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Congressional Update: NSF Authorization and Competitiveness Bills Advance in the House and Senate

Lewis-Burke Associates LLC – May 14, 2021

After a busy week for National Science Foundation (NSF) policy, the House and Senate each took steps to advance their visions for NSF's future. Following an all-day mark-up on May 12 that featured over 200 amendments and several contentious discussions, the Senate Commerce, Science, and Transportation Committee approved a substitute version of the *Endless Frontier Act* (S. 1260) on a bipartisan vote of 24-4. All Democratic Members and most Republican Members supported the bill. It will now head to a floor vote by the full Senate with a first procedural vote set for Monday, May 17. Several other pieces of legislation are expected to be added on the floor, including research security bills from the Senate Foreign Relations Committee and Senate Homeland Security and Government Affairs Committee as well as dedicated funding for the *CHIPS for America Act*, which passed the Congress in late 2020 and aims to enhance semiconductor research and development. Meanwhile, the House Science, Space, and Technology Committee took the first step to advancing the *NSF for the Future Act* (H.R. 2225), with the Subcommittee on Research and Technology unanimously approving several amendments and the overall bill. The House bill now moves to full Committee consideration, possibly as soon as the week of May 17, but a date has not yet been set.

There is still a long road ahead before a new NSF reauthorization bill would be signed into law. The full House would vote on *NSF for the Future* after full committee approval and then assuming both bills pass their respective chambers, the two bills would need to be conferenced before a final vote by each Chamber and the President's review and signature. Issues for the potential conference to resolve will likely include research security provisions, balance between a new NSF directorate and funding for NSF base programs, funding for the Department of Energy Office of Science, and Senate provisions to dramatically enhance the size of the EPSCoR program. While these issues may be challenging to resolve, the bipartisan votes in both committees indicate strong support for creating a new directorate at NSF that would focus on use-inspired research and technology translation and dramatically boosting NSF's authorized funding to enhance US competitiveness. See below for more information on each mark-up and bill.

In addition to the congressional activity outlined above, the Biden Administration proposed $50 billion in its *American Jobs Plan* to establish a new NSF technology directorate in support of collaborative, use-inspired, and translational research in emerging technology areas. The proposal highlights investments in semiconductors, next-generation computing, advanced communications, clean energy technologies, and biotechnology. The President's budget request for NSF for FY 2022 additionally proposes a 20 percent increase for NSF including a new Directorate for Technology, Innovation, and Partnership, to strengthen U.S. leadership in emerging technology areas, including AI, HPC, disaster response and resilience, quantum information systems, robotics, advanced communications technologies, biotechnology, and cybersecurity. More details of these proposals will be available when the Administration releases its full budget request in late May or early June. NSF is moving ahead with visioning for these new activities in the expectation that funding will be approved by Congress in regular appropriations or through the infrastructure package later this year.

Endless Frontier Act

As noted above the Senate Commerce, Science, and Transportation Committee approved a highly modified version of the *Endless Frontier Act* (EFA) on May 12. The main changes were made through an amendment in the nature of a substitute (ANS) from Committee leaders Chairwoman Maria Cantwell (D-WA) and Ranking Member Roger Wicker (R-MS). These changes redistributed authorized funding in the bill to existing NSF activities in addition to the new directorate, added several provisions about research security such as a prohibition on grant recipients participating in foreign talent programs, and added a geographic distribution requirement that 20 percent of new directorate and 20 percent of all NSF funding must be spent on the EPSCoR program. The ANS also added several STEM education or research-related bills to the EFA package, such as the *Rural STEM Education Act*, bills to create quantum and AI-focused STEM workforce programs, the *Supporting Early Career Researchers Act*, the *Research Investment to Spark the Economy Act (RISE),* and the *Bioeconomy Research and Development Act of 2021*. Note that the RISE Act was included without additional authorized funding.

Despite these substantial changes, the bill continued to feature the creation of a new directorate at NSF that would focus on research and development in ten key technology areas, University Technology Centers to advance use-inspired research, graduate education and training, technology testbeds, and activities to enhance commercialization and technology transfer capabilities. The ANS retains $10 billion in authorized funding for the Department of Commerce (DOC) to create Regional Technology Hubs and adds that at least three hubs should be located in each Economic Development Administration region for a total of 18 projected hubs. An amendment from Senator John Thune (R-SD) adopted at the markup would ensure at least one of these hubs is located in an EPSCoR-eligible state without any population centers over 200,000 people. The bill would also boost manufacturing activities at DOC and spur new programs focused on supply chain resilience.

The committee mark-up was mostly congenial, but one issue became a major flash point as the Committee adopted an amendment from Senator Ben Ray Lujan (D-NM) to add Department of Energy authorized funding to the bill at the expense of authorized funding for the new NSF technology directorate. Original EFA co-sponsor Senator Todd Young (R-IN) vigorously objected to the amendment and Senators Lujan, Young, and Chairwoman Cantwell promised to continue to negotiate on the balance of funding between NSF and DOE before the bill heads to the floor. Under the amendment, existing NSF would be authorized for $52 billion over five years, the new Directorate for Technology and Innovation would be authorized at $29 billion, and the Department of Energy Office of Science would be authorized for $17 billion.

The mark-up saw the adoption of several National Aeronautics and Space Administration (NASA) related provisions. In a last-minute agreement between Chairwoman Cantwell and Ranking Member Wicker, the Committee voted to include language reauthorizing NASA science, technology, exploration, and STEM engagement programs. This was nearly identical to the bill introduced early last year (S. 2800) and passed by the Senate in December 2020. The notable difference was language added that would direct NASA to select a second awardee under its Human Landing System (HLS) development program. The agency selected SpaceX to develop the lunar lander in a sole-source award that drew controversy among its competitors, including a Blue Origin-led team. The HLS-directive may impact chances that the NASA components of EFA remain in the bill given the objections of California-based SpaceX. Objections to the HLS language will be raised in the House. The House Science, Space, and Technology Committee has also not put forward a NASA bill to conference with the Senate's proposal. In addition to the NASA

authorization, Chair Cantwell's amendment also included the *SPACE Act*, a bill introduced last Congress that would grant authority for DOC to carry out space situational awareness activities and research.

The Committee adopted several other amendments at mark-up, most of which made small changes to the bill or were unrelated to research issues. However, one to note is the addition by Senator Richard Blumenthal (D-CT) of the *Combatting Sexual Harassment in Science Act*, which would authorize research on reducing sexual harassment in science, promote better data collection and training by agencies, and direct the White House Office of Science and Technology Policy (OSTP) to create policies requiring institutions to report to federal agencies any major harassment investigations or findings involving federally funded researchers. Senator Wicker also added a new program to create an open networks architecture applied research testbed by DOC's National Telecommunications and Information Administration (NTIA) with authorized funding of $20 million.

Additional Resources:

- The Committee's press release on the mark-up has links to the introduced and committee-reported bill text and the text of all adopted amendments: https://www.commerce.senate.gov/2021/5/committee-approves-nine-bills-including-endless-frontier-act-and-two-nominations
- Video of the mark-up can be viewed at https://www.commerce.senate.gov/2021/5/executive-session
- Lewis-Burke's previous summary of the introduced version of *EFA* can be found at https://old.lewis-burke.com/sites/default/files/congressional_update_-_endless_frontier_act_-_april_2021.pdf.

NSF for the Future Act

On May 13, the House Science, Space, and Technology Committee took its first step to advance the bipartisan *NSF for the Future Act* as the Subcommittee on Research and Technology approved the bill on a unanimous voice vote. The mark-up was extremely congenial with all Members applauding the thoughtful work of the committee on the bill. About a dozen amendments were offered and all were also unanimously approved. No amendments made major changes to the legislation, although of note Subcommittee Chairwoman Haley Stevens (D-MI) offered an accepted amendment that would create a new capacity building program at NSF for institutions outside the top 100 in federally funded research and development. The program would be authorized at $40 million.

As Lewis-Burke has previously reported, *NSF for the Future* would authorize increased funding for NSF research, support STEM Education at all levels, increase opportunities for broadening participation, and would create a new Directorate for Science and Engineering Solutions (SES) to address societal grand challenges. The bill would authorize $73 billion for NSF over five years. Compared to EFA, more of this funding would go to existing NSF activities (authorized at $59.5 billion) while the new directorate would be authorized at $13.2 billion total. The proposed new SES Directorate would support collaborative, use-inspired and translational research and in general the bill is less prescriptive than EFA about its activities.

The bill would authorize increased funding of $2 billion for NSF in FY 2022 (not including the new SES Directorate) and additional increases up to $13.3 billion by FY 2026. The bill would further direct a 50% increase to the Mid-Scale Research Infrastructure program, which would include development of a roadmap to address the growing need for advanced computing capabilities. Regarding STEM education,

the bill would authorize a 50% increase in funding over five years for key STEM education programs, establish a new program to scale up K-12 STEM education, increase mentoring and other efforts to better support graduate students and postdoctoral researchers, increase support for minority serving institutions (MSIs) and other emerging research institutions, and expand data collection on the STEM workforce. The bill includes a number of requirements to increase research accessibility, accountability, and security. There are also several provisions related to specific areas of research, including: climate change; violence; social, behavioral, economics; food-energy-water; sustainable chemistry research and education; risk and resilience; and support for biological research collections. Finally, the proposed new SES Directorate would support collaborative, use-inspired and translational research with authorized funding of $1 billion for the new SES Directorate in FY 2022, increasing to $5 billion in FY 2026.

Additional Resources:

- A video of the Subcommittee mark-up and link to the text of the *NSF for the Future Act* and all amendments can be found at https://science.house.gov/markups/research-and-technology-subcommittee-markup-of-hr-2225
- A summary of the *NSF for the Future Act* and list of endorsements can be found at https://science.house.gov/bills/the-national-science-foundation-for-the-future-act.
- The Lewis-Burke analysis of the *NSF for the Future Act* is available at https://old.lewis-burke.com/sites/default/files/hsst_-_nsf_for_the_future_act_-_march_2021_0.pdf
- The Lewis-Burke analysis of President Biden's American Jobs Plan is available at https://old.lewis-burke.com/sites/default/files/policy_update_-_biden_administration_announces_2.25_trillion_infrastructure_and_economic_stimulus_plan_1.pdf

Authorized Funding Levels in EFA and NSF for the Future

(In millions of $)

	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2026 vs FY 2021 (%)	FY 2026 vs FY 2022 (%)
NSF Overall *(Enacted)*	8,487							
NSF Overall *(EFA)*		10,800	12,800	16,600	19,500	21,300	12,813 (151%)	10,500 (97%)
NSF Overall *(NSF for the Future)*		11,469	12,668	14,148	16,037	18,325	9,478 (107%)	6,856 (60%)
New Directorate *(EFA)*		1,800	3,200	6,300	8,400	9,300	N/A	7,500 (417%)
New Directorate *(NSF For the Future)*		1,000	1,500	2,250	3,375	5,063	N/A	4,062 (406%)
Existing NSF *(EFA)*		9,000	9,600	10,300	11,100	12,000	3,513 (41%)	3,000 (33%)
Existing NSF *(NSF for the Future)*		10,469	11,167	11,895	12,658	13,255	4,416 (50%)	2,793 (27%)
DOE *(EFA)*		$1,000	$1,800	$3,700	$4,900	$5,500	N/A	4,500 (450%)