Testimony of the Honorable Dr. Darío Gil
Under Secretary for Science
U.S. Department of Energy
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Chairman Babin, Ranking Member Lofgren, and distinguished members of the Committee,
I am honored to address you today on a topic of profound importance to our Nation's scientific
future and global competitiveness: Artificial Intelligence (AI).

My journey to this role has taken me through decades of scientific research and leadership. As
the 12th Director of IBM Research, I led the effort to successfully transform and reinvent one of
the world's largest and most storied industrial research organizations, and I led work to push the
frontiers of semiconductors, AI, and quantum computing. Those experiences have illuminated a
critical truth: we are standing at the precipice of a scientific and technological revolution. This
revolution, driven by the convergence of high-performance computing, AI, and quantum
computing, will fundamentally transform how science and technology are practiced and how
research and development are conducted.

The Department of Energy (DOE) is uniquely positioned to lead this transformation, with its
diverse science, energy, and national security missions, extraordinary scientific expertise, and
world-class infrastructure at the National Laboratories. Thanks to decades of sustained bipartisan
support from Congress, DOE has the capabilities needed to advance the frontiers of AI and apply
its revolutionary potential to all our missions. The work happening across DOE and its National
Laboratories strengthens our prosperity, bolsters national security, and advances stability at home
and abroad, aligning with President Trump's vision for achieving American energy dominance
and winning the AI race.

The President's recent Executive Order, *Launching the Genesis Mission*, highlights the
importance of the foundational work DOE has already accomplished in AI and charges the

Department, along with the White House Office of Science and Technology Policy (OSTP), with leading an ambitious and inspirational national effort to unleash a new age of AI-accelerated innovation and discovery to solve the most challenging problems of this century. We look forward to working in partnership to carry out the President's agenda.

Launching the Genesis Mission

The Genesis Mission will mobilize the Department of Energy's 17 National Laboratories, industry, and academia to build an integrated discovery platform—The Genesis Science and Security Platform. The platform will connect the world's fastest supercomputers, AI systems, and next-generation quantum computers with the most exquisite scientific instruments and data in the Nation. Once complete, it will be the most complex and powerful scientific instrument ever built.

This unparalleled platform will serve as a national resource, specifically tasked with targeting high-impact grand challenges. These challenges span DOE's broad national mission that includes:

- **Energy Dominance:** accelerating advanced nuclear, fusion, and other technologies that will modernize the power grid using AI, to provide reliable, affordable and secure energy.
- **Scientific Discovery:** The Genesis Mission will use advanced physics-aware AI to accelerate scientific discovery. Scientists will create new breakthroughs in materials and chemistry, deepen our understanding of the universe, and help develop new quantum algorithms. Foundational science underpins every business in America. Ensuring our Nation leads in fundamental science ensures we lead in industry and commerce around the world.
- **National Security:** securing critical materials, strengthening supply chains, and speeding up the development of defense-ready materials and advanced manufacturing.

This mission embodies our ambition to dramatically accelerate scientific discovery and to significantly increase the productivity and impact of R&D in the United States, which we aim to

double within a decade. Through this initiative, which we envision as our generation's "Manhattan or Apollo-scale" projects, we will multiply the return on taxpayer investment into research and development, thereby solidifying America's global technological and strategic leadership.

In the One Big Beautiful Bill Act, Congress recognized the need for additional investment in AI within DOE, providing the Department with necessary appropriations to kickstart the Genesis Mission. Programs across the Department have invested in AI for years because we recognize how the field is evolving, and the impact AI will have on the future of all domains of science, engineering, and manufacturing. By leveraging both new statutory authorizations and these existing programmatic investments, DOE is investing in the foundational elements of the Genesis Science and Security platform. This investment in model and data efforts are crucial in building and deploying self-improving AI models that advance science, engineering, and energy missions by harnessing the unique data, facilities, and expertise of DOE and its partners.

DOE's approach to the Genesis Mission draws on our decades of investment on several critical pillars:

Pioneering a New Era of Supercomputing Platforms
We recognize that AI, and for that matter quantum, are not merely tools but foundational elements of a new class of supercomputing platforms. The Department of Energy and NNSA currently operate the three most powerful publicly benchmarked supercomputers in the world—the exascale machines *Aurora, Frontier,* and *El Capitan.* These machines are already showing what is possible when AI is integrated into scientific workflows. The recently announced new flagship computer at the National Energy Research Scientific Computing Center, *Doudna*, is designed to dramatically accelerate AI training for scientific applications and push the boundaries of scientific computing. Similarly, NNSA recently announced two new supercomputers —*Mission* and *Vision* —that will provide high-performance computing, advanced AI capacity, and the ability to integrate these capabilities for national security missions. The Department remains focused on continuing to integrate new technologies into our supercomputers, which will unlock unprecedented capabilities, allowing us to address the most

challenging scientific problems of this century. By designing systems that can learn, adapt, reason, and experiment, not just calculate, we are creating the engines that will drive discovery for decades to come.

Leveraging AI and Quantum for Deeper Understanding

AI and quantum computing collectively offer a fundamentally new paradigm for understanding the natural world. They are the new scientific instruments of our time, and just like telescopes and microscopes transformed how we see the very large, the very far, and the very small, AI and quantum supercomputers are going to transform how we make sense of the very complex. Both technologies share a remarkable capability: they allow us to reformulate our data and our problems into novel mathematical representations. These advanced representations are too complex and costly for today's computing technology to handle.

Using quantum computers, we can calculate the same way as nature does, achieving exponential speedups for certain critical problems by leveraging the principles of quantum mechanics. Using AI, we can learn the structure of nature through high-quality datasets encoded in massive neural networks. Together, this powerful synergy of AI and quantum will allow us to transform entire scientific fields and unlock deeper insight into the systems that power our economy, our security, our scientific leadership, and open pathways to discoveries that will define the next century of American innovation.

Sustained Scientific Leadership and Workforce Excellence

DOE's National Laboratories are a critical component of the country's innovation ecosystem—the "crown jewels" that our competitors and adversaries seek to replicate. This includes the Department's 40,000 scientists and engineers whose expertise and dedication are actively driving our mission. This is truly a team effort at the Department, and I am honored to be joined here today by the directors of all 17 National Laboratories representing our full scientific, engineering, and manufacturing workforce. The directors will tell you that we meet every week on the Genesis Mission and that we are absolutely united on our commitment to deliver on this mission for the country. Our National Laboratories are more than just research facilities; they are the ultimate proving grounds where theory meets the physical world. Through hands-on exposure to some of the world's most advanced computing systems and exquisite scientific

instruments, researchers and students are dramatically enhancing their capability to design, test, and deploy cutting-edge AI solutions. These experiential learning environments are essential for building the human capital required to drive the next era of innovation.

Forging Unprecedented Partnerships

Winning the AI race requires that we mobilize the full strength of America's science and technology ecosystem. While federal investments provide an indispensable foundation, the reality is that nearly 70% of our Nation's one-trillion-dollar R&D ecosystem is carried out by the private sector. To fully harness AI for scientific advancement and to match the scale of the computing revolution requires us to build partnerships unprecedented in scope. This means academia, industry, philanthropy, and government must align talent, infrastructure, and investment in ways we simply haven't seen before. This is a unique moment in history, and it drives us to build unique solutions to meet these critical missions in both the public and private sectors.

DOE has already begun supporting federal partners and pioneering new models of public-private collaboration to accelerate AI computing capacity and bring advanced systems online in record time. One example of this is the Department's recently announced AI supercomputer partnerships: *Discovery* is being co-developed by Oak Ridge National Laboratory with AMD and HPE; and *Solstice* is being developed through a partnership between Argonne National Lab, NVIDIA, and Oracle. These efforts are not solely about building machines, they are about co-designing tools, shaping next-generation systems, and developing scalable, secure pathways for sharing data across thousands of scientists. Another example is NNSA's deep partnership with OpenAI which has deployed one of the most powerful AI models in the world within the Department's classified national security environments. Both projects are contributing to an innovation ecosystem capable of pushing the boundaries of science at unprecedented speed, leveraging the combined capabilities of industry and the scientific leadership of the National Labs to ensure the benefits of AI flow to the entire nation.

Designing the Future

To uplift the entire U.S. AI ecosystem—public and private—what we envision for the nation is a completely new way of approaching nation-scale science. We will push the frontier of AI beyond its ability to master language and software coding and into the realms of science and engineering. And we will couple this next generation of AI through the Genesis science and security platform, to our singular facilities—light sources, 3D printers, lasers, robotic chemistry labs, and many of our world-leading scientific user facilities. We will define and build closed loops that go from computing to the real world and back—getting better and faster with each loop. We will deliver the fastest innovation the world has seen, outrunning our adversaries in national security and delivering prosperity for the American people.

At the same time, we are not alone in imagining this future. Our only peer competitor and adversary, China, is racing ahead to outpace us if they can, and we take this competition with the seriousness that it deserves. I know we are all united on how much of the prosperity and security of our Nation we have at stake.

Consequently, we operate with a profound sense of urgency, driven by the rapid pace of the computing revolution and this competitive landscape. We recognize that science, engineering, and technology are the new currency of strategic power, and that this is a race we must and will win.

The Department of Energy, through its National Laboratories, is prepared to meet this moment and lead this national mission. We are committed to focusing on what needs to be done and delivering for our Nation and our fellow citizens. This is both the heritage of the Department of Energy, and its destiny. It may well be the work that defines our generation's legacy and its contributions to our country.

Thank you. I welcome your questions, and I look forward to working with Congress as we execute on this national mission.