

Congress of the United States

House of Representatives

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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March 31, 2023

Committee on Appropriations
Energy and Water Subcommittee
H-307, The Capitol
Washington, DC 20015

Dear Chairman Fleischmann and Ranking Member Kaptur,

As the Ranking Member of the House Science, Space, and Technology Committee I am writing to encourage your continued support for our nation's research and development enterprise at the Department of Energy (DOE). Investments in clean energy innovation, from fundamental research to commercial application programs, serve to strengthen U.S. scientific and economic leadership, support the next generation of scientists and technology leaders, and seed the industries that will accelerate a just transition to a clean energy economy. Last year, Congress enacted the *CHIPS and Science Act*, landmark legislation to revitalize and reimagine our science and innovation enterprise and rebuild our domestic manufacturing capacity in several critical technology sectors. This bill was the culmination of many years of bipartisan work by the Science, Space, and Technology Committee.

Specifically, my top funding priorities for the FY 2024 Energy and Water Development and Related Agencies Appropriations Act are as follows:

- Out of funds for the DOE Office of Science, **\$1.043 billion for the Fusion Energy Sciences program**, which is the FY 2024 level authorized in the *CHIPS and Science Act*.
- **\$9.133 billion for the DOE Office of Science**. This would support the Office of Science at \$332 million above the President's FY 2024 Budget Request, which would enable the Office to operate its current portfolio of scientific user facilities at close to their full capacity and fund the Fusion Energy Sciences program at the FY 2024 authorized level in the *CHIPS and Science Act*.
- **\$650.2 million for the Advanced Research Projects Agency – Energy (ARPA-E)**, consistent with the President's FY 2024 Budget Request for ARPA-E.

- **\$31 million for the Foundation for Energy Security and Innovation (FESI):** consistent with the President’s FY 2024 Budget Request to establish FESI and the authorized levels for this activity in the *CHIPS and Science Act*.

I am particularly happy to see the President’s Request for the Fusion Energy Sciences program. It is certainly a significant step in the right direction. That said, my request for this program is consistent with fully funding the levels authorized in the landmark, bipartisan *CHIPS and Science Act* that was enacted in August. These levels and activities are also consistent with the findings and recommendations of two significant reports released in February 2021 by the Fusion Energy Sciences Advisory Committee¹ and the National Academies² that represented a broad community consensus on the next steps necessary for fusion research to achieve the ultimate goal of a commercially viable power plant.

Past budgets have not fully funded the Department’s fusion programs to authorized levels. Yet the recent breakthroughs in fusion research warrant increased support. For example, on September 5, 2021, a company called Commonwealth Fusion Systems (CFS) and their partners at the Massachusetts Institute of Technology (MIT) announced a successful test of their 20-tesla toroidal-field model coil, demonstrating that their magnet can be constructed from advanced high-temperature superconductors. Such a magnet has the potential to enable magnetic fusion systems that are significantly smaller, lower cost, and faster to build than ones based on conventional low-temperature superconductors.³ And most recently, on December 5, 2022, the National Ignition Facility (NIF) at Lawrence Livermore National Laboratory achieved fusion ignition. This is the first-ever demonstration of net-gain in a fusion energy experiment, and is particularly relevant to confirming the potential promise of inertial fusion energy concepts.⁴

Beyond the importance of improving the total budget for fusion research, there are several key activities authorized in statute that have not yet been carried out or adequately supported to date. Therefore, of the funds provided for the Fusion Energy Sciences program, I strongly urge you to include:

- **\$25 million for the inertial fusion energy R&D program**, as authorized in the *Department of Energy Research and Innovation Act* and amended in the *Energy Act of 2020* (42 U.S.C. 18645(d)). – This recently established program will build on the latest achievements of NIF and leverage capabilities and expertise at other NNSA facilities as

¹ <https://usfusionandplasmas.org/>

² <https://www.nationalacademies.org/news/2021/02/government-and-private-sector-should-produce-net-electricity-in-fusion-pilot-plant-by-2035-2040-to-impact-the-transition-to-a-low-carbon-emission-electrical-system-new-report-says>

³ <https://arpa-e.energy.gov/news-and-media/blog-posts/nifty-and-sparcly-recent-achievements-fusion>

⁴ <https://www.llnl.gov/news/national-ignition-facility-achieves-fusion-ignition>

well, while supporting energy-relevant research activities that will not be pursued by NNSA's weapons-focused program.

- **\$32 million to establish an alternative fusion energy concepts program**, as authorized in the *Department of Energy Research and Innovation Act* and amended in the *Energy Act of 2020* (42 U.S.C. 18645(e)(2)(A)). – In addition to the large-scale tokamak and laser-induced inertial fusion concepts, exemplified by the ITER international fusion project and NIF, respectively, several alternative concepts have begun to show promise toward significantly accelerating the development and deployment of commercial fusion reactors. However, there is currently no ongoing DOE program to support research and assessment of these innovative fusion energy concepts outside of public-private partnerships funded by the milestone program. So, for example, researchers of innovative concepts that are currently at the university or laboratory level do not currently have an ongoing program that would even consider their application for federal funding. This program will fill this critical gap.
- **\$130 million (the President's FY 2024 Budget Request level) for the milestone-based public-private partnership program**, as authorized in the *Energy Act of 2020* (42 U.S.C. 18645(i)). – In recent years, several new small and mid-sized start-up companies have emerged proposing fusion energy device configurations which, if successful, could dramatically accelerate the development and deployment of commercial fusion reactors.⁵ However, none of these are expected to ultimately scale up to a commercial, competitive reactor without more substantial federal support in the research, development, and demonstration phases. To better support this emerging industry, a program that would provide federal funding to private companies upon confirmation of the achievement of agreed-upon technical milestones was authorized. This was modeled after NASA's successful Commercial Orbital Transportation Services (COTS) program. DOE formally launched the milestone program for fusion on September 22, 2022, and it is already significantly oversubscribed.⁶ Given the breadth, growth, and the technical accomplishments of private sector fusion ventures over the last several years, this program warrants far greater support than has been provided to date.
- **\$147.5 million (the President's FY 2024 Budget Request level) for materials and fusion nuclear science**, as authorized by the *Energy Policy Act of 2005* and amended in the *CHIPS and Science Act* (42 U.S.C. 18645(b)), with additional relevant activities authorized in the *Department of Energy Research and Innovation Act* and amended in the *Energy Act of 2020* (42 U.S.C. 18645(e)(2)(B)). – As highlighted in the recommendations of the Fusion Energy Sciences Advisory Committee (FESAC) Long Range Plan entitled

⁵ <https://www.nytimes.com/2021/10/18/business/fusion-energy.html>

⁶ <https://www.fusionindustryassociation.org/post/congress-provides-record-funding-for-fusion-energy>

*Powering the Future: Fusion and Plasmas*⁷ and the National Academies report entitled *Bringing Fusion to the U.S. Grid*,⁸ a major challenge to the ultimate deployment of a commercial fusion reactor is the identification and development of materials that are able to withstand the expected heat and neutron fluxes of a fusion plasma over the long term. The significant increase proposed in the President's FY 2024 Budget Request to address these issues is thus well-justified.

And beyond fusion alone, I urge you to improve support for the overall DOE Office of Science as well. This Office is our nation's largest federal sponsor of research in the physical sciences and the lead federal agency supporting scientific research to secure our energy future. The Office not only supports research directly, but it also supports the development, construction, and operation of a broad portfolio of large-scale experiments and unique, open-access scientific user facilities. These facilities are critical to the development of new technologies and to exploring the frontiers of our scientific understanding for researchers all over the world, from academia to industry. Thus, failing to appropriately fund the Office significantly limits our national competitiveness and our ability to develop breakthroughs to aggressively address the climate crisis.

This year's Budget Request for the Office of Science is better than what had been proposed in the previous several years, but there is still significant room for improvement. This is why I am requesting \$332 million more than the Administration's FY 2024 request. Specifically, \$300 million would be used to ensure that the scientific user facilities stewarded by the Office are able to operate near their full capacity, and the remaining \$32 million would enable the Fusion Energy Sciences program to be fully supported at the FY 2024 authorized level in the *CHIPS and Science Act*. If we as a nation are serious about achieving economy-wide emissions reductions and being a global leader in the industries of the future, then we must prioritize the science and innovation that can get us there, and this certainly must include more robust investments in the DOE Office of Science.

I also want to applaud the Administration's proposed 38.3% increase for ARPA-E. Thus far, 135 ARPA-E projects have led to the formation of new companies; 291 have partnered with other government agencies for further development; and 200 have attracted over \$11.4 billion in private sector follow-on funding. I believe that with further investments, as authorized in the *Energy Act of 2020*, ARPA-E will continue to positively impact our nation's energy future.

⁷ <https://usfusionandplasmas.org/>

⁸ <https://www.nationalacademies.org/news/2021/02/government-and-private-sector-should-produce-net-electricity-in-fusion-pilot-plant-by-2035-2040-to-impact-the-transition-to-a-low-carbon-emission-electrical-system-new-report-says>

Lastly, I urge you to provide funding to establish the Foundation for Energy Security and Innovation, as authorized in the *CHIPS and Science Act* and included in the President's FY 2024 Budget Request. The Foundation would help accelerate the commercialization of clean energy technologies by providing a new mechanism to enable the private sector, including philanthropic organizations, to further support promising publicly funded projects. It will also help develop the workforce needed to enable our clean energy future.

We must continue to invest what it takes to secure our position as the global economic and clean energy technology leader. A key to this leadership will be sustained, strong investments in fusion, the DOE Office of Science, ARPA-E, and the Foundation for Energy Security and Innovation.

Thank you for your consideration.

Sincerely,



Zoe Lofgren
Ranking Member

cc:

The Honorable Kay Granger
Chairwoman
Committee on Appropriations

The Honorable Rosa DeLauro
Ranking Member
Committee on Appropriations

The Honorable Frank Lucas
Chairman
Committee on Science, Space, and Technology