Statement of the Director of ARPA-E, Lane Genatowski
Department of Energy
Subcommittee on Energy and Water Development, & Related Agencies
U.S. House Appropriations Committee
FY2021 Budget Hearing
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ARPA-E

Introduction

Chairwoman Kaptur, Ranking Member Simpson, and members of the Subcommittee, it is an honor to appear before you today to discuss the President's FY2021 Budget Request ("Budget Request" or "Budget"). My name is Lane Genatowski, and I am the Director of the Department of Energy's Advanced Research Projects Agency-Energy (ARPA-E).

The FY 2021 Budget proposes to eliminate ARPA-E while incorporating APRA-E's approach to technology development into the execution of applied energy office funding. As a result, the Budget requests no additional ARPA-E appropriation for new competitive solicitations and requests $21,256,000 for administrative expenses related to overseeing ARPA-E obligations carried forward, to remain available until September 30, 2022. Under the FY 2021 Budget, ARPA-E will not invest in new R&D technologies in FY 2021. The approximately 350 active ARPA-E projects will not be affected and will carry forward through their negotiated period of performance.

Current Funding and Results

Since ARPA-E began operations in 2009, the agency has issued $2.3 billion in R&D funding to more than 850 energy innovation projects. We can measure the impact of that support through the 82 companies that ARPA-E projects have formed; the 219 ARPA-E projects that have partnered with other government agencies for further development; the more than $3.2 billion in follow-on funding that ARPA-E projects have attracted; and the 385 patents issued by the U.S. Patent and Trademark Office based on the work of ARPA-E performers.

FY2019

In Fiscal Year 2019, ARPA-E issued approximately $374 million for energy innovation R&D, the highest annual obligation in the agency's history, in accordance with Congressional directive. During that year, the agency launched programs to develop a range of energy technologies. Awardees included teams working to create hydrogen and carbon materials from natural gas, a series of projects to develop deepwater floating wind turbines, and next-generation heat exchangers for use in transportation and petrochemical plants. Some topics of the focused programs awarded in 2019 include:

Artificial Intelligence and Machine Learning: Incorporating machine learning and Artificial Intelligence into energy technology development, ARPA-E introduced Design Intelligence Fostering Formidable Energy Reduction and Enabling Numerous Totally Impactful Advanced Technology Enhancements –DIFFERENTIATE—which aims to enhance the productivity of entrepreneurs through AI/ML in helping to develop next-generation energy technologies.

Rewriting the rules of grid risk management: Present grid operation practices do not acknowledge the true capabilities of a future with more diverse sources. Performance-based Energy Resource Feedback, Optimization, and Risk Management program - PERFORM -seeks to develop innovative systems that represent the relative delivery risk of each asset and balance them collectively, thereby breaking the persistent reliance on the status quo, to allow new and different types of generation.

2019 ARPA-E Summit in Denver

In addition to the research programs, in July 2019, ARPA-E traveled to Denver, Colorado for its 10th Annual Energy Innovation Summit, one of the energy innovation community's marquee events. Nearly 1,700 registered attendees from 47 states, 16 countries, and 21 government agencies joined over 100 expert speakers, including leaders from government, business, and academia.

The Summit's centerpiece, the Technology Showcase, displayed nearly 300 breakthrough energy technologies from ARPA-E awardees and other innovative companies. Panel discussions and networking sessions that enabled participants to meet with ARPA-E program directors, global industry leaders, and energy technologists were held all three days of the conference.

ARPA-E chose to move the Summit from the DC area for the first time to take advantage of all the energy work happening in western states. Denver is an energy innovation nexus in the West, and the Summit engaged its collaborative community of technology investors and entrepreneurs.

FY2020

So far in FY2020, ARPA-E has announced ten new technology programs totaling $287.5 million in R&D funds. These span the spectrum of energy innovation, including waste-to-energy, rare earth materials extraction, and hydrokinetic technology, as well as including innovative programs in:

Fusion: ARPA-E is collaborating with the Office of Science's Fusion Energy Sciences program in a joint funding effort, which provides up to $30 million in funding to develop a range of enabling technologies (beyond confinement of plasma physics) required for commercially attractive fusion energy.

The program, called Galvanizing Advances in Market-aligned fusion for an Overabundance of Watts (GAMOW), will prioritize investment into the basic enabling

technologies and advanced materials that are needed to support successful fusion energy where there remains a significant need for progress before a fusion energy system can become commercially attractive.

Carbon Capture and Storage: The FLExible Carbon Capture and Storage (FLECCS) program will develop carbon capture and storage (CCS) technologies beyond our current grid to enable power generators to manage grid conditions in a high variable renewable energy (VRE) penetration environment (i.e. renewables with natural gas).

Agricultural Carbon Management: One of the United States' largest industries is already engaged in the direct air capture of carbon – the agricultural industry. The Systems for Monitoring and Analytics for Renewable Transportation Fuels from Agricultural Resources and Management (SMARTFARM) program seeks to develop monitoring technologies to quantify feedstock-related emissions and enable new market incentives for efficiency in both biofuel feedstock production and carbon management.

Achieving greater carbon reductions across the biofuel supply chain requires that feedstock producers adopt technologies and practices that improve yield, drive down production associated emissions, and enhance carbon sequestration in soil. Crop-based biofuels have the potential to supply up to 5% of U.S. energy demand, and developing technologies to advance the biofuel towards carbon negativity – sequestering more carbon than the production process emits.

Going forward in 2020, ARPA-E will continue to identify technology areas where ARPA-E funding can have maximum impact.

Personnel

Finally, I would be remiss if I didn't mention the remarkable team of professionals at ARPA-E, who strive every day to fulfill the agency's mission to enhance the economic and energy security of the United States. Specifically, our Program Directors are a unique part of our model, as determined in our authorizing statute. They are intended to serve limited terms, normally of three to four years, in order to maintain a constant stream of new thinking and fresh ideas in the agency.

ARPA-E maintains high standards in selecting its Program Directors, and I am happy to report that we have still managed to increase the number of Program Directors, in accordance with recent appropriations.

Again, I thank you for the opportunity to testify before this Subcommittee, and I am happy to answer any questions you may have.