Testimony of the
American Geophysical Union
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U.S. House Committee on Appropriations
Subcommittee on Energy and Water

Regarding the
Department of Energy

Fiscal Year 2021 Appropriations Request

The American Geophysical Union (AGU), a non-profit, non-partisan scientific society, appreciates the opportunity to submit testimony regarding the Fiscal Year (FY) 2021appropriations request for the Department of Energy (DOE). **AGU, on behalf of its community of 110,000 Earth and space scientists, respectfully requests that the 116th Congress appropriate the following:**

- **$7.4 billion for DOE Office of Science**
- **$497 million for DOE Advanced Research Project Agency – Energy**

Department of Energy

AGU requests that Congress appropriate $7.4 billion for DOE's Office of Science, which represents a 4% real increase over FY2020 spending levels. Additionally, we request $497 million for DOE's Advanced Research Project Agency - Energy (ARPA-E), which is in line with the bipartisan ARPA-E Reauthorization bills passed out of both the House Committee on Science, Space and Technology and the Senate Energy and Natural Resources Committee. These levels will ensure that DOE is able to continue its work and preserve U.S. leadership in scientific discovery by developing new cutting-edge technology, fostering innovation, and training the nation's future scientific workforce.

Office of Science

As the primary funder of basic research in the physical sciences, DOE's Office of Science is at the forefront of scientific discovery, innovation, and the shaping of our nation's energy future. The Office of Science oversees a breadth of programs and technical infrastructure essential to the nation's economic growth, energy and national security, future scientific and engineering talent, and the development of innovative technologies. Additionally, as our nation endures

the COVID-19 pandemic, the Office of Science is utilizing the resources of its 17 national labs to mitigate the impact of the disease, including lending its supercomputing capabilities to advance our understanding of the coronavirus and its spread.

The DOE Office of Science currently engages in research efforts, including next-generation computing, data science and analysis, energy storage, and fusion energy, that have the potential to transform our energy landscape and bring the nation closer to energy independence. Sustained and robust federal investment in scientific research is essential if the U.S. hope to remain globally competitive, especially as other countries like China aggressively increase their investments in scientific research.

DOE's Office of Science also supports about 22,000 researchers—including Ph.D. scientists, engineers, graduate students, undergraduates, and technical and support personnel – who collaboratively work on high-risk, high-reward research projects that foster cutting-edge energy technologies. The Office of Science not only provides essential resources and opportunities, including access to sophisticated scientific capabilities beyond that offered by industry and academic institutions, but also helps in the development of the scientific workforce.

Through competitive grants awarded to national laboratories, universities, and institutions of higher learning in all 50 states and the District of Columbia, the Office of Science fosters collaboration between sectors that helps contribute to our nation's strategic priorities—including national security, economic growth, and innovation.

In addition, the research supported by DOE's Office of Science explores the frontiers of quantum science and technology, machine learning, and genomics, investigating the most pressing and toughest challenges restraining our advancement of energy technologies. With a 90% rate of timely completion of projects within budget, researchers supported by the Office of Science are making key advances in energy and safeguarding our nation's security by leading us towards energy independence. DOE Office of Science proves to be a smart investment now and for the future.

To continue seeing the benefits from DOE research, maintain our leadership, and ensure that our nation is prepared for the challenges of the future, it is essential that the Office of Science sees sustained growth over the long term.

Advanced Research Project Agency—Energy

The Advanced Research Project Agency—Energy (ARPA-E) was established to surmount the barriers posed to high-risk, long-term energy technology development. A recent congressionally mandated assessment of ARPA-E by the National Academies found that the

agency is not only making significant progress towards fulfilling its mission of revolutionizing the energy sector but is having a positive impact on the overall culture of the Department of Energy.

In its short ten-year history, ARPA-E has supported more than 800 projects, 161 of which have attracted over $3.2 billion in private-sector follow-on funding, and 82 of which have gone on to form new companies. Additionally, ARPA-E is making significant contributions to advancing U.S. leadership in cutting edge energy science and technology. ARPA-E projects have submitted more than 3,658 peer-reviewed journal articles and been issued 385 patents by the U.S. Patent and Trademark Office. ARPA-E has also shown itself to be a responsible steward of taxpayer resources by ceasing funding for projects that fail to meet milestones. Overall, ARPA-E projects create jobs, enhance our national energy security and boost economic activity in communities across the country.

Unfortunately, each year, ARPA-E is forced to turn away innovative, potentially game-changing energy technologies. Although roughly 20% of applications received are judged through a peer review process to be both scientifically sound and potentially transformative, only 5% are actually funded. The demonstrated success of ARPA-E demonstrates that funding these additional projects would be likely to create additional benefits for the nation.

We are at a moment when other nations, especially China, Korea and Russia, are making significant investments into advanced energy technologies and are poised to seize the economic and geopolitical advantages afforded by technological supremacy in this field. With global demand for energy projected to increase by almost 30% by 2040 – combined with the often decade long development cycles for energy technologies – those nations making commitments to dominate this economic opportunity today will be the ones to reap the rewards in the years to come. The U.S. is exceptionally well positioned to capitalize on key advantages, including the work of exceptional agencies such as ARPA-E, but only if they are adequately funded.

This highly effective, bipartisan program continues to uphold our nation's reputation for innovation by supporting critical research that could drastically alter America's energy landscape, including work related to energy storage, advanced nuclear, and carbon capture and sequestration. ARPA-E offers the nation a tremendous competitive advantage. Continued and stable investment into this transformative program is necessary to ensure its success and ability to safeguard America's leadership in energy research.