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COMPUTING POWER AND COMPETITION:

EXAMINING THE SEMICONDUCTOR ECOSYSTEM

WEDNESDAY, APRIL 15, 2026

House of Representatives,

Subcommittee on Commerce, Manufacturing, and Trade,

Committee on Energy and Commerce,

Washington, D.C.

The subcommittee met, pursuant to call, at 2:04 p.m. , in Room 2123, Rayburn House Office Building, Hon. Gus Bilirakis [chairman of the subcommittee] presiding.

Present: Representatives Bilirakis, Fulcher, Dunn, Bentz, Fry, Lee, Evans, Goldman, Guthrie (ex officio), Schakowsky, Castor, Soto, Clarke, Dingell, Veasey, and Kelly.

Also Present: Representatives Joyce and Fedorchak.

Staff Present: Ansley Boylan, Director of Operations; Jessica Donlon, General Counsel; Matt Furlow, Counsel, Commerce, Manufacturing, and Trade; Sydney Greene, Director, Finance and

Logistics; Natalie Hellman, Professional Staff Member, Commerce, Manufacturing, and Trade; Megan Jackson, Staff Director; Adam Joseph, Digital Director, Press; Daniel Kelly, Press Secretary, Press; Patrick Kelly, Staff Assistant; Alex Khlopin, Policy Analyst, Commerce, Manufacturing, and Trade; Brayden Lacefield, Special Assistant; Giulia Leganski, Chief Counsel, Commerce, Manufacturing, and Trade; Sarah Meier, Counsel and Parliamentarian; Lillian Noland, Staff Assistant; Evangelos Razis, Professional Staff Member, Commerce, Manufacturing, and Trade; Jake Riith, Staff Assistant; Jackson Rudden, Clerk; Chris Sarley, Member Services/Stakeholder Director; Timothy Trimble, Staff Assistant; Matt VanHyfte, Communications Director; Hannah Anton, Minority Policy Analyst; Giancarlo Ceja, Minority Staff Assistant; Kelly Fabian, Minority Chief Counsel, Commerce, Manufacturing, and Trade; Waverly Gordon, Minority Deputy Staff Director and General Counsel; Megan Kanne, Minority Professional Staff Member; Serena Klebba, Minority Intern; Emma Roehrig, Minority Staff Assistant; and Phoebe Rouge, Minority FTC Detailee.

Mr. Bilirakis. The committee will come to order. The chairman recognizes himself for 5 minutes for an opening statement.

Good afternoon, everyone, and a welcome to today's hearing, examining the state of a semiconductor ecosystem. From consumer devices and household items to AI applications, semiconductors or chips are critical components to today's society and are essential to our national and economic security.

Semiconductors come in many forms, as you know, logic and memory, leading edge, and legacy, each serving distinct and indispensable functions across the economy. For decades, the U.S. has dominated the world stage of semiconductors leading in areas such as global revenue, manufacturing capacity, and semiconductor design, to name just a few, but that leadership is no longer guaranteed, unfortunately.

American semiconductor manufacturing capacity has declined over 25 percent since 1990. Our adversaries, particularly China, are actively seeking to unseat us from global leadership and disrupt our supply chains. Through my work on the Energy and Commerce Committee and the Select Committee on China, I've seen firsthand the strengths and strategic vulnerabilities of the U.S. semiconductor ecosystem that defines our strategic competition with China.

While the U.S. remains a leader in semiconductor design, China is rapidly scaling its own capabilities, backed by significant state subsidies, and maintains a dominant position in the rare earth materials critical to chip production. At the same time, demand for semiconductors is being transformed by artificial intelligence.

AI applications are among the most critical use cases of semiconductors in today's society. AI is the leading use case for semiconductors, and the AI surge is responsible for over half of the total semiconductor revenue, potentially reaching \$500 billion this year and \$1 trillion by 2030. AI is a critical driver of economic growth. As you know, ceding global leadership or leaving our

semiconductor supply chains vulnerable to disruption at the hands of China could be catastrophic for U.S. leadership in AI.

The good news is that we have not ignored these emerging threats. Between congressional and executive action, including actions in this committee, there has been an array of actions to strengthen U.S. global semiconductor leadership. This hearing will also examine those solutions and consider what other actions may be taken.

Thank you again to all of our witnesses for being here. We appreciate you so very much. Thanks for the time. I am looking forward to hearing your expertise and to the conversation ahead.

So I will yield back and recognize the ranking member of the full committee, actually, the subcommittee, Ms. Schakowsky, for her 5 minutes for an opening statement. You are recognized.

[The prepared statement of Mr. Bilirakis follows:]

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Ms. Schakowsky. Thank you, Mr. Chairman.

Well, this is an important debate that we are having right now. The American people definitely rely on these chips. President Biden did the CHIPS Act, which created a lot of jobs for a lot of people, but what has happened now is, unfortunately, with President Trump, we are seeing that a lot of those jobs are not -- are going away, and it is too bad that we are not able to have the jobs that have been created over a number of years by the last President.

We ought to be prioritizing our workers. That is the important thing that we should be doing, and, unfortunately, I think that is not exactly what has been happening, and I hope that we can get back to that so that we can not only have the good things that we need for our people and for our workers.

That is it. I yield back.

[The prepared statement of Ms. Schakowsky follows:]

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Mr. Bilirakis. Okay. Thank you very much. The gentlelady yields back. I thank her for that.

And now I recognize the chairman of the full committee, Mr. Guthrie, my good friend, for 5 minutes for an opening statement. You are recognized.

The Chair. Thank you, Mr. Chairman, and thank you for convening this important hearing. And I want to thank all of our expert witnesses for being here.

Semiconductors are foundational to modern technology and to our economy. From smart phones to cars and household appliances to advanced AI systems, these chips are embedded in nearly every aspect of our daily lives, but their importance goes far beyond the many end uses. The semiconductor industry is a major driver of economic growth supporting millions of jobs and generating tens of billions of dollars in export revenue.

Semiconductors are also central to the AI infrastructure boom, which is already delivering tangible benefits to Americans of economic growth, tax revenue, reinvestment in their communities, and innovations that improve the quality of life.

However, the benefits are not a guarantee to the U.S. semiconductor manufacturing capacity. The U.S. semiconductor manufacturing capacity has declined from its historical highs. And, while we remain leaders in design and advanced equipment, that leading edge is under pressure from strategic competitors and adversaries.

In the wake of the COVID-19 pandemic, we saw how semiconductor shortages exposed the vulnerabilities in our supply chains, costing families and the economy hundreds of billions of dollars. In response, the Trump administration has taken meaningful steps to strengthen American competitiveness across the semiconductor ecosystem, helping to secure \$0.5 trillion in private investments to boost our domestic semiconductor capabilities, drive significant economic growth, and support our national security.

However, we are at a critical inflexion point. Our global leadership is being challenged. Our supply chains remain vulnerable, and the stakes of our economy and national security could not be higher. At a time when demand for semiconductors is at an all-time high, we must examine the state of the semiconductor industry and what more must be done to ensure continued American leadership.

I was talking with some earlier, and every time I talk with my colleagues on both sides of the aisle, we absolutely all agree that the number one priority, that defeating China in every aspect, particularly in technology, is the number one priority. I think you can get 435 votes if you said we are going to beat China. I do believe in the bottom of my heart everybody wants to do that.

And so we have to figure out the right pathways to do it. How do we do it? And it is also who controls technology? Our friend Gary Palmer, I don't know if he is on this subcommittee today, he always says it is not going to be "a" super power but "the" super power.

And so what we are talking about today is extremely important. This is the building block. I don't even want to say block. It is like a speck now. It is just amazing when you look at the scale of what this industry has become and what it is becoming and the minuscule chips and the power that they have.

I remember they used to have calculators that cost \$80 that just added and subtracted, and now I am old enough to know that, and so now it is just amazing what happens. I remember going to see a computer. I did a field trip to see a computer when I was a Cub Scout, and that computer, which took up an entire room at a credit union, couldn't do what this phone does or even close to it.

So it is amazing what you guys have done, what your industries have done. There is so much more to do, and I really believe that all of us on both sides of aisle on this committee and in Congress want to make this happen and figure out the right pathway where we can find common ground to make sure we beat China.

Thank you, and I will yield back.

[The prepared statement of The Chair follows:]

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Mr. Bilirakis. Thank you, Mr. Chairman. I appreciate it. I am old enough to remember, too, those calculators, \$80 calculators. Texas Instruments, I think that was the first one.

Anyway, let me go ahead and yield to my good friend Ms. Castor, who will be representing the ranking member today. I yield to you for 5 minutes for your opening remarks.

Ms. Castor. Well, thank you, Chairman Bilirakis. Yes, Ranking Member Pallone is debating legislation on the floor. So, if he were here, he would be offering this statement.

But this is a very important hearing, examining the semiconductor ecosystem because semiconductors are a critical part of the electronic devices we use every day, everything from computers to phones to cars to medical equipment and more. They are also fundamental to artificial intelligence and the processing power to train AI systems.

And, while the United States has been a consistent leader in chip design, the same cannot be said for chip manufacturing. Since 1990, the Nation's share of global semiconductor manufacturing dropped from 36 percent to just 10 percent in 2020. And, during the pandemic, we saw the impact of this decline when global supply chains from everything from autos to video game consoles were disrupted. This led to higher consumer prices and concerns about access to chips for critical sectors.

In response to the national and economic security threats due to the lack of domestic semiconductor manufacturing, Congress passed and President Biden signed into law the CHIPS and Science Act in 2022. This landmark legislation provided \$50 billion in funds to support domestic manufacturing and research and development of chips.

As of July 2025, almost exclusively thanks to the Biden administration, the Department of Commerce had awarded about \$30 billion to 19 companies in manufacturing grants for projects across the country, including in Arizona, Ohio, and New York. We should be building on that progress, but instead the Trump administration has slashed the expert personnel dedicated to chips,

has shut down Natcast, a nonprofit dedicated to distributing R&D funds under the law.

And, at a time when other nations are investing heavily in research and development, it is irresponsible and dangerous to delay America's efforts. Even more irresponsible, President Trump's reckless war with Iran and the chaotic tariffs that are straining the already complex and fraught semiconductor manufacturing supply chains at a time of unprecedented demand for chips.

This demand is driving a shortage right now of memory chips, which is raising prices for consumer devices at a time when Americans are already struggling to afford basic goods like gas and groceries.

Finally, as we talk about semiconductors which make possible the AI models that are becoming increasingly enmeshed in our lives, we cannot ignore the downstream impacts of those models on Americans, including the privacy impacts. We should be protecting consumers using AI through strong bipartisan Federal data privacy legislation that includes both robust data minimization to defend consumers from abuse of their personal and sensitive information and safeguards in the face of AI-enabled consequential decisions about health, employment, and more. We also must allow States to continue to play a role in keeping their citizens safe in the age of AI.

I am really looking forward to the expert testimony today. The Congress needs your help and advice as we move forward on policy.

Thank you, Mr. Chairman. I yield back the balance of my time.

[The prepared statement of Ms. Castor follows:]

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Mr. Bilirakis. I thank the gentlelady.

I now will recognize our witnesses. Mr. Jason Grebe, the senior vice president of corporate planning at Intel. Thank you very much. Welcome.

Mr. Charles Wessner, nonresident senior advisor, Renewing American Innovation Program, Center For Strategic and International Studies. Welcome.

Mr. Asad Ramzanali, director of AI technology policy, Vanderbilt Policy Accelerator, Vanderbilt University. Welcome.

And, finally, Mr. Jason Oxman, president and CEO of Information Technology Industry Council.

Welcome to all of you, and we will go ahead and begin with Mr. Grebe. You are recognized for 5 minutes.

STATEMENTS OF JASON GREBE, SENIOR VICE PRESIDENT CORPORATE PLANNING, INTEL; CHARLES WESSNER, NONRESIDENT SENIOR ADVISOR, RENEWING AMERICAN INNOVATION PROGRAM, CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES (CSIS); ASAD RAMZANALI, DIRECTOR OF AI AND TECHNOLOGY POLICY, VANDERBILT POLICY ACCELERATOR, VANDERBILT UNIVERSITY; AND JASON OXMAN, PRESIDENT AND CEO, INFORMATION TECHNOLOGY INDUSTRY COUNCIL.

STATEMENT OF JASON GREBE

Mr. Grebe, Chairman Bilirakis, Ranking Member Schakowsky, Chairman Guthrie, and distinguished members, thank you for the opportunity to testify on the semiconductor ecosystem and its central role in artificial intelligence.

Semiconductors are no longer just an input to the digital economy. They are the foundation of economic competitiveness, national security, and technological leadership. Leadership in semiconductors will determine leadership in AI.

Intel is the only American company that both designs and manufactures leading edge logic chips, and what makes us distinct is not just what we build but where and how we build it. Our technology development and manufacturing is conducted in the United States using U.S.-developed process technology in IP. We are investing more than \$100 billion in new and expanded facilities in Arizona, New Mexico, Oregon, and Ohio, and have committed approximately \$93 billion to domestic R&D since 2020.

Co-locating R&D with manufacturing is a national security advantage and one of the reasons Intel partners with multiple Federal agencies, including the Department of Energy.

AI has moved from breakthrough technology to backbone technology at extraordinary speed driving a surge in compute demand unlike anything else in history. This creates three realities: an

opportunity because the U.S. is the world's largest market for AI compute; a challenge because the single leading edge fab cost upward of \$20 billion and takes years to build; and a national security imperative because nations that lead in AI compute have asymmetric advantages in intelligence, autonomous systems, and cyber operations.

The question is straightforward: Will the United States build the infrastructure that powers the AI era or depend on others to supply it? Intel's answer: America must build.

The global semiconductor supply chain is under pressure from three forces at once; surging AI demand, geopolitical competition, and concentration points of failure. Active conflicts have disrupted access to noble gases essential to chip manufacturing. Critical minerals are disproportionately refined in China. Over 90 percent of leading edge production remains concentrated in Taiwan.

The Trump administration's agreement with Japan and Taiwan are driving further U.S. investment. The CHIPS Act has catalyzed more than \$500 billion in announced private sector commitments across 28 States, but the work is not done.

Intel urges trade policies that strengthen rather than tax domestic manufacturers with targeted exemptions for specialized inputs unavailable domestically, updated country-of-origin rules, and duty drawback programs that incentivize global customers to buy American-made chips.

Two areas require near term action. First, the U.S. approval process for specialty chemicals used in advanced manufacturing is significantly slower than in Taiwan, Korea, and Japan. With the EPA's TSCA Fee authority expiring September 30, Congress has a timely opportunity to level the playing field without compromising health or environmental protections.

Second, the semiconductor industry will need 115,000 additional workers by 2030 with more than half at risk of going unfilled. Intel has committed \$100 million over 10 years to workforce development alongside the NSF, university, and community colleges. The Federal partnership through STEM education and sustained training is essential to scale.

The CHIPS Act has been essential to restoring U.S. competitiveness. Intel has received \$8 billion under its chips agreements with \$3.2 billion more available under the secure enclave program supporting manufacturing in Arizona, Oregon, New Mexico, and Ohio.

Equally critical is the bipartisan Advanced Manufacturing Investment Credit under IRC Section 48D. Its scheduled expiration at the end of 2026 risks slowing momentum precisely as global competition intensifies. We urge this committee to extend the AMIC and provide the certainty of these long-term capital intensive investments require.

The decision Congress makes on semiconductor policy will determine whether the United States leads or follows in the technologies that define our future. At the center of that question is a simple reality: If you do not build the chips, you do not control the future of AI.

Intel is the only American company that designs, develops, and manufactures leading edge technology at scale on U.S. soil. This is a strategic national asset, and it is not guaranteed. It depends on sustained investment, aligned policy, and national commitment. The window to act is narrow, but the path is clear. America must set the pace.

Thank you.

[The prepared statement of Mr. Grebe follows:]

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Mr. Bilirakis. Thank you, Mr. Grebe. I appreciate it.

Now, Dr. Wessner, you are recognized for 5 minutes.

STATEMENT OF CHARLES WESSNER

Dr. Wessner. Thank you. Thank you, Mr. Chairman, Ranking Member Schakowsky, and members of the committee. I appreciate the opportunity to speak with you.

I am a senior advisor at the Center for Strategic and International Studies. It was an appropriately named program renewing American innovation. I have the pleasure to work with a group led by my colleague behind me, Dr. Sujai Shivakumar, who has brought a vision to what we need to do to address the competitive economy that we face.

I was very pleased to hear the chairman's remarks that there is an understanding here that semiconductors are not merely another industrial sector. They are foundational to the economic growth and military capabilities, and if I had one simple message for you, we ought to treat the industry that way. They are key to our civilian economy, key to our health, key to our communications, key to our ability to identify threats and address them.

And we sometimes seem to act as if they are just another industry, but, in fact, in fact, they are not, as some of the actions in the Hormuz Strait may be demonstrating today. In fact, the largest affirmation you can have or the strongest affirmation you can have of the importance of chips is Chinese policy.

China policies, you know, you hear criticisms, old criticisms, inappropriate criticisms that we don't want to pick winners and losers. As a professor at Georgetown, I would beg to differ with you. We have had industrial policies since about 1787, and we are still going strong. If you wonder if we have industrial policy, ask yourself what the Department of Agriculture does, what the

Department of Energy does. I mean, these are institutions that provide support for critical sectors.

The Chinese, on the other hand, are not reluctant to pick winners. They intend to be the winners, and they are acting like it. You know, it is great, sir, that we got \$52 billion for the CHIPS Act. In that same time period, the Chinese put in \$150 billion. It may well be that there is substantially more than that given provincial grants to producers.

I don't mean to say that just because there is a grant, everything is well spent. There is massive technological advance, but there is technological advance, and one of the problems we have with our efforts to control Chinese access to our advanced technologies, to put it simply, one of the main problems is they already have it. They are now at parity with us.

As part of our program, we were visiting AIST in Japan, and one of the leading officials there looked at us and said, "Why are you trying to block China? I mean, you may have good reasons to want to, but there are a billion of them. They have all the money they need, all the money they can spend, and you have educated all of their best scientists at MIT and elsewhere in the U.S. Do you really think you are going to stop them?" We may slow them, and that may be a useful thing to do, but it has to be a very targeted effort to slow, not to block.

The proof of that is the Chinese firms have made substantial progress in overcoming the effects of controls in areas of semiconductor manufacturing equipment and materials. They can produce higher node chips very close to the leading edge.

And, you know, I sometimes think when on a Navy destroyer, they see an incoming missile, they really don't turn and say, "Ah, but that is a few nodes behind our best missiles." No, actually, they have got a missile coming straight at them, and that good enough strategy is what often characterizes Chinese policy.

China also has been looking ahead for decades. Their hold, as you mentioned, is on rare earths and minerals. That, combined with their control of magnets, gives them a potentially decisive edge in the equipment industry, not just in chips but in the equipment industry itself.

So what we need are proactive investments. We have to combine our defensive measures with a careful assessment of what are their actual impacts. Now, if I can say so with great respect, what we have to avoid here is who is toughest on China when the trick is they end up being toughest on our own industry with restrictions to the revenue that is absolutely crucial for them to be able to invest and compete. This is not an idle point. You cut revenue by 20 percent; you've cut R&D by 20 percent.

We also need to pay attention to our own house. Chips are highly dependent on robust physical infrastructure, reliable electricity, as I think the whole world is beginning to understand, and it requires power generation for both traditional --

Mr. Bilirakis. Excuse me, Doctor. Can you wrap up in the next 10, 20 seconds, because we have got to move on. Thank you.

Dr. Wessner. We need to invest more and recognize the effects of our policies and do what we have done in the past, which is support our industry in every way possible.

[The prepared statement of Dr. Wessner follows:]

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Mr. Bilirakis. Thank you very much. Good enough.

All right. Next we have Mr. Ramzanali. You are recognized for 5 minutes.

STATEMENT OF ASAD RAMZANALI

Mr. Ramzanali. Chairman Bilirakis, Ranking Member Schakowsky, members of the subcommittee, thank you for holding this important hearing. My name is Asad Ramzanali, and I am the director of AI and technology policy at the Vanderbilt Policy Accelerator. My testimony reflects my own views, and I don't represent Vanderbilt University or anyone else.

Today, I will talk to you about just three parts of the vast chips and computing ecosystem. First, I will talk about the success of the manufacturing incentives of the CHIPS Act and early signs of that success and also how its R&D programs are being gutted.

Second, I will discuss how today's AI boom presents risks to the semiconductor market and to the broader economy.

Third, I will close with a few things Congress can do.

I will start with the CHIPS and Science Act. In August of 2022, President Biden signed that bipartisan bill. In that law, Congress appropriated \$39 billion to reshore chip manufacturing and \$11 billion for R&D.

Here are some of the early signs of success on the manufacturing side. In 2022, before the bill was signed into law, zero percent of advanced chips were manufactured in the U.S. We are now on track for that to be 28 percent by 2032. So, within a decade, and we are on track to be the only country in the world to have fabs from all five of the leading chip companies.

These are early signs of success, but early success requires continued governmental leadership. Recent administration actions that undermine or could undermine that success that

have me a little bit worried include gutting CHIPS Act's office staffing, conflicts of interest in certain deals, equity investments, including the recent one with Intel, without clear legal authority, transparency, and while wiping some of the previous guardrails.

Turning to the \$11 billion R&D program, the story here is much worse. At a high level, the Biden administration was slow to get the programs off the ground, but the Trump administration has reversed progress. Last year, the Commerce Department announced that it was dispensing with a nonprofit, Natcast, set up to administer the R&D funds and several statutorily required programs.

In its place, the administration issued a broad funding solicitation. I worry less about the specific mechanisms, but I do worry deeply that this approach might subsidize what industry was going to do anyway. The goal should be to invest in what no one company or what the industry is going to do alone. The goal should be the national priorities for R&D.

Stepping back on the CHIPS Act, manufacturing incentives or how the U.S. regains global semiconductor leadership, R&D is how we sustain that leadership going forward.

Pivoting from the CHIPS Act, I turn now to the AI boom that is driving half of all semiconductor revenues. Here is how to think about the money involved. Unprofitable AI firms are buying up cloud computing capacity and those cloud computing companies are spending money on a lot of cash and borrowing a lot of money to buy up chips and invest in data centers. Those chips are where a lot of the profits are flowing today.

In that AI chip market, Nvidia has 90 percent of the market share. One mechanism that is financing all of this that I worry about is circular investing. Nvidia is using its profits to invest in cloud companies that buy Nvidia chips. They are also investing in nearly every AI model company, every major model company, which are using cloud computing which buys Nvidia chips. And they are investing in dozens of other companies that depend on Nvidia chips.

But it is not just Nvidia. Microsoft is a major investor in OpenAI. Google invested in Anthropic. And Amazon invested in both. Across AI cloud and chips, major firms are now

enmeshed. This practice is problematic because when vendors invest in unprofitable customers, they use their profits to self-finance growth and demand. This hinders market discipline by inflating revenues, increasing prices, and reducing supply for other customers, and cementing a vendor's dominance by limiting competitors.

These interlocking relationships also enable a problem in one part of the industry to cascade throughout the entire economy. Stepping back, these risks matter most because a lot of this is the public's money. Seven technology companies represent one-third of the entire stock market. That is the 401(k)s, pensions, and life insurance plans of all of the American public. That is where I get concerned about the financial risks.

I will end by saying -- I will end by outlining where Congress can act. First, conduct oversight of chips manufacturing deals, and make sure that the R&D missions get back on track. Second, investigate the circular financing before those risks spill over into the broader economy.

Notably, in 2002, after the dot-com bubble, this committee investigated the circular financing that caused that crash. Of course, investigations of financing mechanisms are better before the crash, but we have that time now.

Third, enact policies that promote competition and protect consumers from the public cost created by the rapid growth of data centers. That is something I detail in my written testimony.

Thank you again for having me, and I look forward to your questions.

[The prepared statement of Mr. Ramzanali follows:]

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Mr. Bilirakis. Thank you very much. I appreciate you very much.

Next is Mr. Oxman. You are recognized for 5 minutes for your statement. Thank you.

STATEMENT OF JASON OXMAN

Mr. Oxman. Thank you. Thank you, Chairman Bilirakis. And, to you and Ranking Member Schakowsky and members of the subcommittee, I am grateful for the opportunity to be here with you today.

My name is Jason Oxman. I am the president and CEO of the Information Technology Industry Council, or ITI. ITI represents 80 leading companies from across the technology sector, including every facet of the semiconductor ecosystem. From semiconductor design, tooling, manufacturing, and packaging to data centers and consumer and enterprise devices and services, ITI's member companies represent the entire technology ecosystem, and we rely on advanced and foundational chips to make the products and services available to all Americans.

We are in a global semiconductor race, and it is imperative that the United States continues to be the world leader in technology.

The semiconductor supply chain is complex. It is global, and it is highly specialized. Chips made or designed in the United States can travel to several countries on their supply chain journey into your mobile phone, refrigerator, car, or medical device. For example, due to the reality of geology, American-made chips necessarily include critical elements simply not found on the ground or under the ground in the United States. And, because the U.S. represents only 5 percent of the world's population, we must have access to global markets to sell to the world.

The modern semiconductor packs billions of transistors into a chip that fits in the palm of your hand, and each chip can take months to manufacture in fabrication plants that cost billions of

dollars to build. These chips power everything in our modern society. Dozens of these chips are in your phones. Hundreds of these chips are in your computer. Thousands of these chips are in your car.

A global supply chain enables U.S.-based manufacturing of these chips in Arizona, in Texas, in Ohio, using quartz sand from North Carolina and specialized equipment developed in California.

Expanding our competitive advantage in chips requires policies that enable companies to better compete globally and make the United States a more attractive investment destination. Since the enactment of the bipartisan CHIPS and Science Act, total public and private investment in the United States has exceeded \$640 billion supporting over half a million American jobs. In addition, U.S. headquartered semiconductor companies have gained 2.4 percentage points of global market share in just the last 3 years.

Public resources are helping unlock the private capital necessary to grow America's innovation lead, to meet domestic demand, and to win global market share. Congress can build on this success and the administration's efforts to support U.S. semiconductor and AI stack leadership by doing the six following things: First, enact commonsense permitting reform. We need Congress' help to speed semiconductor fab and data center construction creating jobs empowering the American AI economy without outdated rules holding us back.

Second, invest in workforce development. We need more skilled talent here in America to build the domestic semiconductor industry.

Third, extend and expand the American manufacturing tax credit, which expires this year. This advanced manufacturing tax credit is a powerful incentive for semiconductor investment by American companies and also by foreign direct investment from our allies. It should also encompass both manufacturing and research and design work.

Fourth, realize the vision of the Trump administration's AI export promotion program. Government has a critical role to play in expanding opportunities for the U.S. AI stack, including

exporting semiconductors.

Fifth, avoid disruptive policies like overly broad tariffs. While tariffs can help achieve certain policy goals, they must be carefully calibrated to avoid causing collateral damage, such as increasing manufacturing costs or reducing investment or raising consumer costs and making U.S. goods less competitive globally.

And, finally, consult with industry on economic security policies. ITI's members rely on transparent policymaking. That is why we are so concerned with the recent decision of the Federal Communications Commission to presumptively ban internet routers that are produced in any foreign country, including by American companies. This action risks raising costs for American consumers and businesses that rely on internet connectivity.

The technology industry is eager to work with this committee to advance American leadership in semiconductors and the technologies that rely on chips. Thank you again for the opportunity to testify before this subcommittee today on this critical topic for the American economy, and I look forward to your questions.

[The prepared statement of Mr. Oxman follows:]

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Mr. Bilirakis. Thank you very much. We appreciate it very much. I thank all of you for your testimony. Very informative.

Okay. Next, I am going to recognize myself for 5 minutes for questioning.

The U.S. is in a competition with China to dominate the semiconductor industry. How immediate of a threat is the People's Republic of China to the U.S. semiconductor ecosystem? And what does that threat look like? Please give me a brief answer.

So, first, we will start with Mr. Grebe, if you can be very brief, and then Professor Wessner, and after that Mr. Oxman.

Mr. Grebe. Briefly, I would say today America and Taiwan have a leadership advantage from a technology development perspective in terms of logic chips. China does have N minus two, N minus three technology that they are developing from a lithography perspective.

The biggest risk we probably have is around critical materials that come out of PRC that are used in the fabrication process that we need to make sure that we can get allocation to and be able to use quickly to develop new lithography nodes.

Mr. Bilirakis. Very good. Thank you.

Professor Wessner.

Dr. Wessner. Thank you. I will join my colleague from Intel --

Mr. Bilirakis. Sir, I don't know if your mic is on. Is it on?

Dr. Wessner. I am sorry.

Mr. Bilirakis. Okay. Go ahead.

Dr. Wessner. I said I will join my colleague from Intel with respect to the -- which is generally a good idea on semiconductors, which is particularly his point about the critical materials. I think it is also important to note that there is essentially a captive market and one that we have encouraged where there is more and more purchasing not based on quality but or origin.

I think there is a strategic threat at the 28 nanometer node. We focus all of our attention on the most advanced logic, but, in fact, those nodes are the ones that make all of our systems work, that support all of our weapons, and I have learned recently that by adjusting the equipment at the 28 node, you can actually go down to 7 to 5 nanometers.

Mr. Bilirakis. Thank you very much, sir. I appreciate it. I know maybe we can elaborate a little later.

Mr. Oxman, please.

Mr. Oxman. Yes. The short answer to your question, Mr. Chairman, is yes, China is an existential threat for two reasons. One, while we are investing \$70 billion through the CHIPS Act in semiconductor manufacturing in the United States, China is doubling that. They are investing \$140 billion.

And they are not just investing for semiconductor manufacturing for China. They are investing for export for the world. They are trying to make products companies like Huawei, exporting them to the rest of the world in the hope that the rest of the world adopts the China technology stack. We want the rest of the world to adopt the U.S. technology stack, and the policies that Congress adopts can make that happen.

Mr. Bilirakis. Very good. Thank you very much.

Okay. A New York Times story from February revealed that, if the chips supply from Taiwan was cut off, it would significantly reduce U.S. economic output beyond that of the Great Recession. Scary, man.

Mr. Grebe and then either or both Mr. Oxman and Professor Wessner, time permitting, what additionally should the United States be doing to address the substantial supply chain vulnerability? Again, we will begin with Mr. Grebe.

Mr. Grebe. The advancements and investments that we made from the CHIPS Act are extremely important, not only for leading edge technology but for mature technology as well

because a lot of those devices go into consumer products cars, et cetera. So we do agree with the assessment that, if there was an issue with Taiwan and being able to deliver silicone products to the United States, it would have a very, very dramatic impact on the GDP. So we hope to continue the investments in AMIC. We hope to continue the investments in R&D, and we hope to build out those nodes here in North America.

Mr. Bilirakis. Okay. Briefly, Mr. Wessner.

Dr. Wessner. I agree with the assessment of the vulnerability, and I think we also have to understand that, despite lengthy search, we found no agreement with the earthquake gods who are responsible for the geology underlying Taiwan, and simply a major earthquake would eliminate a very significant part of the supply of global chips.

The CHIPS Act was designed to address that and did. It resulted in over \$500 billion in investment. We absolutely need to keep some form of not just the investment tax credits but also one involving grants. We can certainly evolve that. We can, ideally, administer it faster, and we also need to -- the plans at Intel and other companies have in the U.S. would help a great deal to mitigate, but as it is right now, we are extremely vulnerable to geological or geopolitical problems in Taiwan.

Mr. Bilirakis. Thank you.

I want to give you an opportunity. I am going over, Mr. Oxman. Briefly, Mr. Oxman, can you answer that question?

Mr. Oxman. Yes. Mr. Chairman, I think you are absolutely right to highlight the risk to global supply chains of that action, but I would say we have seen that already. We saw that during the pandemic and the importance of investing in the entire ecosystem here in the United States.

And I think the importance of the advanced manufacturing tax credit is that it provides incentive for a manufacturing installation here in the United States. My suggestion would be that we look at not only extending that, because it is scheduled to expire at the end of the year, but also

to make sure it includes the rest of the ecosystem.

We need to invest in semiconductor research and design here in the United States, and we can use tax credits to make that happen.

Mr. Bilirakis. Good enough. Thank you very much.

I will yield back, and I will recognize the ranking member of the subcommittee, Ms. Schakowsky, for 5 minutes of questioning.

Ms. Schakowsky. I would say that my major concern is that we are getting -- we are doing good work with hardworking workers and making sure that they are getting the kind of money that they should be getting, and I think they are not right now.

I think that what we are doing is that we have taken away the work that the hardworking people are doing. They are not getting the kind of benefits that they should be getting right now. Corporations are making more money than they have been making before, and I want to see some changes made.

I think that the hardworking people who actually make sure that these products are produced, that the work is being done, and that the people who do that work are getting the amount of money that they should get and the opportunity to be in control. I don't see it happening that way.

But what I want to see right now is that the people who are doing the hard work are getting the kind of benefits that they have, and I think that they have been pushed aside, unfortunately.

I am going to ask Mr. Asad some questions, but I would also just like him to say, are we handling this the way that we should, which I think benefits the workers, that benefits the people who are actually doing the work, and that we are making sure that we aren't just benefiting some companies that are making money, more money than they need to be making right now?

In fact, I think I would like to leave right now and turn it over to Mr. Asad to talk about what we need to be doing here right now. I think some of the things that you were talking about have

not really been dealt with. I am not interested in just some of these companies making a lot of money, but I want to see the workers being able to make the money that they need, that they deserve to have, and that this has been totally reversed in the time when we before -- previously.

So if I could just turn it over now to Mr. Asad. Is that correct? Yes, Mr. Asad --

Mr. Ramzanali. I appreciate the --

Ms. Schakowsky. Hold on. Hold on a second.

I am going to end it there with Mr. Asad then. Go ahead.

Mr. Ramzanali. Ms. Schakowsky, I appreciate your priority on this, and I think you are right that workers are not just ancillary to industrial policy. They are how we do it. We can have the best technology, the best research in the world, but without the workers, we don't get there.

The way I think about -- a lot of the conversation centers around "do we have enough people" when we talk about workforce development. The second part of that equation is, are those jobs good? They should be good-paying jobs with respectful workplaces that protect workers' rights to organize.

These are all important tenets of how we think about industrial policy. These aren't just labor questions. These aren't just one-off questions. They are key to our leadership in industrial policy.

Under the chips and manufacturing programs, the Biden administration did a lot of work to encourage union engagement, to encourage project labor agreements. Some of those protections have been rolled back, and we are starting to see some concerning aspects to that.

I will leave with the other thing I am worried about is on workforce development. There are a number of programs that were set up that they are not getting the funding they deserve, including things in Illinois like IMEC that has been doing great work to train industrial workers. The University of Illinois Urbana-Champaign has a semiconductor workforce program. We need to continue to fund those programs. Those are extremely important.

Ms. Schakowsky. I do want to ask him a question real fast.

Mr. Bilirakis. Just real brief.

Ms. Schakowsky. Okay. So let me just leave the question then to Mr. Asad and, you know, to respond to -- I mean, I just think that our workers are on the bottom line right now and the kinds of things that we should be doing to make sure that the workers are getting what they need.

Mr. Bilirakis. Okay. I really thank the ranking member for making that point. The gentlelady yields back.

And now I will recognize the chairman of the full committee, Mr. Guthrie, for his 5 minutes of questioning.

The Chair. Thank you, Mr. Chairman, for the recognition.

First, Mr. Oxman, I know we were pushed to make America great again, bring things back that have been made overseas for so long. We still have to have trade. We have to have trade in some -- you know, a third of Kentucky agriculture goes overseas. So we want trade to go back and forth.

But why specifically in the semiconductor ecosystem should the U.S. have the leadership in this role?

Mr. Oxman. Thank you, Mr. Chairman. I appreciate the question. And the semiconductor is, of course, the backbone of technology from the old TI calculators from your youth, I had one of those when I was in the Cub Scouts, too, to the modern technology in the AI stack that we are trying to export around the world.

It is so important to recognize for trade purposes that 95 percent of the people who live on the planet don't live in the United States. We have got 5 percent of the world's population. So we want everybody to enjoy the products, the services that are made in the United States and export it to the world.

So I think it is enormously important, as you highlighted, for us to view trade policy as the

biggest opportunity for us to ensure the success of these manufacturing efforts. Manufacturing in the United States is undergoing a renaissance. This administration is very focused on it, as you noted, and we have to give it time to succeed.

It takes 3 to 5 years to build a semiconductor fab. It can't happen overnight. We need to build out the ecosystem that surrounds it. In the meantime, we want to make sure that things that are made in the United States are exported to the rest of the world, and trade policy can help make that happen.

The Chair. Thank you.

So, Mr. Grebe, as the U.S. competes with China across the semiconductor ecosystem, it is important that we have U.S. companies who are dominant in their fields and we have sound public policies to ensure their dominance. So could you, in terms of Intel, or just in the semiconductor industry, what are the two most impactful policy changes you would like to see coming from the United States?

Mr. Grebe. The two biggest ones we would like to see is an extension of the AMIC credit and also very specialized tariff policies that allow us to import products that cannot be made in the United States that are critical for semiconductor manufacturing here in the United States.

This is a global economy, and it is a global landscape of people who we are competing against, and if we are paying tariffs when other people are not, we are going to be at a competitive disadvantage in the marketplace. So it is extremely important to have both the AMIC credit so we can do long-term planning and make sure we understand what our cross-structure looks like at the company level, and, at the same time, make sure we are not disadvantaged from a cost perspective due to tariffs.

The Chair. So what products can you not get in the United States that are important to you? Is it mostly rare earths or critical minerals?

Mr. Grebe. UV equipment would be a big one coming from the Netherlands. Things like

that.

The Chair. Okay. All right. Thank you.

So, Mr. Oxman, again, the AI infrastructure boom is driving significant demand for semiconductors. It is the base that everything is built on. How can the U.S. capitalize on this demand and secure its economic and societal benefits?

Mr. Oxman. You are absolutely right, Mr. Chairman. AI is the future, and the United States is currently in the lead, but China is quickly catching up. We know that China is engaging in a state-sponsored effort to lead the AI stack around the world. They would like the rest of the world to dominate AI.

We have a program that the administration has put in place here in the United States, the AI export program that is really focused on making sure that the rest of the world buys American-made and American-designed and American-researched AI technology. That is I think the best effort for us.

We are making it happen here at home. We are making sure that American AI is available to all consumers and businesses here, and they are benefitting from it, and it is creating jobs, but we also want to make sure the rest of the world adopts what we like to call the American AI stack to make sure that we can lead the world in technology as well.

The Chair. Mr. Grebe, just with a minute, so Mr. Oxman made the point. I think we talked earlier and others that, in automotive, whatever, China picks an industry. We are going to put it -- so you are competing against a state, a major state, not just a major, major player with major resources. How does Intel compete when they are competing with a state like China? And what can we do that -- because that is not our system, but we need to make sure we are not in the way. What kind of things can we do to help you besides what you just said?

Mr. Grebe. The biggest thing is to continue to investment in R&D, number one. Number two is to make us not have a cost disadvantage when we are doing manufacturing here in the United

States. But the key thing for us is to make sure from an R&D perspective we are continuing to fund programs that give America leadership from the semiconductor perspective to keep pushing us ahead, and those things include the AMIC tax thing that we discussed and very smart tariff policy.

The Chair. Okay. So we can always compete with our brain power and our capital to be able to do it, but we have to not put roadblocks in your way to do that?

Mr. Grebe. Correct.

The Chair. All right. Thank you.

I only have a few seconds left, so I will yield back.

Mr. Bilirakis. The gentleman yields back.

Now we have Mr. Soto. You are recognized -- oh, actually, Ms. Castor just slipped in. Ms. Castor, you are recognized. All right. She defers to Mr. Soto. They are both from Florida so.

Mr. Soto. Absolutely. It is a Florida day as always.

Mr. Bilirakis. And I am, too, so that is fine.

You are recognized for 5 minutes for questioning, Mr. Soto, my good friend.

Mr. Soto. Thank you, Mr. Chairman.

Great nations must stay focused on the future to continue to succeed. Unfortunately, we have seen President Trump's policies having us fall behind. We have already heard today about how the tariffs are raising prices --

Mr. Bilirakis. Take that back, for crying out loud. Go ahead. It is a joke.

Mr. Soto. Okay. I am going to continue now if that is okay with you.

Mr. Bilirakis. All right. You are recognized for 5 minutes.

Mr. Soto. We will reset the clock.

Mr. Bilirakis. Reset the clock.

Mr. Soto. Thank you, Chairman.

As I was saying, great nations have to stay focused on the future to continue to succeed, and,

unfortunately, we have seen President Trump's policies having us fall behind. His tariffs are raising prices. We just heard specifically about noble gases as an example, as well as rare earth minerals. In this industry specifically, in microchips.

The Iran war also raising prices and depleting valuable resources. His attacks on clean energy are helping raise prices on energy, and his failure to fully implement the CHIPS Act is holding investment back. We also see the NSF cuts are wrecking critical research for future microchips.

We are in a competition with China, and they are not making these mistakes. They are not starting new wars. They are using more clean energy. They are investing more than double what we are investing, \$140 billion, which we have already heard today.

And I don't know for the life of me why people are saying manufacturing is doing well when, 23 of the past 25 months, it has been in decline. So I honestly don't know what people are talking about. It has been in decline 23 of the last 25 months. That is a disaster.

Now, we have the CHIPS and Science Act, which a lot of us came together on in this committee. During COVID, with chip shortages, we even had vehicles you couldn't roll out of the lots because they had an issue with chips. So we saw \$53 billion allocated, and we saw some of that money come to Central Florida, and we are proud about that with aerospace manufacturing and microchip manufacturing in the aerospace industry happening in NeoCity. That has been huge for Central Florida.

But we saw at the same time several projects be cut. You know, one of our witnesses mentioned Natcast. I get it if you are going to cut something and say \$74 billion is withdrawn, but it has been 8 months, and the money still hasn't been reallocated.

We see this over and over again, the Trump administration saying, "Oh, this Biden administration program, it is no good." Like broadband, we are going to do it more efficient. Well, it has been nearly 2 years with the broadband still not being deployed, a year and a half at least, and 8 months on this.

So, if you are going to make something more efficient, then make it more efficient. Don't just cut a program and then not spend the money.

You know, I was particularly shocked about what happened to the folks at Intel. Thank you, sir, for being here today. You know, having 10 percent of your company be taken by the U.S. Government against your will, I mean, that usually would be the definition of socialism.

How is your company handling all of this stuff? And I know you have to be diplomatic, so I get all of that stuff, but how are you all handling the fact that now U.S. Government is a 10 percent stakeholder in a private company?

Mr. Grebe. The CHIPS Act, in our view, was a bipartisan legislation, and we are very happy with the agreement that we have today. The whole goal of the program was to accelerate U.S.-based manufacturing in developing leadership products, and that is exactly what we are doing. We are now manufacturing in production leading edge products in New Mexico and Arizona, and our R&D facility in Oregon has the latest EUV tools. So everything that we promised to do we are off and doing.

Mr. Soto. And we are pleased that you are doing that, sir.

Mr. Grebe. So we have not stepped off the gas, and everything that we promised to get done we are getting done.

The fact that the taxpayer is now tied to Intel success helped with the commitment from the President and also made us feel like as we are successful, the taxpayer would benefit as well. So, at this point, we are happy with the agreement.

Mr. Soto. Very well done. You won't be in trouble with the Trump administration now. I appreciate the work you are doing.

Then we also see this debacle with China. Trump starts to trade war. They end up not buying our soybeans. Then now Nvidia chips are being released to China that are of a defense nature, and China is still not buying our soybeans. So, you know, how do we get the balance right

with China, Mr. Grebe, do you think? There has been a lot of opinions here. What do you think, as our top manufacturer of microchips? What is the right balance with China?

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[3:04 p.m.]

Mr. Grebe. Well, we do believe it is about balance because, if we have to service a global market, 70 percent of what we sell does not get sold in the United States. Roughly 20, 24 percent of our business does go to China.

The benefit of that China sale, from our perspective, is those revenues and those margins get put back into U.S.-based manufacturing because the chips are manufactured here. And we need to scale the global economy to be able to fill the factories that we have.

Mr. Soto. Are some of the defense nature, though, that could put the Nation in danger, or do you not believe that?

Mr. Grebe. We don't believe any of the chips that we are selling are doing that at all. We follow all government regulation and --

Mr. Soto. Sure. And I was more referring to the Nvidia chips that were --

Mr. Grebe. I can't speak on their --

Mr. Soto. Sure. I understand.

Well, thank you so much, and I will yield back.

Mr. Bilirakis. The gentleman yields back. You are still my friend.

Mr. Soto. Chairman, I love you, too.

Mr. Bilirakis. Okay. All right. Laurel Lee, you are recognized -- the great lady from the State of Florida, you are recognized for 5 minutes for questioning.

Ms. Lee. Thank you, Mr. Chairman.

When it comes to semiconductors, U.S. leadership depends not just on investment, but on protecting our intellectual property that drives innovation and ensuring that we have the workforce to sustain it.

In Florida, we are seeing that firsthand. Our State now has the fifth largest semiconductor workforce anywhere in the country supported by growing partnerships between industry, universities, and community colleges to build a strong talent pipeline.

I am interested in how we can all work together to protect American innovation, compete globally, and ensure that we are building the workforce needed to compete globally in the decades ahead.

Mr. Grebe, I would like to come back to you. In your testimony, you emphasize that Intel's competitive advantage comes in part from co-locating R&D manufacturing and intellectual property development here in the United States.

Given that model, what do you believe are the greatest vulnerabilities when it comes to protecting that U.S.-based semiconductor intellectual property, particularly as China is investing heavily to replicate both our design and manufacturing capabilities?

Mr. Grebe. It is a very serious issue for us. We protect our IP through both a combination of both physical and IT security measures. We have strict access controls on sensitive locations in all of our factories.

And, on the IT side, we limit access to all the systems, and we make sure that they are bifurcated, and no one has access to all the systems. We understand that protecting the IP that we spent 10 years to develop is our critical IP, and that is what makes us different. And we put the proper security measures in place to do that.

Ms. Lee. You also highlighted during your earlier testimony the importance of protecting U.S.-developed process technology in our trade policy.

Are current U.S. trade and export control frameworks doing enough to prevent our adversaries from accessing or replicating intellectual property?

Mr. Grebe. I believe we could always do more, but at this point we continue to, like I said, secure our IP and make sure that our IP is protected, the investments the American taxpayer helps

with and the investments the companies make are protected, and that is where we are spending our time and focus.

Ms. Lee. Are there things that Congress could do or shifts in current existing trade policy that would be beneficial or helpful to you?

Mr. Grebe. The biggest thing from a trade policy perspective is to make sure that we have access to global markets. And, any time we are doing trade, we understand the impact both on how we generate our profits and where we reinvest those profits back into America by manufacturing here in the United States

Ms. Lee. Mr. Oxman, we have heard today that the U.S. could be facing a significant shortage of workers related to semiconductors in the coming years, particularly in technician and manufacturing roles.

As I mentioned, in my home State, we are seeing really positive impacts of efforts, such as the Florida Semiconductor Institute working to build those integrated workforce pipelines connecting universities, community college, and industry to create 10,000 high-wage new jobs.

From your perspective, are these kinds of regional industry-driven models sufficient to meet the scale of workforce demand we are facing, or do we still need to do more?

Mr. Oxman. They are necessary, but we still need to do more. Congresswoman, as you highlighted, 430,000 jobs in Florida created by the tech industry. It is a good start, but we still have hundreds of thousands of more openings.

I had the opportunity to visit Intel's facility in Arizona on groundbreaking day. I was also out in Arizona for a second trip to visit TSMC's new manufacturing facility there. They are creating literally tens of thousands of jobs on each site, everything from construction to maintenance, and they also need more skilled workers as well; we heard 115,000 openings across the fabs in the United States in the coming months.

We are working as an industry to partner with community colleges, with universities and

college and research facilities around the country to create the next generation of job opportunities, to reskill American workers to fill those vital jobs.

This renaissance in manufacturing that is taking place in the United States is exciting. But, as you noted, we need to do a lot of work together with Government in partnership with private industry to reskill Americans to take those jobs of the future.

Ms. Lee. Do you have any thoughts on what more we could be doing in Congress to make sure we are helping to effectively scale those partnerships and build them to close that gap?

Mr. Oxman. Yeah. I think Congress has been looking at a lot of different programs. I think the public-private partnership is the area where I find the most exciting activity happening. Opportunities to invest in research development programs, opportunities to invest in partnership with the leading research universities in the country, to invest in reskilling programs, I think, are really important.

The partnership between government and the private sector means that the private sector can take the lead, as it always should, in doing the education, but Congress' investment in programs can really help advance them.

Ms. Lee. Thank you. Mr. Chairman, I yield back.

Mr. Bilirakis. The gentlelady yields back.

I now recognize Ms. Castor for her 5 minutes of questioning.

Ms. Castor. Thank you, Mr. Chairman. Thanks again to our witnesses.

So here we are in this technological race with other countries and actors across the world when it comes to semiconductors. And, in the years following the passage of the bipartisan CHIPS and Science Act, it seemed like, boy, we were gaining momentum. Private industry was hiring, and there was a strategy.

That is why it is just a real head-scratcher to dive into what the administration has done when it comes to our investments on semiconductors here. They laid off dozens of employees from the

CHIPS program office last fall. Commerce Secretary Lutnick shut down Natcast, which was tasked with the operation of the National Semiconductor Technology Center that was intended to do things that industry actors could not do on their own.

It just seems like this is self-sabotage at a time when we all really need to be working together. Mr. Ramzanali, you yourself note Secretary Lutnick's actions in your testimony.

Can you please elaborate on the impacts of this -- all of the sabotage to our -- what we were setting up as our grand bipartisan strategy when it comes to this semiconductor ecosystem and what repercussions that chaos is having on the industry and supply chain?

Mr. Ramzanali. Congresswoman, the -- as you noted, in fall of last year, the Commerce Secretary shut down the efforts of Natcast, which was a nonprofit set up to administer many programs, including the \$11 billion of R&D funding, workforce development programs. There is advanced packaging work that is happening there;

My -- the reason it was set up the way it was, was to establish an institution that had the long-term foundations to be able to last and to be able to make sure that America retains the leadership.

Now we are gaining by Intel and so many other companies continuing to build in the U.S. That is where the manufacturing incentives come in. That is the goal of them, is for American leadership to get back.

The Natcast work was to sustain that leadership going forward. So I am really worried about that money being cut, about some of the grants that have gone out; some of them have been rescinded. It is especially worrying when we think about the long-term prospects.

Ms. Castor. So where do we go from here? What is your advice on where we go from here? Have you seen the administration make any moves to reconsider strategy, or is it -- is the ball in the court of the Congress now to act again and direct -- direct the administration to get their act together?

Mr. Ramzanali. So two answers. One, the administration has announced a different approach, a broad solicitation for funding instead of a Natcast-like approach that was previously set up.

Ms. Castor. Wasn't that supported by industry, though? Wasn't there a lot of industry buy-in, and that was the reason it was established that way?

Mr. Ramzanali. There was some industry buy-in. My concern is the purpose of the \$11 billion, as you stated, do what industry alone can't do. The purpose of that was to look longer term than the incentives that companies have today.

Many of these companies invest tons in R&D. The purpose of the \$11 billion was not just to add to that bucket. It was to do more. It was to do bigger.

The way I think about all of that is the long-term investments. So, when I think about the CHIPS and Science Act as written, actually defines how that money should be spent, you all, the Congress appropriated that money to specific programs; that should get back on track. Now, if you want to renegotiate the programs that exist in the R&D part of the law, that is something that Congress can do. That is reasonable to do.

And an administration should be able to put their preferences on the things that are in front of them that they are administrating. But we shouldn't lose sight of the goals, and I worry that we have lost sight of the goals.

Ms. Castor. I do, too.

Thank you, Mr. Chairman. I will yield back.

Mr. Bilirakis. The gentlelady yields back.

I now recognize Mr. Evans from the great State of Colorado. You are recognized for 5 minutes.

Mr. Evans. Thank you, Chairman and the ranking member, and, of course, to our witnesses for taking some time today.

We have heard a lot about large-scale investments from semiconductor manufacturers here today, and some of these projects are moving faster than others. And we all know that incentives are great and necessary in this space, but without -- without the proper eye to other things, like permitting reform, we can't actually build the factories; we can't have the energy; we don't have the supply chain to actually create the infrastructure necessary to build semiconductors and CHIPS here in the United States.

And so a big priority of this committee and mine has been making commonsense reforms in a lot of permitting reform areas. One that I am specifically working on now is the Clean Air Act. Actually, I have one of my bills up later this week. It is bipartisan -- the FIRE Act -- which addresses exceptional events, things like wildfire and how wildfire impacts air quality and air quality permitting in States like Colorado, California, and Arizona.

So, Mr. Oxman, first question will be to you. How have any or are you aware of any outdated regulatory interpretations of the Clean Air Act that have delayed or threatened any semiconductor projects?

Mr. Oxman. Thank you, Congressman Evans. And thank you for your leadership on looking at these issues because there is a tendency, as you noted, to overlook these issues as important to the manufacturing ecosystem. And you are absolutely right to highlight the time and the energy and, frankly, the wasted resources that go into complying with outdated regulations that were not intended to address the situation at hand.

And the situation at hand is the construction of AI factories -- which is what a lot of these data centers are -- and the construction of semiconductor manufacturing capabilities where the Clean Air Act may impose permitting requirements that are very backward looking because they weren't interpreted at the time in a way that advances modern manufacturing.

So you are absolutely right, whether it is permitting for land use or for water use or for energy use, all of these issues need to be revisited, and your leadership on making sure that we look at these

with an eye toward modern manufacturing is absolutely important to make sure that we can succeed in this renaissance of manufacturing in the United States.

Mr. Evans. Perfect. I am glad to hear you talk about AI.

Dr. Wessner, next question will be to you, kind of in that same vein. We have got to have every part of this ecosystem, energy, CHIPS, infrastructure, models, applications, all of these things in order to be able to succeed in building out semiconductors, CHIPS, and that manufacturing. And so, while the U.S. has some advantages in some of the space, I am worried we are not keeping pace on energy.

And so we need policies that allows us to build and have more of that energy in the United States versus some of our national -- or international competitors, places like China. And so can you talk about how China's supply of energy is helping them to work around layers of the AI stack and where we may be falling behind because we don't have as much available energy?

Mr. Wessner. Well, certainly, sir. And I think you are right to -- the Chinese approach has some major advantages. They have invested a great deal in renewables, as you know, and they also have a great deal of coal, which can be brought onstream very quickly.

I think what we need to do is bring exactly what you are describing, is this holistic view. What can we do to expedite the development of -- and that gets back to our regulatory morass, where you have a combination of well-intentioned efforts -- and if I may say -- some who are classic NIMBYs, who simply don't want us to produce energy anywhere near them, and that is a structural disadvantage for us.

You know, just reflecting some of the other observations, you know, in the R&D race, I know it is your committee, but we need more funding for the National Science Foundation, not to look at butterflies but because they are a national security agency, and they need to be seen that way.

This is not just academic research off in the corner. We have work at CSIS which shows the patent stream from NSF-funded projects that go directly to our defense establishment and to our

semiconductor companies.

Mr. Evans. Thank you. I have 25 seconds left. Mr. Grebe -- did I say that right?

Mr. Grebe. Yes, you did. Thank you.

Mr. Evans. Just talk about IP theft. I used to be a U.S. Army Black Hawk helicopter pilot.

Even if we make those CHIPS in the United States, we know the Chinese are trying to Hoover up all of that information. Talk about how we can protect our IP.

Mr. Grebe. You know, again, we continue to protect our process IP very diligently. It is the secret sauce of how we make our money long-term and the 10-year investment that we make on R&D. We have physical security controls and IT security controls in all of our factories and all the products that we build, and then we continue to test products out in the market to make sure they are not being tampered with if we sell them in different marketplaces.

Mr. Evans. Thank you. And I am out of time. Yield back.

Mr. Bilirakis. Thank you. Appreciate it very much. The gentleman yields back.

I now recognize Ms. Clarke for her 5 minutes of questioning. Oh, Ms. Kelly. Excuse me. Ms. Kelly is on the list. I will get you next.

Ms. Kelly. Thank you, Chair Bilirakis and Ranking Member Schakowsky, for holding this afternoon's hearing, and thank you to all of our witnesses for participating.

Bringing semiconductor manufacturing back to America was not an accident. Congress passed the CHIPS and Science Act because we believe that strategic public investment in domestic manufacturing was essential to our national security and economic competitiveness. The early results prove that bet was right.

But that investment only pays off if the funds are deployed lawfully, transparently, and in a way that delivers on the promise of making CHIPS in America. Given staffing cuts at the CHIPS program office last year, deals that have proceeded without clear legal authority and fabs still being built overseas, that is exactly what brings us here today.

Mr. Ramzanali, in your testimony you raise concerns about the conversion of Intel's CHIPS grant to a government equity stake, stating it was done without legal authority and without the safeguards that typically protect taxpayers.

Can you quickly walk this committee through what those missing safeguards are and why they matter?

Mr. Ramzanali. Thank you for your question on that. I generally view equity stakes and equity investments as a tool in the industrial policy toolkit that can be useful. In this particular instance, I don't think it is a good match for what we are trying to do.

Put that aside, I also don't see the legal authorization under the CHIPS and Science Act. My view of it is, when their grant was converted to an equity stake, that -- the project milestones were clawed back, there were a number of profit sharing provisions and other things that were clawed back. That is what I worry about.

I worry about the taxpayer protections that were part of the original agreement. But more than that, we don't have full transparency. It would be useful for the public to be able to see a lot more in this rather unique tool, something we haven't done in a while, that requires a heightened level of accountability and transparency.

Ms. Kelly. Thank you. Mr. Grebe, is that the --

Mr. Grebe. Yes, Grebe.

Ms. Kelly. Grebe. Do you have a response, and how will you protect American taxpayers' investments?

Mr. Grebe. Yes. We believe the CHIPS Act was a partisan issue. We believe that the CHIPS Act was designed to accelerate semiconductor manufacturing here in the United States.

Our New Mexico facility that is up, operational, and high-volume production today, we have an Arizona leading-edge 1.8 nanometer factory in production today, and we have an R&D factory in Oregon with the latest EUV tools, and we are continuing to invest in Ohio.

So the whole intent of the CHIPS Act was to accelerate U.S.-based manufacturing, and that is exactly what Intel is doing. And we are also 100 percent obligated under the law and the statutory law of the CHIPS Act.

Ms. Kelly. Thank you. Mr. Oxman, the primary goal of the CHIPS and Science Act was to onshore semiconductor manufacturing. However, most of the advanced semiconductor equipment necessary for these new facilities is still made by foreign companies overseas.

Is this administration's shifting tariff policies helping or hurting the effort to reshore American supply chains?

Mr. Oxman. Well, Congresswoman Kelly, you are certainly right to highlight that supply chains for semiconductors are global, they are interdependent, and they are complex. That is absolutely the case. That is what underpins semiconductor manufacturing.

And you are also right to highlight that, in order to advance semiconductor manufacturing in the United States, American companies need access to those global supply chains. So the answer to your question is you are absolutely right. They are global supply chains.

We do need access to equipment, facilities, components, ingredients, minerals from around the world. And we do need to make sure that our trade policy doesn't make it more expensive for American companies or for foreign direct investment in the United States by imposing additional costs above and beyond what it would have cost to access those crucial ingredients outside the United States.

Ms. Kelly. So is it -- did you answer the question? Is it helping or hurting, or are we just treading?

Mr. Oxman. I think it is a -- it is a complicated question because there are so many different policies that are intertwined. We need to make sure that our tax policies, for example, incentivize investment in not only manufacturing but also research and design, and we are not there yet. We need to make sure that happens.

We also need to make sure our trade policy not only makes it possible for investors in the United States in manufacturing to access global supply chains, but also that we can sell to the rest of the world as well. So it is -- trade policy is very complicated. There is a lot of good happening, but there is definitely more that could be done.

Ms. Kelly. Well, thank you to all the witnesses. And I yield back.

Mr. Bilirakis. The gentlelady yields back.

Now I recognize Mr. Fry for his 5 minutes of questioning. Thanks for your patience.

Mr. Fry. Thank you, Mr. Chairman.

America must lead in semiconductors because CHIP leadership means leadership in AI, advanced manufacturing, national security. I think the list goes on and on.

I think the record here makes clear that the United States still has major strengths in design equipment and innovation. The goal should be to expand domestic capacity, strengthen supply chains, and make sure more of the semiconductor ecosystem is built here at home, but we can't necessarily trade one policy or industry at the expense of another. We have to balance those interests for the sake of our economy, our workforce, and our global competitiveness.

Mr. Oxman, everybody agrees AI is driving demand. But families in the district that I represent experience semiconductor issues through car prices, appliances, broadband equipment, electric bills.

How should Congress balance frontier AI goals with everyday consumer impacts?

Mr. Oxman. I appreciate the question, Congressman Fry. And you are absolutely right that there is a great amount of market demand for semiconductors for both logic chips and memory chips today.

And the good news is the renaissance in manufacturing that we have been talking about today is designed to address that, that demand. It is a marketplace need for more supply, and we are absolutely working on that across the industry.

I also think it is important to note that the semiconductors that we have been talking about today in many cases are advanced semiconductors that are going to power the AI stack of tomorrow, but there are also foundational chips that we need to invest in more in the United States as well that go into cars and appliances and washing machines and the like. And we are doing that as well. There is manufacturing happening for foundational chips at the same time.

So all that to say that you are absolutely right. We do need to invest in more manufacturing capability here in the United States to address that demand to make sure consumers can access the products and services that they want and need.

Mr. Fry. What do you think that semiconductor resilience looks like from the perspective of a local hospital, a small manufacturer, or family maybe buying a car, not just from the perspective of a hyper-scaler? What do you think that looks like?

Mr. Oxman. You are absolutely right to bring that up, Congressman, because I think we saw during the pandemic that lack of access to semiconductors had impacts beyond what we might normally think about. We think about semiconductors, we think about mobile phones, we think about devices like laptops and PCs.

But you are highlighting what really happened during the pandemic, which was auto manufacturers couldn't finish their cars. They were sitting outside the manufacturing facility.

Mr. Fry. Buy it today and come back next month maybe.

Mr. Oxman. Right, because they couldn't get the chips to put in the cars.

Mr. Fry. Right.

Mr. Oxman. So I think you are right to highlight -- that really, from my perspective, is a really important component of this discussion. It is absolutely about the chips of tomorrow. It is absolutely about powering American AI dominance.

But it is also about making sure that we don't have the same problem we had during the pandemic, where we don't have the domestic supply of chips necessary to power all the other

devices we need to.

Mr. Fry. It is kind of a big deal, as they say. Sir, what policy choice do you think would best help both national competitiveness and consumers at the same time? Would this be more packaging capacity, faster permitting, workforce development, grid upgrades? Like, what do you think would really drive this home?

Mr. Oxman. Well, those are all great ideas.

Mr. Fry. Tax incentives?

Mr. Oxman. If I only have to pick one, I will pick tax policy because I think tax policy has been enormously important to encouraging investing in the United States in manufacturing capability.

We have the advanced manufacturing tax credit that is slated to expire at the end of this year, and that would be a disaster for manufacturers. We also need to make sure that that tax policy extends not only to the manufacturing itself, but also to the research and design that goes into semiconductors. I think that would go a long way.

But you are absolutely right to highlight all those other issues. We need more investment in the electric grid, we need upgrades that can make the transmission capability available to these advanced manufacturing plants that are going in as well, a lot of other great work and a lot of other great ideas.

Mr. Fry. Thank you for that. Mr. Grebe, I am going to -- is it Grebe or Grebe?

Mr. Grebe. Grebe.

Mr. Fry. Okay. I just didn't want to butcher that.

Mr. Grebe. I appreciate that.

Mr. Fry. So, sir, would you agree with that? Tax policy may be the most salient in --

Mr. Grebe. It would -- if we had one vote today, it would be around the AMIC extension going forward.

Mr. Fry. Okay. From the perspective of -- in your written testimony you argue that America must build out more domestic AI-enabled -- enabling infrastructure.

What specific Federal actions would accelerate that buildout in your mind?

Mr. Grebe. I think the three things that we continue to come back around are AMIC tax extension, very specialized tariff relief to import tools and equipment and chemicals that we need to build manufacturing here in the United States. And then an acceleration of some of the minerals getting qualified here in the United States from the TSCA perspective. Right now we are -- a very laborious process, a very expensive process to get new chemicals qualified here in the United States. We would like to see that get shortened to more competitive ranges.

Mr. Fry. Appreciate that.

Mr. Chairman, I see my time is up. And with that, I yield back.

Mr. Bilirakis. I thank the gentleman.

Now I recognize the gentlewoman from the great State of New York, Ms. Clarke, for your -- and thanks for your patience -- for your 5 minutes of questioning.

Ms. Clarke. Absolutely. Thank you, Mr. Chairman. And good afternoon to our distinguished panelists here, to our Ranking Member Schakowsky, and to everyone for holding this very important hearing.

There seems to be widespread agreement that the ability to develop semiconductors here at home is crucial to continued American leadership in the tech sector. With the vast majority of semiconductors' production based in Taiwan and often under threat from China, it is crucial that we prioritize domestic production of semiconductors. This is something Democrats have long understood.

The bipartisan CHIPS and Science Act provided billions in funding to support semiconductor production domestically. Unfortunately, the Trump administration has worked to undermine this progress seemingly out of pure pettiness. The attack on the CHIPS and Science Act and the

inconsistent policies from this administration have been a hindrance and remain a hindrance to shoring up our domestic semiconductor supply chain.

The shortsighted decision to attack Iran has only compounded the issues the semiconductor industry is facing. Materials critical to the production of highly advanced chip, such as helium, sulfuric acid, aluminum and bromine can no longer pass through the Strait of Hormuz due to the competence of this administration, and the damage may be felt for years to come.

How can this administration plausibly claim that they want to onshore chip production, unleash AI development, and spur workforce development when they are actively putting up unnecessary hurdles? It is simply inconsistent and, I believe, irresponsible.

If Republicans are serious about investing in the workforce and developing chips domestically, it is time to demand that this administration sticks to their word, ends the senseless war and stops undermining the CHIPS and Science Act.

With that, Mr. Ramzanali, thank you for being here, and thank you for your thoughtful testimony and work in this space. What commitments could Republicans in this room make today that would continue the progress of the CHIPS and Science Act and bolster the domestic production of chips in the United States?

Mr. Ramzanali. I appreciate your focus on this issue, and thank you for that question, Congresswoman.

I think as a starting point, we should continue implementing the law as Congress passed it. As you stated, it was a law that took a lot of work that for decades American leadership and semiconductor manufacturing had declined. And a bipartisan consensus showed up because of the political realization during COVID that supply chains are all intertwined, and that impacts all of us, it impacts all the things we want to buy.

So, for me, committing to implementing the law as written is step one. And when that doesn't happen, Congress should commit oversight, they should call people in for hearings. We

should write letters about why the deals are changing, why commitments are changing, what are the details of a lot of these things that are a little bit more opaque.

As I have stated, I am also really worried about the R&D cuts, both the chips R&D cuts and the Natcast being changed. But, as Dr. Wessner pointed out, NSF and the President's budget for NSF is really low. That is how we maintain long-term leadership is investing in research and having that kind of infrastructure.

And then, finally, because AI is driving so much of the semiconductor market and our economy, I am worried about the systemic risks that that creates. So now is the time to investigate those questions. What is the kind of money that is at risk? How is the public funds -- how are public funds being devoted to all these questions?

Ms. Clarke. Very well. Unsurprisingly, this administration has taken a concerning approach to the CHIPS and Science Act.

Can you please identify the consequences we have seen in AI innovation and workforce development due to the fact that the President has disbanded Natcast, erasing its existing research and development workforce efforts and sought to rewrite existing and pending agreements with CHIPS recipients?

Mr. Ramzanali. The cuts to R&D, in particular, have a longer term impact. It's the kind of thing that doesn't show up immediately. We had an immediate problem. That is where the \$39 billion in manufacturing incentives were going. But that problem doesn't go away if we don't invest in the future.

So, to me, the R&D investments that we were making included workforce development. We have heard a lot about the workforce shortage. That is why we needed the University of Illinois that received a couple million dollars from Natcast to do workforce development for the semiconductor industry.

The shared facilities that the EU, that Japan, that other places have for research, that is the

kind of stuff that we need to do here, and that is what was planned through Natcast.

Ms. Clarke. Very well. Mr. Chairman, I yield back. Thank you.

Mr. Bilirakis. I thank the gentlelady for yielding back.

It looks like we don't have any other members that want to ask questions, so I want to thank the presenters today. You did an excellent job; you really did. Great information. So we will continue to discuss this. It is a very important issue, as you know. So thank you very much.

I ask unanimous consent that the documents on the staff -- the document list be submitted for the record.

And, without anything further, without objection, the committee is adjourned.

So ordered.

[Whereupon, at 3:36 p.m., the subcommittee was adjourned.]