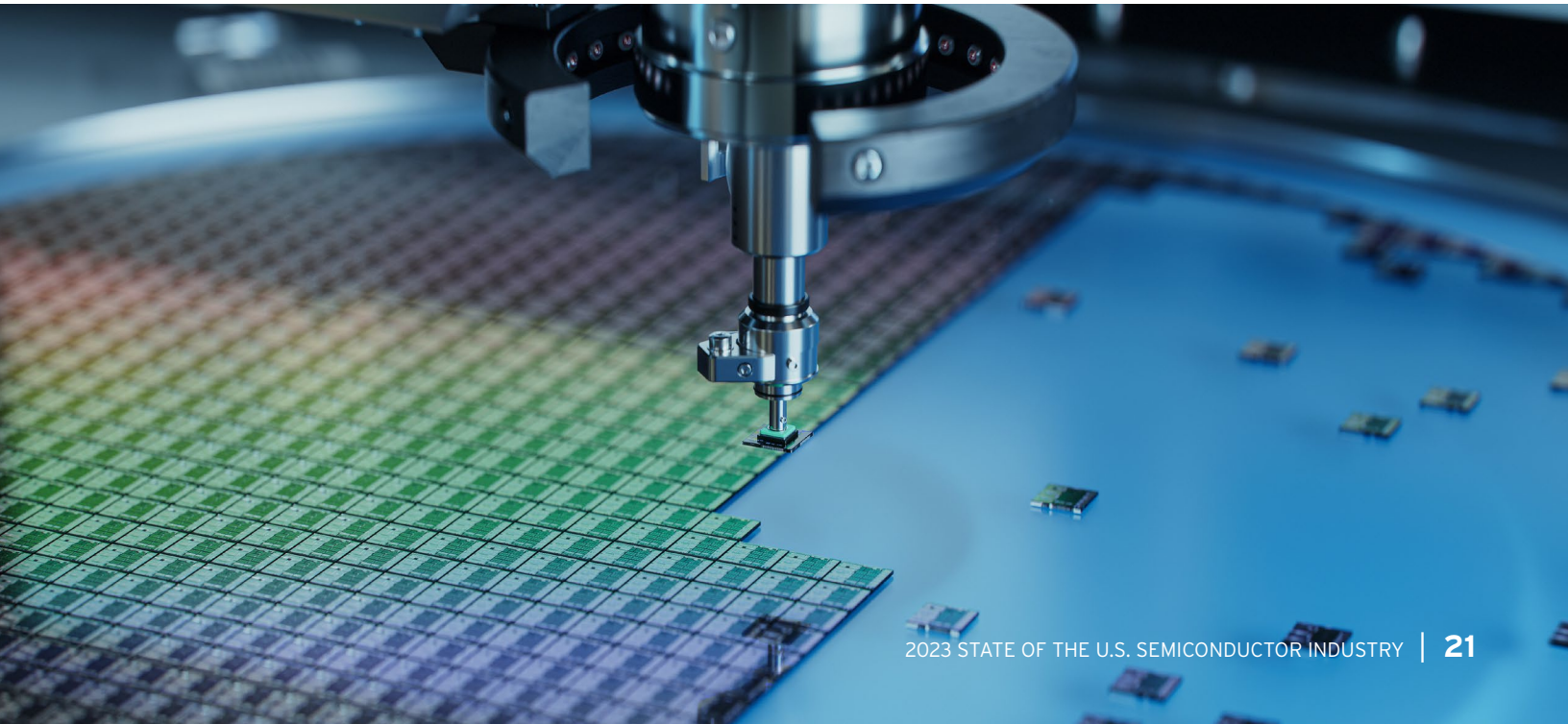
U.S. TECHNOLOGY COMPETITIVENESS

U.S. semiconductor industry R&D expenditures are consistently high, reflecting the inherent link between U.S. market-share leadership and continued innovation.

U.S. semiconductor industry R&D expenditures from 2000 to 2020. In 2022, total U.S. semiconductor industry investment in R&D totaled $58.8 billion, a compound annual growth rate of approximately 6.7 percent. R&D expenditures by U.S. semiconductor firms tend to be consistently high, regardless of cycles in annual sales, which reflects the importance of investing in R&D to semiconductor production.

CHIP INDUSTRY R&D EXPENDITURE ($B)



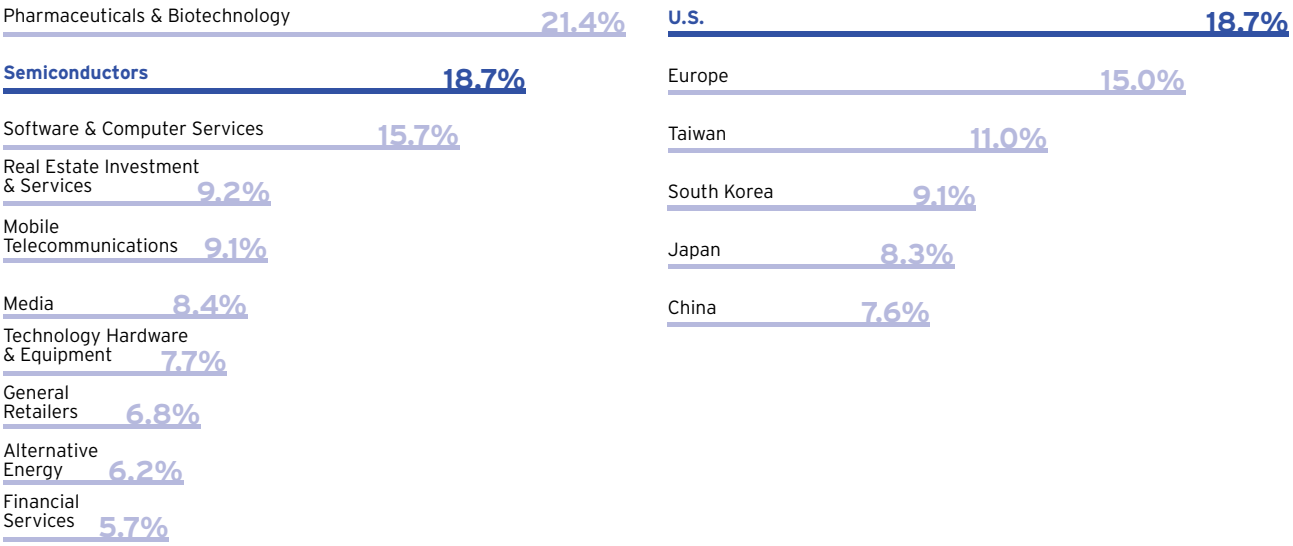


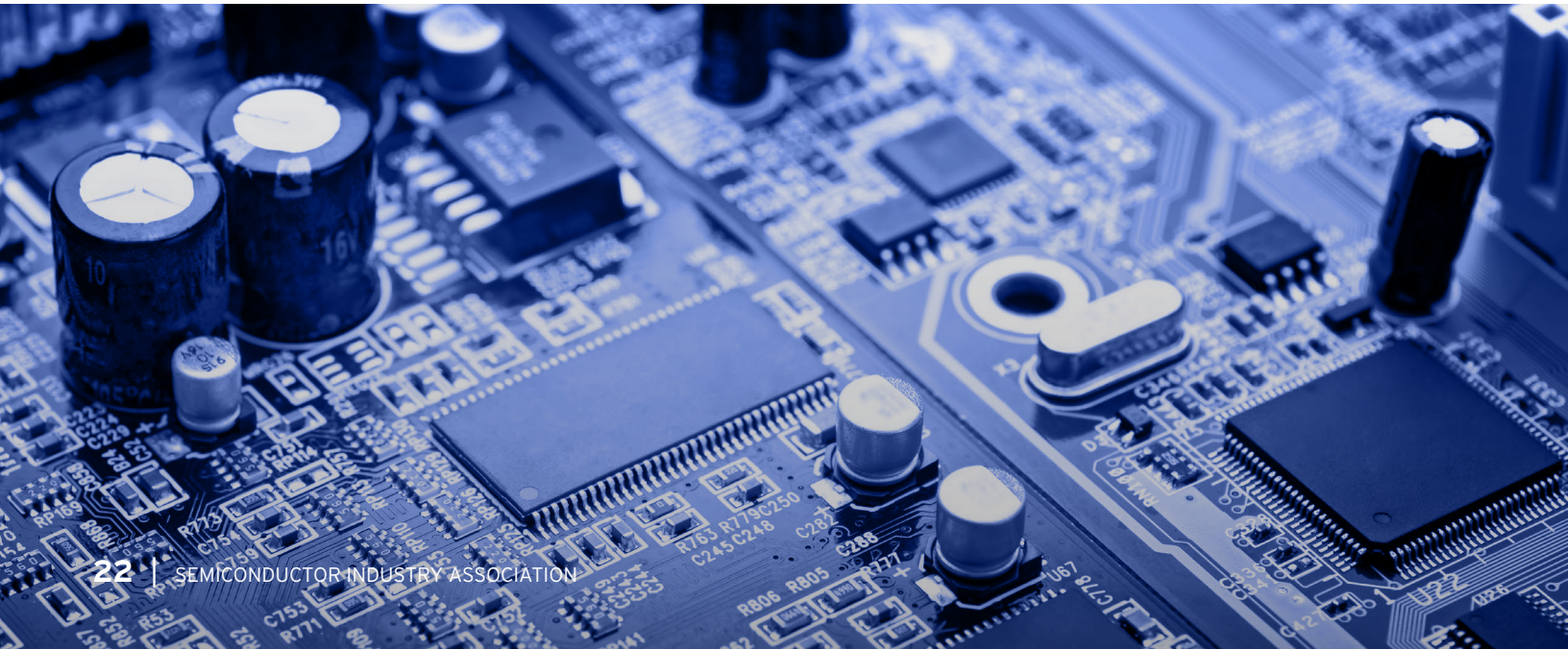
U.S. TECHNOLOGY COMPETITIVENESS

The U.S. semiconductor industry maintains one of the highest levels of R&D as a percent of sales of any U.S. industry.

The U.S. semiconductor industry was second only to the U.S. pharmaceuticals and biotechnology industry in terms of the rate of R&D spending as a percent of sales. While global competitors are increasing their R&D investments to compete with the U.S. industry, American firms spend more on R&D as a percent of sales than any other country's semiconductor industry. These high levels of reinvestment into R&D drive innovation in the U.S. semiconductor industry and, in turn, help maintain global sales market leadership and jobs throughout the United States.

R&D EXPENDITURES AS A PERCENTAGE OF SALES





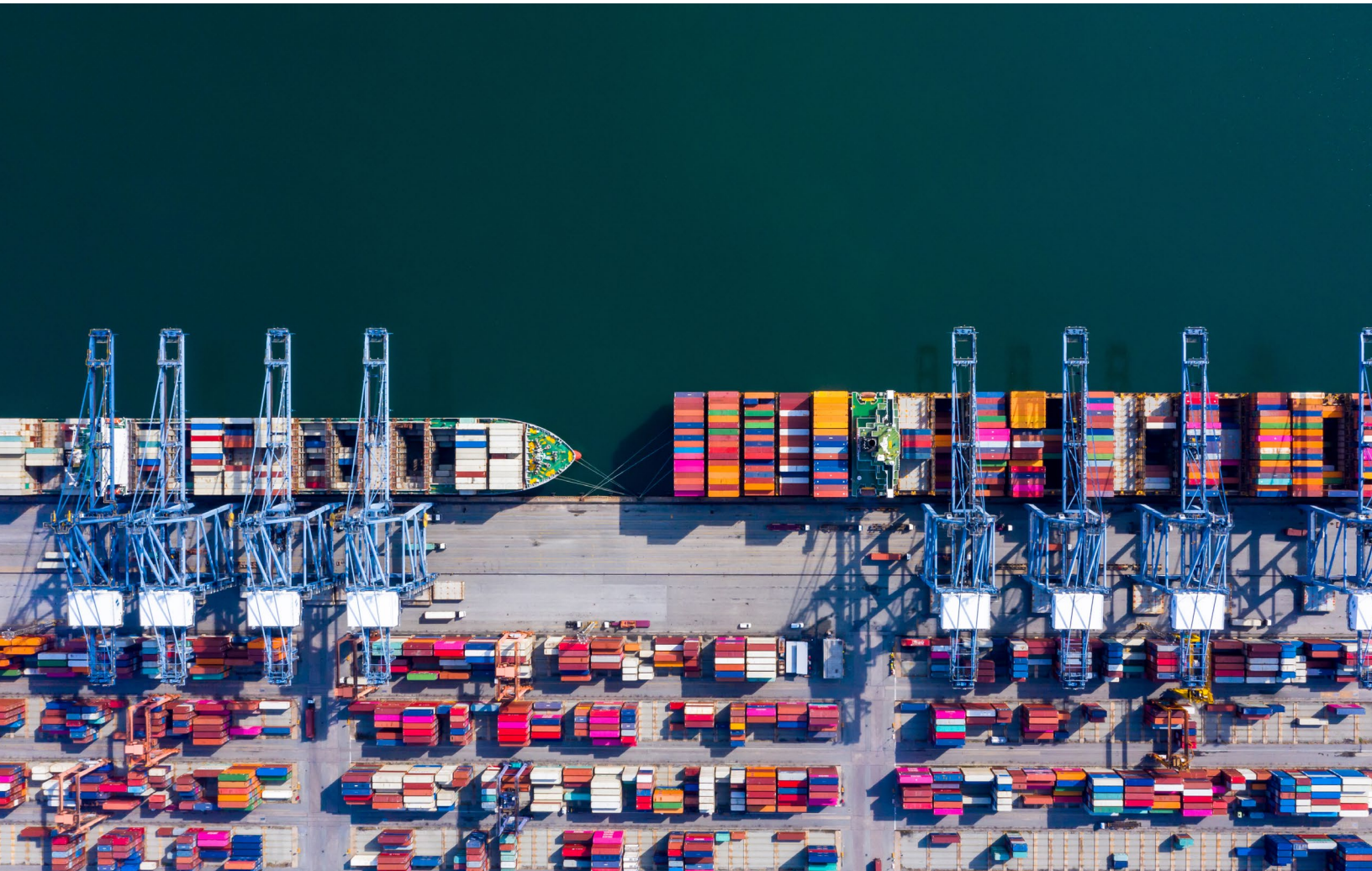
U.S. SEMICONDUCTOR INDUSTRY DOMESTIC ECONOMIC CONTRIBUTION

Semiconductors are one of America's top exports.

U.S. exports of semiconductors totaled $61.1 billion in 2022, fifth highest among U.S. exports behind refined oil, crude oil, natural gases, and aircraft. Sales outside the U.S. comprise over 80 percent of sales of the U.S. semiconductor industry.

U.S. EXPORTS IN 2022

Refined Oil	Crude Oil	Natural Gas	Aircraft	Semiconductors
$146.2B	$116.8B	$96.5B	$93.8B	$61.1B



U.S. SEMICONDUCTOR INNOVATION POLICY LANDSCAPE

To ensure continued U.S. leadership in the global semiconductor industry, the U.S. must adopt an ambitious competitiveness and innovation agenda.

1. Invest in U.S. Semiconductor Leadership:

- Implement the policies and programs in the CHIPS and Science Act efficiently, promptly, and transparently.
- Devise regulations for the advanced manufacturing investment credit in the CHIPS Act to encompass the full scope of investments in the semiconductor ecosystem.
- Adopt policies to promote innovation and U.S. competitiveness, such as enacting an investment tax credit for semiconductor design and strengthening the R&D tax credit.

2. Strengthen America's Technology Workforce:

- Implement a national strategy – backed by appropriate investments and in consultation with education leaders and the private sector – to improve our education system, increase the number of Americans graduating in STEM fields, support those pursuing careers in microelectronics, and ensure training and education opportunities to fill open positions.
- Reform America's high-skilled immigration system to enable access to the best and brightest in the world, including foreign students with graduate degrees in STEM fields from U.S. universities.
- Secure funding to strengthen the semiconductor workforce at all levels and ensure a robust pipeline at all education levels and skills needs.

3. Promote Free Trade and Protect IP:

- Approve and modernize free trade agreements that remove market barriers, protect IP, and enable fair competition.
- Expand the Information Technology Agreement, one of the World Trade Organization's most successful free trade agreements.
- Make permanent the WTO Moratorium on Customs Duties and Electronic Transmissions.

4. Cooperate Closely with Like-Minded Economies:

- Align policies and regulations with like-minded allies to strengthen national security, promote growth, innovation, and supply chain resilience.

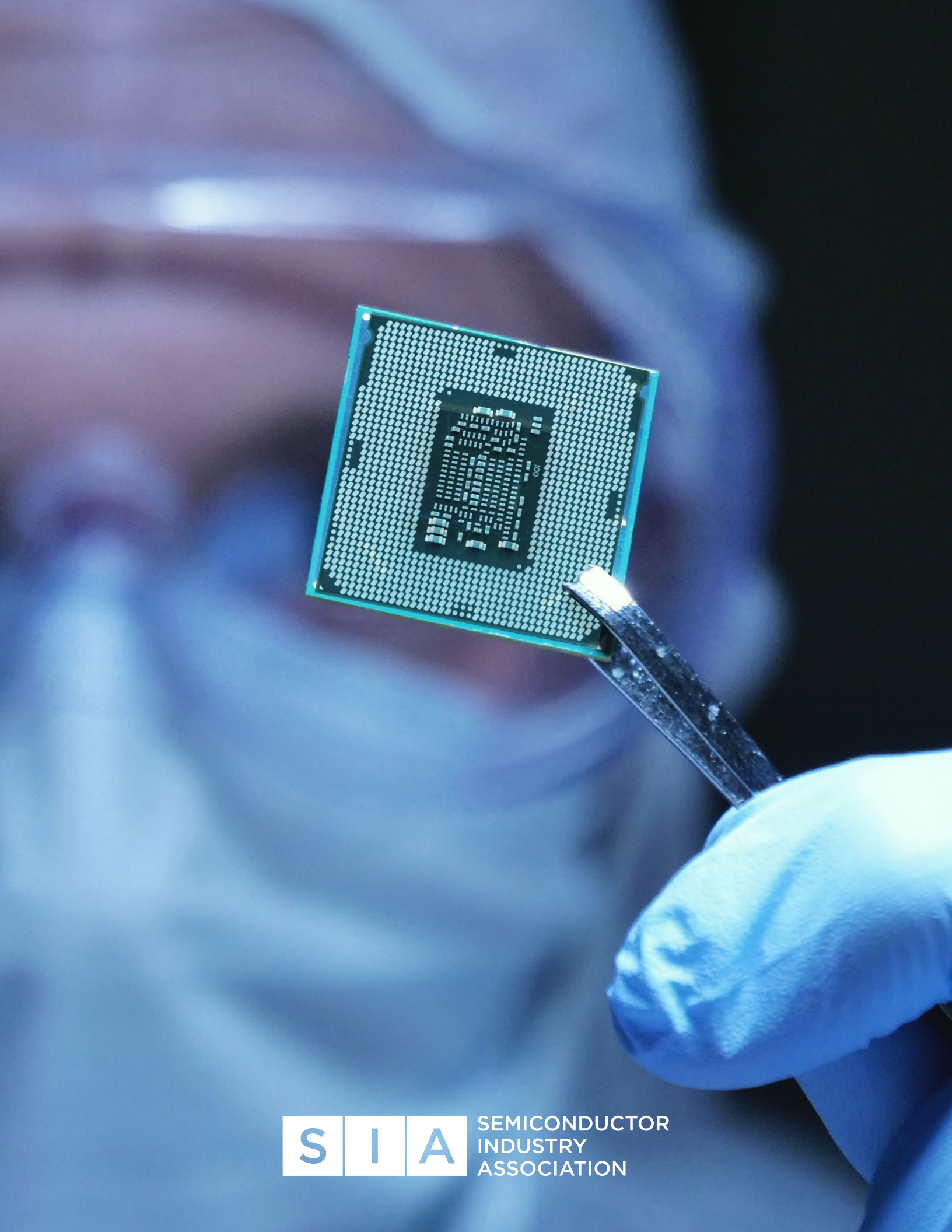
METHODOLOGY

This report is based on data developed independently by the Semiconductor Industry Association and in conjunction with the Boston Consulting Group and Oxford Economics. Figures pertaining to the industry's employment are based on data from the U.S. Census Bureau and the U.S. Department of Labor. Figures regarding the industry's international trade activity are based on an analysis of official U.S. government trade data from the U.S. international Trade Commission. Figures regarding industry manufacturing, capacity, and capital spending were based on data from TechInsights, New York University, McKinsey, The Economist, Tokyo Electron, J.P. Morgan, and IC Insights. Market data was based on World Semiconductor Trade Statistics data. Industry R&D data was based on company financial reports, as well as data from New York University. Lastly, data for the industry job multiplier, GDP contribution, and labor income are based on an Input-Output model developed by IMPLAN.

ABOUT SIA

The Semiconductor Industry Association (SIA) is the voice of the semiconductor industry, one of America's top export industries and a key driver of America's economic strength, national security, and global competitiveness. Semiconductors – the tiny chips that enable modern technologies – power incredible products and services that have transformed our lives and our economy. The semiconductor industry directly employs over a quarter of a million workers in the United States, and U.S. semiconductor sales totaled $75 billion in 2022.

SIA members account for 99 percent of all U.S. semiconductor industry sales. Through this coalition, SIA seeks to strengthen leadership of semiconductor manufacturing, design, and research by working with Congress, the Administration, and key industry stakeholders around the world to encourage policies that fuel innovation, propel business, and drive international competition. Learn more at www.semiconductors.org.



SEMICONDUCTOR INDUSTRY ASSOCIATION