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Remarks by U.S. Secretary of Commerce Gina Raimondo: The CHIPS Act and a Long-term Vision for America's Technological Leadership

Export and investment promotion | ICT Supply Chain | Infrastructure

Gina M. Raimondo

AS PREPARED FOR DELIVERY
Thursday, February 23, 2023

Office of Public Affairs
publicaffairs@doc.gov

Today, U.S. Secretary of Commerce Gina Raimondo delivered a speech titled "The CHIPS Act and a Long-term Vision for America's Technological Leadership" at Georgetown University's School of Foreign Service. In her remarks, Raimondo outlined the historic opportunity provided by the CHIPS and Science Act and the long-term goals she has set for the program to solidify America's technology and innovation leadership while protecting America's economic and national security.

Secretary Raimondo's remarks as prepared for delivery:

Good morning, everyone. Thank you for being here. And thank you to the Georgetown School of Foreign Service for hosting us.

Today I'd like to talk about the incredible opportunity we have as a nation to unleash the next generation of American innovation, protect our national security, and preserve our global economic competitiveness as we implement the historic CHIPS and Science Act.

From the lightbulb to lasers, and from semiconductors to supercomputers, America has always been a nation of invention, entrepreneurship, and innovation.

Throughout our history, there have been moments—like the one we are in today—of tremendous global competition where we, as a nation, have come together to drive technological progress on an unprecedented scale and ensure America's global leadership.

In the 1860s, President Lincoln made historic investments in agriculture and created the land-grant university system to ensure America's food security.

In the 1940s, President's Roosevelt and Truman invested in our nuclear security and pushed the boundaries of scientific innovation in the process.

In 1961, President Kennedy united the country around his call to put a man on the moon by the end of the decade. And in so doing, he created a generation of engineers, scientists, test pilots, and manufacturing workers who propelled America's economy and national security far ahead of the Soviet Union.

Today, because of President Biden's leadership, working with Congress, the CHIPS and Science Act presents us with an opportunity to make investments that are similarly consequential for our nation's future.

But only if we--as a nation—unite behind a shared objective, generate a similar public-private mobilization and think boldly.

The research, innovation, and manufacturing sparked by this law can enable us to be ***the*** technological superpower, securing our economic and national security future for the coming decades.

As with our leadership in nuclear energy and the space race, America's ability to maintain our competitive edge in advanced technologies is essential to our ability to ensure the responsible deployment of that technology.

Semiconductors form the foundation of all advanced technology…many of which can be used for good or for malign purposes.

The stakes couldn't be higher.

Next week, we will launch our first application for CHIPS funding, focused on commercial manufacturing facilities.

This money will incentivize companies to manufacture semiconductors here on American soil.

In the coming months, we will put out additional funding opportunities for supply chain companies and R&D investments.

Years from now, when we judge the success of this program, we will be measured on at least two key imperatives.

First, whether this program enabled us to build a reliable and resilient semiconductor industry that protects America's technological leadership for the coming decades.

As global competition becomes increasingly about technology and chips, rather than just tanks and missiles, it's the countries who invest in research, innovation, and their workforces that will lead in the 21^{st} century.

Second, we will be judged on whether we were good stewards of taxpayer dollars. We are making a public investment in private industry without recent precedent, and taxpayers deserve transparency and accountability.

But before we look forward, let's take a look back.

America invented the semiconductor industry. And in the 60s, the industry was in a golden age.

New companies were sprouting up left and right in what came to be known as Silicon Valley.

Universities established new departments in computer science, electrical engineering, and materials science to train the talent the industry needed.

Interestingly, manufacturing—not software or algorithms—powered this engine of innovation.

And although the chip companies were fiercely competitive, there was an industry-wide effort to advance the technology. The government drove these advances through purchases and tech transfers.

Tens of thousands of engineers in these companies would make daily incremental innovations in manufacturing techniques, resulting in improved scaling and yield, through expertise that is only possible by producing millions and millions of wafers.

This relentless pace of lab-to-fab and fab-to-lab innovation became synonymous with America's tech leadership, doubling our computing capacity every two years.

This ecosystem enabled every smartphone, cloud computing service, new car, medical device, and weapons system we use today.

But what was once a self-propelling engine of innovation and production fell out of balance.

We sacrificed our manufacturing capacity and workforce in the mistaken belief that we could somehow maintain our technological leadership without them.

In 1990, the U.S. accounted for 37% of global chip manufacturing capacity. Today, that number is only 12%.

We once manufactured nearly all of the world's most advanced semiconductors. Today, we manufacture none.

Taiwan alone produces 92% of the world's leading-edge chips, even though the majority of them are still based on technology created at UC Berkeley—with federal funding.

In 2001, the U.S. had more than 300,000 semiconductor manufacturing workers.

In the past 20 years, we lost a third of those jobs while the global semiconductor industry has more than tripled in size.

As the cost of innovation increased, the semiconductor supply chain became more globalized in search of both specialization and cost-savings in different parts of the world.

As a result, today there are fewer suppliers to the industry and fewer opportunities for a new generation of innovators to develop cutting-edge R&D.

Of course, as President Biden often points out, these losses aren't limited to the semiconductor industry. In fact, over the last 25 years, America lost a quarter of its small and midsize manufacturers, and with them, we lost their knowhow, skills, and jobs they once had.

This manufacturing atrophy has real consequences.

For starters, it's a threat to our national security.

So many of our defense capabilities – like hypersonic weapons, drones, and satellites – depend on a supply of chips that aren't currently produced in America.

But, our dependence on foreign semiconductor supply chains also hurts our economy.

In 2021, car prices increased nearly 30% and were responsible for a third of core inflation—all because we didn't have enough chips.

Last year, because Ford didn't have access to enough chips—even for simple things like windshield wipers—their workers in places like Michigan and Indiana only worked a full week three times. In the entire year!

The chip shortage meant medical device makers didn't have enough chips to produce life-saving products like pacemakers and insulin pumps, which are used every day in every hospital in America.

Meanwhile, over the last two years, China has produced more than 80% of new global capacity for certain mature chips, and their market share is growing.

The process of designing and building chips has become the most technical and sophisticated manufacturing process in human history.

And the brutal truth is that, without manufacturing strength in the U.S., and the innovation that flows from it, we are at a clear disadvantage in the race to invent and commercialize future generations of technology.

The CHIPS Act allocated $39 billion for manufacturing incentives to encourage companies to build and expand.

That's the application we will be announcing next week.

These are the goals we aim to achieve by 2030:

First, America will design and produce the world's most advanced chips on our shores. We still lead in design, but that's not enough.

Specifically, the U.S. will have at least two new large-scale clusters of leading-edge logic fabs, that will have been built by highly-skilled union labor.

Each cluster will include a robust supplier ecosystem, R&D facilities to continuously innovate new process technologies, and specialized infrastructure. Each of those clusters will employ thousands of workers in well-paying jobs.

Additionally, the U.S. will develop multiple high-volume advanced packaging facilities, and become a global leader in packaging technologies.

U.S.-based fabs will also produce advanced memory chips on economically competitive terms.

And the U.S. will strategically increase its production capacity for the current-generation and mature-node chips most critical to our economic and national security. These are the chips that go into cars, medical devices, and many of our defense capabilities.

Now, achieving these goals won't be easy. And we're ambitious, but we are not naïve.

There's never been a better time to push ourselves to reach further than we have before.

I want the United States to be the only country in the world where every company capable of producing leading-edge chips will have a significant R&D and high-volume manufacturing presence.

We will be the premier destination in the world where new leading-edge chip architectures can be invented in our research labs, designed for every end-use application, manufactured at scale and packaged with the most advanced technologies.

This combination of technological leadership, supplier diversity, and resiliency does not exist anywhere else in the world today.

Very importantly, we are not aiming for self-sufficiency or looking to close ourselves off from global markets or competition.

But if we achieve these goals, America—with a thriving manufacturing ecosystem—will be in a much stronger position to lead in a fiercely competitive and global industry.

Now, while I've focused on manufacturing, our success will be short-lived if we focus only on manufacturing. The $39 billion in incentives will bring semiconductor manufacturing back to the U.S., but a robust R&D ecosystem will keep it here.

That is why we will invest $11B to build a strong semiconductor R&D ecosystem to generate the ideas and the talent we need to support these efforts.

The heart of these investments will be the creation of the National Semiconductor Technology Center.

The NSTC will be an ambitious public-private partnership where government, industry, customers, suppliers, educational institutions, entrepreneurs, and investors converge to innovate, connect, and solve problems.

We envision a network of several centers around the country, solving the most impactful, relevant and universal R&D challenges in the industry.

Their work – fueled by industry support – will generate new devices, processes, tools, and materials for our manufacturing ecosystem.

Most importantly, the NSTC is going to ensure the U.S. leads the way in the next generation of semiconductor technologies—everything from quantum computing, materials science, and AI to the future applications we haven't even thought of yet.

America's semiconductor industry started and thrived because it was a space where startups could drive innovation and compete.

But today, the barriers to entry for startups in the industry can be prohibitive.

In fact, it's never been more expensive to bring chips to market in America, sometimes costing as much as half a billion dollars.

Funding in technology hardware makes up only 3% of America's venture capital, down from 20% in 2005.

Access to fabs is challenging and talent is hard to find if you're not an established company.

The NSTC is going to reverse these trends by making it easier and less expensive for new and disruptive entrants to get into the market.

And, if we do this right, by the end of the decade, we'll cut in half the projected cost of moving a new chip from concept to commercialization.

And of course, we are eager to continue working with our partners and allies to create diverse, resilient, and sustainable supply chains, write tech standards that align with our values, and invest in our shared digital future.

It's part of the work we're already doing through the Indo-Pacific Economic Framework, the Quad, and the U.S.-EU Trade and Technology Council.

This means being transparent with our allies and developing strategies in collaboration with them. That, in turn, will make our combined supply chains more resilient and diversified. It will prevent all of us from creating a subsidy race.

And critically, we will continue to enforce restrictions, in coordination with our allies, that protect us and them from the misuse of these technologies by malign actors.

Now, the truth is that to achieve the scale of our ambition, government investment isn't enough.

For starters, we're calling on companies and private investors to invest in the chips industry, including in the supply chain.

CHIPS for America is intended to spur private capital investment at every stage, not replace it.

For us to meet this mission, we need the private sector to invest with us, using our $50 billion of public investment to crowd in at least $500 billion in additional funding for manufacturing and R&D.

We're laying a foundation for American business to do what it does best: innovate, scale, and compete.

CHIPS for America is also going to create hundreds of thousands of good jobs that have the potential to change lives, offer family-sustaining benefits, and lead to long-term careers.

But here's the truth: if we don't invest in America's manufacturing workforce, it doesn't matter how much we spend.

We will not succeed.

We need to be both honest with ourselves and creative with solutions if we're going to address this workforce challenge.

It starts with training and inspiring a generation of engineers and scientists who are excited about manufacturing.

In the 10 years after Kennedy announced his mission to put a man on the moon, the number of physical science PhDs tripled and engineering PhDs quadrupled.

In the same way, over the next decade, we're calling on colleges and universities to triple the number of graduates in semiconductor-related fields, including engineering.

We also need more Americans to be a part of this exciting innovation ecosystem. Which means those same colleges and universities have to expand their recruitment pipelines so that more underserved populations – including women, under-represented communities, and veterans – get into these programs and launch these careers.

We also need our students to be job-ready on Day One.

Which means colleges and universities need to partner with industry to align their programs with the needs of positions in fabs, and ensure graduates have the practical skills they need for success.

The manufacturing sector is also one of the best places for workers without college degrees to find high-wage jobs.

In fact, more than 60% of the jobs in a fab don't require a college degree.

To meet that demand, we are calling on semiconductor companies to work with high schools and community colleges to train 100,000 new technicians over the next decade through apprenticeships, career and technical education, and career pathway programs.

If we don't act, the U.S. will have an estimated shortfall of 90,000 skilled technicians by the year 2030.

Finally, we will need more than 100,000 construction workers across the country to build these new facilities.

Unless we do something differently, we will not succeed. It's a simple question of math.

We are in the middle of a tremendous labor shortage, and the skilled workers who will fill these jobs have never been in higher demand.

To succeed, we have to find new ways to bring new people into them.

We need chip manufacturers, construction companies and unions to work with us toward the national goal of hiring and training another million women in construction over the next decade to meet the demand not just in chips, but other industries and infrastructure projects as well.

Many unions have pioneered innovative—and effective—programs for reaching underserved communities. The private sector should learn from these best practices and scale them.

If we get this right, the U.S. semiconductor workforce will be the gold standard for other industries to follow.

We will double the semiconductor workforce over the decade, with the most diverse, productive, and talented workers in the world.

Their success will attract even more talented individuals to join the ecosystem, and the training programs will draw on the best techniques and tools to attract, develop, and graduate an increasingly robust and diverse set of workers.

I'll close with this: we have a choice.

What I've laid out today is going to be really hard.

We can be limited in our vision, build a few new fabs, and call it a day.

Or, if we all commit to this effort, we have a chance to do so much more.

Let's think about what's possible 10 years from now if we are bold.

We can show the world that efficient global supply chains do not require us to sacrifice resiliency and security.

We can once again lead in manufacturing, and all of the innovation that grows from it.

The level of technological leadership, supplier diversity, and resiliency we are seeking does not and will not exist anywhere else in the world.

It will create the new generation of innovators who will write the next chapter in our history.

Chipmakers will view continued expansion here—rather than overseas—as core to their business models.

There will be more venture capital going into chip-related hardware startups.

The NSTC will power innovation with scientists and engineers, state-of-the-art facilities, and by the end of the decade, will have demonstrated technical achievements that solve real pain points.

Colleges and universities will triple their graduation of new engineers over the decade, creating a constant stream of diverse and talented workers.

Tens of thousands of American workers without 4-year degrees will have access to good paying jobs and careers.

And we'll add rocket fuel to our global competitiveness, ensuring that America secures its role as a technological superpower for decades to come.

The choice is clear to me.

President Biden has done more than any other president to revitalize American manufacturing and innovation. CHIPS for America is central to those efforts.

Let's get to work.

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CHIPS Act | Semiconductor Industry | Secretary Gina Raimondo