Department of Energy Artificial Intelligence Initiative for Science, Energy, and National Security

June 17, 2024

The Energy Sciences Coalition (ESC) thanks Congress for making U.S. leadership in artificial intelligence (AI) a top priority. In particular, ESC wants to thank the Bipartisan Senate AI Working Group for developing an AI policy roadmap, "Driving U.S. Innovation in Artificial Intelligence", that gives the Department of Energy (DOE) a central role in AI research and development, including unique applications in science, energy, and national security to advance DOE missions, while also mitigating risks. ESC encourages the Bipartisan House Task Force on AI, as it prepares its policy recommendations, to also fully leverage DOE's unique research and infrastructure capabilities, especially at DOE national laboratories and user facilities, to accelerate U.S. innovation in AI.

The Senate AI roadmap recommendations related to DOE are consistent with ESC's March 2024 DOE AI Initiative Recommendations Statement. In particular, ESC supports the following roadmap recommendations:

- Growing federal funding for non-defense AI research and development to $32 billion a year. A share of this funding would support DOE AI research and development activities. DOE allocated $300 million in FY 2024 and requested $425 million in FY 2025 in AI and machine learning research and development. To advance fundamental research in trustworthy AI and develop unique applications outlined in the 2023 *Advanced Research Directions on AI for Science, Energy, and Security* report, ESC continues to recommend at least $1 billion a year for a DOE AI Initiative, referred to as Foundations in AI for Science, Security, and Technology (FASST).
- Advance DOE AI research and development, including relevant infrastructure, primarily for fundamental and applied science, such as biotechnology, advanced computing, robotics, and materials science, and foundational trustworthy AI, such as transparency, explainability, privacy, interoperability, and security. DOE, through the Office of Science (the largest federal sponsor of the physical sciences), the applied energy programs (the largest federal sponsors of energy research and development), and the National Nuclear Security Administration (NNSA, responsible for maintaining the

safety, security, and reliability of the nuclear weapons stockpile), has the expertise and research infrastructure to advance critical fundamental and applied science and a dedicated program can address trustworthy AI issues.

- Fully fund DOE *CHIPS and Science* programs, particularly those related to AI, including the DOE Office of Science Advanced Scientific Computing Research program and DOE microelectronics programs, especially co-design and manufacturing of future generations of high-end AI chips and AI software development. This is consistent with ESC support for the *CHIPS and Science Act* and FY 2025 appropriations recommendations for the DOE Office of Science, including:
    - No less than $200 million for Artificial Intelligence research and development;
    - No less than $200 million for Microelectronics Research and Development, including $100 million for broad-based foundational research and development activities and $100 million to fund up to four Microelectronics Research Science Centers as authorized in the *CHIPS and Science Act*.
- Authorize and fund the National Artificial Intelligence Research Resource (NAIRR) as a shared national research infrastructure for responsible discovery and innovation in AI. DOE is a partner with the National Science Foundation in providing computational, data and training resources to AI researchers through NAIRR and helping increase collaboration across federal agencies, academia, and industry partners.
- Support a NIST and DOE testbed "to identify, test, and synthesize new materials to support advanced manufacturing through the use of AI, autonomous laboratories, and AI integration with other emerging technologies, such as quantum computing and robotics." This recommendation is consistent with the vision in the *Advanced Research Directions on AI for Science, Energy, and Security* report. Testbeds are critical to find science and engineering solutions. DOE is already a leader in quantum computing, microelectronics and AI. A testbed integrating all of these technologies would build on this by demonstrating unique advantages and reduce risk.
- Develop NNSA testbeds and model evaluation tools. This is consistent with ESC's recommendation to launch an AI Initiative to be jointly led by the DOE Office of Science and NNSA to simultaneously address unique science and national security missions.
- DOE, in partnership with DOD and the intelligence agencies, should work with commercial AI developers to prevent large language models, and other frontier AI models, from inadvertently leaking or reconstructing sensitive or classified information. This is consistent with ESC's recommendation that a key component of a DOE AI initiative would be the safe, reliable, and transparent use of AI and, in partnership with other federal agencies, evaluate and mitigate national and global security risks associated with AI systems.

As Congress advances AI authorization and funding legislation, ESC recommends that future legislation include DOE provisions to execute its unique science, energy, and national security missions and accelerate U.S. innovation to maintain our economic prosperity and global competitiveness. Thank you for your consideration of this critically important initiative.

Sincerely,

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