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U.S. House Committee on Energy & Commerce

"Converting Energy into Intelligence: The Future of AI Technology, Human Discovery, and American Global Competitiveness"

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Chairman Guthrie, Ranking Member Pallone, and Members of the Committee, thank you for the opportunity to address you today.

I am here to speak about two inextricably linked imperatives that will define America's future in the 21st century: artificial intelligence (AI) and energy. Our nation stands at a pivotal moment. Our capacity to lead, innovate, and secure our interests hinges directly on our strategic mastery of these two domains. The sheer speed of AI development is outpacing our societal and governmental ability to adapt, making strategic foresight and decisive action more critical than ever. Failure is not an option in the face of intensifying global competition. This is what we saw coming in the National Security Commission on Artificial Intelligence (NSCAI), which was set up by the foresight of Congress, and why I continue that work with the Special Competitive Studies Project.

AI is no longer a distant prospect; it is a present reality, actively reshaping our economy, national security, and daily lives. Its potential is immense – accelerating medical breakthroughs, potentially curing diseases, optimizing manufacturing, hardening our defenses, transforming finance, and even improving education. But let me be clear: this technological revolution and the prosperity it promises depend entirely on a modern, resilient, and *vastly expanded* energy infrastructure. Without it, AI's potential remains tragically unrealized.

This challenge is magnified by the strategic competition with the People's Republic of China (PRC). The PRC understands the foundational power of AI and energy, and they are investing massively and strategically to achieve global dominance in both. They are pouring resources into AI R&D while simultaneously building the world's leading renewable energy capacity and modern grid infrastructure. Our response must be equally ambitious, coordinated, and decisive. We are in a race, and we must win.

The relationship between AI and energy is profoundly synergistic. AI development is inherently power-hungry; its computational demands will only escalate, with discussions already underway for data centers demanding 1 to 5, even up to 10 gigawatts of power – facilities costing tens of billions in hardware alone. Yet, AI itself offers the keys to unlocking a modernized, efficient, and secure energy future. AI can optimize grid operations, predict failures, enhance resilience against disruptions – both

physical and cyber – and accelerate the development of next-generation energy sources. This synergy is a critical strategic advantage if we choose to seize it.

Conversely, inaction carries severe penalties. Failing to invest strategically in *both* AI leadership and energy modernization will erode American competitiveness, weaken our national security, and diminish our global standing within the next decade. We risk ceding our technological edge, hamstringing our most innovative industries, and leaving our critical infrastructure vulnerable. This convergence of failures is unacceptable, especially given the potential for AI misuse – from enhancing bio and cyber threats, including finding zero-day exploits or modifying pathogens, to eroding our very notion of truth.

The U.S. government cannot win this technological race alone. We must reignite America's unique "innovation power" – the potent collaboration between government, private industry, and academia. This model secured our leadership in semiconductors, aerospace, computing, and the internet itself. Today, facing the dawn of artificial general intelligence (AGI) and fierce competition, we must revitalize this proven playbook. The government must set the strategic direction and foster the ecosystem; the private sector must drive innovation and commercialization at speed; academia must fuel the pipeline of foundational research and talent. Our adversaries, particularly China, are attempting to replicate this through state-controlled mandates. We must counter by unleashing the true potential of our free-market, democratic model, potentially leveraging open-source approaches strategically to accelerate innovation. America must lead the next century of innovation.

I. Strategy in the Modern AI Era: A U.S. Strategic Imperative

A. The Transformative Power and Strategic Importance of AI

Artificial intelligence has exited the laboratory and is now a fundamental driver of national power and progress, potentially reshaping society on the scale of the Enlightenment. The speed of adoption is staggering – consider OpenAI's ChatGPT reaching a million users in five days, a milestone that took Gmail five years. And last month, OpenAI added one million ChatGPT users in only 60 minutes after the launch of its new image generation feature. This velocity underscores AI's transformative potential across every sector: revolutionizing healthcare, optimizing complex manufacturing, providing decisive advantages in intelligence and defense, and reshaping financial markets.

Maintaining clear leadership in AI research, development, and deployment is not merely an economic goal; it is a strategic imperative for preserving American economic dynamism, military superiority, and global influence. Our capacity to innovate, create new industries, and solve national challenges is now directly tied to our AI prowess.

While the United States currently leads in foundational AI research, thanks mainly to our dynamic private sector and global talent attraction, this lead is fragile, and the gap is closing. It requires deliberate cultivation through smart policy, sustained investment, international cooperation on safety, and a national commitment to staying ahead, unhindered by the "anti-science regime" detrimental to American exceptionalism.

B. The Potential of Artificial General Intelligence (AGI)

The accelerating pace of AI development, including the emergence of systems capable of self-learning and autonomous "agents," brings the prospect of artificial general intelligence – AI with human-level cognitive abilities – into sharper focus. AGI represents a potential step-change for humanity, promising unprecedented breakthroughs but also carrying profound disruptive potential and risks, including unpredictable "emergent behavior."

While predicting the exact arrival of AGI is difficult, policymakers cannot afford to wait. We must proactively grapple with its societal, economic, and ethical implications now. The potential for mass automation demands foresight regarding workforce transitions. Ensuring AGI aligns with human values and is safeguarded against misuse – ensuring humans, not machines, remain in control, particularly regarding lethal systems – requires careful ethical frameworks, robust governance structures, and potential regulation focused on liability in extreme cases.

A key marker of the shift to AGI will be AI's ability to produce knowledge based on its own findings, not merely retrieval and recombination of human-generated information. The real magic will occur when systems reach a point at which they become scale-free, meaning that they can train themselves on self-generated data through a process known as recursive self-learning, relying only on electricity to advance. The two domains particularly ripe for this kind of scale-free advancement are mathematics and programming.

Unlike biology and other fields that require real-world experimentation, these disciplines are largely self-contained. A mathematical proof can be checked and verified within the system itself. Similarly, AI could identify the code it needs to complete a defined objective, develop that code and improve on it — all without human intervention. These systems would then engage in self-directed research, iterating through possible solutions. Not only would they feed answers back into themselves to refine their approaches, but they could also draw on the collective knowledge of the internet and of other models. Such superintelligent mathematical tools could be combined with frontier models that are proficient in natural language, bridging the gap between formal and semantic reasoning. This integration could lay the foundation for further advances in reasoning and unlock new discoveries in

other fields like physics and economics. I expect AGI will then move beyond the current limits of knowledge.

C. China's Advancements and Strategic Ambitions in AI

Let us be unambiguous: while the United States holds an edge today, China is out-organizing us as a nation. China is a determined and rapidly advancing competitor in AI. Fueled by massive state investment, explicit national goals articulated by the CCP, and a vast domestic talent pool, China's capabilities are growing formidable. The recent emergence of sophisticated Chinese large language models, like DeepSeek-V3, signals a shift: China is moving beyond imitation to become a true innovator.

China's approach is fundamentally different – a centralized, state-directed fusion of government, industry, and academia, all laser-focused on achieving geopolitical objectives. This allows rapid translation of research into commercial products and global deployment, exemplified by companies like DeepSeek and Manus AI. The risk includes not only competition but also potential IP theft or modification of systems and the possibility of China achieving a monopoly leadership position or initiating preparatory attacks.

China's stated goal is global AI leadership by 2030. Achieving this would allow Beijing to set global technology standards, and norms, and potentially dominate key future industries, fundamentally altering the global balance of power. Their parallel, aggressive investments in energy infrastructure underscore the comprehensive nature of their strategy. While competition is fierce, dialogue remains crucial. Channels between the United States and China are necessary to address shared existential risks like AI enabling bioterrorism or accidental escalation. However, we must compete vigorously while managing these risks.

There is also a debate regarding openness. While some worry about China exploiting Western open-source models, there's a strong case that *Western leadership* in open-source AI is vital for our own innovation speed, transparency, and competitiveness, preventing us from falling behind due to overly closed systems. This requires a strategic approach – fostering openness while implementing safeguards.

D. Recommendations to Organize the United States and Maintain AI Leadership: The Technology Competitiveness Council

To effectively compete and secure our AI leadership, the United States requires a unified national strategy that aligns government action with the dynamism of the private sector. A critical missing piece, as recommended by the NSCAI in 2021, on which I served, is a central coordinating body. To

address this, we proposed the creation of a small, elite Technology Competitiveness Council, or TCC, within the White House, ideally led by the Vice President. We need this leadership on technology competition now more than ever.

Under the first Trump administration, the Space Force was created through a wargaming and strategy process led by the Office of the Vice President. This demonstrated the clarity and leadership that the White House can bring. Similarly, the TCC's mandate would be clear: identify critical emerging technologies, develop national action plans, coordinate disparate agency efforts, and, crucially, ensure continuous, high-level collaboration with private sector leaders. The TCC must be empowered to cut through bureaucracy and drive implementation at the speed of relevance, mirroring the agility of the private tech sector and methodically bringing them into the process. It is the necessary structure to harness our full national innovation power, including strategically embracing open-source development, and ensure America remains the world's leading technological force.

Yet, four years later, this essential high-level coordinating function still does not exist, leaving our national efforts fragmented precisely when AI development is outpacing our ability to adapt.

E. Strategic Significance of Space as the Frontier of Competition and Innovation

The strategic competition increasingly extends to the ultimate high ground: space. This domain is critical for national security – communications, intelligence, surveillance, reconnaissance, navigation – and economic prosperity. The war in Ukraine provided a stark lesson: commercial space capabilities like Starlink can be geopolitically decisive.

China recognizes this and is rapidly advancing its space program. Their progress demands an urgent and robust American response. AI is central to future space dominance, powering autonomous systems, optimizing satellite constellations, managing space traffic, and analyzing Earth observation data in real-time.

America must maintain its leadership in space. Our positional advantage will not be secured by chance any more than Apollo grew naturally from the private sector. This requires significant federal investment in next-generation space infrastructure, policies that foster commercial space innovation, and strong public-private partnerships. Space is foundational to 21st-century power. The intersection of AI, energy, and space will define the competitive landscape for decades.

II. Securing America's Energy Future in the Age of AI

A. Vulnerabilities of the Current U.S. Energy Infrastructure

Our current energy infrastructure faces critical vulnerabilities. Much of it is aging, designed for a different era, and ill-equipped for the staggering demands of the 21st century, particularly the immense power requirements of large-scale AI – potentially needing gigawatts per facility. It is increasingly susceptible to disruption from extreme weather events, sophisticated cyberattacks, and physical threats.

These vulnerabilities directly threaten our economic activity, military readiness, and societal stability. The growing digitization of energy systems expands the attack surface for cyber threats, potentially allowing adversaries to cripple essential services.

B. Strategic Importance of Modernizing Energy Infrastructure

Therefore, modernizing our energy infrastructure is not just an economic upgrade but a national security imperative. A resilient, efficient, secure, and *abundant* energy supply is the bedrock of a modern economy and the enabler of technological leadership, especially in AI. It underpins our military capabilities and the basic functioning of our society.

Without significant modernization and expansion, our energy system will become the Achilles heel of our AI ambitions. We simply cannot power the future of computation – requiring potentially 100x more energy – and thus the future of our economy and security on yesterday's grid.

C. The Role of AI in Enhancing Energy Security

AI is not just a consumer of energy; it is also a critical tool for securing and optimizing our energy future. AI algorithms can revolutionize grid management, optimizing generation and distribution for maximum efficiency and reliability. Predictive maintenance can prevent costly failures. AI can enhance grid resilience, enabling faster detection and response to disruptions.

Crucially, AI is essential for bolstering cybersecurity in the energy sector. AI-driven threat detection systems can monitor networks in real time, identifying and neutralizing sophisticated cyber threats like zero-day exploits far faster than human operators alone. This capability is vital for protecting our critical energy infrastructure.

Our goal should be to make energy so abundant that it is nearly free for our people and exportable to the world. Driving this factor of production down can account for labor costs in America and keep our nation as the destination for building AI companies.

D. China's Role and the Global Energy Landscape

Looking through a competition lens, we must recognize China's strategic, state-driven efforts to dominate the global energy landscape. They are investing heavily in modernizing their grid, deploying renewable energy at scale, and pursuing next-generation technologies like fusion. Their dominance in manufacturing solar panels, wind turbines, and batteries gives them significant global leverage.

China's comprehensive approach to energy, coupled with its AI ambitions, presents a direct competitive challenge. Failure to accelerate our own energy transition and innovation risks ceding leadership in technologies that will define the future global economy and geopolitical influence.

E. Recommendations for Federal Investments in Grid Modernization, Energy Integration, and Cybersecurity

Securing America's energy future requires bold, strategic federal action and investment. We must prioritize:

1. **Massive Grid Modernization, Expansion & AI-optimization:** Deploying grid-enhancing technologies, building out significant new high-capacity transmission, and investing in smart grid capabilities to handle the gigawatt-scale demands of AI and integrate diverse sources.
2. **Energy Integration and Abundance:** Supporting the seamless integration of diverse and abundant energy sources, including advanced nuclear and fusion, alongside significant investments in long-duration energy storage.
3. **Hardened Cybersecurity:** Dramatically increasing funding for energy sector cybersecurity, mandating high standards, promoting AI-powered defense tools, and ensuring robust information sharing.
4. **Domestic Innovation and Manufacturing:** Fostering the development and onshoring of next-generation energy technologies and manufacturing capabilities to ensure supply chain security and technological leadership.
5. **Strategic Open-Source AI:** Fostering a vibrant open-source AI ecosystem in the West through infrastructure support and collaboration to accelerate innovation and maintain competitiveness while developing necessary safeguards.

F. The Potential of Next-Generation Energy Technologies Like Fusion

Looking ahead, we must make strategic bets on game-changing technologies. Fusion energy holds the ultimate promise: virtually limitless, safe energy. Achieving leadership in fusion would be a profound strategic advantage, securing energy abundance for the AI era and beyond.

The United States must declare fusion a national priority, as recommended by SCSP. This requires dedicated fusion leadership, a clear national strategy, robust public-private partnerships, and targeted investments. Leading the fusion revolution would solidify American technological supremacy for generations.

III. Securing American Dominance in the 21st Century

To conclude, U.S. leadership in artificial intelligence and a modernized, secure, and abundant energy infrastructure are the twin pillars of American power and prosperity in the 21st century. They are inseparable.

We face a strategic inflection point, grappling with technology advancing faster than our institutions and carrying risks alongside immense promise. The choices we make now – the investments we prioritize, the strategies we adopt, the urgency with which we act – will determine our ability to out-compete rivals like China, harness AI for unprecedented progress while managing its perils, ensure human values guide its development and secure our future.

By embracing AI's potential, rebuilding and vastly expanding our energy foundations, fostering open innovation where appropriate, engaging in critical international dialogues on safety, and reigniting our national innovation engine, the United States can and must secure its technological leadership, economic vitality, and national security for the decades ahead.

Thank you again for the opportunity to appear before you, and I look forward to our discussion.

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