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CONVERTING ENERGY INTO INTELLIGENCE:

THE FUTURE OF AI TECHNOLOGY, HUMAN DISCOVERY,

AND AMERICAN GLOBAL COMPETITIVENESS

WEDNESDAY, APRIL 9, 2025

House of Representatives,

Committee on Energy and Commerce,

Washington, D.C.

The Committee met, pursuant to call, at 10:04 a.m. in Room 2123, Rayburn House Office Building, Hon. Brett Guthrie [Chair of the Committee] presiding.

Present: Representatives Guthrie, Latta, Griffith, Bilirakis, Hudson, Carter of Georgia, Palmer, Dunn, Joyce, Weber, Allen, Balderson, Fulcher, Pfluger, Harshbarger, Miller-Meeks, Cammack, Obernolte, Bentz, Fry, Lee, Rulli, Evans, Goldman, Fedorchak; Pallone, DeGette, Schakowsky, Matsui, Castor, Tonko, Clarke, Ruiz, Peters, Dingell, Veasey, Kelly, Barragan, Soto, Schrier, Trahan, Fletcher, Ocasio-Cortez, Auchincloss, Carter of Louisiana, Menendez, Mullin, Landsman, and McClellan.

Staff Present: Ansley Boylan, Director of Operations; Clara Cargile, Professional Staff Member; Marjorie Connell, Director of Archives; Jessica Donlon, General Counsel; Andrew Furman, Professional Staff Member; Sydney Greene, Director of Finance and Logistics; Jay Gulshen, Chief Counsel; Emily Hale, Staff Assistant; Kate Harper, Chief Counsel; Brittany Havens, Chief Counsel; Megan Jackson, Staff Director; Daniel Kelly, Press Secretary; Patrick Kelly, Staff Assistant; Sophie Khanahmadi, Deputy Staff Director; Alex Khlopin, Clerk; Brayden Lacefield, Special Assistant; Giulia Leganski, Chief Counsel; Mary Martin, Chief Counsel; Joel Miller, Chief Counsel; Ben Mullaney, Press Secretary; Elaina Murphy, Professional Staff Member; Kaitlyn Peterson, Policy Analyst; Brannon Rains, Professional Staff Member; Evangelos Razis, Professional Staff Member; Seth Ricketts, Special Assistant;

Jake Riith, Staff Assistant; Jackson Rudden, Staff Assistant; Chris Sarley, Member Services/Stakeholder Director, Peter Spencer, Senior Professional Staff Member; Kaley Stidham, Press Assistant; Dray Thorne, Director of Information Technology; Matt VanHyfte, Communications Director; Hannah Anton, Minority Policy Analyst; Rasheedah Blackwood, Minority Intern; Tiffany Guarascio, Minority Staff Director; Lisa Hone, Minority Chief Counsel, CMT; Kristopher Pittard, Minority Professional Staff Member; Emma Roehrig, Minority Staff Assistant; Kylea Rogers, Minority Policy Analyst; Harikrishnan Sanil, Minority Press Intern; Andrew Souvall, Minority Director of Communications, Outreach, and Member Services; and Tuley Wright, Staff Director, ENG.

*The Chair. The committee will come to order.

Welcome, everybody, the committee, back. We appreciate everybody being back this morning for, I think, what is going to be an absolutely exciting hearing.

And I will recognize myself for five minutes for an opening statement, and I want to thank our witnesses for being here and traveling a long distance to be here.

This kind of came from our Library of Congress, this hearing, from presentation that Dr. Schmidt put on his book, "Genesis,'' that he wrote with Henry Kissinger -- Henry Kissinger's last book.

And I walked away thinking we needed to have the entire Congress hear your presentation, and so we are doing it with the entire Energy and Commerce Committee, because I think an author always wants to know, when they write a book, will somebody read my book? And then if they read the book, then will it have an impact? Well, today you and all the witnesses are before the full Energy and Commerce Committee.

And our dear colleague and the dear husband of our colleague, Debbie Dingell, used to say that if it is moving, it is energy; if it stops, it is commerce. Something to that effect. So we have a lot of jurisdiction. I say it takes energy to move commerce. I can't improve on Chairman Dingell, but that is my version of it. And so we are having a full hearing. We typically do this in subcommittee, but

but this touches all jurisdictions, and I think everybody needs to hear it.

If you think about it, it is going to take enormous energy to beat China to AI. We -- in doing that we have to protect the environment. Our telecom and privacy through our commerce and telecom committees will be dealing with this. And AI has particular health care applications, so it touches all of our jurisdiction.

And Dr. Schmidt, when I walked away from the Library of Congress and I read your book, it gave me a sense of mission, and the mission -- a direction I want to take this committee in the time that I am chairman. And to sum up what you said, it is the U.S. versus China, and who will win the war for AI. And it -- essentially, I walked away this is as important as the dollar being the reserve currency in the world. It is that important, and that is what is before us.

And we -- what I hear from people in this space is that we have the brainpower and we have the capital. What we need is the energy and the correct regulatory framework. And we have an example of what not to do, and I believe you said Europe -- in your presentation -- Europe has chosen not to grow, so we can't look there as an example. We have to work through it ourselves.

And Europe's regulatory framework, their energy framework and the regulatory framework, some of their

regulatory framework written specifically to disadvantage American companies, has made them non-competitive. And Europe and the U.S. had a similar size economy in 2008, and I have read that our economy is up about 80 percent larger.

So what do we need to do? And the reason we want to do a full committee is that we have to have broad consensus on how we work together, it has to be Democrat and Republican.

People who tell me they invest, it is tough to invest based on congressional cycles or presidential cycles if the rules are going to change every two to four years. And so what I would like to -- just hopefully what we could do in this committee is come up with a regulatory framework and an energy policy that we can all -- or most of us -- can agree on, at least build a broad consensus on how we develop massive amounts of energy while protecting our environment.

And Dr. Schmidt, you said all energy resources are needed, and then AI will develop solutions to deal with climate change. And so Microsoft -- to put this in perspective, Microsoft Data Center can use as much power as the City of Seattle is what I have been told.

And so in the regulation side of it we have to protect our privacy. Yesterday we had a hearing on bills yesterday on child children's privacy and children's safety. And we have to protect our privacy. I think all of us want our privacy protected. We can't do it in a heavy-handed way that

stifles innovation. And as I said, we have to look at our friends across the Atlantic.

But I think we need to more intently look across the Pacific to a nation determined to win. China has specifically said they are going to win the war on AI, and we are taking up the challenge to prove to them that the American entrepreneur and the American intellect will win the war on AI, but they have to have the energy and the regulatory environment to do so.

So if this committee gets it right, this committee gets it right, America will win. They may win if -- otherwise, but we need to be there to make that happen. And if you look at what if China wins -- we just had a hearing of -- an oversight that a medical device from China had an embedded URL to the University of Beijing. So why does that mean -- a medical device? Because we know they are using everything they can, everything they can to get information they need on us.

So we must win. We will win. And for the sake of the world, we have to win. And I am determined through this hearing -- to the beginning -- that all of us will work together, because all of us are dedicated to winning.

[The prepared statement of The Chair follows:]

**********COMMITTEE INSERT**********

*The Chair. And I will yield back and recognize the ranking member for five minutes for an opening statement.

*Mr. Pallone. Thank you, Mr. Chairman.

Under normal circumstances today's hearing would be a bipartisan conversation on ensuring America continues to lead the race on artificial intelligence, or AI. However, these are not normal times. President Trump is single-handedly destroying our economy. Since he unnecessarily instigated a global trade war, our markets are in turmoil; Americans' retirement savings is in freefall; and prices for everyday goods are spiking. In fact, Trump's tariffs are the largest middle-class tax increase in at least 50 years on hard-working American families.

And our efforts to continue to lead the global race on AI innovation are seriously threatened when Trump has just spiked the price on materials we need to compete, such as steel, aluminum, and chips. Instead of winning the future, Trump's economic turmoil could send America's tech leadership into a tailspin.

There is no doubt that the daily chaos and uncertainty that Trump is creating is not good for American business or for the American people. Despite the unwillingness of the President and Republicans to acknowledge any of the harm their actions are having on American families, I want to address the topic of today's hearing because it is so

important.

As we have heard in every Energy Subcommittee hearing this year, increased energy demand is coming, largely powered by data centers fueling artificial intelligence tools. And I firmly believe that this increased demand can be a good thing, but it must be managed responsibly. We must make sure that AI-driven energy demand increases, don't make electricity unaffordable or unreliable for American families. We must also make sure that consumers aren't stuck bearing the cost for infrastructure investments made necessary by private companies. And we must get a better understanding of just how much energy demand will increase in the coming years.

The committee needs to be talking about all these things. But instead this week House Republicans are poised to vote on a budget resolution that would set the stage to repeal the energy tax credits incentivizing well over 90 percent of the electricity generation poised to come onto the grid. The Trump Administration and Elon Musk DOGE minions are also putting together a secret list of grants and loans that they want to cancel that would modernize our electric grid and build new energy generation.

Meanwhile, yesterday afternoon Trump signed several executive orders to allow polluting coal plants to -- set for retirement to continue to operate, increasing prices and

health risks for American families. And just last month, during a speech to the joint session of Congress, Trump threatened to repeal the CHIPS and Science Act, which invested $52 billion to ensure more semiconductors are produced right here in the U.S.

Semiconductors are critical to the advancement of AI, but right now the overwhelming majority are produced outside the United States, and the CHIPS and Science Act is boosting production of chips here, and now Trump wants to repeal the law. So Republicans constantly talk about winning the AI race, but the actions they are taking make it appear as if they are purposely trying to lose that race to China.

And we should also discuss the tremendous effects AI will have on our everyday lives. We have seen an explosion of AI systems and tools that have been trained on massive amounts of Americans' personal information without our knowledge and consent. Right now sufficient guardrails do not exist to protect Americans and our data from harmful AI systems that violate our privacy, provide false information, or make unjustifiable, discriminatory decisions.

Because many of these systems are trained on massive amounts of data that big tech has collected on all of us, the lack of nationwide protections around what data companies can collect, use, and sell to train these AI systems should concern every American. Clearly-defined privacy and data

security rules are critical to protect consumers from existing harmful data collection practices and to safeguard them from the growing privacy threat that AI models pose. So I strongly believe that the bedrock of any AI regulation must be privacy legislation built on the principle of limiting the amount of consumer data collected, used, and shared. It is the best way to address the aggressive and abusive data collection practices of big tech and data brokers, ensure our children's sensitive information is protected online, and put consumers back in control of their data.

So I look forward to hearing from today's witnesses and intend to continue to focus on developing policies that will harness the transformation power of AI while safeguarding the rights and well-being of all Americans.

[The prepared statement of Mr. Pallone follows:]

**********COMMITTEE INSERT**********

*Mr. Pallone. And with that I yield back. Thank you, Mr. Chairman.

*The Chair. Thank you. The gentleman yields back, and we now conclude with member opening statements.

The chair would like to remind members that, pursuant to the committee rules, all members' opening statements will be made part of the record.

I would also remind members that, once we get to the five-minute questioning, we will have to strictly enforce that. We have a time constraints with some of our witnesses, and I want everybody to have the chance to ask their questions.

I would like to thank the witnesses for being here today. It is -- and you are taking time to testify before this committee. It is greatly appreciated. You will have the opportunity to give an opening statement, followed by a round of questions from members and our witness.

I will read the witnesses, and I will call on you individually to read -- for your opening statement.

So first we have Dr. Eric Schmidt, chair of the Special Competitive Studies Project. Dr. Schmidt previously served as the chief executive officer and chairman of Google. In addition to serving as executive chairman and technical advisor, his time at Google would turn the company into the global tech giant we know it today. In 2021 he founded the

non-partisan Special Competitive Studies Project to strengthen America's long-term competitiveness regarding AI and America's future, and also the author, as we have said, of -- and a Library of Congress spokesman of the book, "Genesis,'' he wrote with Dr. Kissinger.

So thank you for being here.

Dr. Manish Bhatia. Mr. Manish Bhatia, executive vice president of global operations with Micron Technology. Mr. Bhatia has been with Micron since 2017, and has 25 years of engineering and operations experience. He has previously held positions at Western Digital Corporation, SanDisk Corporation, and Matrix Semiconductor, to name just a few.

The Honorable David Turk, a visiting fellow with the Center on Global Energy Policy at Columbia University School of International and Public Affairs. Mr. Turk served as the Deputy Secretary of the U.S. Department of Energy during the Biden Administration. Before his time as deputy secretary, Mr. Turk spent several years at the International Energy Agency.

Thank you for being here, as well.

And Mr. Alexandr Wang, the founder and chief executive officer of Scale AI. Mr. Wang founded Scale AI as a 19-year-old student at MIT, focusing on the concept of humanity-first artificial intelligence. Currently, Scale AI has a team of over 900, and is valued at nearly $14 billion. At 24 he is

the youngest self-made billionaire in the world.

So I thank you all for being here today, and I will call on each of you, and I will begin with Dr. Schmidt. You have five minutes for your opening statement. Thank you.

And you will see -- before you get started -- there are -- you will have a green light, and when it gets to four minutes I think a light turns yellow, so it will kind of give you a warning in front of you. You have a minute, and when it turns red it will be -- wrap it up, so we can make sure we get all our questions in.

So Dr. Schmidt, your five minutes, you are recognized.

STATEMENT OF ERIC SCHMIDT, CHAIR, SPECIAL COMPETITIVE STUDIES PROJECT; MANISH BHATIA, EXECUTIVE VICE PRESIDENT OF GLOBAL OPERATIONS, MICRON TECHNOLOGY; THE HON. DAVID TURK, DISTINGUISHED VISITING FELLOW, CENTER ON GLOBAL ENERGY POLICY, COLUMBIA UNIVERSITY; AND ALEXANDR WANG, FOUNDER AND CHIEF EXECUTIVE OFFICER, SCALE AI

STATEMENT OF ERIC SCHMIDT

*Dr. Schmidt. Thank you, Mr. Chairman, and thank you, Ranking Member. Thank you all for being here. This is incredibly important.

I am here to tell you that I honestly believe that the AI revolution is under-hyped, and here is why. The arrival of this new intelligence will profoundly change our country and the world in ways we cannot fully understand. And none of us, including myself and, frankly, anyone in this room, is prepared for the implications of this.

What is happening at the moment in our industry is that we are very, very quickly, for example, developing AI programmers, and these AI programmers will replace traditional software programmers. We are building in the next year AI mathematicians that are as good as the top-level graduate students in math. This is happening very quickly. You can look at this in a number of the products. Today you

think of AI as ChatGPT, but what it really is is a reasoning and planning system that we have never seen before. The implication of this is profound.

In terms of the way the algorithms work, they are going to need a lot more computation than we have ever had. They are going to need a lot more energy, and I will talk about that. What does the industry need? We need high skills immigration. We talk to you about this every day. Light touch regulation around cyber and bio threats. We can talk about that. And most importantly, we need the energy. And the numbers are profound.

What we need from you, if I may say that directly, is we need energy in all forms, renewable, non-renewable, whatever. It needs to be there, and it needs to be quickly. I and others are investing in things like fusion, which are incredible, but they are not going to arrive soon enough for the need. And I will frame this at the end by my comments about China.

So people are planning 10 gigawatt data centers. Now, just to do the translation, an average nuclear power plant in the United States is one gigawatt. How many nuclear power plants can we make in one year, where we are planning this 10-gigawatt data center? It gives you a sense of how big this crisis is. Many people think that the demand in -- of -- energy part that our industry takes will go from 3 percent

to 99 percent of total generation. One of the estimates that I think is most likely is that data centers will require an additional 29 gigawatts of power by 2027, and 67 more gigawatts by 2030. It gives you a sense of the scale that we are talking. These things are industrial at a scale I have never seen in my life.

In the terms of energy planning, the current model is mostly natural gas, peaker plants plus renewables. And that is probably going to be the path we are going to have to follow, right, to get there, and for all the reasons that you can imagine. We have a bunch of regulatory issues around fixing the energy grid. It takes, on average, 18 years to get the power transmissions and so forth to put these things in place. We need to find Federal ways to preempt that and make it happen faster in order to deal with the needs.

Many of these data centers, by the way, are in the heartland. They have a huge economic impact positively on areas that typically do not have the kind of growth that they would like.

Now, why is this all important? When you build these systems, you have intelligence in the computer, and then eventually human-level intelligence. Some people think it is within three to four years. Then, after that, you have something called super-intelligence, and super-intelligence is the intelligence that is higher than of humans. We

believe, as an industry, that this could occur within a decade. It is crucial that America get there first.

What is China doing? They are leading in some open source. They are very close behind us. You all have done a great job in doing chip restrictions and things like that to try to slow them down. They are clever and they are smart. They have industrial programs, huge grants going into these companies, and they are weaponizing up in the sense of competition. If you look at DeepSeek, DeepSeek showed up, right, nobody expected this. It turns out it is on par now with some of the top models. Welcome. China has arrived into the competition.

What would happen if China beat us? Let's think about it. The path to intelligence, that super-human intelligence, think of the national security implications of that competition. This is why I believe -- and I will say it directly to you -- that although everyone is concerned about Taiwan, I am much more concerned about this. Because if they come to super-intelligence, the strong form of intelligence first, it changes the balance of power globally in ways that we have no way of understanding, predicting, or dealing with.

Thank you, Mr. Chairman.

[The prepared statement of Dr. Schmidt follows:]

**********COMMITTEE INSERT**********

*The Chair. Thank you. Thank you for that sober assessment. It is why we wanted to have this hearing. We appreciate that very much. Now we will recognize Mr. Bhatia.

You have your five minutes for your opening statement.

STATEMENT OF MANISH BHATIA

*Mr. Bhatia. Thank you, Mr. Chairman, Ranking Member Pallone, and members of the committee. My name is Manish Bhatia, and I serve as executive vice president of global operations at Micron.

Micron was founded in 1978 in Boise, Idaho, and over the last several decades has become one of the world's most innovative companies, with more than 58,000 U.S. patents granted. And Micron is America's only manufacturer of memory chips, and the only U.S. semiconductor company with worldwide technology leadership today. Micron is truly a national treasure.

Micron has become fundamental to America's economic competitiveness because our fabs manufactured the world's most advanced memory chips and are at the heart of the AI revolution. For each AI chip that Nvidia sells, there are 96 high-bandwidth memory chips integrated with it. Without our chips, there simply is no AI.

Micron is the only company planning to invest more than $100 billion over the next 20 years to build leading-edge memory fabs here in the United States. These investments will power America's AI leadership, they will serve domestic demand for other industries, and drive U.S. semiconductor exports. Our investments are projected to create 11,000

high-paying direct Micron jobs; 9,000 construction jobs; and ultimately, between direct and indirect, 80,000 new jobs created across our expansions planned in Idaho, New York, and Virginia.

The President and Congress have made clear that the United States needs to continue to lead on AI and increased domestic manufacturing. The success of our investments will keep the U.S. at the forefront of the AI revolution, strengthen the economy, and make America more secure.

To make our historic U.S. investments we need reliable and affordable energy. One of the most important factors that made upstate New York and Boise, Idaho attractive for our planned investments is reliable, low-cost power. And in Virginia, where we have been operating for two decades, grid reliability has been critical to our operations. Each of these full-scale fabs built here will run 24/7/365 days a year, and consume, at full build-out, about 400 megawatts of power. By 2040 we expect our U.S. energy demands to reach two gigawatts. This demand comes from a variety of highly complex manufacturing process steps, including using extreme ultraviolet lasers to create advanced nanoscale features on our chips.

Beyond scale, we also need power to be reliable. Even fractions of a second of power loss or even just power sag or droop forces us to reset equipment, check for inconsistencies

and deviations in the material, and ultimately can cost tens or even hundreds of millions of dollars. Reliable power is critical to our U.S. expansion.

Historically, the United States has maintained low electricity prices due to the abundance of energy resources and its all-of-the-above approach. From oil and natural gas to solar and nuclear, this was a bright spot for Micron as we built here at home, and is one of America's key competitive advantages in manufacturing. However, after years of matched supply and demand, we are now seeing significant electricity demand growth, and supply may struggle to keep pace. By one estimate U.S. electricity demand could rise by 128 gigawatts, more than 15 percent over the next 5 years alone. This risks the United States losing leadership in AI and in the technologies that enable it.

Meeting this energy demand means the Federal Government needs to take an all-of-the-above approach and cut through red tape to bring generating projects to life. We also need to invest in energy equipment and supply chains. When I visited the Idaho National Lab last month to discuss their cutting-edge work on advanced nuclear technologies, it became clear how much investment is needed in uranium fuel supply chains and other new technologies.

Beyond generating capacity and energy supply chains, we need to ensure that U.S. transmission infrastructure is fit

for the 21st century. Without new and updated transmission infrastructure, new generation won't deliver -- won't be able to be delivered to customers like us. This is why permitting reform to accelerate transmission infrastructure is so important.

Taking a step back and looking at manufacturing and AI more broadly, this also means continued investment in manufacturers that enable the AI revolution. Micron and other U.S. semiconductor companies building and operating fabs in the U.S. experience cost deltas with our Asian competitors of 35 to 45 percent. To ensure U.S. global competitiveness, we are calling for an extension and expansion of the expiring Semiconductor Manufacturing Investment Tax Credit. This will continue to enable the success of America's semiconductor manufacturing renaissance.

Finally, to echo Chairman Guthrie's remarks, having consistent, reliable regulations, particularly in energy and permitting, allows Micron to make long-term manufacturing investments at home so the country can lead in manufacturing and in AI.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Bhatia follows:]

**********COMMITTEE INSERT**********

*The Chair. Thank you. Thank you for your testimony.

Mr. -- the Honorable Mr. Turk, you are recognized for your five-minute opening statement.

STATEMENT OF DAVID TURK

*Mr. Turk. Chairman Guthrie, Ranking Member Pallone, and distinguished members, thank you for the opportunity to testify today.

More importantly, let me thank you for this committee's concerted, sustained focus on both the opportunities and the risks surrounding artificial intelligence.

As someone who has spent a lot of time in windowless rooms, including given my last four years as deputy secretary of the U.S. Department of Energy, let me clearly state my bottom line up front: housing as many AI data centers as possible, especially cutting-edge AI training models within our country, is both an economic and a national security imperative. There is no more powerful and transformational technology facing our world.

I have also found that the experts who understand AI the best are the ones who most forcefully stress the need for thoughtful, effective guardrails and protections.

As the title of this hearing suggests, we need to quickly and affordably convert energy into intelligence. The best numbers I have found come from Lawrence Berkeley National Lab, in terms of what we need to prepare for. In 2023, data centers used 4.4 percent of the overall electricity in the United States. By just 2028, data

centers' total usage will increase to between 6.7 to 12 percent.

Let me share a three-part strategy to satisfy this increasing electricity demand.

First, we need to maintain the full range of tax incentives, grants, loans, and other tools in our tool belt. Now is exactly the wrong time to make it more expensive to bring online new electrons. Getting rid of just the technology-neutral production and investment tax credits 45Y and 48E will substantially raise the costs and delay our ability to power AI. A repeal of just these tech-neutral tax credits would also increase prices. On average, U.S. households between $140 to $220 each and every year. Grants and loans, including from the Bipartisan Infrastructure Law, are also vital. Utility CEOs, developers, rural electric cooperatives are all urging Congress to retain these important tax, grant, and loan tools. Let us also remember that, among others, the Independent Energy Information Administration predicts that a full 93 percent of additional capacity added to our grids in 2025 will be with renewables and storage. Finally, uncertainty, whether caused by deliberations in Congress or President Trump's tariff policy, will also chill needed near-term investment to power AI.

Second, we need to redouble all our efforts to more quickly permit new power generation and new transmission in

our country without sacrificing important protections. Recent bipartisan efforts such as the Barrasso-Manchin Energy Permitting Reform Act, provide a promising foundation for further progress.

And third, we should more fully leverage public-private partnerships, including with strategic use of Federal land for cutting-edge AI, something advanced by both the Biden and the Trump Administrations. Ensuring cutting-edge AI data centers remain in the United States also gives our democracy a fighting chance to provide effective and efficient guardrails on AI technology. Companies by themselves simply do not have all the requisite expertise, nor do they have a perspective that takes into account all relevant considerations. We need to fully leverage our biological, chemical, and nuclear government experts to help companies red team new models to ensure they don't inadvertently empower terrorists and rogue states. We have made some progress, including voluntary cooperation with companies, but we must do more and we must make this a requirement. Safeguards against misinformation, deepfakes, model hallucinations, and privacy infringement must also be a top priority to protect public trust and democracy.

Let me conclude by reiterating what I heard from you very clearly, Mr. Chairman, and I think we will hear again and again throughout this hearing. We are in a global AI

race. The stakes are too high for us to lose. I think Dr. Schmidt put it incredibly eloquently with his opening statement. To win, we must all work together and we cannot take any tools off our toolbelt to quickly power AI.

Mr. Chairman, Mr. Ranking Member, and other committee members, thank you again for your diligent, your bipartisan, and your urgent focus on AI. I look forward to your questions.

[The prepared statement of Mr. Turk follows:]

**********COMMITTEE INSERT**********

*The Chair. Thank you. I appreciate your testimony.

Mr. Wang, you are now recognized for five minutes for your opening statement.

STATEMENT OF ALEXANDR WANG

*Mr. Wang. Chairman Guthrie, Ranking Member Pallone, and members of the committee, thank you for the opportunity to be here today to discuss the steps that must be taken to ensure U.S. leadership in AI.

My name is Alexandr Wang. I am the founder and CEO of Scale AI. Today's hearing is personal for me. I grew up in Los Alamos, where my parents were physicists at the National Lab, the birthplace of the atomic bomb. They taught me that America's leadership in science and technology is vital to our national security and global strength.

At MIT I learned that progress in AI depends on three key elements: data, compute, and algorithms. While most of my classmates pursued expertise in compute and algorithms, few were focused on the data challenge. That inspired me to start Scale. We deliver expert-level data and offer technology solutions to leading AI labs, multi-national enterprises, and the U.S. Government, and our allies. At Scale we keep humans at the center of everything we do because AI should always work for us, not the other way around.

Over the past decade it has become clear that the United States faces intense global competition in determining how AI should evolve and who should lead. In 2018 the Chinese

Communist Party's AI master plan started taking shape. They were already developing advanced AI capabilities and using that technology to surveil and suppress their people. Fast forward to today. Their plan is more sophisticated and expansive. It includes four key areas of focus: first, the CCP is taking a whole-of-country approach, having recently launched their AI+ initiative; second, the CCP is out-investing us in data, spending billions on AI-ready data, and unlocking vast public data sets to fuel AI systems; third, they are finding ways to catch up on compute and building out their physical infrastructure; and lastly, they are developing leading AI models and exporting them to the world.

But we are not here today to just talk about what China is doing, but to identify how the U.S. can lead. Given how close the competition is across all foundational elements, the policies this Congress promotes could determine the outcome. Global AI dominance is not about trying to level the playing field by mimicking China's authoritarian way of government and AI adoption. Instead, the United States must charter our own course, one that is anchored in American values. This is vital to our long-term national security. This requires decisive action by the United States across four main themes: dominate, unleash, innovate, and promote.

To dominate, we need to win on data. The U.S. Government is one of the largest producers of data in the

world, but currently most of that data is unavailable to advance American AI leadership. There are three immediate actions that would move us forward towards data dominance. First, establish a national AI data reserve. This resource should serve as a centralized hub for the government's AI work, housing relevant government data and allowing it to be easily shared between agencies and enabling widespread AI adoption. Second, make all government data AI-ready, and stand up AI data infrastructure to enable scaled implementation. And third, Congress should invest to position data dominance as a national priority.

The next theme is unleash, meaning we must unleash AI technology and establish an agentic government. An agentic government is one that uses AI under human supervision to enhance its operations. For example, Federal agencies could leverage AI to streamline veteran healthcare paperwork, improve fraud detection at the IRS, and boost efficiency and information-sharing across agencies. This will improve the lives of public employees and the American people. Congress should require each agency to set up at least one flagship agentic government program.

Next we must maximize the ability of companies to innovate. I believe the right regulatory framework is one that allows for innovation while still creating proper guardrails. Congress should take three actions: first,

confirm a use-case-based regulatory framework and conduct an analysis to address regulatory gaps; second, establish one single Federal AI governance standard to avoid patchwork legislation at the state level; and third, implement policies that enable American workers to become the AI workforce of the future. These policies would provide the skills necessary to train, fine-tune, and evaluate AI systems.

The final theme is promote, meaning we need to promote U.S. technology globally. Countries around the world, what I call AI geopolitical swing states, will soon be forced to choose between Western or CCP-controlled technology. To help make sure they choose Western technology, Congress and the administration should empower NIST to complete all relevant measurement science for AI, and export it to the world through the global network of AI safety institutes.

America led the Industrial Revolution, the space race, the Internet age. AI is the next frontier and, with your assistance, I am confident we will lead again.

Thank you for the opportunity to be here today, and I look forward to your questions.

[The prepared statement of Mr. Wang follows:]

**********COMMITTEE INSERT**********

*The Chair. Thank you. Thank you for your testimony, as well. We will now begin questioning, and I will recognize myself for five minutes for questions.

So Mr. -- Dr. Schmidt, you talked about we need all available sources of energy, and I think you said in the Library of Congress we can use AI to solve climate change. If we are going to try to build a broad coalition, we can't just go for energy without dealing with climate. And we can't just do climate and not have energy, because though wind, solar, and batteries are important, they won't supply the energy that we need. So what do you mean by all sources of energy, and how do you think that we could solve climate through AI?

*Dr. Schmidt. Thank you, Mr. Chairman.

As we discussed, the needs of our industry are so great that we cannot cut down any of the sources of energy right now. Why does this make sense, knowing that climate change is real, and knowing that it is a problem, is that the intelligent revolution, the ability to do planning and discovery, will allow us as Americans to develop new materials, new energy sources, and so forth because of the AI data centers.

So our core argument is invest in the way we can now, because the future will be so much cleaner and so much more efficient as a result of these algorithms.

*The Chair. Thank you for that. And also, you said in the Library of Congress that Europe has chosen not to grow. As we look to our competitor across the Pacific -- I mentioned we look over to the Atlantic -- what lessons learned do you think we need to look -- as we say, a lot of times people look at Europe and want to see what they are doing and copy it. What should we not do that Europe has done?

*Dr. Schmidt. Europe is a wonderful place to visit, but it is not growing. It has great human values, but it is not growing. As a result, everyone is unhappy. The standard of living between the United States and Europe has now diverged. The U.S. lives much better than Europeans, which is annoying to my European friends.

There are so many reasons why economic growth is important. Growth solves every problem in a democracy.

*The Chair. Well, thanks. So you were talking about better -- so what kind of things have Europe -- decisions European leaders have made that we need to avoid?

*Dr. Schmidt. Well, the primary issue is over-regulation. We have a similar problem in America in that the overlapping set of local-Federal-state rules, which were done with good intentions, have the property that they are slowing things down. Our competitor, China, is not a democracy, it is an autocracy, whatever you want to call it. And they just

decide.

In this fight, as I said before, if they get there first we will be very upset. All of us will be alive when this occurs. Every one of you will see it. Imagine a situation where attacks that we cannot even imagine are unleashed by China in an adversarial thing. We have no concept of having a super-intelligent opponent where we are not as intelligent as they are.

*The Chair. Thanks. So in your article I have here on The Atlantic -- or the Foreign Affairs, I am sorry, the Foreign Affairs, you wrote, essentially, technological advances in the next 5 to 10 years will determine the country that gains the upper hand. I have a couple of minutes. Could you kind of explain militarily what this means?

And then, what -- because you wrote about what they can do militarily. And then this is -- we need to act now.

*Dr. Schmidt. So in the framing in China and Taiwan, which is discussed a great deal, everyone assumes that it is a battle of missiles and aircraft carriers. That is not correct. It will be a battle of swarms of drones. Those drones will be highly intelligent, highly planned, and they will do maneuvers that no one can anticipate. We collectively are not ready for that.

Imagine a situation where China has invented new algorithms for military attacks and defense that we cannot

even conceive of. Remember, I am discussing a world where humans have a partner that is smarter than the collection of those people. As I said, this will happen in our lifetimes, and it is important that we get there first. If you take a look at Ukraine and Russia right now, you see the future of war.

I am assuming, by the way, that China would start by cyber attacks and so forth. There is evidence that these new systems will be able to come up with zero-day exploits that we cannot foresee. A zero-day exploit is something we have never seen before and we can't anticipate. There is lots of people who were worried that biological attacks can be done, and there is a lot -- there is a report from the Emerging Biothreats Commission this week with the great details, and there is a classified version that all of you should take a look at. There is plenty of evidence that these things are possible.

*The Chair. So Mr. Wang, I see you are shaking your head. I only have about 30 seconds, but if you would like to make a comment on what he was -- that comment.

*Mr. Wang. I agree with Dr. Schmidt that the potential implications on national security are incredible. As he mentioned, I think the place we are going to see this first is in cyber. I think we are going to see agentic cyber warfare in which we will see incredibly powerful AI and

large-scale data centers being utilized to hack into our systems.

One of the things that we were discussing previously is how vulnerable our energy --

*The Chair. Thanks. I am at zero on my time, and we are going to try to stick to it, so I have to hold myself to that. So I appreciate that, and we will get more answers.

I will yield back and recognize the ranking member for five minutes.

*Mr. Pallone. Thank you, Mr. Chairman. My questions are of Mr. Turk.

You laid out how important it is that we keep our investment environment stable and attractive so AI data infrastructure and energy companies can make the large investments. And America needed to build AI tools in the U.S. But unfortunately, the Trump Administration is doing the opposite. Trump has frozen investments in energy infrastructure, is attacking tax credits for energy generation, and put in place tariffs that are destroying our economy. And don't just take my word for it, others are saying it, too.

So I would ask unanimous consent, Mr. Chairman, to insert into the record an article from Politico entitled, "Why Trump's Tariffs and Tax Policies Could Derail Efforts to Boost U.S. Power Supply,'' if I can.

*The Chair. Without objection, so ordered.

[The information follows:]

**********COMMITTEE INSERT**********

*Mr. Pallone. Thank you.

So Mr. Turk, can you talk about the harm that some of the Trump Administration policies will have on our AI competitiveness?

I have to tell you, I would also like to talk about the harm that he is doing to our major universities like Columbia, but that is for another committee, so I can't ask you that today. But tell us about the harm that he is doing to our AI competitiveness, if you will.

*Mr. Turk. Well, thanks, Ranking Member Pallone. Let me start with the tariffs, just because that is the news of the day and the week.

I can't think, honestly, of a worse policy right now if you want to bring on AI power quickly in our country, power for AI in our country. Not only is it increasing costs across the board for the AI and the data centers itself, but for the power that goes into the data centers. But it is also injecting an immense amount of uncertainty. Folks who are planning data centers don't want uncertainty, they want stability of policy so they can plan going forward. So I think tariffs is absolutely the worst if you want to bring on additional data and additional energy for data centers.

Secondly, the uncertainty of the incentives, the tax incentives, the grants and the loans, all that Congress has worked on in recent years, repealing that and even the

uncertainty of whether provisions are going to be repealed or not is also going to have a chilling effect on the investment for this power that I think all of our panel here agrees that we need to have.

*Mr. Pallone. All right.

*Mr. Turk. We also need to be honest with ourselves. Right now, the quickest power, the most affordable power to bring onto our grids, including for data centers, is renewables and storage: 93 percent in 2025 will be renewables and storage. So we need to focus on a wide variety of energy sources.

I completely agree with folks, but if we want to put urgency to it the last thing we need to do is repeal these tax credits, grants, loans.

*Mr. Pallone. And then what about -- I am going to ask you to be quick, if you will, but -- because I have a couple of questions -- what about the repeal of these programs like the Inflation Reduction Act that you mentioned that was put in place by Democrats, and the tax credits? How is that going to make energy more expensive for American families in an era of increased energy demand, if you would?

*Mr. Turk. Well, we not only have additional energy demand, electricity demand for data centers, we have it for additional manufacturing, electrification of buildings. So the demand for electricity is going up now when it has been

flat for about 15, 20 years. That puts upward pressure on prices, unless we have more supply coming on.

And so to increase the cost of more supply, more of those electrons coming on makes it more expensive for AI data centers, but it makes it more expensive for households. I mentioned $220 per household, on average, being increased with just a couple of those tax provisions being revoked. If you get rid of more tax provisions, more grants, more loans, it is just going to increase that cost for everybody.

*Mr. Pallone. And what are -- lastly, do you agree that we need sensible guardrails to ensure that the privacy and security of Americans' personal information is not a casualty of the rapid development of these AI algorithms and leaky AI tools, if you will?

*Mr. Turk. Well, I absolutely agree, and certainly private companies, including those represented here, are going to be the ones who do this cutting-edge AI and bringing all these tools to help humanity.

But they have a profit motive. They are companies. They are trying to make a profit. They don't have expertise. They don't have nuclear weapons experts. They don't have biological weapons experts. We need democracy to step up. That is why I am so happy to be in front of you all, a committee that is taking this seriously to have a hearing after hearing, and really looking to have that kind of

sensible, thoughtful regulation, that balance that the chairman talks about.

*Mr. Pallone. Well, thank you. And I have to say again -- I don't want to talk about Columbia and universities today because it is not in our jurisdiction, but I have to say that, you know, cutting all these research money for major universities, trying to get rid of -- you know, today he announced -- or yesterday -- that he was denying all the visas for foreign students at Rutgers University in my district. I mean, I see that -- we are not going to have -- you know, our universities aren't going to be able to do the work that is necessary to actually keep up competitively with China, and it is just really sad. But thank you.

I yield back, Mr. Chairman.

*The Chair. I thank -- the gentleman yields back, and the chair recognizes Mr. Latta for five minutes for questions.

*Mr. Latta. Well, thanks very much, Mr. Chairman, and thanks for witnesses for being here. This is extremely important.

And just a few weeks ago the head of Nvidia said -- and I will paraphrase -- in order for us to keep the model responsive, we have -- we now have to compute 10 times faster. The amount of computation we have to do is 100 times more, easily. Another report had come out saying that in

2024 -- that said that China is looking at about a 94.5 percent -- or 94.5 percent gigawatts new -- of power coming from co-generation. And so what we are seeing is, across everything we have been talking about in this committee for quite a while, is that we are going to have to have more power.

And Mr. -- Dr. Schmidt, if I could start with you, you said something very interesting, something that has been brought up in this committee for a good number of years about light touch regulation. And I have heard it from the Internet of Things, you name it, that -- what we touch in this committee. But could you just talk a little bit about, when you talk about the light touch, what we have to be doing to make sure we stay competitive?

*Dr. Schmidt. The first thing the government needs to do is to make sure the government understands at the secret and top secret level what China is actually doing. So some variation of these safety institutes that is at the classified domain that allows our government to understand the details of what our opponents are doing is important.

With respect to the current U.S. companies, all of them are very well aware of these issues, and are working very hard to mitigate them. I am part of a group that actually talks about this informally every week, to give you a sense of it. And the companies are trying very hard to keep the

models safe. Having an agreement, for example, where the government is aware of what the companies are doing, is probably a good thing. That is what I mean by a light touch.

This innovation, this arrival of this new, alien, incredible intelligence will be done by the private sector. I want our U.S. Government to understand in detail its consequences and help it -- and help us be successful as a nation.

*Mr. Latta. Let me follow up, because also you talked about, you know, we need energy in all forms. A couple of weeks ago in our Subcommittee on Energy, we had the RTOs and the ISOs here in this country, about seven different ones. They all said this exact same thing: We have to have more power, and we shouldn't be taking generation offline. Do you agree with that statement from all those companies?

*Dr. Schmidt. Well --

*Mr. Latta. Or all the ISOs and RTOs?

*Dr. Schmidt. I don't understand the structure of that part of the industry as well as you do, sir. From my perspective, the single most important thing to do is to have an all-energy strategy. It -- as Honorable Turk said, it makes no sense to shut down the renewable stuff. We need more renewables. We also need more natural gas. We need more of everything. We are not going to be able to get the targets of gigawatts that we need without doing everything

more, right? That includes permitting, as I think we have all talked about.

*Mr. Latta. Thank you.

Mr. Bhatia, you mentioned that we need reliable power, and, really, we can't have disruptions out there in it. And, you know, one of the issues, again, is we have got to make sure, again, with -- what the RTOs and the ISOs are all saying is we have got to have this power. Do you see us meeting that power's need in the very near future?

Because again, when you are talking about, you know, we have to have permitting reform, what is going on in this country.

*Mr. Bhatia. You know, I think that we are behind. I think that we need to think long term, but act now.

For semiconductor manufacturing, power is essential. It is one of the highest input values, and it has incredible impact on the stability of the power. The reliability of the power has incredible impact on the -- our ability to run efficient operations and to not have disturbances.

I mentioned in my prepared testimony that even a fraction of a second of power droop -- not even loss, not even a second, a fraction of a second of power droop -- can have tens of millions to hundreds of millions of dollars of impact in our fabs. So we absolutely need to make sure that we have more power, that power -- transmission lines are, you

know, built for the 21st century. And in fact, everywhere where we operate our fabs, power reliability is absolutely, you know, at the very top of our list when we do site selection.

*Mr. Latta. Well, in my last 37 seconds -- because you also mentioned we need to cut through that red tape -- how would you recommend to this committee that we cut through that red tape?

*Mr. Bhatia. Well, I think one of the ways is being sure that we reduce the duplicative regulations that are in place between Federal and state.

In, you know, one of our projects in New York right now we have to do similar filings in both the Federal and state level, even though the state-level regulatory requirements match the Federal ones. And so that just, you know, extends the timeline, creates more effort, and, you know, creates delays. And I think the same thing can be true for many, many different energy projects and transmission projects around the country.

*Mr. Latta. Well, thank you, Mr. Chairman. My time has expired right on the button.

*The Chair. Thank you.

*Mr. Latta. And I will also submit my questions, other questions, to the witnesses.

[The information follows:]

**********COMMITTEE INSERT**********

*The Chair. Thank you. The gentleman yields back, and the chair recognizes the gentlelady from Colorado, Ms. DeGette, for five minutes.

*Ms. DeGette. Thank you so much, Mr. Chairman, and my questions follow very closely on what Mr. Latta was just talking about. I want to thank you for having this hearing. We had a hearing in the Energy Subcommittee in 2023 about AI and energy, and many people hadn't even been thinking about the tremendous use of energy by AI up until that time.

I think that this issue is a really ripe issue for bipartisan solutions. However, I am concerned sometimes, when we talk about cutting red tape or eliminating these proposals, sometimes that is a code word for partisanship. But we have had -- as several people have pointed out, we have had bipartisan suggestions. Mr. Peters from this committee has worked on some with people from your side of the aisle. They have had them in the Senate. So, you know, if we try to -- well, if the Republicans on this committee try to go this alone, then I think this is going to run into trouble, but I think there is tremendous potential for us to work on this in a bipartisan way.

I want to talk about an issue, though, that Mr. Pallone raised, which is -- and also Mr. Turk raised -- which is really a concerning issue of today, and that is these tariffs. All of the witnesses here today can stipulate that

we are going to need a large increase in all types of energy to not just deal with current demands of consumers, but AI. Does anybody disagree with that?

No, no one disagrees with it.

So Mr. Turk, so if we are going to build more transmission infrastructure, we are going to have to have raw materials like steel and aluminum. Is that correct?

*Mr. Turk. Yes.

*Ms. DeGette. And if these tariffs actually go into effect, which it seems like it might, won't those raw materials needed to add transmission capacity be more expensive?

*Mr. Turk. Yes.

*Ms. DeGette. And Mr. Bhatia, just yesterday, in fact, Micron announced that they are going to have price increases on some products today starting today doing -- due to President Trump's tariffs. Isn't that correct?

*Mr. Bhatia. We did -- we -- you know, memory market is --

*Ms. DeGette. No --

*Mr. Bhatia. -- by many different factors --

*Ms. DeGette. I mean, didn't you announce yesterday that Micron is going to impose tariff-related surcharges on some products from April 9?

*Mr. Bhatia. The tariffs are an evolving situation, and

we are communicating with our --

*Ms. DeGette. Okay. Well, Mr. Chairman, I ask unanimous consent to put into the record a Reuters article which says, "Micron to Impose Tariff-Related Surcharges on Some Products'' from April 9.

*The Chair. And without objection, so ordered.

[The information follows:]

**********COMMITTEE INSERT**********

*Ms. DeGette. Thank you.

Now, Mr. -- Dr. Schmidt, you just talked about -- and I agree with you -- that we need more energy in all forms, and that is -- and also, that is likely the way that this market is going to develop. Is that right?

*Dr. Schmidt. Yes, correct.

*Ms. DeGette. So when people say, oh, we need to drill, baby, drill, that -- we do need natural gas, but we also need to make sure that we can upgrade our grid to deal with the renewable energy that is inevitably going to be a part of this process. Is that right?

*Dr. Schmidt. Yes. Yes, ma'am.

*Ms. DeGette. Now, so Mr. Turk, I want to ask you. Without guardrails, how is it that we are going to be able -- without guardrails that protect consumers, how is it we are going to be able to develop centers, data centers for AI, at the same time we can ensure average Americans can get the electricity that they need at decent prices?

*Mr. Turk. Well, I think we need to do two things at the same time. We need to bring on those electrons as quickly as we can, including to streamline permitting but to do it on a bipartisan basis. Bipartisan means durable. It means making sure things work, actually, in the real world. And then secondly, we do need to have the guardrails. With all due respect to the other witnesses, we got phenomenal

talent in the U.S. We are lucky to have that talent working on AI. But we also need to have the government step up. We need to have sensible, thoughtful guardrails to protect everyone's privacy. That is your jobs.

*Ms. DeGette. And if we don't have those guardrails, what is going to go -- what is going to happen for energy prices for consumers?

*Mr. Turk. Well, energy prices will go through the roof and we will lose trust for AI by the American people, as well, which isn't going to help our competition with China either.

*Ms. DeGette. Thank you.

I yield back.

*The Chair. The gentlelady yields back. The chair recognizes Mr. Hudson for five minutes for questions.

*Mr. Hudson. Thank you very much, Mr. Chairman, and thank you for holding this very important hearing today. This topic is crucial to future generations in ensuring the resources for health care facilities, banks, universities, our national security, including our warfighter.

I thank the witnesses for your very important testimony, it is very informative. The bottom line is we must maintain our place as a global leader on AI, and I think we can all agree on that.

North Carolina, where I live, is a state that leads in

innovation, and that includes in AI. There is no doubt we will continue to incorporate AI in many of our industries, but we must ensure we have the resources necessary to advance and sustain AI. I represent Fort Bragg. We call it the epicenter of the universe, home of the Airborne and Special Forces. At Fort Bragg we use AI. AI benefits the warfighter by anticipating what is next, adjusting to situations, and connecting our soldiers.

It is absolutely critical to our national security that we stay ahead of our near-peer adversaries, particularly China, so that we maintain our superior advantage. I never want my guys and gals in a fair fight, I want us to be the leader. And I certainly don't want us to face a near-peer adversary that has a superior AI technology.

I have also seen threats to our energy sources, whether it is the rolling brownouts we saw in California, but also including when two substations in my district were attacked in my home county, causing a multi-day power loss. Nearly 4,000 people were without power for almost a week. Hospitals faced blackouts, schools and businesses closed, restaurants and grocery stores lost their inventory, stop lights were dark, cell signals went down. Even gas stations had to close. One of my constituents lost her life.

Disruptions to our energy supply are dangerous, and an attack like this has big implications on our future AI

capabilities. The threat only grows as AI is further incorporated in our everyday lives. I would ask -- I will start with Mr. Wang, but if anyone else wants to, jump in -- can you please share, from your opinion, how an unreliable or a non-resilient grid would impact investing -- investment planning and existing commercial activities?

*Mr. Wang. First of all, I want to just echo many of your statements. They are spot on. First of all, we need advanced AI for our national security. We need our Department of Defense, our warfighter, to have advanced AI capabilities. That is absolutely critical for this next phase. And that is dependent on energy, as we have discussed here in the -- over the course of today.

One of the greatest risks, if you think about the training of these large-scale AI systems, it requires a continuous source of power to be able to both train advanced AI systems and keep them running. If we have an unreliable energy grid in any sort of, you know, competitive or conflict scenario, if the adversaries have the ability to take down our grid through cyber attacks or other forms of attacks, then that greatly impacts our ability to be competitive or to be able to fight in that battle. So it is absolutely critical we have a reliable energy grid. It is important that we secure this energy grid. It is important that we are able to protect against cyber attacks and other forms of

attacks and we have consistent power.

*Mr. Hudson. Does anybody else want to weigh in?

Mr. Bhatia?

*Mr. Bhatia. I think that, you know, the President, as well as Congress, is behind the strong growth in manufacturing across many different sectors, including semiconductors. And energy has always been an advantage for this country, due to, you know, abundant natural resources. And we have invested in all different technologies over time, and that has just stalled over the last 10, 15 years, as some of the other panelists noted. And so I absolutely believe that investing in energy is going to help to fuel this manufacturing renaissance, and in particular the semiconductor renaissance that, you know, we all know is so important to winning in AI.

AI, you know, just to co-opt some of the words of Mr. Wang on the panel here, you know, it is about data. And data needs memory chips, and it needs the most advanced memory chips in order to be able to create all of the insights that are valuable in whatever circumstance or application that we see.

*Mr. Hudson. Well, thank you for your answers.

Mr. Turk?

*Mr. Turk. Just -- Congressman, if I could just say a word on grid, and I am just so pleased you mentioned the

grid, it is just such a fundamental backbone of our infrastructure -- for military bases, but for everybody else in industry.

This is where I think it is so important to have all the tools in the tool belt. You all provided through the bipartisan infrastructure legislation $10.5 billion to improve our grid through a program called the GRIP program. We have $23 billion in our loan program right now, with a whole bunch more in the pipeline to help utilities to strengthen the grid going forward. That is what I am talking about of keeping all these tools in the tool belt.

*Mr. Hudson. Thanks, I appreciate that.

Mr. Chairman, my time has expired, so I will yield back, but thank you to the witnesses for those answers.

*The Chair. Thank you. The chair will -- the gentleman yields back, the chair recognizes Mr. Schakowsky for five minutes for questions.

*Ms. Schakowsky. Thank you so much.

Mr. Turk, I want to -- did I do that wrong?

No? Okay. I have questions for you. Some go way back. We are talking about AI today, but I have to tell you that I and Gus Bilirakis on the Republican side have been working on the issue of privacy for a very, very long time, and even more before that with -- in all kinds of tech interests. But we have never done anything to rein in big tech, nothing

whatsoever. So we see families that have to give all kinds of information, which they do, all kinds of, I think, risks that go on.

So of course, we are talking about AI. But in the meantime, we have seen tech leaders apologize to consumers. Oh, we didn't mean to put children at risk, we didn't mean to do this or that, and yet we have done nothing at all. So what it seems to me is now we are talking about AI, and you talk about risk. You used that word, "risk.'' So do we have to go back further, or let's -- we -- if you want to just talk about risk with AI, what exactly are we talking about?

You mentioned that in your written statement, but I would like to know who -- and we can start with how -- do we address the issue of risk? But who should be addressing the issue of risk?

*Mr. Turk. Well, thank you, Congresswoman, for that question, and thank you for your focus on these issues for years and years. Your leadership has just been tremendous.

I completely agree with something Dr. Schmidt said at the beginning in his opening statement about AI being under-hyped, if anything. This is an incredibly powerful technology. What that means to me is -- and I have had the chance to work with a lot of our experts in the government, and we need to make sure that we keep those experts in the government, we need more AI experts in the government, not

letting AI experts leave, which gives me concern with some of the firings and some of the other things that this administration, the Trump Administration, is doing -- but powerful technologies can not only be used for good. Powerful technologies, especially in terrorist hands, in rogue states' hands and other hands, once you get these models out there, it is incredibly difficult to bring them back in.

So I will give you a specific example of a risk. And I know this is an unclassified setting, so I will just talk a bit in generalities. As smart as the folks are who work in Scale AI, and OpenAI, and Google, and Meta, and these other big tech companies, they are not nuclear weapons experts, nor should they be. I am not sure why you would be a nuclear weapons expert -- and Mr. Wang mentioned his parents working at Los Alamos, which is just a phenomenal lab for us in our country.

We need to make sure that, before a model goes out there in the public, that there is some red teaming, there is some vetting by nuclear weapons experts to know what to look for, to make sure that terrorists can't take these models and help them develop nuclear weapons or biological weapons or chemical weapons. That is where I think they are -- just as you suggest, it is who and how. The private sector will need to lead. They have an incentive to make sure that their

models are safe, but they don't have all the expertise they need to red team and make sure that those models are safe.

I would prefer that not to just be a voluntary kind of understanding. I think it should be a requirement that, before models come out, there needs to be some vetting. Now, that has to be done efficiently. It has to have the right balance that the chairman is talking about to make sure that the broad expertise that we have, the nuclear weapons experts, the chem weapons experts are poking and prodding and making sure that these models aren't going to cause us harm. So that is one particular example.

The other one that you mentioned, which I think is incredibly important, as well, is privacy and making sure that information is not sucked up inappropriately to go into these AI models in the first place, and that these models aren't going to infringe on the privacy. I absolutely think consumers, citizens, Americans should control their information, and we should have guardrails. We should have regulations in place to ensure that that is the case. Again, this should be thoughtful, this should be efficient, this should be in a way that allows our companies to push the boundaries.

I completely agree with everyone who has spoken that we need to win this AI race, but we need to do this thoughtfully and make sure that the democracy, the people's

representatives, have some say here, too.

*Ms. Schakowsky. So as part of the who, you are saying that the Congress of the United States should play a role?

*Mr. Turk. Absolutely. That is why I am so pleased that this committee is having multiple hearings, not just one-offs.

*The Chair. Thank you.

*Ms. Schakowsky. Well, thank you so much, I appreciate it.

I yield back.

*The Chair. Thank you. The gentlelady yields back. The chair recognizes Mr. Bilirakis for five minutes.

*Mr. Bilirakis. Thank you, Mr. Chairman, I appreciate it. Thanks for holding the hearing. I thank the presenters.

Mr. Wang, to win the race against China, American AI companies need to succeed at home and abroad. However, we have seen our largest foreign trade partners, especially the EU, enact sweeping, new AI data regulations that could be used to target U.S. companies. How can we address new and emerging digital trade barriers to ensure American AI companies can out-compete their Chinese competitors, again, on an even playing field?

*Mr. Wang. Thank you for the question.

You know, it is certainly true that China in particular, and the Chinese Communist Party has a strategy to win on

data. This includes some of the things that you mentioned around, you know, being more loose around data privacy both domestically and internationally, as well as explicit programs that they have within their country to create tax incentives, you know, vouchers and other forms of large-scale government programs to win on data. That is why I actually think it is critical in the United States that we focus on exporting our technology globally, as well as exporting our standards globally.

So one of the avenues that we have as a country to be able to do this is through NIST. You know, as the United States we have an opportunity to really define what are the standards for AI that will be adopted globally. And other countries are listening, and they -- you know, through the global network of AI safety institutes, there is a global coalition of countries who are looking to us to help define what are the standards for safety and other provisions that they will -- that we will all collectively utilize to define how we govern AI in the future. So we have a golden opportunity as a country to help set the global AI standards, and we need to take that and be very thoughtful about what we present.

*Mr. Bilirakis. Thank you.

Mr. Schmidt -- Dr. Schmidt, we have seen Chinese AI companies, DeepSeek, Alibaba, and now -- debut powerful AI

models in the past two months. Many are rightfully focused on these models' capabilities. But I am also concerned about how they were trained, potentially on Americans' personal data and by misusing access to American AI services.

We should also be cautious about how Chinese AI will be used by American consumers and in potentially sensitive areas of the U.S. economy, such as health care. And I am very interested in that. We should act now, before China has a foothold on these emerging markets and controls AI data outputs to Americans' queries.

What steps can we take to address these risks to American consumers and businesses?

And first I want to talk to Dr. -- if Dr. Schmidt can answer, and then if anyone else wants to chime in and I have some time, please don't hesitate.

*Dr. Schmidt. Not only is your question great, it is worse than you said. Sorry.

The Chinese models are released in open source, which means that you can see how they work, and they are easily spread, and they are free. It is highly likely that the U.S. companies will be, by the time we are done, pretty well regulated by you all because of the importance of what they are doing. This is my personal opinion. I am not calling for it, but I think that is what is going to happen. It is very hard to regulate the open source movement coming out of

China. We need to make sure we deal with that.

The industry is struggling with your question because we have not figured out a way to deal with what is called distillation, where -- and distillation is where you take one model, and you ask it questions, and you get the answers. And the -- there is lots of evidence that the Chinese did exactly what you said in your question using this distillation mechanism, so we don't really know.

My own view is that the best answer is more offense, not more defense. And simply invest, invest, invest to stay ahead. In order to invest, as I mentioned in my opening statement, we need high skills immigration of key people because these things are essentially math problems. We need all the energy that we discussed.

I think the American innovation system, which is the combination of the government, the venture capital industry, the private sector, and universities is phenomenal. It is important we not in any way slow down the universities in AI research.

We can win this. It has to be an all-country effort. I am -- my personal view is it is a national security issue for America against China.

*Mr. Bilirakis. Agreed, agreed. Yes, I don't have any more time left, so I will yield back.

Thank you, Mr. Chairman.

*The Chair. Thank you. The gentleman yields back. The chair recognizes Ms. Matsui for five minutes for questions.

*Ms. Matsui. Thank you very much, Mr. Chairman. I want to thank all the witnesses for being here today. This is a critically important issue for the future of America and, really, for the future of humanity at large.

Now, as co-author of the original CHIPS Act, I know how critical this policy is to strengthen our national security and technological leadership. The CHIPS and Science Act is working as intended, leveraging its $50 billion of government funding to spur a ninefold investment of $450 billion from the semiconductor industry. Yet President Trump threatened to abandon this once-in-a-generation effort to bring advanced semiconductor manufacturing back to America, and his tariffs are driving up costs to what we need to be competitive in AI, including aluminum, steel, semiconductors, and electronics. This administration's chaos and uncertainty will harm our AI leadership.

Dr. Schmidt and Dr. Bhatia, how would dismantling or delaying the CHIPS and Science Act programs impact America's global competitiveness, especially in AI innovation?

*Mr. Bhatia. Thank you, Congressman Matsui, for your support of the CHIPS Act and our industry over your entire career.

We are the only U.S. memory company, and our investments

are -- you know, bring tremendous value across leading-edge memory solutions, as well as across other industry -- other segments like the automotive industry, aerospace, defense. So we believe our investments and our more than $100 billion plan over the next 20 years will bring tremendous value, and we are actually encouraged by the executive order to create an accelerator program for large-scale projects through the CHIPS office, through the Department of Commerce to be able to ensure that our projects --

*Ms. Matsui. So you don't want any slowing down, right, no pausing.

*Mr. Bhatia. That is right, that is right. I think the accelerator's goal is to be able to make sure that the projects can be successful.

*Ms. Matsui. Dr. Schmidt?

*Dr. Schmidt. A number of us were very strong supporters of your legislation for the following reason. Twenty-five years ago we made a mistake, as a country, and we got out of this business. It costs money to get back into it. It costs money to build the factories, to train the people, and so forth. Ten billion of the fifty billion is in new R&D for new kinds of packaging, which will give America a possibility of leading globally in semiconductors. The other 40 is to allow us to have domestic production.

Why do we need domestic production? Think national

security. Just think about it. It is worth it to our nation to have a supply chain of critical intelligence materials. That is literally the things that do the thinking under your control, Congresswoman.

*Ms. Matsui. Okay.

*Dr. Schmidt. Thank you.

*Ms. Matsui. And Dr. Schmidt, I read your testimony. I was very impressed with it, particularly the part about our innovation power, the potent collaboration between government, private industry, and academia. The government, you know, really provides the strategic direction, and the private sector driving innovation, and academia, which fuels a pipeline of foundational research and talent.

I was wondering. You know, I think it is great to have this collaboration, but I am wondering because the Trump Administration claims they are committed to American dominance, yet time and again their actions show the opposite. We should be training and recruiting talent to shape our AI leadership. Instead, more than 75 percent of U.S. researchers surveyed are considering leaving our country because of the chaos of the Trump Administration. President Trump is firing experts in our agency, waging a war against science, and destroying our public research funding system.

Mr. Turk, this dismantling of public research and reductions in the Federal workforce consistent with -- is it

consistent with strengthening U.S. leadership on AI and other emerging technologies?

*Mr. Turk. I think it is absolutely inconsistent. I think this is a huge threat going on right now, hollowing out the expertise in our national government, and I certainly got a chance to work with phenomenal experts, civil servants in our Department of Energy. We built that institution up for years and years, that kind of talent at our national labs. And to be haphazardly and chaotically firing people, losing that talent at the exact time that we need, it given the global competition we have got in AI and all these other critical technology areas -- so I think it is exactly the wrong approach.

*Ms. Matsui. Okay. There are other energy technologies the Republicans have historically supported. The Bipartisan Infrastructure Law -- we created the Office of Clean Energy Demonstrations to help develop advanced nuclear, hydrogen, carbon capture, and long-duration energy storage. Mr. Turk, what is happening to the Office of Clean Energy Demonstrations under President Trump?

*Mr. Turk. So it is one of the offices that has been decimated the worst. And you just mentioned --

*The Chair. I am sorry --

*Mr. Turk. -- the incredibly important areas that they are working on. Funding that has been provided --

*The Chair. We need --

*Mr. Turk. -- on a bipartisan basis from Congress.

*The Chair. The time --

*Mr. Turk. And to see that being dismantled is just a travesty.

*The Chair. We have to move on.

*Ms. Matsui. My time has -- I have other questions I will submit for the record.

[The information follows:]

**********COMMITTEE INSERT**********

*The Chair. Thank you. I thank -- the gentlelady yields back. The chair recognizes Mr. Palmer for five minutes for questions.

*Mr. Palmer. Thank you, Mr. Chairman.

Dr. Schmidt, I read your book, and I have -- one of my favorite quotes is from Henry Kissinger. He said the absence of alternatives clears the mind marvelously. I say it another way: Nothing brings clarity and focus quite so well as the absence of alternatives.

My concern is that we are in an arms race with China for artificial intelligence and quantum computing, and that if China wins that race they will not be a superpower, they will be the superpower.

I also continue to point out in this committee that there is not a single major refinery for rare earth elements in the Western Hemisphere. There is only nine in the world. Eight are in China. The other one is in Malaysia. And I just want to ask you, do you think this ought to be one of those moments of clarity that focuses Congress on meeting these demands, these needs?

*Dr. Schmidt. Thank you, and I do.

If I told you with certainty that in five years China will be able to mount cyber attacks against American infrastructure that we have no defense of, would you act now? Yes.

*Mr. Palmer. Absolutely.

*Dr. Schmidt. If I told you that China was building an architecture for national security that was autonomous, robotic, attritable, et cetera, would you act now? Yes, you would. I am telling you those now.

*Mr. Palmer. So if we don't act on the mining, processing, and refining of rare earth elements immediately, we could find ourselves in the very position you just described.

*Dr. Schmidt. That is correct. We want full control of our own supply chain.

*Mr. Palmer. Absolutely.

*Dr. Schmidt. Energy, chips, the infrastructure that we need. It is an issue of national security for America.

*Mr. Palmer. Mr. Wang, in order to meet the demands that we have for power generation, what -- how -- what power generation capacity do we need to have to achieve dominance in AI and quantum computing? Do you have any idea of what that would be?

*Mr. Wang. Well, as was mentioned earlier, the scale of data centers that are being built require similar amounts of power as entire cities --

*Mr. Palmer. Okay.

*Mr. Wang. -- in the United States.

*Mr. Palmer. Well, Dr. Schmidt, I don't -- you probably

don't remember this. At the dinner at the Library of Congress you and I had a brief discussion. One of the things that I continue to point out in this committee and other places is that there is 100, 200 hydrocarbon power generation facilities that have been shuttered and dismantled.

We know that we have these enormous power demands. I know there is a move now to go back to opening these back up on natural gas and coal. But what do you think about using small modular reactors to locate them on these facilities to meet -- it is the quickest way, I think, to meet these power demands.

And the good part of this is, with all due respect to my Democratic colleagues, we are not going to do it with renewables because we just don't have the time to build out everything you have to build out, including the transmission lines. Those transmission lines still exist at these shuttered power plants. We could literally -- we could open them with coal or natural gas, but I think we ought to be thinking about small modular reactors that can plug into the existing transmission lines. How would you respond to that?

*Dr. Schmidt. One of my personal frustrations is the regulatory structure around nuclear NSMRs. SMRs are the right answer, so your instincts are exactly correct. Furthermore, they can be built in volume. How many SMRs are in use in America today? Zero.

*Mr. Palmer. Zero.

*Dr. Schmidt. How many -- what is the most promising one? An initiative in Canada. Why --

*Mr. Palmer. And I am glad you brought that up, because they just licensed it, what, two days ago, or a week ago.

*Dr. Schmidt. And the typical supply -- the fast approval time is considered to be 12 years. That defies logic. We need a new program around much faster permitting for safer and safer fission and fusion nuclear. SMRs are the correct path.

One of the issues that is -- sorry for the details -- is 30 years ago or 40 years ago, when -- the standard for permitting in nuclear was set at a threshold below natural radiation. Alex can talk about this with great detail more than I can. At the end of the day, it was set too hard. It was a mistake. It needs to be fixed.

*Mr. Palmer. Well, the GE Hitachi -- and I am not taking sides for any brand -- it could be built in about three years.

But you made another point there that I think is very important for this committee, and that is the economy of scale. If we were committed to building these out in scale, so much of it can be done in factories, so much of the testing can be done in a factory and then on site.

I think it is extremely important that this government

move toward small modular reactors to meet the power demands that we have to have to even be competitive with China in the AI space.

Thank you, Mr. Chairman, I yield back.

*The Chair. The gentleman yields back. The chair recognizes Mr. Castor for five minutes for questions.

*Ms. Castor. Well, thank you, Mr. Chairman. This is a very important topic, and we should be focused on bipartisan solutions to advance American innovation.

The problem is there are so many new roadblocks right now, and President Trump has turned himself into the anti-innovation president. He is -- has outright killed large, new energy resources that were in line to come onto the grid. He has imposed these new import taxes and tariffs on everything we need to compete on AI: aluminum, steel, semiconductors, electronics. He is threatening to halt our investment in semiconductors in America. He is -- has taken a hatchet to the academic and scientific workforce. This is all a gift to China at exactly the wrong time.

But let's focus in on the challenges and the opportunities for energy and AI. Secretary Turk, it is good to see you. One of the challenges is the enormous need for new energy capacity, but I am very concerned for what this means for everyday Americans and their electric bills there.

Mr. Chairman, I am going to offer -- ask unanimous

consent to submit for the record a new study from the Environmental and Energy Law Program out of Harvard Law School, where they highlight -- they say they are skeptical of utility claims that data center energy costs are isolated from other consumers' bills. Rate structures, as well as secret contracts could be transferring big tech's energy costs to the public. How do we balance --

*The Chair. Without objection, so ordered.

[The information follows:]

**********COMMITTEE INSERT**********

*Ms. Castor. Thank you.

How do we balance these needs?

*Mr. Turk. So I think we have to, as I said in my opening statement, bring power on the grid -- it could be behind the meter, as well -- to power data centers, to power AI cutting-edge models.

We also need to make sure we have downward pressure on prices. I don't know of any elected official anywhere in our country who shouldn't have affordability and the cost to consumers as job one, and everything seen through that lens. As you suggest, it doesn't seem like that is what the President -- our president right now -- has in mind.

So even contemplating repealing the tax credits that puts downward pressure on prices across the board -- technology neutral, right? Any technology can qualify for those tax credits if it meets certain thresholds. Getting rid of those is exactly the wrong thing to do right now.

And I mentioned the analysis that has been done, a number of groups have done really good, cutting-edge analysis: $220 more annually each and every year for an average household. Now, that goes up in some states to $400 more a year. If you happen to represent Missouri, Arkansas, Texas, New York, Iowa, and Kansas, watch out, it is $400 more per year just to repeal two of the tax credits, let alone the full panoply of what has been done.

*Ms. Castor. Yes, thanks.

So one of the opportunities, however, is to work together on a much more efficient and modern electric grid across the country. It is kind of outdated, the way everything is structured and -- right now. That is why yesterday I introduced my Advancing Grid Enhancing Technologies Act with Senators Welch and King that will implement shared savings incentives that promote the deployment of grid-enhancing technologies. That is the cheapest way to super-charge our grid. We have got to optimize the existing grid infrastructure to bring energy projects online more quickly and save consumers billions of dollars.

Do you see hope here with our -- with modernization of the grid and GETs?

*Mr. Turk. Well, thank you for your leadership, and thank you for focusing on GETs, grid-enhancing technologies.

We have got such a range of technologies. Some we still need to reduce costs, but some, like GETs and reconductoring, make sense. We just don't have a utility industry now and the incentives for those technologies to be utilized at scale, to allow us to get more out of our existing grid.

We of course need to build new transmission, as well, in our country to make sure that we are prepared for what we need in the future. So I am really pleased and thankful for

your leadership in that area.

I am also firmly one -- and I agree with Dr. Schmidt and others -- that Congressman Palmer was just talking about, small modular reactors. I think small modular reactors -- I think we should be investing now in fusion so we have that as a solution.

Enhanced geothermal is such a phenomenal resource in our country, taking advantage of the drilling expertise in the workers to drill 24/7 clean power, including for data centers. We should be investing even more now to try to bring that technology online very quickly.

*Ms. Castor. Thank you.

I yield back my time.

*The Chair. Thank you. The gentlelady yields back. The chair recognizes Dr. Dunn from Florida for five minutes.

*Mr. Dunn. Thank you very much, Mr. Chairman. So exciting topics, from tech startups to energy, grid operators, Internet service providers. Everybody is working to develop these new AI technologies, and America has always been at the forefront of technological innovation. But with AI, we are just not. We are not untouchable. We have competition. We are in a race with China to lead in this field.

And it is promising to have two major American companies sitting before us today, Scale AI and Micron, who are leading

the way. This global AI boom has prompted widespread industry adoption across all kinds of sectors. Health care is one of keen interest to me, but also finance, telecom, weather. This morning I met with NOAA. They are excited.

However, this exponential growth of demand brings it with [sic] some substantial energy requirements. And as AI models grow in size and complexity, so does the infrastructure required to train and operate them. For instance, training large language models can take weeks of processing and high-powered GPUs, and the energy consumption can be staggering. At the same time, our telecoms infrastructure has to keep up with AI's growing demands. High-capacity networks are essential to ensure fast data transfers in these real-time AI applications such as autonomous driving, telemedicine, and smart cities and whatnot.

As AI use grows, both the energy consumption and telecom's capacity required will grow commensurately with it. At the same time, the Chinese Communist Party is moving fast and hard with zero regulations and zero ethical restraints, so we have our work cut out for us.

I also sit on the China -- Select China Committee and the NATO Parliament, and I had a chance to discuss these issues with our European counterparts. And I met with the member of the European Parliament who led the current EU

privacy bill. And she cautioned me, whatever you do in Congress, don't do that. Don't do what we did, don't do what we did. That was her words kind of from a -- right from the horse's mouth, if you will. The expert witnesses here, I think, understand today that the EU bill has indeed restricted artificial intelligence development in Europe.

With that, Mr. Schmidt, as these AI tools develop, their utility to each of us will be proportionate to their -- our ability to access them. With that in mind, are we moving quickly enough to enable the deployment of broadband connectivity and commercial access to spectrum, Mr. Schmidt?

*Dr. Schmidt. On the spectrum side we need another round of a spectrum analysis and a new way in which the unused spectrum is allocated. I happen to believe in a situation where companies are able to buy the spectrum but they have to build it out, or they are given the spectrum and they have to build it out. I don't want people sitting on spectrum and not making it use. We need that bandwidth. However you all arrange that, it will be fine with us, I think.

*Mr. Dunn. Well, it is trickier than you think, but thank you for that. I am pleased that this -- our members of that committee are sitting here with us today.

Mr. Wang, it is good to see you again here in Washington. You are becoming a regular up here. I fear for

your soul.

[Laughter.]

*Mr. Wang. Today cutting-edge AI research is dominated by industry, partially due to the very high costs of computing needed to train these advanced models. Given the fast pace of the progress, how can we ensure our government or our pilot programs keep up with the rapidly evolving industry needs and standards?

*Mr. Wang. I think that the most useful framework here is to just think about what are the raw ingredients for these AI models. So it boils down to three major elements: computational power, which requires a lot of energy, as we have discussed a lot today; algorithms, the sort of instructions for the models, and that requires incredible talent to devise new algorithms; and then data.

And often times we really -- and really, these AI models and progress in AI models boils down to progress in every one of these three underlying components. Often times we don't consider enough our relative position on data with respect to the Chinese Communist Party. They have had a decade-long strategy to be dominant in data, to win on data. They have large-scale government programs. They have built their entire system and their entire country, their sort of civil military-fusion system, to be dominant on data.

And we need to begin thinking as strategically on this

front, as well. We need a program, and we need thought around how we achieve data dominance as a country, how we utilize all of the incredible data that we have as a country to get out ahead. And our government is one of the largest producers of data, and we need to leverage this advantage.

*Mr. Dunn. And do you think having a privacy law would help that? I mean a standardized privacy rule for the country.

*Mr. Wang. I definitely want to prevent this -- the case where we have a patchwork of privacy laws --

*The Chair. The gentleman --

*Mr. Wang. -- across every state in the --

*The Chair. The gentleman is out of time. I am sorry.

*Mr. Dunn. Okay. Just on that, sort of on the --

*The Chair. The gentleman is out of time.

*Mr. Dunn. Mr. Bhatia, a similar question.

*The Chair. The gentleman yields --

*Mr. Dunn. Coincidentally, the European --

*The Chair. The gentleman is out of time, I am sorry, I am sorry.

*Mr. Dunn. -- announced yesterday --

*The Chair. I am sorry, you are out of time.

*Mr. Dunn. I am out of time.

*The Chair. I am sorry.

*Mr. Dunn. God, that one flew fast.

*The Chair. The gentleman yields back.

*Mr. Dunn. I was having fun.

[Laughter.]

*The Chair. It does go fast, doesn't it?

*Mr. Dunn. All right.

*The Chair. And Mr. Tonko --

*Mr. Dunn. Thank you very much, Mr. Chairman --

*The Chair. -- is recognized for five minutes. Mr. --

*Mr. Tonko. Thank you, Mr. Chair. Let me begin by acknowledging that just about every witness who has testified at the Energy Subcommittee this year, whether by invitation of Republican or Democrat, has agreed that we must make it easier to build transmission infrastructure to meet our nation's growing energy demands and to be the global leader in AI. Today's witnesses are no exception, so I really hope this is an issue that the committee can get serious about.

Dr. Schmidt, your testimony mentioned building more transmission, but you also called out the need to embrace small grid capabilities and grid-enhancing technologies. Why is it important to maximize our existing electricity system's efficiency and performance while we also work to build new infrastructure?

*Dr. Schmidt. One of the ways to think about the energy problem is that you are building things that last 40 years, and that you are in a constant process of renewing things

that were built 40 years ago. And in that sense we need an integrated plan to upgrade everything.

I like what the Honorable Turk said, that you need all of it. My list was fusion, fission, especially SMRs, and enhanced geothermal, natural gas, renewable wind, and solar. We need all of it. In order to do that, the grid has to be more dynamic.

You want to have the source of power be as close as possible to the consumer. The ideal scenario is you put your power plant next to your data center. The data centers need five gigawatts. They are huge, right? You need five gigawatts of power, which is also huge. We can't do that. Therefore, we need to have the transmission to get them from one to the other.

*Mr. Tonko. Thank you. I appreciate that.

And, Mr. Turk, your thoughts on this. If we can make some existing loads more flexible through demand response programs, or deploy grid enhancing technologies to get more out of our existing infrastructure, are these important tools to create the energy system conditions needed to win the race for global AI leadership?

*Mr. Turk. Well, I think they are absolutely indispensable, and there are no regrets, as well. Just as Dr. Schmidt was talking about, why wouldn't we take advantage? And I know you have been a leader on this for

years in the Congress. Why wouldn't we take advantage of that infrastructure that we have built? Infrastructure is one of those things that is going to be around 40 years or even more. Let's get the most out of it.

And we do have technologies these days, GETs technologies, reconductoring, using AI, using machine learning to help the grids balance loads a lot quicker. We started a program at the Department of Energy to use AI for permitting to make sure that we could do more permitting, including on transmission, to build out our transmission system even more quickly than we have been doing. It is a big challenge, but have we got to use all the tools.

*Mr. Tonko. Thank you, both of you gentlemen.

And Mr. Bhatia, I want to first and foremost welcome you to upstate New York. I also want to thank you and recognize the important commitments that Micron has made to upstate New York. Today we are talking a lot about how we can build and operate our energy system to meet AI's needs, but we rarely talk about how AI and its enabling technologies can be developed to better fit within the reasonably foreseeable constraints of our system. And that is why it is critically important that we continue to invest in research.

So Mr. Bhatia, your testimony mentioned that Micron is developing chips with much more improved energy efficiency. Can you discuss why this is a priority for Micron, and how

important is a chip's energy efficiency to reduce the overall energy demands of these data centers?

*Mr. Bhatia. Certainly. Thank you for your comments, Congressman.

And, you know, I really believe the semiconductor industry and memory chips are part of the solution. You know, the brilliance of Moore's Law, which is the governing law for the industry over the last -- well, since its, you know, inception 50-plus years ago, is that with every generation of technology that we introduce, 18 -- every 18 to 24 months, we are taking the same operation and doing it with higher performance, lower power, and less resources utilized to build that device, whether, in our case memory, cells. And so that scaling path by itself is part of the solution to being able to make all these tremendous AI innovations, these data-driven AI innovations come to life using lower and lower power as we progress through time.

And Micron has actually been very focused on leadership in that way. For the last four DRAM generations, Micron has been first to market by several quarters, ahead of our Asian competitors. And that allows us to build chips that are lower-powered than those competitors. So for example, I mentioned in my prepared remarks that every one Nvidia GPU has 96 high bandwidth memory chips integrated with it. Our high bandwidth memory chips are 30 percent lower power, 30

percent lower power than our competitor's chips that go into those similar systems.

So absolutely critical for us, and we look for all avenues to be able to continue to reduce power as we scale down the trajectory and improve the efficiency of our chips, including --

*The Chair. Thank you.

*Mr. Bhatia. -- partnering with national labs --

*The Chair. Thank you, the time --

*Mr. Bhatia. -- to do research with --

*The Chair. The time is expired, thank you.

*Mr. Tonko. Well, thank you very much, Mr. Chair, and thank you for the comments from --

*The Chair. I appreciate --

*Mr. Tonko. -- the witnesses.

*The Chair. The gentleman yields --

*Mr. Tonko. I yield back.

*The Chair. -- back, thank you, and chair recognizes Dr. Joyce for five minutes.

*Mr. Joyce. First I want to thank Chairman Guthrie for holding this critical hearing on the future of artificial intelligence.

AI is the defining technology of the next several decades. It will have a revolutionary effect on all aspects of our lives. It will be integral in everything, from the

high-level data analysis to the use of a search engine. In industries as diverse as energy production and health care, AI is already making significant inroads.

As a doctor, we see AI integrated into innovative medical devices, helping to translate the information collected by the device into clinical guidance. In medical practices, AI can help streamline the administrative tasks, allowing doctors to ultimately spend more time with their patients. This is just the beginning of the capabilities that AI will give us, and it is why it is critical that the U.S. leads the way in the development and the deployment of this technology, just like the space race during the Cold War.

However, our geopolitical rival is striving to catch up and overtake America so that they can dominate this new sector. Make no mistake, China is desperate to beat us in the field of AI. It is a national imperative that we do not allow this to happen. America and the free world can't afford to let the Chinese Communist Party win the race with AI.

Fortunately, we have an advantage, and that advantage is the vast energy resources, the resources that are under the feet of my constituents in Pennsylvania. Energy is now the limiting factor for building the data centers that AI uses, which is why, to win the race for AI, we need to unleash

American energy.

We have already begun to see the new project development with data center agreements between AWS and Talen Energy at the Susquehanna Nuclear Generation Facility, and the reopening of Three Mile Island, thanks to the power purchase agreement between Constellation Energy and Microsoft.

Another project in Indiana, Pennsylvania, was the announcement to repurpose the retired coal-powered Homer City Generating Station. This new facility, powered by Pennsylvania's abundant natural gas reserves, will be one of the largest power-generating sites in the entire country, capable of generating up to a staggering 4.5 gigawatts of electricity to power data centers and AI facilities on the site, attracting billions of dollars in investment to our region.

These projects show that America's ability to lead the world in AI is directly tied to our nation's energy production. We must continue to use our energy advantage in this global competition.

Dr. Schmidt, in earlier public statements you had supported moving away from fossil fuel baseload power. Today it seems that you have a different view on the energy industry. Can you please explain why your views have evolved, and what that connects with your views on AI development?

*Dr. Schmidt. Let me also mention that 35 to 40 years ago, Carnegie Mellon in Pittsburgh invented a great deal of the world that we are talking about, so thank you to your state and to what they were able to do.

We need all sources of power to accelerate because we don't have a choice. If you just assume that you can get there with baseload power, with renewables, you can get there -- maybe 25, 30 percent, we can debate it -- you can't solve the whole power -- the whole problem as we are laying out without an all-power solution. And that is why I am taking the position that I have today.

*Mr. Joyce. You mentioned renewables, but renewables do not provide that baseload power that is so necessary in the data centers. Correct?

*Dr. Schmidt. Not correct. I am sorry, sir. Renewables plus batteries are now roughly competitive with the price of new -- natural gas, partly because the natural gas demand has gone so much.

And so, again, from my perspective, the answer is yes to all. Let the market sort it out. Let everybody build everything. We need it all now.

*Mr. Joyce. And I think, ultimately, we need the nuclear and the natural gas to be able to allow those data centers to continue to develop and continue to grow.

*Dr. Schmidt. Yes, and let me -- sir, may I just

emphasize the importance of baseload power, which I think is what you are getting at?

We need continuous -- if you listen to Micron, these guys are superhuman. What they have done in America against the Chinese and the other Asian manufacturers is enormous. They need that baseload power. That is why your premise is correct.

*Mr. Joyce. Thank you very much. I think we can all agree that the baseload power is truly the key to moving forward with the development of AI in the United States.

Mr. Wang, as I mentioned earlier, there are two data center projects in Pennsylvania that are collocating with nuclear power stations --

*The Chair. I am sorry, we are beyond time. Sorry.

*Mr. Joyce. Thank you. I will --

*The Chair. Do that for the record --

*Mr. Joyce. -- issue my questions for follow-up.

[The information follows:]

**********COMMITTEE INSERT**********

*Mr. Joyce. I thank you again, Chairman Guthrie, for holding this important hearing today.

*The Chair. Thank you. The vice chair of the committee -- I appreciate -- yields back, and the chair recognizes Ms. Kelly for five minutes for questions.

*Ms. Kelly. Thank you, Mr. Chair.

As my colleagues have noted, this hearing comes at a pivotal time. The Trump Administration, led by Elon Musk and DOGE, are working to rescind key investments made under the Inflation Reduction Act, which you have heard, that have spurred unprecedented growth in clean energy generation while expanding domestic manufacturing opportunities. These investments have made a major difference in my district, which is urban, suburban, and rural. I go from the City of Chicago downstate, where I have 4,500 farms.

Mr. Turk, given the expected growth in demand and significant investments that will be made to our grid's infrastructure, can you discuss the difference -- the different responsibilities between states and Federal governments in regulating how these improvements will be paid for?

*Mr. Turk. Yes, absolutely. Luckily, we have got policies in place, tax incentives in place, grants in place, loans in place to make it more affordable to -- for us in our country to build the kind of power that we need not just for

data centers, but for the rest of our economy, as well. Repealing those tax credits -- I hope I have been incredibly clear here at this hearing -- repealing those tax credits, those grants, those loans will raise the price, will raise the costs, and will delay how quickly we can bring electrons onto our grid.

So I think it is incredibly important for the Federal Government to play a strong role. Luckily, we have got those incentives in place, it is just a question of whether we take those off the table, take those tools off the table. And I just couldn't agree with you more strongly we need those tools on the table.

*Ms. Kelly. Well, thank you. I hope everyone is listening.

Alongside the provisions in the IRA, it is imperative we continue working to invest in our nation's critical supply chains. Supporting our capacity to develop and produce a high-tech revolution is essential for prosperity in this modern economy, which is why I was proud to join my colleague, Representative Dingell, in leading the Democratic Supply Chains Act last Congress. Vital provisions from this package were included in the Promoting Resilient Supply Chains Act, which was passed by this committee yesterday. Efforts like these, not unpredictable, unlawful funding cuts and across the board tariffs on our allies, will help the

U.S. lead the way on AI, while ensuring innovation continues to thrive in communities like mine.

Mr. Turk, during your time as deputy secretary, how has the rapid growth of AI transformed future planning and considerations around grid reliability and resilience?

*Mr. Turk. So AI is an incredibly powerful technology. It can help on the grids. The grids are becoming increasingly complicated. We have got a complicated patchwork in our country. We need to not only have the local grids and the regions work, but we need interregional communication, interregional flows if we are going to be effective in terms of dealing with the challenges that we have got in front of us. So AI can be an incredibly powerful tool there.

We also need an independent FERC to make sure that we have got good regulation, predictable regulation, regulation that has the certainty that folks can plan for going forward. So we need to have that regulatory environment in place, too.

*Ms. Kelly. Thank you for your response.

My district is poised to lead the charge by building an innovative quantum computing campus right in Chicago's southeast side. I am encouraged by the promise of world-class collaborations, exciting new technological advancements, and ensuring economic development returns to this community. With major projects like the Illinois

Quantum and Microelectronics Park and other large-scale data centers coming to the area, we must also work to bring new, clean energy generation online to help meet the projected load growth in the coming years. We could not simultaneously pull back from these critical investments while trying to lead on AI and critical manufacturing here in the U.S.

Last question, Mr. Turk: What critical supply chain investments need to be made to ensure that we meet projected demand while ensuring reliability and affordability?

*Mr. Turk. So, again, we have got a whole panoply of tax incentives, grants, and loans. Let me give two specific examples.

We talked about critical minerals earlier in this hearing. Because of those tax incentives, because of the grant money that we have been given -- thank you for giving us that from the Congress, from the Department of Energy perspective -- we have now made a real dent. We are on a pathway to diversifying supply chains. China holds 80 percent of the processing for critical minerals in our world right now. Because of the grants, because of the loans, because of the tax incentives, we are on a pathway to increase in the U.S. alone -- of course, working with allies -- 2,100 percent lithium increase. I could give you a statistic for cobalt and other kinds of things.

So we are on a pathway, but this is not the time to lean

back --

*Ms. Kelly. Right.

*Mr. Turk. -- to take these tools off the tool belt. We need to lean in on that front.

*Ms. Kelly. I am going to have to cut you off, out of respect for my time.

So I yield back, Mr. Chair.

*The Chair. The gentlelady yields back. The chair will now recognize Mr. Weber from Texas for five minutes.

*Mr. Weber. Thank you, Mr. Chairman.

Mr. Schmidt, I am going to come to you and then, Mr. Wang, you are next.

When discussing the power needs of the AI industry, it is important to look at the recent track record of investment decisions in generating facilities. Constellation Energy is investing 1.6 billion -- with a B -- dollars to restart Three Mile Island nuclear plant. Amazon Web Services paid $650 million to house a data center facility next to a nuclear plant. The Homer City Generating Station in Pennsylvania is investing 10 billion -- with a B -- dollars to convert a natural gas plant.

Billions of dollars of investment have gone into AI, and barely any is going to wind, solar, or battery storage. So I have got kind of a two-pronged question here.

First of all -- we will start this way -- can you

discuss -- oh, well, let me -- I -- let me make this statement. Is it possible that those investment companies used AI in their decision on how to invest in energy? Let that sink in for just a little bit, okay?

Can you discuss why AI -- Mr. -- I am coming to you -- companies are investing billions of dollars into dispatchable and reliable generating resources. I know you had the conversation with Dr. Dunn, but we are talking about real companies, real businesses making real investment decisions based on risk. Your thoughts?

*Dr. Schmidt. So all of the data I have seen indicates that it is a fair choice now between renewables and batteries, and essentially natural gas and so forth. In other words, the answer is you want both. How they make those decisions are highly local, involving funding, permitting processes, and so forth.

Texas -- and what you are doing is phenomenal -- if you look at -- many of the new data centers are being built in Texas because of the environment that you all have created, and some of the largest ones are being created there.

*Mr. Pallone. Bigger than the country.

*Mr. Weber. I am sorry, I am getting invaded over here.

[Laughter.]

*Mr. Weber. By a friendly fire.

[Laughter.]

*Mr. Weber. Keep going.

*Dr. Schmidt. So Texas is a really good model of -- as you know, you have your own electric grid, and it is highly unregulated. What I like about the Texas grid is that you see real power, real pricing power on a -- essentially, a microsecond level.

With respect to how people make these decisions, I hope that every company in America uses AI tools to make important, strategic decisions. They are natural allies in the business decision process.

*Mr. Weber. Okay, I am going to actually jump off the questioning line I had.

So AI, so what happens if China, who is so far ahead of us because we don't have our permitting process lined up right, we are so stupid that it takes so long to permit stuff that China doesn't have that problem, what happens if they intercept and take over our AI? What happens then?

*Dr. Schmidt. Well, I am not suggesting they will take over our AI. Our analysis is that China has very large power supplies compared to the United States. They do not have the power problem that we see --

*Mr. Weber. So they can't hold our AI hostage?

*Dr. Schmidt. As a technical matter, no. What they can do is they can -- there are what are called adversarial attacks, where they can essentially go in and screw with the

model, excuse the term, and basically screw it up.

*Mr. Weber. What if they have better AI than we do?

*Dr. Schmidt. That is a competitive issue. And the issue -- one way to think about it is -- and I will make an argument -- if you and I are competitors, you are the good guy, I am the bad guy, and I am ahead of you, and I am six months ahead of you, you say, oh, it is only six months. But if the slope of innovation is near vertical, it is almost impossible for you to catch me up.

*Mr. Weber. Right.

*Dr. Schmidt. It is a dynamically unstable --

*Mr. Weber. And that doesn't work when you are talking about America's security at risk.

*Dr. Schmidt. It puts --

*Mr. Weber. That analogy doesn't work --

*Dr. Schmidt. -- our core national security --

*Mr. Weber. I got you.

*Dr. Schmidt. -- at risk.

*Mr. Weber. Let me move on.

Mr. Wang, the Energy Subcommittee held a hearing on the role of AI and powering the American energy future October 19, 2023. AI -- during the hearing we discussed how AI can be used to improve the performance of the grid used in oil and gas production, and also some of the vulnerabilities of AI -- like kind of you are alluding to, Mr. Schmidt. I have

no doubt that there have been major advances in AI since that hearing, so I have got a couple of questions from [sic] you.

What benefits would there be from integrating AI into our nation's energy sector?

And would you want that sooner, rather than later, and all the permitting to be reasonably quick?

*Mr. Wang. I think what you have been alluding to through all of your questions is a very important point, which we, I think, have been grappling with in the AI industry, which is that AI has the ability to transform nearly every industry. What -- we refer to this in the industry is how do you move towards more agentic systems, how do you move towards systems where AI are able to make more decisions more quickly, and result in an overall dramatically more efficient, more effective system? This will tackle every industry over time, but particularly in the energy sector it is critical.

And the last answer is sooner, rather than later.

*Mr. Weber. Got you.

Mr. Chairman, I yield back.

*The Chair. The gentleman yields back. The chair recognizes Dr. Ruiz for five minutes.

*Mr. Ruiz. Thank you, Mr. Chairman.

Consumer protection, data privacy, and artificial intelligence impact every American. But for me, I feel a

deep responsibility to ensure that our nation gets this right not just as a lawmaker, but as a father of two young daughters. I see how kids today are shaped by AI-powered platforms and digital relationships like never before.

While tech can inspire creativity, it also poses real risks. Studies link heavy social media use, especially for young girls, to anxiety, depression, and low self-esteem. Too often, AI algorithms promote harmful content over healthy self-worth content.

Dr. Schmidt, you have often cited the example of an AI-enabled teddy bear that learns and evolves with a child, highlighting the potential risks of such intimate AI relationships. As this scenario becomes increasingly plausible, what steps are companies taking to design systems that protect rather than exploit young users?

*Dr. Schmidt. So thank you. Every company is very concerned about the point you are making, and every company is trying to address this question of, let's call it, a rogue AI that comes out of themselves partly for moral reasons, but also it is just bad for business.

As to whether the government will ultimately regulate that area, it is not clear to me. You do have some things that you could do right now. There is a law called COPPA, which has a 13-year -- you have to be 13 to be online. I have strongly recommend it to be raised to 16 for that

reason. You can also look at section 230, and try to reduce some of the most egregious harms, and that has been discussed for some time in Congress. Those small changes would take the most extreme examples of harm and take them out of the market, which is probably a good thing.

*Mr. Ruiz. Thank you. You know, too often systems are designed to keep kids online longer to collect their data and serve them ads for profit. They are not designed to keep them safe, respect their privacy, or ensure age-appropriate content. That is why we need action, we need enforceable privacy safeguards and clear rules on how AI interacts with minors, because no algorithm should decide what is best for our kids without oversight.

But we must also be honest about what could stand in the way. The sweeping tariffs proposed last week by the Trump Administration risks slowing innovation, raising costs on the very tools needed to build safer online spaces and delaying efforts to hold tech companies accountable. They risk putting petty politics ahead of public good, and in doing so they leave our most vulnerable, our kids, exposed.

Dr. Schmidt, as efforts to strengthen data privacy and AI safeguards move forward, how do you anticipate the 2025 Trump Administration's tariffs will affect our ability to develop and deploy privacy-first technologies designed to better protect young users online?

*Dr. Schmidt. I don't know that I can make the combination in the question. I will have to think about it.

I will tell you that tariffs are tax increases. Tax increases slow down progress, increase costs, lead to inflation, are generally bad.

*Mr. Ruiz. Deputy Secretary Turk, the Department of Energy, particularly through its national labs, has been deeply engaged in advancing AI safety and red teaming efforts. Can you speak to the importance of DoE's role in this space, and what the implications might be if that role were diminished or reassigned by the administration?

*Mr. Turk. Absolutely. We have got world-class experts at our national labs, nuclear experts, bio weapons experts. We need to make sure that that expertise is tapped into, those individuals are utilized for this red teaming, right?

So before a model comes out, have those folks with their expertise working with the companies to make sure that those models -- not purposefully, I don't think any company, certainly here, would purposefully put out a model that allows a terrorist to build a nuclear weapon, but they don't have the nuclear expertise to ensure that that is the case. That is why having these experts, these government experts, these independent experts, are so important as part of that red teaming.

Getting rid of those folks is absolutely a national

security concern, would have serious national security implications not just for AI, but for everything that we need those experts for.

*Mr. Ruiz. Thank you. You know, we have the opportunity and the responsibility to get this right. We cannot afford to wait until we see another crisis in youth mental health, another generation struggling with digital addiction, or another data breach exposing millions of children's personal information. So I urge my colleagues, let's put families first.

Thank you, and I yield back.

*The Chair. Thank you. Dr. Ruiz yields back. Mr. Allen is recognized for five minutes.

*Mr. Allen. Thank you, Chair Guthrie, for hosting this full committee hearing examining AI and impacts -- how it impacts development --

*Mr. Ruiz. They gave it --

*Mr. Allen. -- with an all-out energy approach and the technology. And certainly, we have got to be competitive globally.

In fact, you know, we wouldn't be hiring this -- we wouldn't be having this hearing if President Trump were not in office, because he has said that his -- part of his agenda is an all-out energy program. We need to dominate energy in the world. And of course, AI, we understand that race. And

so -- and everything that we are doing, our conference is doing, is to provide every opportunity for us to be the energy-dominant country that we were just six years ago. And so that is what is so critical, and that is why we are having this hearing today to find out, okay, what do we need to do to make that happen.

I would like to thank you for being here, our witnesses.

You know, with the emergence of AI, the U.S. has to be a global leader. To be a leader in AI it is critical that our energy sector is equipped to meet the demands of -- that AI poses.

Dr. Schmidt, in about 2030, data centers can consume upwards of 9 percent of total U.S. electricity at the same time as we are seeing historic projections of electricity demand because of AI developments, and the nation's bulk power system is already under incredible strains. In fact, the North American Electrical -- Electric Reliable [sic] Corporation, or NERC, found in their last long-term reliability assessment that half the nation is at risk of resource adequacy. We know in some states we are having brownouts. That is, half the nation is at risk to blackouts during times of extreme weather.

In my opinion, our nation will need significantly more power to meet these demands, and fast. How can we balance the needs of everyday Americans to keep the lights on, while

simultaneously powering developments in AI models?

*Dr. Schmidt. The answer, of course, starts with our overall premise, which is more of everything. It also includes a more intelligent grid that is more flexible when bad things happen. That is now possible with AI and with grid modernization. You need both.

*Mr. Allen. Mr. Bhatia, last month we heard directly from the grid operators talking about grid who are charged with overseeing the reliability of our electric grid. And they highlighted one of the biggest issues facing the bulk power system is the premature retirement of baseload power plants, which has been mentioned quite often in this hearing.

We also heard that places like New England, who do not have sufficient natural gas capability and longstanding opposition to nuclear energy, are not seeing the same uptick in new investments or data centers and manufacturing facilities.

My home state of Georgia, which has been the best state to do business in 12 years in a row, has been a leader in investment in job-creating industries, largely because of our pro-business environment and diverse slate of baseload generating resources. In fact, now we have just added to Plant Vogtle two more units, and it is the largest clean energy facility in the United States built in the last 30 years.

Given your company's energy-intensive nature, how important is access to reliable, affordable electricity when deciding where to invest in U.S. manufacturing facilities?

*Mr. Bhatia. Thank you, Congressman, and I would like to just start by giving a call out to our research and development center that we have in your home state. And we have certainly found that, over time, that that has been a wonderful place for us to attract talent and grow our engineering capabilities there.

*Mr. Allen. Yes.

*Mr. Bhatia. In terms of your question on baseload, absolutely. I think many of the questions today have been focused on that.

And for, you know, semiconductor operations, we have very, very consistent loads. We have, of course, high loads. And the reliability of the power is incredibly important, as I have mentioned earlier. So nuclear power, hydroelectric power, these are excellent fits for us. But we also agree with the other panelists an all-of-the-above approach is what is required.

*Mr. Allen. Good. I have a few -- Mr. Bhatia, I have a few yes-or-no questions I am going to ask you.

Do you agree that permitting reform is needed to meet, as you discuss in your testimony, our rising energy demand?

*Mr. Bhatia. Yes.

*Mr. Allen. Do you agree that it includes air permitting?

*Mr. Bhatia. Yes.

*Mr. Allen. The National Ambient Air Quality standards implemented by the Biden-Harris Administration's EPA, for example, have proven to be a significant burden on the U.S. manufacturing base. These stringent regulations have made it difficult to permit and develop many of the facilities needed to support our next generation of industrial base. Whether it be PM 2.5 or ozone, EPA needs to be more flexible. No question about it.

*The Chair. Your time is --

*Mr. Allen. My time has expired. I have an additional question for you. If you would answer that for the record, I would appreciate it.

[The information follows:]

**********COMMITTEE INSERT**********

*Mr. Allen. And I yield back.

*Mr. Bhatia. I would be --

*The Chair. Thank you. The gentleman yields back. The chair recognizes Ms. Clarke for five minutes for questions.

*Ms. Clarke. Thank you very much, Chairman Guthrie, Ranking Member Pallone. And to our panelists for today's hearing, thank you to our witnesses for being here to testify.

And let me just say that it is a pleasure to see Micron presented -- represented on this panel, as Micron is making historic investments in New York that will transform our state and the semiconductor industry more broadly.

Members of this committee are well aware that generative artificial intelligence has proven to be one of the most impressive technological advancements of this generation. But with a tool so expansive, it is up to us to ensure that AI systems are developed and deployed responsibly and with consumers in mind.

Last Congress I had the honor of being appointed to the Bipartisan Task Force on Artificial Intelligence, which was established to ensure that the United States continues to lead in AI innovation, as well as examine appropriate guardrails to protect against emerging threats like those outlined in the 2023 GAO Report on the Rapid Use and Growth of AI. I have been sounding the alarm on issues related to

AI and algorithms for years, namely the potential for algorithmic bias.

AI has only gotten smarter. And with its rapid development, consumers are faced with the increasingly acute potential for harm caused by algorithmic discrimination. For example, facial recognition technology, a tool used by both retail stores and law enforcement, has repeatedly shown an inability to accurately identify people of color, which has led to multiple instances of false identification and unwarranted harassment. And when it comes to home ownership, Black applicants are denied mortgages at higher rates, a decision that is increasingly made based on algorithms. In health care algorithmic bias can lead to misdiagnosis, as the people of color or historically under-represented in existing data sets, and algorithms are improperly tested for accuracy.

My top priority with respect to the growing use of AI is simple. We need to make it abundantly clear to developers and deployers of algorithmic systems that Americans do not forfeit their civil liberties when they go online. That is why I have prioritized algorithmic accountability, and have fought to codify and make explicitly clear that civil rights protections still apply in the digital realm, especially when AI is used in critical decision-making.

Lines of code remain exempt from our anti-discrimination laws and too often go unchecked. Every algorithm has an

author. Every bias has an origin. Through proper regulation we must ensure safety, inclusion, and equity are top of mind in the deployment of automated, critical decision-making systems that affect Americans' lives.

And while I am pleased with the final report of the bipartisan Task Force on AI, and find that it serves as a productive framework to set guardrails on AI that includes civil rights and liberties, the conversation does not end there. It is up to this committee, my Republican colleagues, who seemingly have an aversion to the words "civil rights,'' to properly protect all Americans when they either electively or unknowingly use AI to make critical life decisions.

I have one question, Mr. Turk. Do you agree that it is important to ensure that AI systems are rigorously tested for bias before they are deployed and on a regular basis thereafter?

*Mr. Turk. Well, let me first thank you for your leadership on the bipartisan task force and more generally, and I completely agree we need to have those kinds of protections in place. This is a powerful technology, an incredibly powerful technology, and we need to get this right.

*Ms. Clarke. Yes, I am just concerned that, you know, some biases get baked into our systems,, and that inaccuracy can be detrimental not only to communities, but to our

ability as a nation to be as strong as possible, particularly when guarding against adversaries that seek to do us harm.

So thank you for your work, gentlemen. I appreciate all that you are doing.

Young man, Mr. Wang, you are making it happen.

[Laughter.]

*Ms. Clarke. We are proud of you. Much continued success.

And I yield back the balance of my time.

*The Chair. Thank you. The gentlelady yields back, and the chair recognizes Mr. Balderson for five minutes.

*Mr. Balderson. Thank you, Mr. Chairman, and thank you for holding this hearing today, and I would like to thank all the witnesses for being here also today.

Let me start with you, Dr. Schmidt.

I represent Ohio's 12th congressional district, which covers central and southeastern Ohio, Licking County, which I am proud to represent, has one of the largest clusters of data centers in the country. Google, Amazon Web Services, Meta, QTS, Vantage, and more all have data centers in central Ohio and my district. In total, power demand from data centers will reach 5,000 megawatts in central Ohio by 2030, based on signed power agreements. Just last month Williams announced a $1.6 billion investment to build new -- two new natural gas-fired plants in Licking County with a combined

capacity of 400 megawatts. This reliable baseload power generation is critical to meet growing demand in central Ohio.

Dr. Schmidt, in order to alleviate strain on the electric grid, I am curious what role or involvement you think these tech companies should have in helping to bring in new generation to secure the massive amounts of power needed for their facilities.

And how should these companies partner with grid operators or power providers to ensure we can properly account for tracking -- growing tracking demand?

*Dr. Schmidt. So when I was at Google, we made a bet on Ohio and we built the largest data center at the time in the world, which was massive. And I used to go visit it. And so, oh my God, the data centers you are describing are 10 times larger than anything I ever built way back when I was doing this only 7 years ago. So it gives you a sense of the scale of the investment in what you are doing.

The best thing to do is to have a strategy within your state where everybody agrees to solve the energy power problem. We found in -- working in Ohio that we were able to get access to the high-voltage lines that we could not get access elsewhere. We built our own substations, which are also massive. That is what it takes. That is what every one of you is going to have to do to have your states be a center

for AI -- the AI revolution.

*Mr. Balderson. Thank you.

Mr. Bhatia, I will switch to you. I would also like to hear your thoughts on this. What is Micron doing to be proactive in securing the power needed for these chip fabs?

*Mr. Bhatia. So as part of our selection of the locations where we will be expanding the power availability and the agreements that we could reach with local power companies was a key part of that criteria. As I mentioned before, nuclear power, hydroelectric power, both very good fits for us, and those are in strong availability in the areas where we selected, and we continue to work with the providers in those areas to be able to ensure that we can have more investments to be able to have long-term access to that affordable and reliable power.

*Mr. Balderson. Thank you. I will continue with you, sir. You note that one of America's strongest competitive advantages compared to markets in Asia is our reliable and affordable energy supply. I strongly agree with you, with this assessment that we must maintain this key competitive advantage by building out generating capacity to meet the expected short-term surge in energy demand after years of flat growth.

However, right now we are seeing massive backlogs of generation project and grid operators, interconnection

queues. Depending upon the region, power projects are sitting and waiting in interconnection queues for five years before they can even get studied and then ultimately built and connected to the grid. The build-out of AI and data centers isn't happening in five years. It isn't happening now, and these facilities need power. Do you have concerns that the current process can take years and years just for new power generation projects to get through the queue?

*Mr. Bhatia. Yes.

*Mr. Balderson. Thank you. Do you think Congress can play a role in ensuring new generation is getting online and connected faster, given the historic increase in power demand?

*Mr. Bhatia. Yes.

*Mr. Balderson. Thank you very much.

Dr. Schmidt, would you like to add anything to that?

*Dr. Schmidt. The interconnection queues are a very good example of something which is something that you all need to work on: basically, getting the system to be more flexible when the industry shows the demand.

I mean, the delays are crazy, right? People -- they have the money, they have the ability to get the power built, and they can't interconnect it. That is a good example of grid modernization. It applies to everybody.

*Mr. Balderson. So I encourage you -- we have

introduced some legislation called the GRID Act, and it is all about the interconnection queue.

So with that, Mr. Chairman, I yield back. Thank you.

*Mr. Joyce. [Presiding.] The gentleman yields. The chair recognizes the gentleman from California, Mr. Peters, for his five minutes.

*Mr. Peters. Thank you, Mr. Chairman. I do think it is great that the whole committee is hearing this.

And I thought particularly, Dr. Schmidt, I want to compliment you on setting the table on this because we are caught up in a lot of little things, and you really gave us a very big perspective on how important and daunting this is.

I had a bunch of questions from before. I am only going to ask one, which is about the Energy Permitting Reform Act, or EPRA, which was the Senate permitting deal at the end. Mr. Turk, can you talk a little bit about the importance of transmission and the importance of interregional planning and interregional transmission as a way to help deal with our energy needs?

*Mr. Turk. Well, put simply, we just need to make improvements. We need to get the most out of our existing transmission: grid-enhancing technologies, reconductoring, bringing AI and other tools to make sure that we are smart about these assets, and they are flexible, and they are smart.

And then secondly, we do need new transmission, and it does take too long in our country to build transmission. We underwent a whole series of reforms in the Biden Administration to try to improve that, and I think we made some significant progress, but we need to do more. And certainly, Congress has an incredibly important role here.

*Mr. Peters. Well, I am an advocate on this committee and the Energy Subcommittee for permit reform. We did a lot of work to get EPRA to the point it was. I think we should start with that and adopt it.

I will say that this concept of all-of-the-above energy, I understand -- I think sometimes it is all of the above, as long as it is natural gas. The thing I would say is we -- I was recently at a meeting with the energy company and some of my Republican colleagues, where they said now it takes five years to get a national -- natural gas plant online, largely because of the supply chain constraints and getting turbines. But you can get solar within a year. And the company was begging us not to repeal the incentives for solar power and probably wind that are in the IRA. And I hope, when we talk about all of the above, we are really committed to all of the above, and that we don't do something to shoot ourselves in the foot.

With respect to natural gas, I am more than willing to work on natural gas. I have been saying like a broken record

what I want out of that, from an environmental perspective, is some agreement on the regulation of fugitive emissions, methane emissions. It is an easy thing to do. It is something the industry is open to. If we did that here, it would solve a lot of -- it would answer a lot of the questions we have about the use of methane, or use of natural gas as a bridge fuel. I think that is an easy thing to follow.

I would reiterate what some other people see, the need to invest in basic science is really critical here. China is more than keeping pace with us. They are out investing us by quite a bit. In my district a lot of that is in biotechnology, but a lot of it is in fusion. And I think that is something that we have to continue to invest in. It is -- it would really solve a lot of problems, but it takes investment. And I think investment in energy in our universities, the best university system in the world, the best set of universities in the world, is really critical to this -- for this country.

I agree that our data is ridiculously unmanaged and uncoordinated. We saw this in COVID. I tried to deal with it in COVID. You can't draw conclusions from a data set that is so disparate and unorganized. I think that your comments were really wise about that, sir, and I think that Congress has a role in making sure that we get on top of that.

I would -- do not want to overlook the role of imports in this. I mean, we do not make solar panels here. We import a lot of things. We are making it more expensive. It is craziness. It is a craziness. And I think, for the Republicans who used to be such staunch supporters of free trade, and Democrats like me who supported both the Trans-Pacific partnership and the USMCA negotiated by Donald Trump, we can't forget the benefits of that international trading system, and that the cost of inputs that we need to solve this problem are really being heightened by this trade war and this self-harm.

I do want to say, too, that I think we should think hard about whether some of the calculations can be decentralized. We have taken for granted, we have taken as a given that there is a certain amount of energy we need. I have no doubt that it is a lot. I had actually heard 5 gigawatts for a data center, now I hear 10. That is a massive challenge. We ought to think about whether, as a -- systemically, some of those calculations could be done on these handheld devices. It would take some of the power requirements away from those big facilities.

And finally, I would -- the other thing I would observe as a Californian is we can't let ourselves get into the situation we are in with privacy, where we have 38 different standards across the country. This committee has got to come

to grips with the notion we have to do preemption. There is a Federal supremacy clause for that reason. This has got to be a national policy. We have got to set national standards. We have got to do it on privacy, we have got to do it on AI, and we can't be scared of using our power here.

Thank you very much. We have a lot of work to do. Again, thanks so much for the witnesses. And I yield back.

*Mr. Joyce. The gentleman yields. The chair recognizes the gentleman from Texas, Mr. Pfluger, for five minutes.

*Mr. Pfluger. Thank you, Mr. Chairman.

Dr. Schmidt, Mr. Bhatia, what role will LNG play in providing the power that is necessary for AI and data centers?

*Dr. Schmidt. I am sorry, LNG?

*Mr. Pfluger. Natural gas.

*Dr. Schmidt. So natural gas? It sure looks like natural gas is needed in most renewables scenarios because of, essentially, a peaker plant. It also looks like we just need more natural gas, more natural gas generation kind of everywhere.

*Mr. Pfluger. Mr. Bhatia, you mentioned that in your testimony --

*Mr. Bhatia. Yes.

*Mr. Pfluger. -- earlier today about concerns with intermittent power. So when we are looking at sourcing, what

do you need, intermittent? Or do you need a reliable baseload?

*Mr. Bhatia. Well, so we have -- obviously, we need reliable baseload power. Natural gas has the ability to be able to be a really good smoothing capability for the -- and buffer, basically -- for the ups and downs of the overall grid. And that is why I would agree with Dr. Schmidt that it is an important area and it is an element -- it is an area that the United States has, you know, a tremendous amount of capability in.

*Mr. Pfluger. The power providers were here. ERCOT testified last week, and they said that Texas alone is at a peak demand of about 80 to 85 gigs right now, and that is going to increase in the next 4 to 5 years to 150. So Mr. Turk, are you familiar with the study that DoE did last year -- it actually started in 2023 -- on LNG?

*Mr. Turk. I am.

*Mr. Pfluger. What was your role in the --

*Mr. Turk. So I was the ==

*Mr. Pfluger. -- Department of Energy?

*Mr. Turk. I was at that time the deputy secretary, the number two official.

*Mr. Pfluger. Okay, did you --

*Mr. Turk. And I was very involved.

*Mr. Pfluger. You were involved with that report?

*Mr. Turk. I was.

*Mr. Pfluger. What was the title of that report?

*Mr. Turk. I don't remember what the title of the report was.

What we did is we asked a number of our national labs to give --

*Mr. Pfluger. Let me --

*Mr. Turk. -- us an independent assessment.

*Mr. Pfluger. Okay. When was that report released?

*Mr. Turk. We pushed our national labs to do it as quickly as possible, and --

*Mr. Pfluger. When the Department of Energy release the report?

*Mr. Turk. I think we ended up releasing it late last year or early this year.

*Mr. Pfluger. Okay. So you actually did release it?

*Mr. Turk. We did release it.

*Mr. Pfluger. Were there sections that were redacted?

*Mr. Turk. Not to my knowledge.

*Mr. Pfluger. That is --

*Mr. Turk. We believe very strongly --

*Mr. Pfluger. That is what was reported.

*Mr. Turk. We wanted an independent analysis to look at the cost implications, the environmental implications, and we did not suppress any information whatsoever.

*Mr. Pfluger. Were you aware of the 2023 study's findings prior to the January 26 decision to indefinitely ban new export authorizations under section 3 of the Natural Gas Act?

*Mr. Turk. So we didn't ban any -- we did the study in order to take a step back because we have authorized so much. Up to half of our natural gas production right now is authorized to actually go abroad and to be sold, including to China.

*Mr. Pfluger. Why was --

*Mr. Turk. So what we did was take a pause --

*Mr. Pfluger. I will reclaim my --

*Mr. Turk. -- did the study, and then --

*Mr. Pfluger. I will reclaim my -- Mr. Turk, thank you. Thank you. Pause, ban, we can debate this all day long, but why was the study not released immediately after it was done?

*Mr. Turk. So it was.

*Mr. Pfluger. So --

*Mr. Turk. We released the study --

*Mr. Pfluger. So do you --

*Mr. Turk. -- once the experts finished the study.

*Mr. Pfluger. Do you disagree that the study was more favorable to LNG than the Biden Administration would have liked, and that is why there was a pause put on LNG exports?

*Mr. Turk. The study -- the pause was so that we could

do the study before making decisions.

*Mr. Pfluger. So --

*Mr. Turk. And to actually have our independent experts, and the independent experts in our national labs were the one [sic] who did the study.

*Mr. Pfluger. Okay. So the study actually came out, was released by Secretary Wright, and --

*Mr. Turk. We released the study.

*Mr. Pfluger. -- there was --

*Mr. Turk. The Biden Administration released the study.

*Mr. Pfluger. In December of 2026 -- or December of 2024, excuse me. And it came out as a -- pretty favorable with regards to emissions, but it was delayed by the Biden Administration for months --

*Mr. Turk. It wasn't.

*Mr. Pfluger. -- on being released. Well, that is --

*Mr. Turk. It wasn't. I was there. It wasn't delayed.

*Mr. Pfluger. It --

*Mr. Turk. That is how long it took because we wanted a thorough, independent analysis by several of our national labs.

*Mr. Pfluger. So do you agree that the emissions of natural gas were better and more consistent and actually more favorable than what you claimed and what Secretary Granholm claimed in the attempt to ban natural gas exports?

*Mr. Turk. So LNG exports have a very, very significant -- a very significant greenhouse gas footprint. So just one project, we are talking 4 BCF per day. That project itself has more emissions throughout the life cycle -- methane emissions, but CO2 combustion -- when that gas is burned than 141 --

*Mr. Pfluger. You haven't --

*Mr. Turk. -- countries in our world.

*Mr. Pfluger. You haven't answered my question, so --

*Mr. Turk. That is one facility, a hundred and forty-one countries in our world.

*Mr. Pfluger. So --

*Mr. Turk. That is a pretty significant footprint.

*Mr. Pfluger. So you stand by your decision to ban LNG exports.

*Mr. Turk. Again, we did a pause so we could do the study.

*Mr. Pfluger. And you stand by that.

*Mr. Turk. And so that any Secretary of State could have good, independent analysis --

*Mr. Pfluger. Your decision to do that is going to impact these guys right here. It is going to impact our ability to provide power for the AI data center --

*Mr. Turk. So again, that is LNG that is being exported.

*Mr. Pfluger. Okay.

*Mr. Turk. This had nothing to do with domestic use of gas here.

*Mr. Pfluger. I yield back, Mr. Chairman.

*Mr. Turk. In fact --

*Mr. Pfluger. Thank you.

*Mr. Turk. In fact --

*Mr. Joyce. The gentleman --

*Mr. Turk. -- the more we export, the more price pressure for our --

*Mr. Joyce. The gentleman yields.

*Mr. Turk. -- domestic.

*Mr. Joyce. The chair now recognizes Mr. Soto from Florida for his five minutes.

*Mr. Soto. Thank you, Mr. Chairman.

You know, listening to this hearing, I feel like we are in a time warp back to 2024. Biden was president, we had the strongest economy in the world, and we were free to debate the finer points of AI regulation, the IRA, and data centers. But it is April 9, 80 days into the Trump Administration, and Trump's tariffs, chaos, and deportations have sent our economy into a freefall while our friends across the aisle just bury their heads in the sand and pretend this isn't happening. Or will you join us to help fix it?

Speaker Johnson just today blocked any consideration of

tariffs until September 30. He put a straitjacket on the U.S. House of Representatives to even try to address this issue. Meanwhile, AI data centers could see an estimated 30 percent increase in expenses to build, according to Fortune Magazine this week. Air conditioning, liquid cooling systems, transformers, circuit breakers, cabling, routers, switches, construction materials, battery systems will all go up because of Trump's tariffs.

So is the biggest threat to AI over-regulation, or is it the tariffs? Duh.

Mr. Turk, what do you think is the biggest threat right now to AI development, is it the over-regulation, allegedly, or is it tariffs?

*Mr. Turk. I think tariffs increase costs, and they increase uncertainty, and that is damaging for AI being built in our country, but it is damaging across our economy.

*Mr. Soto. And then we -- I am worried about demand and access to capital. I heard it in both Newsweek and in Fortune Magazine this week: access to capital is in real jeopardy because major tech companies, the biggest investors in AI, see a potential recession on the way and their core businesses are threatened. Ad spending drops, the capital drops during a recession.

Dr. Schmidt, we saw that the Google shares were at $200 a share when Trump took office, and now they are at $146, a

27 percent drop in 3 months. No one celebrates that, that is awful. That would have a negative effect on future AI investments for Google right now. Isn't that true?

*Dr. Schmidt. Don't remind me of the stock price.

*Mr. Soto. Yes, I didn't mean that -- I am not here to attack anybody, I was -- but that -- but how does that affect Google's investment in future AI?

*Dr. Schmidt. I can't speak for Google, but I can say in general the genius of the American financial system, aside from the fact that we are a reserve currency, is that crazy entrepreneurs can raise billions of dollars on a whim, on a risk. That is why we are leading. If that system breaks, the system that is the unification of the government, the private sector, and academics, and that money is not available, we are toast.

*Mr. Soto. Yes, we are the world's currency right now. But, you know, that is in jeopardy as we speak.

Mr. Bhatia, we saw Micron take a thump too, from 109 per share when Trump took office to 65 today, a 41 percent drop. Again, no one likes this or celebrates this, but how does that affect your access to capital and the ability for you to continue to develop AI chips -- AI microchips and technology?

*Mr. Bhatia. So, you know, we have -- we take a long-term view, and the demand for growing, for memory -- the demand for data, and therefore the demand for memory --

continues to grow. It is a secular trend. And so we intend our investments to be for the long term, but we have to bring them online -- in line with the demand trends that we see. And so we continue to expand in that way.

But that shows the importance of -- and these kind of volatile events will happen from time to time in our industry, and that shows the importance of us having a durable, predictable investment tax credit to be able to support our continued expansion here in the United States, where we are committed to building.

*Mr. Soto. We all want to make sure these stocks go back up and people's retirements are protected, and that is why this Congress needs to work together. We did work together on the bipartisan ADVANCE Act, which boosted nuclear, signed by President Biden, a bipartisan product from this committee.

Mr. Turk, how does the speeding up of deployment and licensing of new reactors and fuels help, through nuclear, the future of AI?

*Mr. Turk. So I think it is a big deal, and thank you for the leadership on the ADVANCE Act. We need to not only get the most out of the resources that we have got, including those resources that can be brought on quickly to our grid -- right now that is solar and storage and wind. Those are the resources that allow us to bring electrons on quickly to

power these AI data centers. But we absolutely have to work on clean baseload power. Nuclear is an incredibly important part of that equation. Enhanced geothermal is another incredibly important part. And so we need to have the research, we need to have the investment, and we need to have those tools as quickly as we can.

*Mr. Soto. Thanks.

I yield back.

*Mr. Joyce. The gentleman yields. The chair now recognizes the gentleman from Idaho, Mr. Fulcher, for five minutes.

*Mr. Fulcher. Thank you, Mr. Chairman.

Mr. Bhatia, in a different era back years ago, I was privileged to work for Micron Technology. Technically, I began with the start-up phase. It was still in startup phase. I spent 15 years there. I cannot tell you how proud I am of that, and the education that I received personally, and the experience, life experience, that was truly unique. And I could not have higher regard for your company. And so please know that.

At that time, as I say, things were different. But we sold ourselves, we positioned ourselves with customers and potential customers that most of our costs were fixed. And whether we produced one die or a million die, the costs were largely the same, and that gave us the ability to sell

ourselves as an American supplier.

Now, today you discussed how energy is one of the factors that has changed that business model. In those days it was all about die size, and could we stack the capacitors and make it efficient, and that was the secret sauce. And if we got that, we won. What has changed in today's business model, other than the energy that you correctly spoke about to change that strategy and business model in the framework that you are operating in today?

*Mr. Bhatia. Thank you. Thank you, Congressman, and thank you for your time in the early days of Micron and helping put the company on the track to where it is today.

I think the biggest thing that has changed is the cost competitiveness of building and operating fabs in the United States over this last 25 to 30 years has become a widening gap between doing that in the United States versus Asian countries where we operate.

*Mr. Fulcher. Construction cost, just to be clear --

*Mr. Bhatia. Construction cost is one of the biggest gaps. It is probably the biggest gap between the Asian countries and where our competitors are versus the United States.

In fact, the energy is an area that has been a bright spot for the United States, and it is an area that, you know, the focus of this hearing is to make sure that it continues

to be an area of advantage for semiconductor industry, for Micron, but also for many other industries so that we are able to be able to make sure that all of these projects can come to fruition. And --

*Mr. Fulcher. Workforce?

*Mr. Bhatia. And the investments we are making in workforce, you know, we certainly believe that, in partnership with the many different universities that we are working with across the country, that we are going to be able to redevelop a pipeline of skills and capabilities that have been lost over the years as manufacturing left the country.

We are also working with various different military exit organizations to be able to train veterans to come and work, because we think there is a really good overlap between the skills that they have from the military and the skills that they have to be able to operate and maintain fabs.

And I think, you know, as I have mentioned before, expanding and extending the currently expiring investment tax credit for semiconductor projects is really, really very critical.

*Mr. Fulcher. Got it, and I am going to come back to you if I have time.

Mr. Wang, I want to ask you a question. In your testimony you said there is three things Congress should do in order to move forward regarding AI. The second point you

made was one Federal AI standard. We have had discussions about that on the committee. Dig that a little deeper. Peel that onion back. Specifically, what should those standards be, to the best of your advice?

*Mr. Wang. Yes. So first of all, just speaking as an AI company and being able to operate and innovate effectively, we need one Federal standard. We cannot afford a patchwork of 50 different state standards --

*Mr. Fulcher. I understand.

*Mr. Wang. -- that we have to execute against.

Then peeling the onion back, we believe that we need to create a regulatory framework that enables innovation while still adding some level of guardrails. So our view is we need a use case, sector-specific regulatory framework, where in certain industries like medicine or financial services or insurance or others, where there should be heightened levels of scrutiny or heightened levels of controls for what AI systems can and should do, we should put those in place. But in other industries where we want the core technology to advance more rapidly and more effectively, we need to allow that to happen.

*Mr. Fulcher. Okay. And I am about out of time, and I am going to submit some questions for the record, Mr. Chairman.

[The information follows:]

**********COMMITTEE INSERT**********

*Mr. Fulcher. But Mr. Wang, I do think you are a wealth of knowledge, and I would just say to you and the rest of the committee, as we go about -- forward in setting or trying to set some Federal standards, please be careful what you ask for, because you just might get it. And we can be a friend, or we can be a very ugly big brother. And I say that because it is very difficult to identify the proper role of the Federal Government with these things.

So thank you to all those who testified.

Mr. Chairman, I yield back.

*Mr. Joyce. The gentleman yields. The chair recognizes the gentlelady from Michigan, Mrs. Dingell, for her five minutes.

*Mrs. Dingell. Thank you, Mr. Chairman, and thanks to Chair Guthrie and Ranking Member Pallone for convening this hearing.

AI, as has been discussed today, is transforming every sector, from health care and transportation to manufacturing. But with rapid advancements come serious challenges such as data privacy risks, algorithmic bias, and the growing threat of foreign adversaries exploiting our vulnerabilities. And we cannot afford to let America's data and personal information be weaponized by China or other adversaries, or allow AI to spread unchecked through deep fakes, robocalls, and deceptive ads. That is why I was proud to help lead the

TAKE IT DOWN Act, which passed out of the committee yesterday, to hold bad actors accountable for sharing non-consensual deepfake content online and to protect survivors.

AI, when paired with 5G and emerging technologies, is already transforming lives, streamlining public services, modernizing transportation, and improving health care outcomes. But to lead, we have to invest. That is what we were doing during the Biden Administration. And quite frankly, I am very worried that we are now witnessing efforts to undo that progress.

Programs that were signed into law through the Bipartisan Infrastructure Law, the CHIPS and Science Act, the Inflation Reduction Act, all of which provided funding that is crucial for the AI ecosystem, are being dismantled. And these investments aren't just about clean energy. That is what people don't understand. They are about global competitiveness, job creation, and securing the future of the American industry. The IRA has been critical to accelerating domestic manufacturing, especially in the auto sector -- I admit that is one I care about deeply -- which remains the backbone of the American economy.

My Republican colleagues say we must outcompete China in AI. They are right. We must. I agree. But you don't win it by slashing your own tires. You can't lead by cutting funding, firing experts, and abandoning the public-private

partnerships that fuel innovation.

Secretary Turk, does cutting funding from agencies like the Commerce Department's Bureau of Industry and Security, holding up CHIPS investments, threatening that they may not happen, firing technical experts at NIST keep the U.S. competitive in the global AI race, especially as China ramps up its investments?

And what happens if we walk away from CHIPS and the IRA incentives?

*Mr. Turk. I think this is exactly the wrong time to walk away for those -- from those incentives.

*Mrs. Dingell. Okay, short.

[Laughter.]

*Mrs. Dingell. Mr. Bhatia, what are the -- I like it. It is wrong.

What are the consequences of repealing the tax credits and public investments that are driving domestic industry growth and clean energy and advanced manufacturing?

*Mr. Bhatia. Well, Congresswoman, first I would like to just comment that I am proud to have been born and raised in Michigan. My first job in manufacturing was more than 30 years ago in the Body Shop, and that created my love of manufacturing.

And, you know, a thriving automotive industry, as you said in your comments, is, I think, critical for the

country's, you know, economic health, as well as for national security.

I absolutely agree that we need to have continued support for investment tax credits for areas that are critical to AI, including, of course, semiconductor manufacturing. The tax credit that was passed is expiring, and this will create a challenge for continued investment, especially long-term investment, because this is not just a five-year race. This is a 15, 20-year race that we are getting into, and we want to make sure we have leadership in technology and capacity together to be able to lead in creating the -- in enabling the AI revolution.

*Mrs. Dingell. Thank you.

Dr. Schmidt, do companies operating in the U.S. currently have meaningful incentives to protect consumer data and privacy?

Are the current patchwork of state laws and voluntary standards sufficient, or would a comprehensive Federal privacy law with strong data minimization provide greater clarity and consistency for both consumers and the industry?

*Dr. Schmidt. I think there is a general view in the industry that a single privacy law would be a good outcome. I think it will be very hard to achieve. My own opinion is, given that is hard to achieve, you are better off working on the most extreme cases, such as I fully support the bill you

did yesterday. That is a good example of an extreme case. Maybe there is some other extreme cases that we could also handle through your good work.

*Mrs. Dingell. Well, more questions, and I want to dig into that too, Mr. Chairman, because I am out -- I am going to have questions for the record, as some of my other colleagues do.

[The information follows:]

**********COMMITTEE INSERT**********

*Mrs. Dingell. But this is a very important issue, all of them are. Thank you, Mr. Chair, and I yield back.

*Mr. Joyce. The gentlelady yields. The chair recognizes the gentlewoman from Tennessee, Dr. Harshbarger, for her five minutes.

*Mrs. Harshbarger. Thank you, Mr. Chairman. Thank you to the witnesses for being here today.

I will start with you, Dr. Schmidt. When tech companies are building the future of AI in the United States, we know these data centers use massive sums of energy. And for the most part, they are going to be running at maximum capacity 24/7. And this technology requires more baseload power -- production, rather than renewables like wind and energy where that production fluctuates. And my question is, how would it strengthen America's bid to lead the AI economy if we adopted a more friendly environment for natural gas and build out additional pipeline infrastructure?

*Dr. Schmidt. I agree with the need for more natural gas in the United States, more pipelines. I would also point out that you can achieve the same baseload goal with a combination of batteries and renewable. I think that the industry and the energy suppliers should make those on an economic basis, and I think the collective panel here is telling all of you --

*Mrs. Harshbarger. Yes.

*Dr. Schmidt. -- all of more is better.

*Mrs. Harshbarger. Yes, all of the above.

*Dr. Schmidt. Yes.

*Mrs. Harshbarger. Mr. Bhatia, your testimony goes into great detail about the difficulties of navigating U.S. permitting law. Does the challenge Micron faces when building a facility like the one you are working on in New York -- chip makers -- would it make the chip makers reconsider the United States?

And if so, how could the U.S. be -- could it be leaving opportunities on the table by failing to update NEPA?

*Mr. Bhatia. So certainly we have, you know, experienced delays, and the duplicative nature of the process has --

*Mrs. Harshbarger. Yes.

*Mr. Bhatia. -- been challenged. And it is a challenge for, I think, any company who has to go through the NEPA process, whether in semiconductors or in other areas, and there will be other NEPA projects, including in potentially in energy and other sectors where, you know, I think that there is a potential for some streamlining to have Federal and state processes to be harmonized so that we don't have to go through the extended time.

*Mrs. Harshbarger. Yes, it is duplicative. I mean, very much so. Thank you, sir.

Mr. Wang, one thing I really love is government efficiency. And I was inspired by your testimony -- by your recommendation of implementing AI applications for the government. It could free up public employees to think more strategically and could reduce regulatory backlogs. So how could the administration use AI to lower taxpayer burdens and increase government efficiency?

*Mr. Wang. The opportunities for AI to aid in government efficiency are immense, and this is one of the areas where I think AI can have tremendous impact very, very quickly, actually.

You know, this goes to one of the things that we are talking a lot about in the industry, which is moving towards an agentic government. So how can we enable AI agents to start speeding up and streamlining a lot of the processes that we have within the government so that they go from years to weeks, or potentially even days?

So a few examples of that. You know, I think about how we can use AI to cut down the time it takes to handle veteran health care paperwork, or an AI system that could vastly improve fraud detection at the IRS. And then, you know, I think the combination -- you know, if you look at every single agency, there is immense opportunity.

*Mrs. Harshbarger. Yes.

*Mr. Wang. And you can go across -- you know, we see

this in the DoD, who we work very closely with. We were working with them recently, we have been deploying a system called Thunder Forge, which is a system to using -- for using AI for military planning and wargaming, a process that currently is extremely manually intensive. And we all know that, to be competitive in the future, we need to be more efficient.

So there is just a wealth of opportunity, which is one of the reasons why we recommend that, ideally, every Federal agency should have some flagship AI programs to start implementing and getting into the process of utilizing AI and AI agents to streamline more of their processes. And ultimately, if we do that today, we will reap the benefits in the years to come.

*Mrs. Harshbarger. You are right. I see that already in some of the things we have already found with fraud, waste, and abuse, and some other -- we don't even communicate within an agency, for heaven's sakes. So AI would absolutely benefit.

You keep doing your work, young man, okay?

All right. With that, Mr. Chairman, I yield back.

*Mr. Joyce. The gentlelady yields. The chair recognizes Mr. Veasey from Texas for his five minutes of questioning.

*Mr. Veasey. Thank you sir, and I think this is amazing

that we are here having this conversation today.

Right now in the Dallas-Fort Worth region we are literally becoming a hub for advanced manufacturing and AI innovation, and you can see it in all the new facilities that are opening up. You know, we have had the Facebook data center for a long time now, but we just -- we have groundbreaking on several other new centers in the Alliance Corridor near Crowley and near Benbrook in Fort Worth. And this is really amazing, because you can see the new facilities going up, and the jobs that they are bringing along with them, which is very, very important. It is generational, and it is really helping the DFW area lead the charge in this area.

But as we lean into the future, we have to be clear-eyed about what comes with it, because I just doesn't run on code, and it runs on power, something that we talk a lot about on this committee. And with a massive growth of data centers and AI infrastructure that is happening right now, it is putting a tremendous strain on the grid. And we have to get ahead of this, or consumers could end up footing the bill on this through higher prices and tighter capacity and more volatility.

And so we can't treat energy demand from AI like an afterthought. We have got to be smart. We have got to keep the lights on. We have got to keep the bills affordable, and

we have got to keep the grid resilient, especially in places like Texas. That is a huge part of our country's economy, but also because we have already seen by what not investing in the grid can look like in 2021 during Winter Storm Yuri. Because if AI moves forward without guardrails for jobs, for privacy, and for families, we really risk turning a lot of this promise into disruption.

And I had a question for Mr. Turk: Do you believe the Department of Energy or Congress needs to take more aggressive steps to plan for and manage the energy load coming from AI infrastructure?

And are there policies that you would recommend to ensure grid reliability and, again, affordability?

*Mr. Turk. Absolutely is the short answer. And fortunately, Congress provided a whole range of tax incentives, grants, and loans that are having a real impact right now on making prices more affordable not only for AI companies, but also for consumers across the country. And it is helping to improve our grid reliability also.

I know there is an active discussion going on right now in Congress: Do you all repeal those tax incentives that are lowering costs and allowing us to bring electrons on more quickly? And we look at what type of electrons are going to be brought on more -- most quickly in our country. It is solar, it is wind, it is storage. That is what the experts,

that is what the utility CEOs are saying.

Unfortunately, right now we have a backlog on natural gas turbines right now. That is making it very challenging to bring natural gas on as quickly as some AI companies might want it to. So if you want to bring on electrons quickly, keep those tax incentives, keep those grants, keep those loans in place so that we can do it quickly, we can do it affordably, and that reduces costs for everybody, including for consumers.

*Mr. Veasey. Yes, absolutely, and it keeps America ahead by us investing in those things.

You were at DoE when the CHIPS and Science Act passed, a law that is helping bring semiconductors and AI-related manufacturing back to U.S. soil. If those incentives are rolled back, do you think companies would continue to invest in domestic manufacturing, or would they move those operations overseas?

*Mr. Turk. I think Dr. Schmidt described what happened, unfortunately, a decade, two decades ago, when we let those manufacturing facilities slip out of our hands and go to other countries. And the CHIPS and Science Act was Congress working with the administration to step up and say we need to bring that back, and it is going to take some upfront capital. It is a perfectly appropriate role for the government to say this is a critical technology, we are going

to invest, we are going to encourage, and sent a bunch of private-sector investment to have those chips manufactured here in the U.S.

So the short answer to your question is, if we were to some reason slow down the CHIPS Act or rescind that funding, we are going to be right back where we were, which is not where we need to be.

*Mr. Veasey. Yes. If for some reason we didn't fully implement CHIPS Act in this area, what would that mean for America competitively, particularly when we start talking about what countries like China are doing?

*Mr. Turk. So it is not only the economic opportunities that producing the chips here have for communities across the country. There is a real national security implication.

*Mr. Veasey. Yes.

*Mr. Turk. Chips, along with data and power and human intelligence, fuels this AI revolution we are in the midst of. If you don't have those chips and you are beholden to other countries and other supply chains, that is a real vulnerability.

*Mr. Veasey. Yes, which means China rules the world. Very scary.

Mr. Chairman.

*Mr. Joyce. The gentleman yields. The chair recognizes Mr. Bentz from Oregon for his five minutes of questioning.

*Mr. Bentz. Thank you, Mr. Chair, and thanks to all of you for being here.

Is there a reason that we should have a more organized approach, Mr. Wang, to the approach that we are using to try to achieve this win in artificial intelligence?

And before you answer that, tell me what a win is in artificial intelligence. I know, when I was reading the Oppenheimer book, and Turing's Cathedral, and other such literature -- well, more Oppenheimer -- the goal was a bomb. What is our goal in AI?

*Mr. Wang. AI is, as has been mentioned, a unique technology because it has such a broad-reaching implications. It can be utilized to empower our economy and enable our industries to grow. It can be used for science in accelerating scientific discovery, helping us do things such as, you know, solving fusion or finding a cure to cancer. And it can also be used for -- as a weapon, and used in military contexts.

*Mr. Bentz. And I know I asked you to tell me if our approach is the proper approach, and we will get back to that in a second. But as Lincoln said, the way you get things done is to change public opinion. And the great thing about this hearing today is what we are trying to say is this is an existential issue. This is so important we need to waive environmental rules, we need to push things aside, we need to

create exemptions. We need to get past this haystack of obstacles that we have created for ourselves to protect things. But it takes forever now to do anything here, and we don't have forever.

So what I am really asking is, make the best argument you can to America right this minute about why this is an existential, truly absolutely necessary thing for us to set these other important things aside. And it has to be more -- and maybe it can't be. But your best argument. I am going to ask everybody else the same question, but go ahead.

*Mr. Wang. If we fall behind the Chinese Communist Party, this technology will enable the CCP, as well as other authoritarian regimes, to utilize the technology to, over time, effectively take over the world. You know, they will be able to export their ideologies, they will be able to utilize it as a military technology to invade other countries, and they will be able to use it for effectively spreading their regime in a more broad way across the world.

*Mr. Bentz. And so what is missing, of course, is -- you say, "use it.'' The definition of "it'' is going to become more and more important. So people actually can grasp -- this broad phrase of AI as so general.

Your turn.

*Mr. Bhatia. Well, I think it is really critical that we not only maintain our leadership in terms of the

algorithms and the data structure approach to being able to enable the AI applications, but absolutely the hardware, semiconductors, logic, memory. These are -- it is absolutely critical that we are able to maintain our advantage --

*Mr. Bentz. They are critical. But what I am trying to get at here is public opinion has to understand why they are critical --

*Mr. Bhatia. Yes.

*Mr. Bentz. -- why it is absolutely essential that we win this race to a goal that is not as clear as I would like.

Dr. Schmidt.

*Dr. Schmidt. In 5 to 10 years, every American citizen will have the equivalent of an Einstein on their phone or in their pocket. This is an enormous increase in power for humans. What if that Einstein is a Chinese one?

*Mr. Bentz. And I am going to shift back to Mr. Wang for just a minute because of, frankly, your age as compared to those others on the panel. So if everybody is going to have Einstein available, how would you suggest to teachers that they address this in the classroom?

*Mr. Wang. I think it is important. Frankly, I think AI will be an immense opportunity for humans and for industries to be able to leverage as a core technology. Our view is that, you know, in many ways our role -- you know, humans' role will go towards supervising and managing these

AI systems, these AI agents, if you will, in a -- and give ourselves, frankly, more leverage.

So I think the key for teachers and for education system is to teach people how to leverage AI systems, how to use them. You know, how do you embrace the technology as a tool, as something that enables you to do more things, better things, you know, more ambitious things?

*Mr. Bentz. And that would mean that all of our teachers have to understand how to use this new tool.

And I am going to be out of time, but I was interested, Mr. Turk, in the remarks you made about trying to recover and bring back to the United States manufacturing capability. I know that Micron is the only memory chip maker we have left here, and so I think the tariff concept is exactly that, to try to, in some fashion, get us back to where we need to be as we watched all those different, important jobs flee, now doing our best to get them back. And the real question is how to do it.

And I am out of time, but it is certainly incredibly important. Thank you. Thank you all.

I yield back.

*Mr. Evans. [Presiding.] The gentleman yields. The chair now recognizes the gentlelady from Massachusetts, Mrs. Trahan.

*Mrs. Trahan. Thank you, Mr. Chairman.

Congress must lead in advancing a pro-consumer, pro-innovation AI agenda. Clear guardrails and regulatory certainty will fuel, not hinder, that innovation. So to understand what that looks like for everyday Americans, let's just start at the beginning of the AI pipeline with research and what we need to be doing to set the conditions for AI capacity.

Foundational research drove breakthroughs like transistors, the Internet, and large language models. Our adversaries get this. While Federal R&D funding is being cut, the Chinese Government is scaling its investments. For example, China is outspending us by more than double in fusion energy research and commercialization.

Dr. Schmidt, in your testimony you noted the importance of ramping up fusion energy research. Commonwealth Fusion is in the district that I get to represent. The fusion and AI leaders that I regularly speak with tell me how important public-private partnerships are for advancing new technology and moving towards commercialization. How important is a strong Federal research enterprise for domestic innovation, including infusion and in AI?

*Dr. Schmidt. Commonwealth is an example of American exceptionalism. As you know, their development of these incredibly powerful batteries -- or, sorry, magnets, excuse me -- that was done in research at MIT shows you the path.

You do it at MIT, you do a spinout. It was done collaboratively with MIT, with other investors. People have put billions of dollars into Commonwealth, including myself. I am also the chairman of a competitor company on the West Coast. That is how the American system works.

*Mrs. Trahan. Yes.

*Dr. Schmidt. The current 15 percent indirect cost issue is hurting American science, and it needs to be addressed. If there are issues in specific programs, do it surgically. The damage that is being done to American research, broadly speaking, will harm the country for the next 50 years.

*Mrs. Trahan. Thank --

*Dr. Schmidt. This is the time to reverse this.

*Mrs. Trahan. Your answer is exactly why the Federal Government must bolster and not squander its research capacity. Whether it is pushing away international researchers or gutting science agencies like NIH or the National Science Foundation, undermining research, the first step in the AI pipeline, threatens our ability to win, which I believe we all want to do.

I would like to turn to AI development, which depends on computer chips. In 2022 Congress passed the CHIPS and Science Act to bring chip production back home. China sees the same strategic value, and is implementing a massive

state-sponsored campaign to strengthen its semiconductor supply chain. Mr. Bhatia, companies like Micron have received billions through the CHIPS Act to expand chip factories in the United States. How important is it that the Federal Government fully implement the CHIPS Act to ensure that Micron and other firms are able to bolster their domestic manufacturing capabilities?

*Mr. Bhatia. Thank you, Congresswoman, and you are right that, you know, our Asian competitors do have, you know, large cost gaps, cost deltas versus our operations here in the United States -- 35 to 45 percent range, depending on where in Asia -- and those countries are also incentivizing their domestic companies, which creates competitive disadvantages for the U.S. companies.

And it is absolutely essential that we are able to extend and expand the investment tax credits that were passed as part of that legislation so that the spring of new facilities that have started can continue and bloom over the next decade.

*Mrs. Trahan. Yes, thank you. You know, President Trump says he wants to revive American manufacturing, but he is gutting the CHIPS program office and floating repeal of the CHIPS Act altogether, and that just doesn't add up.

Finally, on AI deployment, to benefit from AI people need protection. AI isn't flawless. It can mislead, it can

make false predictions, it can expose personal data. Yes, we must beat China, but we don't need to become China. America must lead with its values, especially privacy. Our tech laws should reflect that.

Mr. Wang, in your testimony you affirm the need for effective AI guardrails. This committee has repeatedly come close to passing a Federal privacy standard based on data minimization and transparency. How important are privacy protections as a guardrail for AI?

*Mr. Wang. You know, we strongly support Congress's desire to get data privacy legislation done. Ultimately, what we find critically important is that -- again, I have mentioned this a few times -- that we have one Federal framework so that we don't have a patchwork of various frameworks throughout the country.

*Mrs. Trahan. Yes, this committee has a lot of work to do. Thank you so much for your testimony.

*Mr. Evans. The gentlelady yields. The chair now recognizes the gentlelady from Iowa, Mrs. Miller-Meeks.

*Mrs. Miller-Meeks. Thank you very much to the chair and ranking member for holding this extremely important hearing on AI, energy, and global competitiveness.

Iowa's 1st district has become an important contributor to our nation's AI infrastructure. In February Cedar Rapids announced its largest economic development investment in the

city's history, a $750 million partnership between the city, Alliant Energy, and QTS to build a major data center campus. The project will bring hundreds of construction jobs and high-tech positions, while featuring innovative, water-free cooling systems that address resource concerns.

It is also home to Azure's largest super-computers, which Microsoft built for OpenAI to train breakthrough AI models. This cutting-edge infrastructure in our state's heartland demonstrates how communities beyond traditional tech hubs can play vital roles in advancing AI innovation.

As we examine these technologies, I am particularly interested in how we ensure reliable power generation for these high-demand facilities. Iowa's diverse energy portfolio positions us well, but we need significant additional generation capacity nationwide to meet growing electricity demands for AI, domestic manufacturing, and residential demand. I am eager to explore how we maintain America's energy competitive edge, and especially against China's targeted effort to become the global AI leader by 2030. The decisions that we make today about regulation infrastructure will determine whether the United States maintains its leadership position and how critical this is, as has been mentioned earlier.

Mr. Wang, I was impressed by MIT's AI innovation when I visited there a few years ago, but concerned to learn about

the CCP's whole-of-government approach to accelerating Chinese AI capabilities. With the recent emergence of models like DeepSeek, how would you characterize our current competitive position against China, specifically in the areas of data and -- I think you have answered this partly -- computing algorithms and workforce development?

*Mr. Wang. It is an important question. And, you know, I always -- you know, AI really does boil down to its ingredients, and these ingredients are the ones that you referenced: computational power; data; algorithms; and ultimately, the workforce that we have to support it.

When it comes to computational power, we are still ahead as a country, but we have to be very diligent to ensure that we stay ahead. We are lucky that the leading chips in the world are Nvidia chips, some of the chips from Micron and others, which are the forefront of the industry and the envy of the world. But we need to maintain those leads, and we need to think deeply about how we do that.

When it comes to algorithmic -- the algorithms, you know, I would actually say we are probably on par at this point with China. You know, we used to have a meaningful lead. Most of the most innovative algorithms are American innovations, but they have been very quickly replicated. And at this point it is not clear that we have a lead.

When it comes to data, this is where China has an

immeasurable lead. They have invested in it for years, you know, nearly a decade of investment into data sets to fuel their AI development. This started with their global surveillance programs and when they, you know, instituted large-scale AI for facial recognition and other technologies throughout the country. And it has continued to today.

We need to figure out, as a country, how we achieve data dominance, and how we can do that both in the public sector as well as across the private sector.

And then lastly, on the workforce, this is an important point. We, as a country -- again, the workforce is what fuels every component of this -- of these sets of innovations, so we need to ensure that we, as a country, are setting up the right programs to empower the AI workforce of tomorrow. Thank you.

*Mrs. Miller-Meeks. Mr. Bhatia, in your testimony you stated that the U.S. is not on track to keep pace with projected energy demand, and that unless the U.S. makes substantial policy shifts, access to affordable and reliable power will begin constraining America's manufacturing renaissance.

During our hearing with the nation's grid operators last month, they expressed similar concerns. Your testimony specifically highlighted the Boardman to Hemingway transmission line project that has faced nearly 20 years of

permitting delays. Can you elaborate on how these permitting challenges directly impact Micron's expansion plans and competitiveness, compared to China's ability to rapidly deploy energy infrastructure?

*Mr. Bhatia. Thank you, Congresswoman.

The Boardman to Hemingway line is just an example. It is a project that is, I think, 300 miles long and has been on the drawing board for almost 20 years now, and it is -- we were joking earlier that it is approaching its 21st birthday almost, in terms of how -- when it was proposed until today, and still hundreds of millions of dollars spent on permitting. It is a project that does span three different states to be able to connect transmission in the Pacific Northwest. And because of those kinds of regulations between the different states, as well as Federal oversight issues and regulations, we have not been able to see it even get started. And that is just one example of, I am sure, many, many other examples of projects which really are needed to be able to bring the grid resiliency that others on the panel have talked about and that I have called for, as well.

*Mrs. Miller-Meeks. Thank you. I have a question for Dr. Schmidt on fusion, but I am out of time so I will submit it for the record, if you could please answer it. But I hadn't heard fusion mentioned, so I wanted to get that in.

[The information follows:]

**********COMMITTEE INSERT**********

*Mrs. Miller-Meeks. Thank you, I yield back.

*Mr. Evans. The gentlelady yields. The chair now recognizes the gentlelady from New York, Ms. Ocasio-Cortez.

*Ms. Ocasio-Cortez. Thank you, Mr. Chair, and thank you to our witnesses for joining us today and offering your testimony.

You know, this -- the crux of what we are here to discuss today is where a lot of where the rubber meets the road when it comes to AI, and how this actually manifests in the world, and the real problems that we are going to have to square and solve, particularly as it comes to energy and energy consumption.

Mr. Schmidt -- Dr. Schmidt, you have written in the past about the energy consumption of AI. You mentioned in this article here on Project Syndicate that "AI guzzles electricity. A single ChatGPT query requires 10 times as much as a conventional web search.'' And in your opening statement today you said something very fascinating and compelling, I think, about the actual scale of the energy consumption that we are confronting here when you talked about gigawatts and nuclear facilities. Could you repeat that for me very quickly?

*Dr. Schmidt. So some math here is -- and thank you, Congresswoman -- the typical data center -- sorry, the typical nuclear power plant is one gigawatt. We have roughly

90 of them. We are talking about 90 gigawatts in the next 3 to 5 years needed in America to maintain this leadership. And you put the --

*Ms. Ocasio-Cortez. Ninety gigawatts for the AI data centers?

*Dr. Schmidt. For the United States. And the reason I want to emphasize this is, one, this is insane, in terms of a build. Why do we need it? Because we are going from the ChatGPT that you know, which is language-to-language --

*Ms. Ocasio-Cortez. Right.

*Dr. Schmidt. -- to reasoning systems that do thousands and thousands --

*Ms. Ocasio-Cortez. Yes.

*Dr. Schmidt. -- what they do is called reinforcement learning. They go back and forth and back and forth.

*Ms. Ocasio-Cortez. Correct.

*Dr. Schmidt. They are not as efficient as our brains, and they discover new things.

*Ms. Ocasio-Cortez. And so we are -- and I completely hear you on the scale of the technology that we are dealing with here. And going back to that 90 gigawatt number, that is the equivalent of -- to what you mentioned here, 90 nuclear power plants, just that we would be developing -- or the equivalent of that just for AI data centers alone.

And of course, we are not talking about building 90

nuclear power plants. We are talking about building that capacity, which, before us here today, to be frank, and with the current administration, is fossil fuel infrastructure. Of course, we have talked about mixed energy loads, but with the investments and what we are seeing in terms of what is getting defunded and what is getting funded and what is being advocated for, this is largely fossil fuel infrastructure, and particularly methane, methane being 28 times more potent in contributing to the climate crisis than even traditional CO2.

But what we are also seeing is that in the administration's moves to massively invest in AI, we have also seen the fossil fuel market be tightly associated with this. In fact, the day after Trump announced his $500 billion AI Stargate initiative, gas prices in the market went up 5.3 percent. And after the DeepSeek announcement from China, which announced that they used -- consumed 50 to 75 percent less energy, gas prices fell 8 percent.

And so, increasingly we are seeing fossil fuel market speculation seeming to start to intertwine with the development of the AI industry. And this is a problem for working people, and this is the part that we need to square. In New York, Con Edison bills -- that is our kind of local energy provider -- are up for -- some families are paying $1,200 a month to pay their energy bill. And we are here

talking about massive energy investments not to lower their bills, but for, ultimately, infrastructure that is privately owned.

Mr. Turk, if a utility invests in a new substation so that gas generation for an AI data center can connect to the grid, will that utility typically pass those costs on via its electrical rates?

*Mr. Turk. Well, I think you have hit the nail on the head here, right? We don't just need new electrons for AI. We need them for consumers, right? And we need to have downward pressure on prices, not the opposite.

And so that is why we need to keep our eye on the ball, including and especially with the IRA tax credits. What we are talking about is average households paying $200 more per year if those tax credits are repealed. For citizens in New York it is $400 per year more.

*Ms. Ocasio-Cortez. And so I think -- so -- but at -- the core of the question -- without -- you know, if we currently go on this path, the increases in that energy consumption from AI get passed on through the bills.

*Mr. Turk. That is exactly right. It is a competitive environment. We have increasing demand. If we don't have a range of resources, especially solar and storage, which are the cheapest resources to bring on quickly right now in our country, if we increase the prices of that, everyone is going

to feel it --

*Ms. Ocasio-Cortez. And --

*Mr. Turk. -- and consumers in particular.

*Ms. Ocasio-Cortez. And fossil fuel prices are certainly more volatile than renewables.

*Mr. Turk. That is right. That is right.

*Ms. Ocasio-Cortez. Thank you very much.

*Mr. Evans. The gentlelady yields. The chair now recognizes the gentlelady from Florida, Ms. Lee.

*Ms. Lee. Thank you, Mr. Chairman.

Mr. Wang, I would like to go back to your testimony of earlier today. Specifically, toward the end, where one of the things that you touched on was how we, as Congress, might empower and utilize NIST to help us in our promotion of artificial intelligence.

One of the things that you mention is that NIST needs more resources to be able to complete relevant measurement science, such as standards and frameworks. Would you tell us a little bit more about -- elaborate on those standards and frameworks, and what you think NIST could be doing that would be constructive?

*Mr. Wang. Ultimately, as AI develops as a technology, it is very important that we have what we call test and evaluation regimes, that we are able to both test and evaluate the performance of these AI systems, understand

their limitations, as well as do, as other of the panelists have mentioned, do extensive red teaming on these AI systems, understand how an adversary would be able to utilize AI or hack into our AI systems to harm us.

You know, this work is incredibly important, and serves as a foundation that we can use to export American AI standards globally. And this is -- you know, this is really the strategic move for America, which is how do we ensure that the way that we think about AI, both embedded with our values and our democratic values, as well as how we think AI should be developed globally, is exported as broadly as possible throughout the world.

You know, we saw, I think, in the last few generations of technology the Chinese Communist Party actually be quite strategic on this, the Belt and Road initiatives, their use of Huawei technology for 5G. You know, they have in many recent developments, major developments in advanced technology, they focus on exporting their technology and making sure that Chinese technology is the global standard.

We need to do the opposite with AI. And the beauty of the situation that we are currently in is that many, many countries -- you know, Japan, France, the UK, India -- have all established AI safety institutes that are all looking towards the testing that we are doing in the United States and the standards that we are enforcing in the United States

for them to institute their own standards.

*Ms. Lee. If we are able to develop and then effectively export that measurement science, would you elaborate on how it is that you think that will help promote democratic values?

And similarly, if we fail to do so, what do you anticipate that we will see if we do not create those standards and share them globally?

*Mr. Wang. Ultimately, you know, just as a simple example, let's say that we institute as part of our test and evaluation systems certain guardrails around factuality. So the AI systems, you know, or certain guardrails around, you know, whether or not the AI could be used to create bioweapons or whatnot. That would totally eliminate certain classes of risks of a CCP model being used globally to, you know, perpetuate their ideologies or perpetuate, you know, perpetuate instability globally.

You know, there is -- we have an immense ability to ensure that the United -- that the American view of AI, which is a democratic technology that can be utilized by the people, for the people to ultimately empower industries, that that is how the entire world views the technology. And it is a fixed window of opportunity. We will not have this opportunity forever. At some point all of the other countries will start instituting their own AI standards, and

so we need to act quickly.

*Ms. Lee. One of the things that you mentioned is your assessment that NIST would benefit from having additional resources from Congress in order to be able to undertake this activity. Do you have a perspective on how that looks, whether it is dollars, whether it is people, if there is a certain type of workforce they require? Do you have any perspective on how we could better equip NIST to be ready to do this?

*Mr. Wang. Yes. I think all of the above are important. I think ensuring that they have the dollars, ensuring that they have the headcount. And one of the things that I think is very critical is that they are able to bring in and leverage cutting-edge AI talent as a part of NIST to help define these standards globally, because these are very advanced technical questions that need to be answered, but ones that will have immense benefit to America and our economy long into the future if we succeed.

*Ms. Lee. Thank you.

Mr. Chairman, I yield back.

*Mr. Evans. The gentlelady yields. The chair now recognizes the gentleman from Massachusetts, Mr. Auchincloss.

*Mr. Auchincloss. Thank you, Chairman.

Dr. Schmidt, it is good to see you again. You had come and spoken to the Select Committee on China, and you were

elucidating then, and I have enjoyed hearing your testimony today, as well. I was hoping you could tell the committee a little bit about a famous Google paper in 2017 called, "Attention is All You Need.''

Now, you were no longer executive chairman at that point, but you had been stewarding the company for the 15 years before that, and I am sure is well aware of how that publication came to be. Can you give us, like, a minute backstory?

*Dr. Schmidt. I was, in fact, still executive chairman. And the interesting thing about that paper is when it came out I didn't even notice it. That shows you -- asleep at the wheel, or something.

The six authors all became hugely famous because they came up with a way of building scalable intelligence. Before that, the RNN and CNN -- not media CNN, the convolutional neural network -- architectures were slow, and the attention is all you need allowed you to essentially devolve the computation into subdividable things which could scale infinitely. The transformer paper -- and the "T'' in GPT is transformer -- is the underlying architecture --

*Mr. Auchincloss. Right.

*Dr. Schmidt. -- that has enabled this explosion.

*Mr. Auchincloss. Am I right, that that transformer architecture in the 20102 was -- really came -- became

coherent around the problem of natural language translation?

*Dr. Schmidt. Not really. The transformer architecture was essentially a refactoring of the technologies of the time into a more scalable architecture, specifically that you could have federated computing -- you would have lots of different computers doing things at the same time is the easiest way to explain it. And it was a real breakthrough. They will ultimately win the equivalent of Nobel Prizes for it.

*Mr. Auchincloss. Well, I was looking, I was doing some research about the -- what has been called the transformer eight, the eight --

*Dr. Schmidt. Yes.

*Mr. Auchincloss. -- the authors of that publication. And they are almost like the PayPal mafia of AI. I mean, what they have gone on to do is remarkable.

Here is what else is remarkable. Of those eight, seven are immigrants.

*Dr. Schmidt. Yes.

*Mr. Auchincloss. And the eighth is the grandson of refugees who came to the United States fleeing persecution. In fact, two-thirds of top AI startups are founded by immigrants, and most PhD-level AI talent in the United States is foreign-born.

Dr. Schmidt, can you describe the impact of immigration

on AI's -- America's AI competitiveness?

*Dr. Schmidt. I was in a conversation last week in London, where people were talking about people leaving the United States AI companies to move to London because they couldn't work here anymore. That is insane. It is so counter to American national security. It is, like, crazy.

From my perspective, the most important thing America can do is look for high skills immigration. These -- to describe how hard this stuff is, these are PhDs in math. I have no idea what they are doing, and they are inventing these incredible algorithms.

*Mr. Auchincloss. Yes.

*Dr. Schmidt. We need all of them in America, every single one of them. Physics, chemistry, you name it, we need them all.

*Mr. Auchincloss. And yet the Trump Administration is currently eroding due process for immigrants in this country, whether they have green cards or student visas. They are deporting students, they are creating a climate of fear and anxiety on some of our best campuses.

Go ahead, sir.

*Dr. Schmidt. It is actually worse. We agree it is actually worse. People are being thrown out of the universities that are doing AI research. Universities have shut down their hiring pipeline. And they need AI

professors, and the people will otherwise go to industry. So the damage being done to the universities is really, really profound. It is very, very important that we understand that American leadership in the -- in research, which you understand very well from where you are, is the cornerstone of our future. We will not get there. Meanwhile, China is pouring an enormous amount of money into the same groups.

*Mr. Auchincloss. Do you think, if the Trump posture towards immigrants, student immigrants in particular, universities more broadly, if that persists, can America beat China in AI?

*Dr. Schmidt. No. In fact, when I was -- you all appointed me to be the chairman of the National Security Committee on -- Commission on AI, and we looked at this very carefully. What was interesting is that Chinese-born contributors were often part of the key papers. They were not the lead author, but they were part of it. If you would get rid of those people, and in particular they go to China, right? The leadership literally moves. I would much rather have them be here.

And people say, well, you know, they are criminals. They are not criminals. They want to be in the United States.

*Mr. Auchincloss. Right.

*Dr. Schmidt. If they are criminals, arrest them.

*Mr. Auchincloss. They are Americans by choice. Not only is Donald Trump providing a massive opening for China with his xenophobic immigration policy, he is also providing a massive opening for China with his trade wars that is bringing Europe and China closer together.

With that I yield back, Mr. Chairman.

*Mr. Evans. The gentleman yields. The chair now recognizes the gentleman from California, Mr. Obernolte.

*Mr. Obernolte. Thank you very much, Mr. Chairman, and I would like to thank Chairman Guthrie and the Energy and Commerce Committee for having this hearing on a topic that is very close to my heart, and something I think is of immense national consequence to our economy and our country.

Mr. Wang, it is great to see you again. In your testimony you were talking about the steps that must be taken to ensure U.S. continued leadership in AI. And I was very thankful that you had some very specific asks of Congress and the administration. And one of those was that we adopt a regulatory framework that is sector-specific and use case based. And I wanted to ask you, could you elaborate a little bit on what you mean by that, and how we would go about enacting it?

*Mr. Wang. Yes. So ultimately, what we need as a country is to ensure that, from a technology development standpoint, that we do not slow down. We need to ensure that

AI as a technology moves forward as quickly as possible. And that includes embracing the technology and ensuring that we have the -- we have room to innovate.

But the application of that technology towards certain sectors or certain specific use cases in the economy are areas where I think, you know, there probably needs to be some level of regulation, or at least some level of guardrails in place. You know, these could be industries like the medical industry, the pharmaceutical industry, the financial services industry, and others. You know, industries that already have some degree of regulation to protect consumers and protect Americans.

You know, we can -- in many cases, we can utilize those same provisions or those same regulations, and then there might be some cases where there are some gaps.

*Mr. Obernolte. All right. The Artificial Intelligence Task Force in the House issued a report in December that made exactly that same recommendation, and I think the exact finding was that we regulate tools, not -- outcomes, not tools. And AI is a very powerful tool, but it is a tool. If we focus our regulation on outcomes, then we can capture all the different uses of the tool.

You also talked about the need for a single Federal standard for regulation, and Congressman Dunn was on the way to asking you about that, and unfortunately ran out of time.

So I wanted to give you a little bit of space to explain what you meant by that.

*Mr. Wang. Yes. So, you know, as an AI company -- and I think what we ultimately want as a country is to ensure that our industry can continue developing advanced AI systems and continue driving American leadership. You know, the worst case scenario for us is actually that there are 50 different -- that every state adopts a different regulatory standard, and we have to, you know, operationally comply with 50 different regulatory standards.

I mean, it quickly becomes impossible, especially as you consider, you know, in a lot of cases the way that we develop AI is we develop, you know, one large model, and then we start applying that model in all sorts of different industries and use cases and jurisdictions. And so we need, as an industry and as a country, one clear Federal standard, whatever it may be. But we need one -- we need clarity as to one Federal standard and have preemption to prevent this outcome where you have 50 different standards.

Just to put a finer point on this, you know, we do not want our American companies spending all their time figuring out how to comply with every state's standards, whereas the Chinese models and the Chinese companies will just race ahead on innovation.

*Mr. Obernolte. Right. That is another conclusion that

we completely agree with you. In the task force report we had a whole chapter on this issue.

And let me just point out the fact, that since then, just in the last couple of months, we have at last count 958 bills pending in state legislatures across the country on the topic of AI regulation, and I am sure it is going to grow to be several thousand just in this year. If we allow this regulatory landscape that complicated to exist, I actually think that Scale is probably well suited to that because you have got the legal sophistication to deal with that. But who does not have that sophistication are two people at Caltech -- see what I did there -- not MIT, Caltech -- trying to start the next Scale. So I think we definitely -- we have a limited amount of legislative runway to be able to get that problem solved before the states get too far ahead.

And one last question for you, Mr. Wang. You had mentioned the need to establish a national AI data reserve. Could you talk a little bit about why that is so important?

*Mr. Wang. If we -- you know, ultimately, national security is the responsibility of the government. And our government's data, particularly our DoD's data and our data relating to national security, is so vital and valuable to ensuring that our AI systems are able to defend our country, defend our men and women, and ultimately ensure national security, broadly speaking.

So the necessity of the national AI data reserve is so that, you know, in 10 years, 5 to 10 years, we are not sitting here seeing how advanced the Chinese systems for defense and intelligence and, you know, cyber warfare and other systems are because they have an integrated data approach versus our systems, which would be dramatically behind.

*Mr. Obernolte. Well, thank you very much for your testimony. Sorry I didn't get to the other witnesses. I have a million questions. We will submit that for the record.

[The information follows:]

**********COMMITTEE INSERT**********

*Mr. Obernolte. I yield back.

*Mr. Evans. The gentleman yields. The chair now recognizes the gentleman from Louisiana, Mr. Carter.

*Mr. Carter of Louisiana. Thank you, Mr. Chairman, and thank you to our witnesses for joining us today. I am glad we are discussing the need to upgrade our infrastructure for the 21st century economy and provide for all Americans' access to cutting-edge technologies championed by our witnesses here.

In January, Louisiana became the first state to secure Federal approval for deploying $1.3 billion in Broadband Equity Access and Deployment, otherwise known as BEAD, funding. This achievement highlights the bipartisan nature of Louisiana's commitment to universal connectivity and to set standards for states regarding broadband access.

The state's BEAD rollout plan began under the Democratic governor John Bel Edwards, and was completed under Republican Governor Jeff Landry, who called it a generational investment that will create thousands of jobs, drive billions of dollars in economic growth, and transform Louisiana's communities in all 64 parishes. The state's plan will connect approximately 140,000 locations to high-speed Internet through funding awarded to 20 Internet service providers, with nearly 70 percent of the funds awarded to Louisiana companies.

More than 90,000 of these locations were set to

transition from zero connectivity to future-proof broadband fiber, although these broadband investments will drive significant economic growth for the state, creating approximately 10,000 new jobs and generating an estimated 2 to $3 billion in new revenue for Louisiana companies.

However, since the Trump administration took office, just a week after Louisiana received approval, its final approval to move forward on its proposal, the Commerce Department has withheld final funding to the approval that would have otherwise had shovels in the ground installing high-speed broadband infrastructure today -- not aspirational, but now. The unexpected delay has stalled progress, frozen investments made by small Internet service providers and contractors, and left rural communities still waiting on the promise of broadband access.

Just recently, Meta announced that they were building a roughly $10 billion data center in rural Richland Parish in Louisiana, an area that would have benefitted from the state's broadband rollout. In fact, over 600 households within a 10-mile circumference of the new Meta facility would be connected via BEAD. We also expect that -- around the data center to grow as the facility brings in hundreds of workers, including skilled technical specialists.

The delays around BEAD rollout mean that these workers for -- the $10 billion advanced data center may lack high-

speed broadband at home, threatening yet another huge investment in my home state. The freeze in BEAD funds is yet another example of how the Trump Administration has shown chaos and uncertainty for businesses trying to make major investments in technology and energy. On top of the past week of economic turmoil and worldwide market crashes, this is unacceptable.

Mr. -- is Bhatia? It is close enough?

*Mr. Bhatia. Enough.

*Mr. Carter of Louisiana. How important is quality of life for your workers when you are looking to grow your operations in new areas?

Would considering making major investments in the area where your workers are, and their families lack access to the Internet be a major factor?

*Mr. Bhatia. Absolutely. We would like to ensure that we have a workforce that is highly skilled, highly trained, and can -- and, you know, all the jobs that we are creating with our projects, you know, 11,000 direct jobs at Micron, 80,000 direct and indirect jobs, those all should be high-paying jobs, which will allow people to have a high standard of living. And we think that is an important element to ensure our technology leadership, as well as our manufacturing efficiency.

*Mr. Carter of Louisiana. Thank you.

Mr. Wang, in your testimony you recommended that the Federal Government put policies in place to let the AI workforce thrive in America. Would you agree that we are holding back our future workforce by allowing children to grow up in an America without access to high-speed broadband Internet?

*Mr. Wang. I certainly think that the ability for our future -- for our children and future workforce to embrace AI technologies and other technology is going to be absolutely critical to, you know, the future development of our country. So ultimately, yes, I think we need to ensure that --

*Mr. Carter of Louisiana. Thank you. I have got four seconds.

Real quickly, Mr. Turk, our American grid is now facing an unprecedented surge in electrical -- electricity demand. How has the Trump Administration's blanket refusal to permit large-scale offshore wind projects impacted our country's ability to meet this new demand?

*Mr. Turk. So it is another tool in the tool belt. Why take it off? It is incredibly important, along with other sources of power.

And I think your point more broadly about infrastructure funding, you need predictability and you need certainty. You don't need chaos. And that is what --

*Mr. Carter of Louisiana. Thank you very much.

*Mr. Turk. -- we are seeing.

*Mr. Carter of Louisiana. My time has ended.

I yield back. Thank you.

*Mr. Evans. The gentleman yields. The chair now recognizes the gentlelady from North Dakota, Mrs. Fedorchak.

*Mrs. Fedorchak. Good afternoon, everyone. Thank you for being here. It has been an interesting hearing.

Dr. Schmidt, you said you think the AI -- the importance of AI and the challenges we face has been under-hyped. I agree with you. I also think that the challenges that our electric grid in this country face have also been under-hyped. The truth of the matter is we are under-powered today, and that doesn't even take into consideration the demands that the AI industry brings, or the need and the urgency for us to meet that demand.

So knowing that, would you all agree that one of the first things we should be doing is stopping retiring of existing resources that are connected to the grid?

And I will just go down the line. Mr. Turk? Real quickly. I don't need a one-minute answer. Yes or no, we should stop retiring existing resources if they are still somewhat economic.

*Mr. Turk. Yes, but we do need to keep an eye on other goals, including climate, and we need to make sure we --

*Mrs. Fedorchak. Okay, thank you.

Dr. Schmidt?

*Dr. Schmidt. Yes.

*Mrs. Fedorchak. Okay. Mr. Wang?

*Mr. Wang. Yes.

*Mrs. Fedorchak. Mr. --

*Mr. Bhatia. All of the above.

*Mrs. Fedorchak. Excellent, thank you. I think it is not a yes-but, it is yes, we need to stop retiring. This is an urgent need. Everyone has said it is a national security issue. All resources take time to get on the grid. And so when we don't even have enough to meet demand today, then we most certainly -- and we have growing demand, we most certainly should all be able to agree in a bipartisan manner that we should keep whatever we can right now, and then go from there, because technologies evolve and they will continue to evolve.

Mr. Turk, you had said earlier that you think that you had said that solar and wind are the cheapest resources to bring on to the grid. Can you elaborate? What do you include in that calculation?

*Mr. Turk. Yes. So I look not only at the levelized cost, but I look at what is actually being brought into our grid right now, driven by economics.

*Mrs. Fedorchak. Does that include --

*Mr. Turk. And so 93 percent -- our independent Energy

Information Administration is saying 93 percent of the new power brought on this year will be solar and storage and wind.

*Mrs. Fedorchak. Okay, but that doesn't necessarily mean it is coming on because it is the cheapest. Does your calculation include the cost of transmission to bring that online?

*Mr. Turk. Well, this is why we need to have -- and I know you are an expert in this, and thank you for your leadership in NARUC, in particular, with your previous job -- we need to have the whole grid. We need to be thinking about reconductoring. We need to be thinking about grid enhancing technologies. We need to be thinking about transmission, too. We need to think about it holistically --

*Mrs. Fedorchak. Right.

*Mr. Turk. -- and systemically.

*Mrs. Fedorchak. Exactly. And I support GETs 100 percent. It is not the 100 percent solution, though. And it is not --

*Mr. Turk. It is not, that is right.

*Mrs. Fedorchak. It should not be overstated, because I think a lot of people who don't understand this hear things like that and think there are simple solutions, when really they are far more complicated.

And the truth of the matter is, when you consider solar

and wind as being the cheapest, the cost of the transmission is not included in that calculation, nor is the cost of all the backup generation that is needed to provide power when solar and wind aren't available. Those have to be included in our calculations when we are talking about costs, because the people who pay for that, they notice that those aren't the cheapest things because it is all included in their bill. Nobody else soaks up those costs but the final customers who pay the bill.

I would like to ask one more question of all of you. So I think that in an urgent time like this it is more important than ever that the signals that this Federal Government sends through its policies provide clear messages and clear instruction about what we need the most. We had all the grid operators here a week ago. To the person, they all said what they need now is dispatchable power. Knowing that, is it reasonable for the Federal Government to continue to incentivize resources that are not dispatchable?

And I will start down here at the end. Should we be sending that signal? If what we need is dispatchable, why are we sending strong signals that you should bring on things that aren't dispatchable through tax policy?

*Mr. Bhatia. I think that, you know, I mentioned all of the above earlier. I think that we need to think about technologies that can -- and investing in technologies that

will be able to contribute longer term. We shouldn't take away from that.

I mentioned in my prepared remarks, you know, some nuclear technology that we have stopped investing in that, you know, probably looks today to be short-sighted. But at the same time, we need to be focusing on the technologies -- on the sources of energy that can support the demand today.

*Mrs. Fedorchak. Thank you.

Mr. Wang?

*Mr. Wang. I am not an energy expert, I am an AI expert, so I am probably not the best to answer to this.

*Mrs. Fedorchak. Okay, Dr. Schmidt?

*Dr. Schmidt. If you take all of the subsidies away of oil and gas and all the ones around renewables, you get a different calculation. Given we have the oil and gas subsidies, it is -- I think it is fine to have the renewable subsidies.

*The Chair. [Presiding.] Yes, our --

*Dr. Schmidt. The key thing is solve the storage problem, which I think has largely been solved. That creates dispatchability.

*The Chair. Thanks.

*Mrs. Fedorchak. Thank you, I yield back.

*The Chair. The gentlelady yields back. The chair recognizes the gentleman from New Jersey, Mr. Menendez, for

four minutes.

*Mr. Menendez. Thank you, Chairman Guthrie, for holding this hearing this morning -- afternoon, I guess, now.

Dr. Schmidt, in your testimony you state that securing America's energy future requires bold, strategic Federal action and investment. One example highlighted by both you and Mr. Turk is the potential for fusion energy, which is generally supported by both Democrats and Republicans. Dr. Schmidt, can you briefly describe the potential fusion has for the future of our domestic energy production?

*Dr. Schmidt. Fusion is different from fision. It is a very different process. It is the technology that is inside our sun. There are two main approaches. One is essentially -- it is called a tokamak. You essentially create a plasma that floats. The plasma is so hot you have to control it using magnets and AI to hold it, otherwise the walls would melt. There are a number of companies in America that are using that approach.

There is an alternative approach which is a pulsed fusion. This was funded initially through something called NIF in Livermore way back when. And it looks like the pulse -- and what you do is you create a magnetic field which causes a collapse that causes electricity, and the electricity generated is greater than the electricity to cause the pulse. It is called Q > 1. The timeline of these

things is demonstration for a number of these companies by roughly 2030.

If you make some assumptions about the number of electricians, and the scale of the problem -- and the devices are typically 400 megawatts. So think of the number of 400-megawatt sort of power sources, and you sort of take the current power source, coal power, nuclear -- basically, natural gas, whatever, and you put this fusion thing in it, that is the model.

The problem is, when I look at the timeframe, you are not until 2040 to 2045 when you have abundant fusion.

*Mr. Menendez. Right, to get onto the grid and make it part of our daily life.

*Dr. Schmidt. Now, having said that, this is an area where America will lead. It should be a source of great pride for America to lead in this for the world.

*Mr. Menendez. I agree with you. And how important is Federal funding specifically for the U.S. National Laboratories program to advancing new technologies like fision?

*Dr. Schmidt. The DoE work in this is fundamental, and such is true of the labs and all of the stuff I am talking about. The people that I have hired in my company are all coming out of the labs, thank God.

*Mr. Menendez. And thank you for that. And so just yes

or no, if this program were to see its funding cut or significantly reduced, would that hinder our ability to harness this new technology?

*Dr. Schmidt. It would be horrific. We need much more funding in these areas.

*Mr. Menendez. See, I agree with you, but last month at a Space, Science, and Technology Committee hearing, leaders from the Department of Energy sounded the alarms about tens of millions of dollars that are crucial to research development being put on hold because of President Trump's funding freezes across the Federal Government.

Dr. Schmidt, in your testimony you mentioned the need to dramatically increase funding for energy sector cybersecurity. Dr. Schmidt, again, just yes or no, should the Federal Government take the lead on having a strategy to combat cyber attacks to our critical infrastructure?

*Dr. Schmidt. It has to.

*Mr. Menendez. Yes, I agree, but President Trump recently signed an executive order that puts states and municipalities at the forefront of our nation's cyber attack response process, instead of the Federal Government, weakening Federal investment in disaster preparedness and creating a patchwork plan for attacks to our critical infrastructure across the country. Dr. Schmidt, yes or no, does that seem like a wise strategy?

*Dr. Schmidt. It is not a good idea. Remember that we have an incredible cyber force in America under the Pentagon and the National Security Agency. I do a lot of military work. They are phenomenal.

*Mr. Menendez. I agree with you, and their work should be celebrated, and it should sit at the Federal Government, not state and municipalities. I am in complete agreement with you.

Mr. Wang, in your testimony you called for the establishment of a national AI data reserve. Your testimony also notes that the right regulatory framework maximizes innovation while still creating proper guardrails. Mr. Wang, yes or no, should guardrails be placed on the government's collection of sensitive data?

*Mr. Wang. Yes.

*Mr. Menendez. Yes, I agree. But here is the thing, right? So the Trump Administration is currently weaponizing data that they have within their control, including families' sensitive personal information that is collected by HUD and IRS to target immigrants, mixed-status families, right?

So I agree that having the data is the power, right, that we will be able to use in terms of AI, right? And the Federal Government having a reserve or a collection of data is how we fully harness AI, right? But this administration is undermining our belief and trust in the Federal

Government's ability to properly hold data and not use it and weaponize it, which this administration is.

This is my challenge with Republicans right now, is that they are seeing all this stuff happen in real time, right? Dr. Schmidt, you have talked about in all-of-the-above approach to energy production, but they want to roll back investments in renewable energy. And they sit here every week and make it seem like it is business as usual. You are their witnesses, and you are telling them we need to reverse course in what this administration is doing, and they remain silent week after week.

*The Chair. I am sorry, the --

*Mr. Menendez. And that is the challenge.

And by the way, people have gone over on the other side.

*The Chair. The time has expired.

*Mr. Menendez. I am three seconds over, Mr. Carter [sic], three seconds, okay?

But this is something you all need to be accountable to the American people --

*The Chair. The gentleman's time has expired.

*Mr. Menendez. It is like this administration --

*The Chair. And the gentleman from Georgia is recognized.

*Mr. Menendez. Thank you, Chairman Guthrie.

*The Chair. Yes, thanks.

*Mr. Carter of Georgia. Thank you, Mr. Chairman. Thank you all for being here. And thank you, Mr. Chairman, for holding this very important meeting.

Artificial intelligence is transforming every aspect of our economy and our society, as we well know. From energy and communications to national security and health care, AI is both -- presents extraordinary opportunities.

I am very interested in health care, and chair of the Health Subcommittee, so I want to give you an example: HealthFlow. HealthFlow is a company that is applying artificial intelligence to transform the diagnosis and treatment of coronary artery disease, which kills one in five Americans. This is significant. Using a standard CT scan of the heart, HealthFlow's algorithms can determine blood pressure and flow in the coronary arteries, allowing physicians to determine the severity of disease and whether invasive treatment is needed. In fact, HealthFlow's technology has proven to decrease the rate of heart attacks and save the Medicare program more than $3,100 per patient. Per patient.

Our job as lawmakers is to make sure the U.S. continues to lead in AI innovation while protecting American values like data privacy, reliable infrastructure, and fair competition.

Mr. Schmidt -- Dr. Schmidt, I want to ask you. Startups

play a crucial role. We all know that they play a crucial role in driving innovation in the technology ecosystem. How can we avoid creating regulatory structures that only large companies with extensive legal teams and lobbying power can navigate?

*Dr. Schmidt. I agree with the premise of your question, sir. The innovation that is occurring in startups is phenomenal. You see completely new techniques using AI. A typical example would be cancer scoring, right, where you have a bunch of things. I am part of the Mayo Clinic board and so forth, and they have -- they are spinning out startups to do precisely this, so it can be done. We need to have the entire ecosystem of venture capital and so forth behind the image that you described.

*Mr. Carter of Georgia. Exactly, and not just where the bigger companies are the ones who are doing this --

*Dr. Schmidt. Right, and may I add that some of that is actually the data problem that Mr. Wang keeps talking about?

Many of the startups cannot get the data that they need for various regulatory reasons. A simple example would be that if you had opt out of privacy things for health care that people could -- for research, that you could have research pools, then you could accelerate that. There is a whole bunch of approaches there that are reasonable trade-offs.

*Mr. Carter of Georgia. Okay, let's talk about the role that AI is going to play in developing new treatments and cures. And we know that is going to be the case. How should lawmakers be thinking about integrating AI tools into HHS and CMS and FDA to create a more efficient process like quicker drug approvals?

*Dr. Schmidt. One of the -- well, the biggest problem with drugs is the phase three trial cost, and the timing.

*Mr. Carter of Georgia. Exactly.

*Dr. Schmidt. I am involved with a startup that has a new approach using AI to simplify that. We will see if my startup is successful or not.

The current model is static and unchanging. It is not informed by data. A simple regulatory change to allow better analytics around how you prove that the thing is phase three trial would really -- would deliver a drug in -- years ahead of time, and years is lives ahead of time.

*Mr. Carter of Georgia. And we all understand this is -- this could be a great benefit. I mean, this could be a game-changer with diagnosing, with making sure that we are doing the right treatments. AI in health care is going to be phenomenal. I am very optimistic about that. But it is also going to have some downfalls and some things that are dangerous that we need to really guard against.

But we have heard a lot of promise about how it can cut

costs and how it can increase efficiency within the Federal Government, especially in some of the organizations like HHS. How should regulators think about contracting with innovators to integrate AI into the regulatory and oversight functions that we have, particularly in Congress?

*Dr. Schmidt. I will give you a personal answer.

The Federal Government does a terrible job of procuring software. The Federal Government does quite a good job of building -- buying hardware. Software is not managed the same way that you manage hardware. Software is never done, it requires constant attention, the teams are constantly turning over. Instead, the Federal Government purchases specific contracts for specific outcomes with specific teams. It doesn't work in software. In order to achieve your vision, you have to attack the software problem. The reason our government is so incredibly inefficient, in my view, is because it doesn't use software correctly.

*Mr. Carter of Georgia. It doesn't use software correctly. Have you got an example of that?

*Dr. Schmidt. Everywhere you look. I mean, if you look at what the tech companies do in terms of integrated software, there is no analog. Every aspect of data in the Federal Government is insecure. All of them are being attacked by the Chinese and others. The systems --

*The Chair. Thank --

*Dr. Schmidt. -- are so bad that people have to add layers on top to fix them.

*The Chair. Thank --

*Dr. Schmidt. Many of the underlying databases are COBOL --

*Mr. Carter of Georgia. My time is up. Thank you, and I yield back.

*The Chair. So Mr. -- so Dr. Schmidt, I know you had a hard stop. Can we do one more?

*Dr. Schmidt. Yes, of course.

*The Chair. And we will -- we have just a handful left, but whenever you are -- let me know when you need to be excused.

*Dr. Schmidt. No, no, I appreciate that. These are very important --

*The Chair. But I want to make sure that everybody gets a chance to ask questions.

So Dr. -- Mr. Mullin, you are now recognized from California. Mr. Mullin, you are recognized.

*Mr. Mullin. Thank you, Mr. Chair. Thank you to all of our witnesses for your testimony.

We have heard from our panel today that to compete on AI, we are going to need a lot more stuff, more energy, more materials, more investment, more of everything. But steel, aluminum, and everything else that goes into powering data

centers cost money. And we cannot win the global race on AI if American businesses can't afford the raw materials to build that infrastructure.

Amid this uncertainty, the majority is considering a repeal of the IRA and the Infrastructure Law, two landmark laws that have already leveraged hundreds of billions of dollars of private sector investment in our country's energy infrastructure. There are also reports coming out that the DoE is planning to unilaterally cancel billions of dollars in grants for hydrogen hubs and long-duration energy storage projects that have already received congressionally-approved funding. Rolling back these laws and unlawfully cutting committed funding will severely undermine the trust in the Federal Government that stakeholders have, until now at least, taken for granted.

So Mr. Turk, in your time as the deputy secretary at DoE, you interacted with stakeholders across the energy and AI sectors. What will be the worst impacts of all of this economic and policy uncertainty, including the tariffs which were referenced multiple times today, on the investments that are underpinning AI?

*Mr. Turk. So it is the grants, it is the loans, and it is the tax incentives, and getting rid of or even just causing confusion about whether the grants are actually coming.

And I should say on the grants this was money that you all have already given, and this is money already obligated in some instances. And so the private sector needs to rely on the government doing what it is supposed to do, doing it professionally, doing it without any political interference.

So I think what it does is it not only puts those immediate projects at risk, but it puts the credibility of the government at risk, as well. And if we are going to be successful competing on AI, building out our infrastructure, doing all the other things that we need to do, we need to have credibility in the government working in partnership with the private sector.

*Mr. Mullin. So thank you for that, and I fear there will be serious repercussions for our energy system if cuts are made to the IRA programs that are essential for energy as energy demand increases as part of AI.

But as important as the AI race is, we also have to talk about rising costs. People are paying more not only at the grocery store, but losing money in their retirement savings. But recent estimates show these tariffs are going to cost everyday Americans an additional $3,800 a year on their utility bills. To meet both the AI challenge and cost challenge, it is clear that we need more energy resources, and we need to get them online as soon as possible.

Earlier today you mentioned that renewables are the

cheapest, quickest sources to deploy when it comes to energy. So what, Mr. Turk, what does Congress need to do to unlock this development and ensure that consumers are not hit with the higher costs yet again by the Trump Administration?

*Mr. Turk. So the good news is you all have done your jobs. Now, we could use more, but you have got the tax incentives, the grants, the loans in place. What is at risk here is, if those are repealed, just two provisions, the investment and production tax credit, technology-neutral tax credit, if that is repealed, Americans' households are paying, on average, $220 more per year just with those two provisions repealed, let alone the other provisions and grants and loans not going out in the way they are.

So this is -- the worst way to keep downward pressure on prices is to repeal these incredibly important tax incentives.

*Mr. Mullin. Great. Thank you for that, sir. And thank you all.

With that I yield back.

*The Chair. Thank you. The gentleman yields back. The chair recognizes Mr. Griffith -- oh, I am sorry, Mr. Fry. I apologize.

*Mr. Fry. Thank you, Mr. Chairman.

South Carolina is experiencing a remarkable spat of economic growth. From the Grand Strand of the Pee Dee, new

businesses are opening, manufacturers are investing, and families are moving in. That growth is a tremendous opportunity, but it does pose some significant challenges.

Yesterday President Trump issued executive orders declaring a national energy emergency and directing swift action to boost grid reliability and cut red tape for energy projects. These steps are both timely and necessary. Power demand is rising sharply. There is a lot of contributing factors to that, but it is. And in South Carolina nuclear power provides more than half of our electricity, giving us a pretty strong foundation.

But permitting delays, premature plant retirements, and transmission bottlenecks threaten not only our state, but all 50 states. We need a Federal policy that keeps pace with innovation. That means faster permitting, support for fuel-secure generation, and a strong, reliable grid. I appreciate the testimony of all the witnesses today.

My initial questions, Mr. Bhatia, I appreciate your comments on the need to reshore semiconductor chip manufacturing and secure our supply chains in this country. As you noted, China controls an overwhelming majority of global capacity for critical material refining and processing, an unacceptable strategic vulnerability on our part. During our hearing with the regional grid operators, we heard that regions like New England, as an example, are

facing real constraints on natural gas capacity. That bottleneck is holding back the type of energy-intensive investments that we need to support AI and manufacturing.

So if we are going to plan for the future, where we reshore significant portions of our supply chain, how important do you believe permitting reform is to infrastructure like natural gas pipelines and the like?

*Mr. Bhatia. I think it is critical. And I think the cost of inaction that we have had over the last several years and continue to have is very, very high.

I mean, you have heard multiple data points in testimony around the sharp spike in demand that is forecasted both because of the data centers that are going to be built, as well as the manufacturing in semiconductors, as well as other industry segments. And so, you know, after having, you know, many, many years where supply and demand has been matched and stable, this spike threatens to create a dislocation that could ultimately threaten the viability of some of these projects longer term, whether those are in the data center segment or in manufacturing.

And I think streamlining and working to be able to remove, you know, duplicative processes between Federal and state is something that both parties can get behind. And states -- red, blue -- red states and blue states both can get behind trying to ensure that there is a streamlined

process for critical projects to move forward.

*Mr. Fry. Sir, do you think that we can realistically meet our energy demands without those simple reforms that you talked about?

*Mr. Bhatia. You know, I am not sure. I believe that we -- I don't think we should try and figure that out. I think we should make sure we move forward with the permitting, and I think the permitting needs to be across transmission, it needs to be across generation, and it needs to be across all of the above sources of energy investments that we need to make.

*Mr. Fry. Thank you.

Dr. Schmidt, I appreciate you staying a little bit. Your testimony laid out the strategic importance of AI and the race with China in pretty stark terms. You mentioned that AI data centers could require up to 10 gigawatts of power each, and that we risk falling behind.

Given what we are seeing across the country, though, especially in states with business-friendly environments, can you speak to the importance of permitting reform and how it relates to our competitiveness in the AI space?

*Dr. Schmidt. When you look at people who have the money, they still can't get the permits and, in particular, the interconnection permits that are needed to get into the grid. You can solve that problem by, for example, building

your own power plant next to your own data center. But that is not particularly efficient.

There are all sorts of other issues. If you look at the cost of, for example, building -- I will give you an example. TSMC built a semiconductor plant in Arizona, and by the time they were done it cost four times more than in Taiwan. Some of that is labor, some of that is permitting, some of it is government. We are not competitive globally against our key partners and competitors with respect to costs and timing.

*Mr. Fry. Thank you for that. And you also mentioned the potential for AI to help manage and secure our grid. What role do you see for the Federal Government in AI-enabled grid modernization, particularly for regions like mine in the southeast that are growing so rapidly?

*Dr. Schmidt. So way back when, before all this was well known, Google did an initiative where we looked at our data centers which had been designed by the very best scientists, according to us, you know, in our own arrogant way, and we applied our own AI. And it beat our own top people by 15 percent. That 15 percent of efficiency went straight to the bottom line. It showed me that you can take any system and, using AI, do more -- what is called predictive analytics, and you can predict loads and basically shed loads and handle it much more efficiently. That is where our grid needs to be.

*Mr. Fry. Thank you.

Mr. Chairman, I have many more questions, but I got 15 seconds. So with that --

*The Chair. Will --

*Mr. Fry. -- I will yield back.

*The Chair. -- you yield to me?

*Mr. Fry. Yes.

*The Chair. My purpose -- for Mr. Menendez -- for asking Dr. Schmidt to be here is not to come as a Republican witness, and not tell us what we want to hear, but tell us what we need to hear. And I think we have all heard some things that probably don't fit within our ideology, but things we needed to hear and we can figure out and work through.

So time has expired. I yield back, and I will recognize -- I am sorry, I apologize to Mrs. Fletcher for missing her last time. But Mrs. Fletcher, you are recognized for five minutes.

*Mrs. Fletcher. Thank you so much, Chairman Guthrie. I appreciate it. And I appreciate all of our witnesses for being here today and for your testimony.

I think this has been a really useful and important hearing. You have given us lots to think about, and we have heard from all of you, right, that the United States is really on the brink of an AI revolution, that there are many

things we need to be thinking about, and just kind of the transformational change that this is going to bring, including demand for energy.

And in normal times that should be great news for my home state of Texas, where we already have a growing industry, a cluster of data centers, and we have the energy resources and the know-how to meet this sort of record high demand. But President Trump's policies are eroding the certainty and predictability that the people who run businesses and make investments need to succeed at every turn. And this is particularly true when it comes to building our infrastructure for our energy to meet tomorrow's demand. So I want to focus a little bit on that.

But Mr. Schmidt, I really appreciated your opening testimony today before the panel, and I wrote down a few things that you were speaking about that I want to follow on. And you mentioned -- you referenced sort of the balance of power globally, and I think we can all acknowledge that we are in a very uncertain and shifting moment in our history. It is changing minute by minute.

And -- but you said something I thought that was really important, kind of -- that I want to ask you about that in the context of something you said in your written testimony, which really struck me. And I am just going to quote from your testimony, but you said, "The government can't win this

technological race alone. We must reignite America's unique innovation power, the potent collaboration between government, private industry, and academia,'' and I won't read the whole quote in the interest of time.

But before I served on this committee I served on the Science, Space, and Technology Committee, and I was struck at every single hearing by the witnesses. We always had a witness from academia, from the government, and from industry talking about how well and efficiently and effectively they collaborated.

And so I assume that you would agree with me that the disruptions that we are seeing are challenging in this moment. I assume you would agree with me that regulatory certainty is an important factor for private industry and attracting capital and to projects. That is yes?

And I assume you would agree that the supply chain disruptions and other kinds of things that we are experiencing are going to hurt productivity.

*Dr. Schmidt. Yes.

*Mrs. Fletcher. I also assume that you are aware, based especially on your testimony about your involvement with the Mayo Clinic, that you are aware of the cuts to academic research that are happening. Whether it is through the NIH and the cost sharing for medical research or grant funding at various institutions, I keep hearing from my constituents in

every industry that the increased uncertainty that we are experiencing as a result of this administration's policies -- these are all new changes this year -- is really an impediment.

And so I just want you to elaborate with the time we have left, which is about two minutes, on your vision for revitalizing the partnership that you described between industry and academia and the government, and then share your thoughts on how we can and should do that in this environment, and what kinds of changes we should make to make that possible.

And I know we don't have everybody in the room today, but I have heard our colleagues on both sides of the aisle are listening, and I think your insights here would be really important.

*Dr. Schmidt. Thank you. The -- Vannevar Bush post-World War II constructed the sort of structure that you are describing. The government is a regulator and a proposed -- and a proponent, and also does basic research funding. Universities do that research, and then venture capital takes huge risks to do this.

You see this in traditional Democratic areas, but also Republican areas. For example, fracking was an American invention following the same problem, and it produced enormous benefits to America by virtue of economics and so

forth. Everybody is aware of that. We are now essentially energy independent.

So the role of innovation is core. I call this innovation power. I have written about this at some level. The future of America will be determined about the rate at which we can innovate. And we have, unfortunately, somebody who is trying to copy us, and moves very quickly. Their innovation model is more centralized, but they are plenty smart, they got lots of resources, and they are very focused, and they do all the right things with respect to -- of course, it is not a democracy -- getting the right smart people in the right place. They produce national champions, as Alex mentioned, and they push them and they push them hard for globalization.

China is now, in fact, over-building manufacturing so that they can essentially become the world's manufacturer, again, with huge impacts economically to everybody. You see the power of innovation right in front of you there in China. Why are we not going after that in AI? We should. We invented it. It is right in front of us. It is the core of everything we can do, new developments in physics and biology and science and so forth.

The current administration's cuts, the 15 percent indirect cost recovery, the NIH costs are not consistent with that vision. If they have a problem with specific programs,

do it specifically, not generally.

*The Chair. Thanks.

*Mrs. Fletcher. Thank you so much. I have gone over my time. I really appreciate it.

*The Chair. Thank you, I appreciate --

*Mrs. Fletcher. And Chairman Guthrie, I yield back.

*The Chair. I appreciate it very much. The gentlelady yields back.

Mr. Evans, you are recognized for five minutes.

*Mr. Evans. Thank you, Mr. Chairman and Ranking Member, and, of course, to the witnesses for taking the time to testify today.

Dr. Schmidt, my first question will be to you. In your testimony you talk a lot about China's investment in a lot of different forms of energy like wind, solar, and newer technologies like fusion. The United States has made similar investments in the past several years, but I think it is also important to highlight that not all energy is necessarily created equal. And so the first question to you is, in your opinion, which nation has brought more dispatchable baseload energy generation online over the last five years between China and the U.S.?

*Dr. Schmidt. It is almost certainly China.

*Mr. Evans. And then, in your opinion, which nation has taken the most dispatchable baseload energy offline in the

last five years?

*Dr. Schmidt. Almost certainly the United States.

*Mr. Evans. Thank you, and I agree with your answers there. Obviously --

*Dr. Schmidt. I should include Germany for shutting down all of its nuclear plants, which was also a mistake.

*Mr. Evans. Thank you. But yes, I agree with your answers there.

We know that China's thermal power generation has reached a record high just last year, and that is driven by things like coal-fired plants which have also reached a record high as a percentage of what it is generating in China. And by comparison, the United States is on track to retire 12.3 gigawatts of dispatchable power this year. And for me personally, that is concerning because over 10 percent of that -- about 1.3 percent of that is retirements of dispatchable baseload power that is taking place in Colorado, even though we are only 1.3 percent of total energy production in the United States.

So with that focus on Colorado, the next question to you is, we are taking over a gigawatt of power -- or scheduled to take a gigawatt of baseload power offline in Colorado this year, 5 gigawatts of dispatchable baseload power offline by 2030, at the same time that my governor is saying he wants to make our state a -- or, excuse me, a hub for quantum

technology and AI.

So the question to you is, if you wanted to be your state -- make your state a leader in quantum computing AI, what would be the energy policy that you would want to see to support that?

*Dr. Schmidt. It probably makes sense to retire the coal plants and replace them by natural gas plants. It makes sense in Colorado because you have such great natural resources to work on enhanced geothermal. So there are things that you can do.

But the core message, I think, from the entire panel here is we want more of everything, right, and that we want it sooner. And not only do we want it, we need it for American exceptionalism.

*Mr. Evans. Thank you, and I appreciate your reference to the gas plants, because my district is truly an all-of-the-above energy district: 83 percent of the oil, 56 percent of the natural gas in Colorado, largest wind generating, you know, the wind turbine manufacturing facility probably in the United States, is headquartered in my district. Geothermal, solar, we truly are an all-of-the-above.

But specifically with gas plants, one of the things that I have heard there is that there is a major backlog in getting the gas turbines. So can you speak a little bit more to the timing of retiring coal generation if you don't have a

gas alternate immediately ready to go?

*Dr. Schmidt. I am not enough of an expert to give you a precise answer. The reason that natural gas plants have become more expensive is demand, which is -- and is sort of what we want, right? We want more of everything, and then the market will react. The problem is that these things take years to -- backlogs get -- years. That delay in natural gas plants will hurt AI competitiveness because it is the best source of power in certain situations.

My personal advice is start by -- since China is allegedly dumping solar panels, just buy them, right, because they lower energy costs, right? Do whatever it takes to get more power into America. As Mr. Turk says, more electrons.

*Mr. Evans. Thank you for that.

Mr. Wang, kind of pivoting off of that conversation, I am just curious if you can speak to -- in my remaining 45 seconds -- just briefly, what happens if we lose this AI race with China?

What does the world look like if China becomes the leader in that space and no longer the United States in part because we retired too much power?

*Mr. Wang. I spoke to this, and I think Dr. Schmidt made some relevant comments that, you know, AI is on the brink of becoming a very, very powerful technology that is much more than just ChatGPT. It is a reasoning engine. It

has the ability to, you know, very soon conduct cyber attacks, you know, be really a very important technology for national security.

So to sum it up, I guess, in 10 seconds, you know, in a world where the Chinese Communist Party wins, they have clear intention to utilize AI as a mechanism to export their ideology globally, as well as potentially, you know, enable them and other authoritarian countries to lead.

*The Chair. His time has expired on this. So thank you, Mr. Evans. He yields back. We are trying to keep -- we have three more to go, Mr. -- Dr. Schmidt.

So Mr. Landsman.

*Mr. Landsman. Thank you, Mr. Chair, and thank you to all of our panelists for your testimony today. This has been incredibly helpful. And, you know, the issue of AI is one that, you know, we have to get right. There is no debate about that. Winning on AI and harnessing it for good requires, as you all have said very, I think, impactfully, clear instructions and guidance and meaningful investments.

Mr. Turk, let me start with you. Congress has struggled to do this, and I am not picking a fight here, I am not leading you in any direction. I am genuinely curious. What do you think the barriers are, in terms of us laying out that clear guidance and making the necessary investments?

*Mr. Turk. So the good news is Congress provided that

certainty, provided that window of investment. That is one of the brilliant parts of the legislation that you all passed on the tax credit side to have tax credits in place for 10 years that investors, that developers, that utilities, that AI companies can rely upon and know will be there so that they can make investment decisions that will come to fruition over a period of years.

So the good news is the biggest thing you have to do at this point is leave those tax incentives, let that grant money do what the grant money was intended to do by Congress, but just execute on that.

*Mr. Landsman. That is on the investment and -- so thank you for that -- on the investment and -- piece of this. But on the clear instructions and guidance, I mean, what do you think is holding us back from providing that framework that everyone has been asking for?

*Mr. Turk. Well, this is where the private sector will do what the private sector does best when it has that certainty, it doesn't have the chaos from tariffs, it doesn't have the chaos from repeal of provisions.

I also completely agree with all the panelists. I don't think there is disagreement. We need to build, and we need to build quicker in this country, including transmission, but a whole range of clean energy resources. Permitting takes too long in our country. It is complicated. We have made

some progress on that, but we need to make more progress.

*Mr. Landsman. I totally agree.

*Mr. Turk. To make it durable it needs to be bipartisan. And so I know there is conversations happening. We just need to get on with it.

*Mr. Landsman. Mr. Schmidt -- thank you, I agree with that.

Mr. Schmidt, I -- can you just talk a little bit about how important talent is? You discussed it earlier, but how important talent is to this whole process and the impact of the chaos around the administration's immigration policies.

*Dr. Schmidt. So Silicon Valley and the world I represent is powered by the smartest people, or at least the self-proclaimed smartest people in the world. And we collectively need them because the algorithms and the approaches we take are incomputable by normal people. I don't understand what most of these people are doing, and I have a PhD in this area.

*Mr. Landsman. Yes.

*Dr. Schmidt. That is how complicated this stuff is. The new AI stuff is largely math, and it is a new set of math. In fact, there are people who are working on what are the limits of AI using -- again, trying to find out where the -- really, limits are. All of that knowledge is in the heads of people around the world who are highly specialized. They

are not normal people. They are just geniuses in one way or the other, men and women. I want all of them here. It is insane to not let them in here.

If you look at polymaths -- I wrote a book on this called "Genesis,'' and we studied polymaths. A single polymath, the person who invents something -- this is the Leonardo da Vinci type person -- can generate a $1 trillion industry. Carver, Mead, and so forth in the 1970s invented semiconductors, now a multi-trillion dollar industry. We need those people in America. Imagine if each and every one of those people did not live in America, they lived in another country, and in particular China.

Furthermore, we have lots of evidence, for example, that the quantum lead that China now has occurred because a specific quantum physicist was not allowed to stay in the country. And he said, okay, I will go back and work for China, and the rest is history. And quantum is a huge national security issue for America right now.

*Mr. Landsman. Thank you for that. Also, Dr. Schmidt, I just wanted to talk a little bit about the prices. I only have a few seconds, but prices have gone up, electricity prices in Ohio. And obviously, this is going to cause even more pressure on prices. Is it the tax credits? And is that the most important thing we can do to keep prices down, or do you want Congress to do more?

*Dr. Schmidt. I want more supply.

*Mr. Landsman. Yes.

*Dr. Schmidt. More supply should lead to better and tougher competition and more -- a more dynamic network, which would allow vendor choice.

The way -- the Congress should not set prices. The Congress should enable competition at every level in the value chain in every industry, and in particular in electricity.

*The Chair. Thanks. We have two more, two more. If somebody else comes in after, we are going to excuse you, Dr. Schmidt, and we will keep going.

But Mr. Griffith is -- thanks for yielding back. Mr. Griffith is recognized for five.

*Mr. Griffith. Thank you very much. Let's continue talking about prices.

So it makes absolutely no sense to retire a coal plant, let's say, that was opened up in 2012 or 2013 that has a life expectancy of more than 50 years because we have decided we hate coal. Isn't that right, Mr. Schmidt -- Dr. Schmidt?

*Dr. Schmidt. It has to do with how long -- it is a more complicated answer.

*Mr. Griffith. Okay.

*Dr. Schmidt. It has --

*Mr. Griffith. So for the question -- let me cut

through some of the complications. For the question that Mr. Landsman asked, he said our prices are going up, what do we need to do, you said we need more supply. I agree with that. But also, we can't leave stranded assets out there because this was opened up in my district in 2012 as the cleanest coal plant at the time in the world, and a very clean plant, and it is under-utilized right now, and there is movements afoot to have it close up early, and that takes power away from us, and that affects prices because the consumer not only can't access the power because there is not enough supply, which you just said, but it also puts them in a situation where they are paying for the stranded asset of the existing coal plant and the new plant that might replace it with whatever fuel source it uses, whether it be nuclear, which I am also in favor of, or whether it be natural gas, or whether it be wind or solar.

That is fairly straightforward, isn't it? Because if you leave the stranded asset, the ratepayer is paying for both the old and the new.

*Dr. Schmidt. I grew up in the coal country of Virginia, so I do understand.

*Mr. Griffith. Oh, what county?

*Dr. Schmidt. Blacksburg.

*Mr. Griffith. Okay. Well, they did have coal mining there at one time, but, yes, I represent that area. That is

my district.

*Dr. Schmidt. The important thing about coal is that over the long run coal is going to get regulated out, because it is such a coal is much dirtier than natural gas.

*Mr. Griffith. Yes.

*Dr. Schmidt. You would always choose natural gas over coal if you made that decision today.

Given that you have an under-utilized coal plant, I would encourage you to look at the network interconnect. Why is it not fully used? Why are we not taking that resource that you described and fully using it right now?

*Mr. Griffith. Because we are over-regulating coal. I will just answer that one for you.

Now I also have -- and this gets to be interesting -- I have an under-utilized natural gas plant, as well, in the area, and so we are trying to attract investment into that region that you grew up in. Blacksburg is a wonderful town. I also represent the coal fields where they still produce the coal and natural gas, as well, because of our coal bed methane. And we have got a natural gas facility that used to be a coal facility -- it was converted -- that is also under-utilized.

And we would love to see folks take a look because, as you know, having come from that region, these are very industrious people. And whether or not they have that

diploma, I am reminded of the scene in The Wizard of Oz, that there is a lot of smarts out there, and I believe that both data centers and AI could benefit by being in the region.

But when you close down these facilities -- and I understand you have a preference for natural gas, and I understand that. But when you close down these facilities, that creates a problem because, wouldn't you agree we -- right now, in the last year, the American Electric Reliability Corporation's long-term assessment estimated that 115 gigawatts of dispatchable generation is planned to retire over the next 10 years, in comparison to what they estimate to be an increased demand of 150-plus gigawatts. Doesn't that impede or make it more difficult for us to have space to grow AI and power our AI as we need to?

*Dr. Schmidt. Again, I think all of us believe in more.

*Mr. Griffith. Yes.

*Dr. Schmidt. With respect to the specifics, you have regulatory issues which you pointed out, which I think should be loosened. But I also think the long term for coal is to be replaced by natural gas, and I think we should get organized around that. And eventually, natural gas will be replaced by fusion, which will ultimately solve all of our problems 15 years from now.

*Mr. Griffith. Yes, I am looking forward to fusion getting here. I hope that you are right on your estimate.

I would say this, as well, because so many times people hear statements like that in my district, and they automatically assume that that means coal production is going to end, and they don't realize that what you are talking about is coal production for the creation of electric generation. And my district has a rich seam, as you are probably aware, of metallurgical coal, which for those who don't know, means that we mined that coal to make coke and steel out of it so that we can produce the steel that is needed for this country. I think somebody mentioned it earlier today, that we need the steel so we can make sure we build the equipment and so forth to do the AI with, the buildings, et cetera. And you are not going to make that really good steel without burning some of my metallurgical coal.

I yield back, Mr. Chairman.

*The Chair. The gentleman yields back and the chair recognizes Ms. McClellan --

*Ms. McClellan. Thank you, Chairman.

*The Chair. -- for five minutes.

*Ms. McClellan. Thank you, Chairman Guthrie and Member Pallone, for planning this hearing. This is probably my favorite hearing of my entire almost a little over two-year congressional career. It is definitely the most important.

And Dr. Schmidt, I am glad you stayed because in your

opening statement you said that the sheer speed of AI development is outpacing our societal and government ability to adapt, and I wholeheartedly agree with you. In fact, seven years ago, in 2018, I attended a conference at which a speaker was talking about the rise of AI and megatrends and all of these things, and he basically said the same thing. And I came to the conclusion seven years ago that none of our systems in the United States at all -- government, education, none of them -- are prepared for what is coming.

But at the same time, as Mr. Wang testified, at that point seven years ago China already had an AI master plan, advanced capabilities, and President Xi Jinping declared China's plan to dominate AI by 2030. Yet this committee held its first hearing on AI in 2023. The race for AI dominance is reminiscent of the space race, but instead of the Soviet Union, now it is China. But the stakes are even higher. And we won the race to land a man on the moon, and that was critically important to our economy and our national security and innovation and scientific advancement. And to win the race for AI is just as important.

But as Mr. Wang testified, while the U.S. leads on computing, and we are tied with China on algorithmic development, China leads on data, which is the raw material that enables AI to learn, adapt, and improve over time and, as Mr. Wang said, is AI's oil, gas, wind, solar all wrapped

in one. So if we lose the race to lead data, we lose the race for AI dominance.

Now, the Trump Administration's actions since January 20th have directly undermined our ability to win the race for AI dominance. The haphazard firing of Federal workers, freezing or cutting Federal funds for government agencies and universities critical to supporting competing AI hinders our ability to implement the recommendations of Mr. Wang's testimony and his four pillars to win.

This war on renewables that the President has engaged in, attempts to repeal the Inflation Reduction Act tax credits undermine the ability to meet our energy demands for data centers. And Trump's reckless tariff policy is increasing costs, exacerbating supply and demand issues already occurring, and raising the cost to build new data centers and semiconductor manufacturing plants that are critical for our AI success. Because while semiconductors have been exempted from the tariffs, the equipment and machinery used to build and run the data centers have not.

This is not theoretical. Just this week, Microsoft announced that it is backing off plans to build three data centers in Ohio. So, given this committee's clear desire to position the U.S. to win the competition with China for AI dominance, I am perplexed by my colleagues on the other side of the aisle's silence over the Trump Administration's

actions that hinder our ability to do so, and the blank check it looks like we are about to give the President to take those actions.

So Mr. Wang, you offer two options for AI dominance in the future, and recommend working with our allies to promote an American model of AI technology. But this trade war is actively undermining our ability to work with our allies to do so. Can you elaborate quickly on the steps that we should actually take to work with our allies to promote a U.S. model of AI usage and governance?

*Mr. Wang. Yes. So the first thing is we need to ensure that NIST, the National Institute of Standards, is properly resourced and we are able to make progress on AI measurement science and, ultimately, the development of these AI standards.

Then we need to codify this into a set of standards that we ultimately agree with in terms of how we should measure AI performance, how we should -- what are the characteristics of safe and performant AI systems in the future, and then we should utilize the global network of AI safety institutes, which is -- which already exists. Many, many countries have stood them up, you know, France, the UK, Japan, India, Korea.

I have met the heads of many of these AI safety institutes. They are all looking towards the United States because, you know, they understand that we are the leader in

the technology, and we need to give them our standards and export it globally.

*The Chair. Thank you.

*Ms. McClellan. Thank you, and I yield back.

*The Chair. Thank you. The gentlelady's time -- I had committed to Dr. Schmidt that he got -- we have -- Dr. Schrier did come in, but I committed to you, Dr. Schmidt, to leave.

You -- Dr. Schrier, you are recognized for five minutes.

And if anybody else shows up, you are -- I will let you walk out and go. Thank you for your -- because it has been valuable. I will shut up and let her go.

*Ms. Schrier. I am so glad you are staying.

Let's see. Thank you. Thank you, Mr. Chairman, and thank you to all our witnesses. This is a fantastic hearing.

I am from the Pacific Northwest, and chip manufacturing and data center expansion are the big energy demand drivers to the region, so I am thrilled to have this discussion.

We are at this inflection point. We all know that we are really headed straight to an energy crisis if we don't act quickly on this. It impacts AI and data centers, as we have heard a lot about, but also we have been talking nationally a lot about manufacturing, and we need affordable energy for that.

One of the best ways to maximize access to the power we

already have in the U.S. is strategically building out transmission. And last year Senators Manchin and Barrasso introduced the bipartisan Energy Permitting Reform Act, and I will be really clear it is not the bill I would have written. I was not a fan of all the provisions. But we need to move forward, and that is the whole idea, that we need compromise in order to move the ball forward.

Mr. Bhatia, in your testimony I see this prime example that you have talked about a couple places, a couple times, where this bill for speeding permitting would make a difference. It was the Boardman to Hemingway transmission project that connects Oregon to Idaho. And in the Pacific Northwest our peak energy demand is in the winter, when we turn on the heat, and yet we have our peak hydropower generation in the warmer months, when the snow melts. The opposite is true in the mountain region, where we see the opposite. So irrigation and air conditioning drive that demand and in the summer, and then wind energy is more abundant in the spring and winter. So connecting those two regions would allow us to correct this mismatch and meet the demand. The project, as you said, is about to hit its twenty-first birthday, and it has been stalled for almost 21 years.

If we continue to require transmission projects to jump through all of these hoops and red tape, how is that going to

hamper our ability to onshore tech, keep onshore tech, and expand manufacturing here at home?

*Mr. Bhatia. Well, absolutely, you know, EPPA is something we are absolutely supportive of because what it is going to do is exactly what you mentioned. You know, we have talked about investing in the grid, we have talked about modernizing the grid, creating more flexibility so that you can balance supply and demand.

And, you know, the big data centers, certainly the large semiconductor manufacturing which we are under construction right now in Boise of what will be the largest -- the only large-scale memory manufacturing facility in the country, the first leading-edge one more than 25 years -- needs that transmission to be able to ensure that we can have that stable power for the consistent and long-term load growth that we have.

*Ms. Schrier. And Dr. Schmidt, basically, same question. If we don't have good transmission and the ability to move energy across the country, how does that impact our ability to remain dominant and win the AI race?

*Dr. Schmidt. When I think about your state, I think about all of the incredible natural resources you have, whether it is the west or east part of your state. That power does not have the path out of your state that is strong enough. It needs to get fixed.

*Ms. Schrier. Yes, thank you.

I just want to emphasize for my Republican colleagues that if they introduce a bill like that one, they will have Democratic partners because we all understand, especially after this hearing, that we need to get --

*Mr. Bhatia. If I could just add one more, just one more thing to add to this.

*Ms. Schrier. Yes.

*Mr. Bhatia. It is not just about the success of those projects. I know we are talking a lot about AI, but it is about jobs that are being -- that all of this investment in manufacturing are going to be creating, high-paying jobs, higher-paying jobs in -- today.

And domestic supply of semiconductors, while critical and important for AI, is also critical for many, many other industries that we haven't been able to talk about. The automotive industry, for example, 50 percent of the cars on the road have a chip made in Micron's facility.

*Ms. Schrier. That is right, and we need to manufacture --

*Mr. Bhatia. And so there are many, many industries that need these projects to be successful.

*Ms. Schrier. I am going to turn one more question quickly to Dr. Schmidt.

AI, as I read in Dr. Wang's testimony -- Mr. Wang's

testimony, brings potential benefit, potential risk. We have seen the abuse of AI in China for public surveillance and crackdowns. Now, unfortunately, I am having to think about that in our country, too, with what we are seeing now as suppression of dissent and retribution efforts to crack down on free speech and stymie scientific research, target non-violent university protesters who I may not agree with, but we all have the First Amendment rights.

And we have also seen insurance companies with Medicare Advantage use AI to deny or delay coverage. So as you think about -- we only have -- we actually don't have any time. If you could write me an answer to what you would suggest for guardrails for AI as we move forward, we want to be able to keep up and do this wisely.

*Dr. Schmidt. I will do so. Thank you very much.

*Ms. Schrier. Thank you.

*The Chair. All right. Seeing no further folks here to ask questions, I ask unanimous consent to insert in the record the documents included on the staff hearing documents list.

Without objection, that will be the order.

[The information follows:]

**********COMMITTEE INSERT**********

*The Chair. I remind members they have 10 business days to submit questions for the record, and I ask the witnesses to respond to the questions promptly.

Without objection, the committee is adjourned.

[Whereupon, at 2:30 p.m., the committee was adjourned.]