

LEWIS-BURKE

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**Analysis of the
President's FY 2022 Budget Request
for Federal Research, Health, and Higher
Education Programs**

**Implications for Research, Higher Education, and
Academic Medicine**

Prepared by Lewis-Burke Associates LLC
June 4, 2021

Biden Administration FY 2022 Policy Priorities



Public Health



Climate and Clean Energy



Innovation



Education

Highlights

Biden Policy Priorities

Public health, climate and clean energy, innovation, education, and racial equity

Flat Funding Proposed for Military Spending

Major cut to DOD's Science and Technology accounts; decrease in funding for NNSA's academic research and development programs

Note

This analysis is based on the President's fiscal year (FY) 2022 budget request and does not indicate what final appropriation levels will be. While this document is important for understanding President Biden's policy priorities, it is up to Congress to embrace, modify, or reject budget proposals. Lewis-Burke will monitor the appropriations process and continue to provide updates as appropriations for programs of interest are finalized.

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Executive Summary

On May 28, 2021, President Biden released the full details of his first budget proposal to Congress. Unrestrained by legally-imposed budget caps for the first time in a decade, President Biden proposed an 18 percent boost in discretionary spending for a total of \$1.522 trillion. President Biden's top FY 2022 budget priorities are public health, climate and clean energy, innovation, and education. This is a sharp contrast from the Trump Administration, which prioritized defense spending and proposed major cuts to other domestic programs. President Biden's proposal would provide \$769 billion in non-defense spending—a \$123 billion increase or 16 percent increase over the FY 2021 enacted level. In contrast, the proposal would provide \$753 billion for defense spending—a \$13 billion or 1.7 percent increase over the FY 2021 enacted level. This would be the first time in more than a decade that non-defense spending would exceed defense spending.

Overall, the budget proposal would significantly increase funding for research and development, manufacturing, education, and healthcare programs of interest to the research, higher education, and academic medicine communities. The notable exception is a \$2.1 billion proposed cut to basic, applied research, and advanced technology development accounts for DOD's Science and Technology programs. Some proposals require new agencies to be created, which will be a bigger lift in a narrowly divided Congress. Other proposed increases (e.g., the National Science Foundation) are consistent with existing legislation to invest in R&D for national competitiveness.

The full budget request follows the Biden Administration's initial budget blueprint, known as the "skinny" budget, which was released on April 9. The full request contains many more details about Biden initiatives and agency plans. While it is ultimately up to Congress to decide which proposals to embrace, modify, or reject as part of the annual appropriations process, Congress has been waiting on the new Administration to provide more information on its major political priorities and new funding initiatives. The release of the fiscal year (FY) 2022 budget request formally kicks off the congressional appropriations process. While the discretionary budget proposal kicks off FY 2022 congressional appropriations, the timing of passing final FY 2022 appropriations remains uncertain and the late start to the appropriations process increases the likelihood of a stop gap funding measure, known as a Continuing Resolution, to avoid a government shutdown and continue to fund federal agencies beyond September 30—the end of FY 2021.

In addition to \$1.5 trillion in discretionary spending, the budget request also proposes \$2.3 trillion for infrastructure consistent with the American Jobs Plan and \$1.8 trillion for health care, education, and childcare consistent with the American Families Plan—for a total of \$6 trillion if enacted by Congress. As Lewis-Burke has reported previously, a separate funding package or a series of funding packages would be needed beyond annual appropriations bills to fund these additional infrastructure and social programs. To offset some of these costs, the Biden Administration proposes generating \$3.5 trillion in revenue over the next decade through significant changes to U.S. tax policy and the repeal of several provisions in the *Tax Cuts and Jobs Act of 2017*. The partial offset would come from, among other things, increasing the corporate tax rate from 21 percent to 28 percent, taxing corporate offshore earnings, and increasing tax rates for high-income earners. This analysis focuses primarily on discretionary spending proposals and major changes to mandatory funding programs that impact education, health care, and science and technology programs.

The graphic below shows proposed FY 2022 funding levels for major federal research and education agencies compared to the FY 2021 enacted levels.

Key Agencies at a Glance (IN BILLIONS)

Commerce
\$11.4 B
+28%

HHS
\$134 B
+23%

NIH
\$51 B
+19%

NSF
\$10.2 B
+20%

Education

Total Requested:
\$103 B

+41% increase over
FY 2021 enacted

Agriculture
\$28 B
+16%

Defense S&T
(6.1-6.3)
-\$2.1 B
-12.7%

Energy
\$46 B
+10%

NASA
\$25 B
+6%

FY 2022 Biden Administration Science and Technology Priorities

Major proposed initiatives include:

- \$6.5 billion to establish a new Advanced Research Projects Agency for Health (ARPA-H) within NIH;
- \$7.4 billion for a new Prepare Americans for Future Pandemics Initiative to fund research, development, and manufacturing programs related to biopreparedness and biosecurity at HHS, DOD, and DOE;
- \$865 million to establish a new NSF Directorate for Technology, Innovation, and Partnership to strengthen U.S. leadership in emerging technology areas;
- \$500 million for a new Advanced Research Projects Agency for Climate (ARPA-C) managed by DOE, but funded in collaboration with other agencies such as USDA and NOAA;
- \$500 million, a \$100 million increase, for the Advanced Research Projects Agency for Energy (ARPA-E) within DOE;
- \$9 billion, a \$5.8 billion increase, for DOE applied energy programs;
- \$48 million to launch four new Manufacturing Innovation Institutes, with two at NIST and two at DOE; and
- \$275 million, a \$125 million increase, for NIST's Manufacturing Extension Partnership.

While the budget proposal increases funding for fundamental research at key science agencies, its primary focus is on use-inspired research, translation, and technology development and deployment. For example, the budget proposal would establish a new NSF Directorate for Technology, Innovation, and Partnership; provide \$6.5 billion for the creation of a new Advanced Research Projects Agency for Health (ARPA-H) within NIH; allocate \$500 million for a new Advanced Research Projects Agency for Climate (ARPA-C); increase funding for applied energy development and demonstration projects at DOE by \$5.8 billion; and establish four new Manufacturing Innovation Institutes through NIST and DOE. The budget proposal would also continue to grow investments started under the Trump Administration for emerging technology areas, such as quantum information science, artificial intelligence, microelectronics, and advanced computing.

For education, President Biden's budget request would provide a major expansion in discretionary funding for education and workforce programs while also incorporating \$50 billion in new or expanded mandatory-funded programs initially floated within the President's American Jobs Plan and American Families Plan. The most notable funding provisions include a significant increase to the Pell Grant program, with a \$8,370 maximum award, and expansion of Pell eligibility for Deferred Action for Childhood Arrivals recipients. Following the American Families Plan, the budget calls for a free community college program and tuition subsidies for two years of enrollment for students of families earning less than \$125,000 at four-year Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs) and Minority-Serving Institutions (MSIs). The budget proposal would also provide an additional \$600 million in discretionary funds to increase institutional capacity and student support at HBCUs, TCUs, and MSIs. The proposal would increase support for Registered Apprenticeships (RA) at the Department of Labor (DOL), with \$285 million in funding proposed, a \$100 million increase above the FY 2021 enacted level. The request also proposes \$81.5 billion in mandatory spending to support programs for dislocated workers and sector-based training, among other efforts.

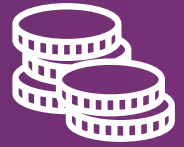
While Democrats strongly favor many of the new initiatives and investments proposed by the Biden Administration, Republicans remain opposed. Republicans have two major concerns. The first major concern is insufficient funding for the Department of Defense (DOD). Defense spending is the top priority for Republicans and the Biden Administration proposed flat funding for DOD. Republicans are concerned about China's growing military strength and the United States' ability to defend against future threats. While Republicans want to increase defense spending, progressive Democrats have called for a 10 percent cut. Finding consensus on DOD and overall defense spending will be the biggest challenge to move forward the FY 2022 appropriations bills.

The second major Republican concern is rising deficits and major increases in government spending. This \$1.5 trillion discretionary funding proposal comes on the heels of a \$1.9 trillion COVID aid package and \$4 trillion in proposed spending for infrastructure, health care, and education in the American Jobs and Families Plans. Republicans to date have rejected calls by the Biden Administration to increase taxes or reverse some of the 2017 tax cuts for corporations to partially offset the costs of these funding proposals.

Congress still has not started negotiations to set an overall discretionary funding level for FY 2022. Without a budget agreement in place, the House and Senate cannot negotiate final FY 2022 appropriations bills. To start to advance all 12 of its appropriations bills, the House will assume a discretionary spending level of \$1.522 trillion—the same proposed by the Biden Administration—and plans to mark up all 12 bills at the end of June into early July. The House will then have to adjust funding levels based on a final budget agreement. The Senate has not yet announced a schedule to advance its bills. Senator Patrick Leahy (D-VT), the Chairman of the Senate Appropriations Committee, announced plans to begin bipartisan negotiations in early June between the House, Senate, and the White House to reach agreement on top-line spending levels.

Below is an analysis of major new initiatives and funding proposals for relevant federal agencies of interest to the research, higher education, and academic medicine communities.

Department of Commerce



The Department of Commerce includes the National Oceanic and Atmospheric Administration (NOAA), National Institute of Standards and Technology (NIST), and the Economic Development Administration (EDA). The Department of Commerce overall would receive \$11.5 billion in discretionary funding, a \$2.6 billion, or a 29 percent increase, from the FY 2021 enacted level.

National Oceanic and Atmospheric Administration



At the time of this writing, the NOAA FY 2022 Congressional budget justification was not available. The analysis below reflects publicly available information in the OMB budget appendices for the Department of Commerce.

The budget proposal requests a total of \$6.97 billion for NOAA in FY 2022. This increase of \$1.5 billion, or 28.2 percent, would be among the largest increases that the agency has ever received and one of the largest percent increases to an agency in the FY 2022 federal budget. The increase is indicative of the Biden Administration's intent to make climate change and climate science a top priority. The NOAA Operations Research and Facilities (ORF) account would receive an \$849 million, or 22.1 percent increase, and the Procurement Acquisition and Construction (PAC) account would receive a \$694 million, or 45.3 percent increase, compared to the FY 2021 enacted level. The Office of Oceanic and Atmospheric Research (OAR), the main extramural research office, would grow by \$154 million, or 27.1 percent, compared to the FY 2021 level.

Quick Take: Each of NOAA's offices are proposed to see major increases, which is a stark difference to the stagnant funding levels of the last few years. The prioritization of climate change in the Administration and Democratically-held Congress bodes well for the agency to see across the board increases for the line offices.

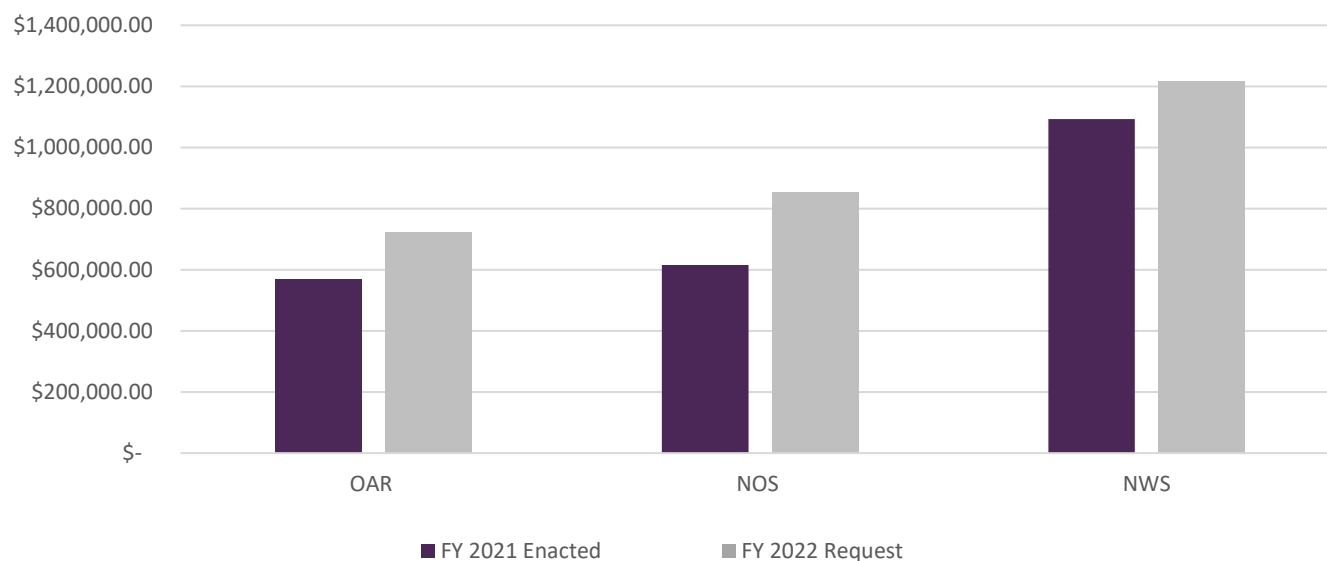
Signature Initiatives: While program- and research initiative-level details are not yet available, there will be a strong focus on improving observations and forecasting for decisionmakers. In addition, there is likely to be support for resilience and community readiness research to address economic development and racial disparities in areas affected by climate change. Topics prioritized under the Trump Administration such as weather forecasting, ocean exploration, and information systems will remain priorities, but they will have a new motivating lens of combatting climate change rather than commercial purposes. The agency will need to continue to staff up significantly in order to meet the increased demand for climate science and accommodate the proposed new funding if it is appropriated by Congress.

The Bottom Line

NOAA's budget is proposed to grow by \$1.5 billion or 28 percent. Much of this increase will connect to the agency's role in climate science. Support for extramural programs would benefit as the Administration looks to work quickly and bring in new partners to support the whole-of-government approach to climate.

Department of Commerce

One-Year Enacted Funding Levels (In thousands of \$)



National Oceanic and Atmospheric Administration (NOAA) (in thousands of \$)

	FY 2021 Enacted	FY 2022 Requested	FY 2022 Requested vs. FY 2021
NOAA, total*	5,432,198	6,965,677	1,533,479 (28.2%)
Operations, Research and Facilities (ORF)	3,840,300	4,689,381	849,081 (22.1%)
Oceanic and Atmospheric Research (OAR)	568,000	722,000	154,000 (27.1%)
National Ocean Service (NOS)	615,000	854,000	239,000 (38.9%)
National Weather Service (NWS)	1,093,000	1,217,000	124,000 (11.3%)
National Marine Fisheries Service (NMFS)	956,000	1,099,000	143,000 (15.0%)
Procurement, Acquisition, and Construction (PAC)	1,532,558	2,226,982	694,424 (45.3%)
National Environmental Satellite, Data, and Information Systems (NESDIS)	1,225,000	1,676,000	451,000 (36.8%)

*The amounts shown for total NOAA enacted and requested funding are taken from the Department of Commerce FY 2022 Budget Summary Discretionary Control Table at https://www.commerce.gov/sites/default/files/2021-05/FY22_Presidents_Budget.pdf.

Department of Commerce

National Institutes of Standards and Technology



The President's FY 2022 budget request proposes \$1.5 billion for NIST, which would be an increase of \$462.7 million, or 44.7 percent, above the FY 2021 enacted level.

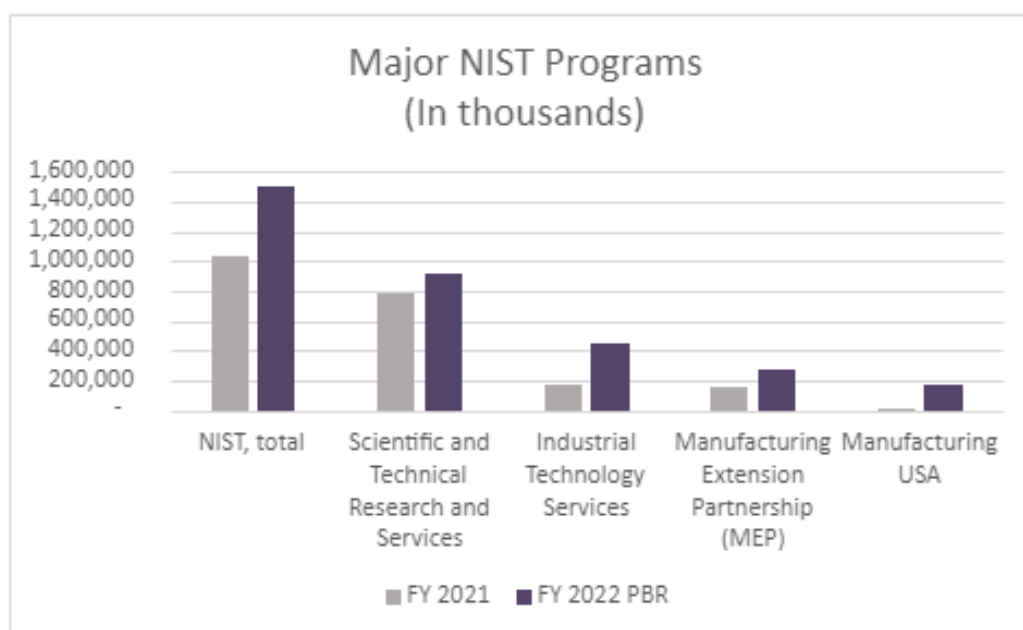
Quick Take: NIST priorities for FY 2022 would continue previous areas of focus in computing, cybersecurity, artificial intelligence, quantum information science, biotechnology, and advanced manufacturing. New for FY 2022 would be a research focus on climate-resilient building codes and semiconductors.

New Initiatives/Priorities: Overall NIST Manufacturing programs would be funded at \$442 million, more than doubling the FY 2021 level. This is aligned with Administration plans to “ensure the security and resilience of the Nation’s supply chain and foster a robust resurgence of American manufacturing.” The FY 2022 request would provide funding for two new Manufacturing USA Institutes, including one focused on semiconductors.

Major Cuts/Eliminations: Unlike previous years, the FY 2022 would not propose cuts to NIST.

The Bottom Line

The FY 22 budget request reflects many of the Administration’s priorities in technology research areas as well as climate change and activities that advance U.S. capabilities in semiconductor design and manufacturing. NIST has requested funding in previous years to support additional Manufacturing USA Institutes that Congress has not previously supported.



Department of Commerce

Proposed Reductions and Terminations

There are no major proposed reductions or terminations in the NIST budget request for FY 2022.

New and Signature Initiatives

Scientific and Technical Research and Services

The Scientific and Technical Research and Services (STRS) account would be funded at \$915.6 million, an increase of \$128 million or 16.2 percent above the FY 2021 level. Of the increase, \$96.1 million would be for program increases and \$31.4 million would be for inflationary adjustments. Research would be aligned with Administration priorities including, advanced communications, climate and energy measurements, measurements for the circular economy, artificial intelligence, quantum, semiconductor research, bioeconomy, and strengthening equity and diversity.

Manufacturing USA

The budget request would provide \$166.7 million to the Manufacturing USA program. This would include \$150 million to fund two new Manufacturing Innovation Institutes (MIIs), one of which would be focused on the design and manufacture of semiconductors. FY 2022 funding would include \$5 million to support the current Manufacturing USA network, \$10 million for the NIST-funded National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL), and \$1.7 million for grants to develop industrial technology roadmaps.

Hollings Manufacturing Extension Partnership (MEP)

The MEP program would be funded at \$275 million in FY 2022, an increase of \$125 million, or 83.3 percent, over the FY 2021 enacted level. MEP supports small and medium manufacturers and aims to strengthen domestic supply chains. The proposed increase would enable MEP to provide additional services to more companies to support critical supply chains and workforce development.

Ongoing Areas of Interest

NIST is anticipated to continue focusing on research related to computing, cybersecurity, artificial intelligence, quantum information science, biotechnology, and advanced manufacturing. It should be noted that the budget request includes a proposed reorganization of units within the Associate Director Laboratory Programs (ADLP).

Source: The NIST budget justification document is available at

https://www.commerce.gov/sites/default/files/2021-06/fy2022_nist_congressional_budget_justification.pdf.

Department of Commerce

National Institute of Standards and Technology (in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021
NIST, Total	1,034,500	1,497,200	462,700 (44.7%)
Scientific and Technical Research and Services	788,500	915,600	127,600 (16.2%)
Industrial Technology Services	166,500	441,600	275,100 (165.2%)
Manufacturing USA	16,000	166,700	150,200 (910.3%)
Hollings Manufacturing Extension Partnership	150,000	275,000	125,000 (83.3%)

Department of Commerce

Economic Development Administration



In the FY 2022 budget request, the Biden Administration proposes a \$433.1 million appropriation for the Economic Development Administration (EDA) in FY 2022, an \$87 million increase over the FY 2021 level.

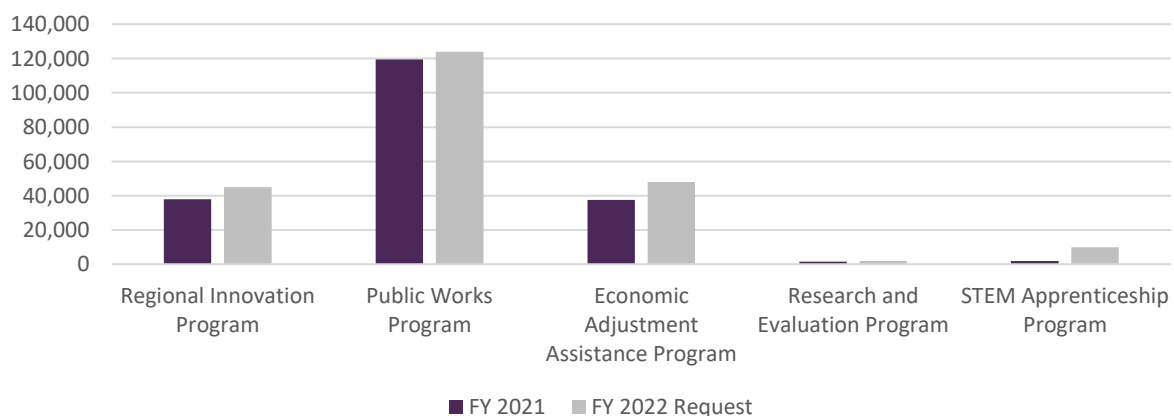
Quick Take: The president's FY 2022 budget request would provide a 25 percent increase over FY 2021 appropriations. This is a stark reversal from the previous Administration, which routinely proposed the elimination of EDA.

New Initiatives/Priorities: The budget request for EDA reflects its recently announced investment priorities,¹ which were updated to support DOC's four pillars to increase American competitiveness. These four pillars are revitalizing U.S. advanced manufacturing, building a 21st century workforce, maintaining leadership in global innovation, and promoting American business. Another theme prevalent throughout the budget request is the need to create a resilient economy that promotes diversification, as well as racial and regional equity. These themes will likely be core components of EDA investments throughout the Administration.

The Bottom Line

The Administration's proposal to increase funding for EDA will benefit federal economic development efforts across the U.S., including activities at anchor institutions like universities. The proposal budget is indicative of the Administration's philosophy for the government to play an active role in supporting economic development and recovery. While the request would seek to bolster existing programs that are popular on Capitol Hill, it remains to be seen whether Congress would support significant funding increases for EDA after it received \$3 billion in flexible emergency support from the *American Rescue Plan* (ARP) earlier this year. EDA's upcoming roll out of grant competitions for ARP funds will be closely watched by Members of Congress in the months ahead.

One-Year Enacted Funding Levels (In Thousands of \$)



Department of Commerce

New and Signature Initiatives

President Biden's budget request proposes increased funding and expanded purviews for several key programs at EDA. Highlights include:

Regional Innovation Program

The request would fund the Regional Innovation Program (RIP, recently rebranded by EDA as Build to Scale) at \$45 million, a \$7 million increase over FY 2021. If enacted, this would be the most funding ever provided to RIP, but it would still be \$5 million below the program's authorized level. RIP provides support for universities and research institutes to develop and scale commercialization efforts, to cultivate funding campaigns for promising startups, and to further tech-based economic development initiatives. RIP currently runs two core challenges, the Venture Challenge and the Capital Challenge, as well as the occasional sector-specific Industry Challenge.

In the budget request, EDA specifies that it would allocate \$35-36 million to the Venture Challenge, which received around \$32 million in the most recent competition for FY 2021; \$7 million for the Capital Challenge, which received around \$6 million in FY 2021; and \$2-3 million for the Industry Challenge, depending on availability of funding from a partner agency. There was no Industry Challenge competition in FY 2021. EDA also plans to leverage additional funds to "reach new geographies and industries, or geographies and industries that have historically been underinvested in by this program."

Public Works and Economic Adjustment Assistance

The budget request would fund the Public Works Program at \$124 million, a \$4.5 million increase from the FY 2021 level. This program invests in infrastructure, such as technology-based facilities, research and development centers, and skills training facilities. Investments aim to "create good jobs, build resilient infrastructure, and help revitalize rural communities and persistent poverty areas." The budget request also recommends requiring at least 10 percent of funds appropriated to the Public Works Program to be invested in persistent poverty counties, which are defined as "any county that has had 20 percent or more of its population living in poverty over the past 30 years, as measured by the 1990 and 2000 decennial censuses and the most recent Small Area Income and Poverty Estimates, or any Territory or possession of the United States."

The Economic Adjustment Assistance Program (EAA), which provides funding for activities like technical assistance, construction, and other activities that can strengthen regional economies, would receive \$48 million in FY 2022. This is a \$10.5 million increase over FY 2021. In its justification for the funding increase for EAA, EDA specifically states the \$10.5 million funding increase is needed to ensure EDA can respond to the "next crisis," whether it is another pandemic, natural disaster, or other major event.

Research and Evaluation

EDA's Research and Evaluation program would receive \$2 million in funding from President Biden's budget request, a \$500,000 increase from FY 2021 levels. The budget request proposes establishing an Equitable Access Initiative to focus on engaging communities that are underserved by EDA and identifying barriers in these communities to EDA funding. This would be the first major new research program at EDA in several years.

Department of Commerce

Assistance to Coal Communities

The largest proposed increase in the budget request would be an additional \$47 million for the Assistance to Coal Communities program to support areas facing significant job losses from the downturn in the coal economy. This would be more than double the amount provided in FY 2021 and further reflect the Administration's priority to support the transfer from economic reliance on fossil fuels. The additional funding will provide support for infrastructure, industry clusters, entrepreneurship and small business support, and workforce programming in these communities.

STEM Apprenticeship Program

Finally, the budget request proposed funding the STEM Apprenticeship Program at \$10 million in FY 2022, which would be an \$8 million increase from FY 2021. In EDA's budget justification document, they argue the increase is necessary because the program is "oversubscribed," having received 78 applications in the last competition while only being able to make 7 awards. With the increase in funds, they intend to expand the program and the number of grantees.

Source: EDA's budget request can be found at https://www.commerce.gov/sites/default/files/2021-05/fy2022_eda_congressional_budget_justification.pdf and its new investment priorities are available at <https://content.govdelivery.com/accounts/USEDA/bulletins/2ccd92e>. The Department of Commerce's full budget request is available at <https://www.commerce.gov/about/budget-and-performance/FY-2022-congressional-bureau-justification>.

Economic Development Administration (in thousands of \$)

	FY 2021 Enacted	FY 2022 Requested	FY 2021 Enacted vs. FY 2022 Requested
EDA, total	346,000	433,110	87,110 (25.2%)
Regional Innovation Program	38,000	45,000	7,000 (18.4%)
Public Works Program	119,500	124,000	4,500 (3.8%)
Economic Adjustment Assistance Program	37,500	48,000	10,500 (28%)
Research and Evaluation Program	1,500	2,000	500 (33.3%)
STEM Apprenticeship Program	2,000	10,000	8,000 (400%)



The FY 2022 Defense budget request would enable the most Research, Development, Technology, and Evaluation (RDT&E) funding ever at \$112 billion, an increase of \$4.5 billion or 4.2 percent above the FY 2021 enacted level. Although the FY 2022 budget contains DOD's largest RDT&E request to date, the science and technology (S&T) accounts—which include basic research (6.1), applied research (6.2), and advanced technology development (6.3)—would be cut in favor of more deliverable capabilities (6.4 and up) in critical areas like microelectronics, hypersonics, and space.

Quick Take: The Administration would overall increase funding for RDT&E with an emphasis on delivering capabilities in cutting-edge technologies such as artificial intelligence (AI), hypersonics, longer range lethality, cyber, and operational energy. The Administration's FY 2022 request would supersede last year's budget request for the largest RDT&E funding request in history (by 5.4 percent).

The request reflects what DOD leaders are referring to as the “pacing challenge” posed by China, calling it “the only U.S. competitor able to combine its economic, diplomatic, military, and technologic power to mount a sustained challenge to the international system.” Unlike past years, the request includes significant investments in S&T for energy and climate resilience. The request also highlights DOD's role in preventing and responding to future pandemics and the importance of bolstering the national security workforce.

Major Cuts/Eliminations: While the Administration would increase topline funding for RDT&E, the budget request would cut funding for S&T (6.1-6.3) to \$14.7 billion, a \$2.1 billion decrease in basic and applied research and advanced technology development compared to FY 2021 enacted levels. The budget request would also divest \$2.8 billion in older and less-capable DOD platforms (or legacy systems), a marked shift from the Trump Administration.

New Initiatives/Priorities: The DOD priorities outlined in the budget request align with the president's campaign themes and goals of renewing America's commitment to research and development, tackling the climate crisis, and countering 21st century challenges and threats. The request would prioritize investments in emerging technologies and outlines the following goals across its appropriations categories:

- Sustain and advance readiness;
- Protect investments in critical deterrent capabilities such as long-range strike, next generation air, advanced munitions, and maritime response;
- Reallocate resources to fund climate resiliency, clean energy, and R&D in advanced technologies; and
- Fund both military and civilian pay raises to ensure that the Department can attract and retain top talent.

The Administration states that the FY 2022 DOD request reflects its commitment to innovate and modernize with the largest RDT&E budget ever, totaling \$112 billion. This would reflect an increase of more than 4.2 percent over the FY 2021 enacted level. These investments include:

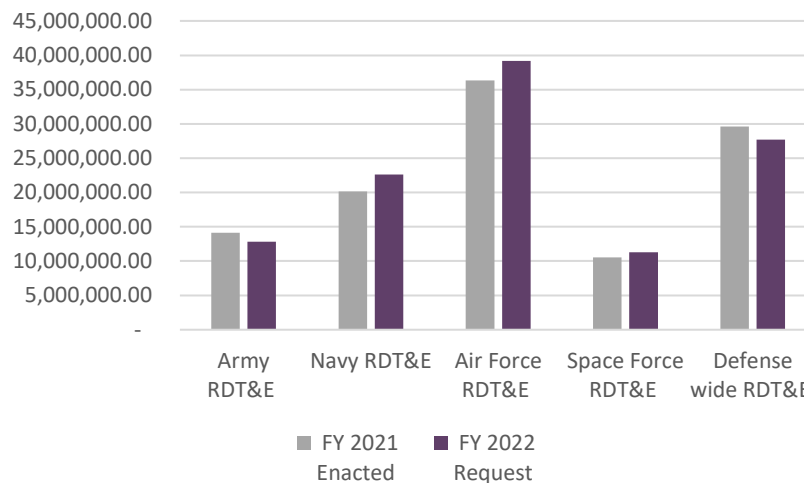
- **Hypersonics:** \$6.6 billion to develop long range fires and field hypersonic weapons on air, land, and sea.
- **Microelectronics:** \$2.3 billion to improve assurance, availability, and access to advanced semiconductors and components.
- **5G:** \$398 million to leverage 5G technologies and networks for military applications.
- **AI:** \$874 million to invest in AI as a top priority, funding over 600 AI-related efforts.
- **Pacific Deterrence Initiative (PDI):** DOD plans to spend over \$66 billion in direct efforts to address the China threat in the Indo-Pacific through a mix of RDT&E, procurement, and operational funding. \$1.6 billion is requested specifically in Air Force, Navy, and Defense-wide RDT&E.



The Bottom Line

DOD's budget request accelerates 6.4 and up RDT&E investment for modernization areas like AI, hypersonics, 5G, and cyber. These increases come at the cost of a \$2.1 billion cut to 6.1-6.3 S&T. This reflects the Department's overall FY 2022 goal of delivering fieldable capabilities to the warfighter faster and more efficiently. Given these and other DOD cuts, the Administration's flat topline for Defense spending, and razor-thin Senate and House voting margins, it will be challenging for Congress to add appropriations to make up for requested cuts.

One-Year Enacted Funding Levels
(In thousands of \$)



Proposed Reductions and Terminations

The budget request would provide \$715 billion for DOD, which is more than the FY 2021 budget request of \$705.4 billion and level with the FY 2021 enacted amount of \$715.8 billion. After much speculation about the Defense budget top line, the Biden Administration proposed flat funding for the agency, bucking the trend of 3 to 5 percent annual growth enacted by the Trump Administration. The DOD request also proposes eliminating the Overseas Contingency Operations (OCO) account and associated funding, marking an end to specific budgeting for operations in the Middle East begun in 2001 with the Global War on Terror. As such, DOD will divest many legacy Global War on Terrorism (GWOT) and OCO programs.

Shift from Basic Research to Prototyping & Delivery

The S&T accounts (6.1-6.3) would be funded at approximately \$14.7 billion, a \$2.1 billion decrease compared to FY 2021 enacted levels. Basic research would be funded at \$2.3 billion (a 13 percent decrease), applied research would be funded at \$5.5 billion (a 14 percent decrease), and advanced technology development would be funded at \$6.9 billion (an 11 percent decrease). However, overall S&T would increase by \$4.5 billion compared to the FY 2021 president's budget request, where the bulk of funding would be allocated to 6.4 accounts for advanced technology research and prototyping. This is consistent with Lewis-Burke conversations with the Biden Administration on the prioritization away from basic research to delivering new capabilities to the warfighter.



The Army, Navy, and Air Force **basic research accounts** would decrease by \$79 million, \$48.3 million, and \$45.6 million, respectively, compared to FY 2021 enacted levels. The Army, Navy, and Air Force **applied research accounts** would decrease by \$604.5 million, \$203.1 million, and \$248.3 million compared to FY 2021 enacted levels, respectively.

Defense-wide RDT&E would be funded at \$25.8 billion, a \$155 million, or 0.6 percent, decrease compared to the FY 2021 actual level. While Defense-wide basic research would decrease by 19.2 percent, applied research and advanced technology development would receive an 8.6 percent and 0.7 percent boost, respectively. Significantly, the budget request would reduce funding for the **Defense-wide Manufacturing S&T program** by 45.4 percent, **National Defense Education Program** by 18.2 percent, and **Basic Research Initiatives** by 47.3 percent compared to FY 2021 actual levels.

New and Signature Initiatives

Research Priorities by Service Account

- The **Army** has would shift funding for in-house basic research and extramural single investigation into more university-focused efforts. The applied research portfolio would include new programs in AI, biomedical technologies, communications, and soldier centric enhancements with increases to 6.3 activities. In fact, the 6.3 portfolio is significantly increased to address demonstration activities, AI, enhanced lethality, and biotechnology.
- The **Navy's** research portfolio would cut all basic research at warfare centers and 6.3 research. The applied research portfolio proposes new efforts for autonomous systems and hypersonics at the cost of U.S. Marine Corps programs.
- The **Air Force's** research portfolio would cut basic and applied research in favor of more 6.3 and above activities. 6.3 efforts of interest include next-gen aerospace, conventional weapons, battlespace knowledge development and demonstration (like the massive Joint All-Domain Command and Control or JADC2 program), and new cyber initiatives. Directed energy research was eliminated and transferred to Defense-wide accounts. New funding is proposed for nuclear command, control, and communication capabilities.
- The **Space Force**, which does not fund basic research, proposes significant increases to its RDT&E efforts with a total of \$2.2 billion for 6.2, 6.3, and 6.4 activities. New efforts include space technology development, test and evaluation investments, and satellite communications.
- **Defense-wide RDT&E accounts**, which include the Defense Advanced Research Projects Agency (DARPA) and the Defense Threat Reduction Agency (DTRA), show a decrease in basic research in favor of 6.2 and 6.3 activities to include high-energy laser research; joint hypersonics testing, development, and transition; testing and evaluation; and climate/energy initiatives. DOD also proposes new funding for the Joint Artificial Intelligence Center (JAIC) at \$186.6 million for operational systems development.

Ongoing Areas of Interest

Throughout the budget request, DOD proposes renewed or new emphasis in the following big-ticket areas:

Cyber

The request includes \$10.4 billion for cybersecurity, cyberspace operations, and cyber R&D. Funding would also include addressing critical infrastructure vulnerabilities to the defense industrial base through a new cyber resiliency initiative. Cross-cutting AI activities in cyber cryptography and rapid development, testing, and operational support to the Cyber Mission Forces under U.S. Cyber Command can also be expected in FY 2022.



Supply Chain

The request would provide \$341 million for the Defense Production Act (DPA) and \$617 million to the Industrial Base Analysis and Sustainment (IBAS) program to prioritize onshoring the U.S. supply chain. In line with the President's Executive Order on Supply Chains, the request includes \$182 million to increase U.S. production capacity for microelectronics, rare earth elements, and critical chemicals.

Climate

The Biden Administration would invest \$617 million at DOD to address the climate crisis, including \$263 million to strengthen the energy resilience of installations and \$186 million for new climate/energy S&T. This \$186 million would support efforts ranging from basic research to prototyping (6.1-6.4) focused on reducing and managing the Department's energy demand and new energy supply and storage technologies. Lewis-Burke has received indications that the Strategic Environmental Research and Development Program (SERDP) will play an expanded R&D role in ensuring climate resiliency of military installations and operational clean energy use.

Space

The budget request would provide nearly \$11.3 billion for Space Force RDT&E, a \$726.3 million increase compared to the FY 2021 enacted budget. This funding would provide increases in some space-based programs while others, mostly at the 6.1 (basic research) level, would be cut. Many space programs transferred from the Air Force budget were either consolidated or otherwise reduced. It should also be noted that while individual programs appear reduced, there would be a substantial increase in RDT&E funding for classified programs, implying FY 2022 plans to transfer many prior programs' research into operational prototype delivery and support. Defense-wide space investments would be increased \$633.4 million from the enacted level of \$466.6 million in FY 2021 to \$1.1 billion requested in FY 2022. This proposed investment reflects the Administration's commitment to operationalizing new space technology, programs, systems, and manpower. As an additional example of this commitment, the budget request proposes \$809 million for the Space Development Agency (SDA) in FY 2022, an increase of \$541.9 million over the FY 2021 enacted level of \$267 million.

Workforce

The budget request would maintain funding at previous levels for S&T undergraduate and graduate education, collaborations with universities to grow STEM students, manufacturing workforce, and shipyard and depot development programs. Cyber workforce development programs are included in a \$500 million cyber S&T request to be executed across the Department. The Administration's request includes small but targeted increases to Defense civilian and military compensation, upskilling/reskilling, and talent attraction and sustainment. While few details are provided, the Defense budget request narrative implies an increase in AI and STEM occupations and training at the expense of workforce reductions in areas made redundant by new technology and systems. How this will play out in terms of opportunities remains to be seen and will no doubt be affected further by Congress's Defense authorization and appropriations.

Other Defense Agencies and Programs

DARPA would receive approximately \$3.5 billion, a \$28 million increase relative to the FY 2021 enacted level. Within DARPA, funding for basic operational medical research science would increase, but funding for defense research sciences would decrease. Funding for basic research at DARPA would decrease, while applied research programs would increase across the board (except for tactical technology). Advanced technology development funding would remain relatively flat.

Department of Defense



The budget request would increase funding for **DTRA**, allocating \$634.9 million, an increase of \$40.8 million relative to the FY 2021 enacted level. DTRA's basic research initiatives would be funded at \$11.8 million, a decrease of approximately \$2.8 million compared to FY 2021. Funding is prioritized for applied and advanced technology development efforts to counter improvised-threats and weapons of mass destruction.

The **Defense Health Program** would receive \$630.7 million, a substantial decrease of 73.6 percent compared to the FY 2021 actual level of \$2.4 billion. However, the Congressionally Directed Medical Research Program (CDMRP) accounts for the difference between the actual and requested amounts, as CDMRP funding is added by Congress during the appropriations process.

Source: DOD's FY 2022 Budget Summary and Background Information is available at https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2022/fy2022_Budget_Request_Overview_Book.pdf.

Department of Defense (in thousands of \$)

	FY 2021 Enacted	FY 2022 Requested	FY 2021 Enacted vs. FY 2022 Requested
RDT&E, total	107,454,767	111,964,188	4,509,421 (4.2%)
S&T, Total	16,816,487	14,685,278	-2,131,209 (12.7%)
6.1, Total	2,625,796	2,282,934	-342,862 (13.1%)
6.2, Total	6,436,330	5,508,884	-927,446 (14.4%)
6.3, Total	7,754,361	6,893,460	-860,901 (11.1%)
Army RDT&E	14,144,856	12,799,645	-1,345,211 (9.5%)
Army 6.1	552,521	473,475	-79,046 (14.3%)
Army 6.2	1,518,770	914,288	-604,482 (39.8%)
Army 6.3	1,940,015	1,297,437	-642,578 (33.1%)
Navy RDT&E	20,138,391	22,639,362	2,500,971 (12.4%)
Navy 6.1	650,180	601,869	-48,311 (7.4%)
Navy 6.2	1,179,053	975,915	-203,138 (17.2%)
Navy 6.3	835,756	777,788	-57,968 (6.9%)

Department of Defense



	FY 2021 Enacted	FY 2022 Requested	FY 2021 Enacted vs. FY 2022 Requested
Air Force RDT&E	36,360,842	39,184,328	2,823,486 (7.8%)
Air Force 6.1	536,314	490,706	-45,608 (8.5%)
Air Force 6.2	1,560,836	1,312,490	-248,346 (15.9%)
Air Force 6.3	1,000,257	733,986	-266,271 (26.6%)
Space Force RDTE*	10,540,069	11,266,387	726,318 (6.9%)
Space Force 6.2*	216,874	175,769	-41,105 (19.0%)
Space Force 6.3*	0	76,653	76,653 (--)
Defense-wide RDT&E	26,013,489	25,857,875	-155,614 (0.6%)
Defense-wide 6.1	886,781	716,884	-169,897 (19.2%)
Defense-wide 6.2	1,960,797	2,130,395	169,598 (8.6%)
Defense-wide 6.3	3,978,333	4,007,596	29,263 (0.7%)
Defense Health R&D	2,392,579	630,680	-1,761,899 (73.6%)

**The Space Force RDT&E, 6.2, and 6.3 lines are not new efforts initiated in FY 2021, but rather space-related efforts within the Air Force that have been transitioned to the newly established Space Force.*

Department of Education

Under the President's budget request, funding for the discretionary programs within Department of Education (ED) would be \$102.8 billion, a 41% increase compared to the FY 2021 enacted level. The Pell Grant program maximum award would increase by \$1,875 for the 2022-2023 school year and eligibility for Pell and campus-based aid would be extended to recipients of the Deferred Action for Childhood Arrivals (DACA) program.

Quick Take: The budget request for ED is inclusive of the President's FY 2022 budget priorities and President's proposals previously outlined in the American Jobs Plan (AJP) and the American Families Plan (AFP). Overall, it proposes significant increases in investment into education, with an emphasis on equity, accessibility, and affordability.

New Initiatives/Priorities: The request proposes a wide variety of new programs and priorities. Highlights include raising the maximum Pell Grant award to \$8,370, after accounting for proposed increases in discretionary and mandatory funding. The request also proposes \$14.3 billion to invest in free community college, and incorporates the AFP's proposal to subsidize tuition at Historically Black Colleges and Universities (HBCUs), Tribal Colleges and Universities (TCUs), and Minority-Serving Institutions (MSIs), for families earning less than \$125,000 a year. It also proposes \$20 billion for a new Title I Equity Grants program, which would support K12 districts serving high concentrations of students from low-income backgrounds.

Major Cuts/Eliminations: There are no proposed program eliminations or consolidations in this budget request.

The Bottom Line

This budget request proposes a historic investment in American education that is focused on access, affordability, and equity. Although Democrats control both chambers of Congress, it is unlikely that this budget is passed into law as written, given recent high levels of spending in COVID-19 recovery bills and other Administration proposals.

New and Signature Initiatives

In addition to the new priority areas above, the FY 2022 budget request also proposes numerous policy changes such as creating a grant program to help states finance free community college, a new grant program to support innovative approaches to increase student postsecondary completion, and investments in teacher preparation and professional development. Many of the new programs and dramatic expansions of funding for existing programs are proposed to run through mandatory rather than annual, discretionary spending and likely to have a very difficult pathway for advancing through Congress.

Significant Expansion of the Pell Grant

The budget request recommends a \$400 discretionary increase to the **Pell Grant**, the largest one-time increase since 2009. After the \$1,475 increase outlined in the American Families Plan is taken into account, the **Pell Grant** would have a maximum grant award of **\$8,370** for the 2022-2023 school year. The budget request makes clear this is President Biden's first step in fulfilling his commitment to doubling the Pell Grant. In addition to the proposed 28.9% increase in the maximum Pell Grant, the budget request would extend Pell Grant and campus-based aid eligibility to DACA recipients.

Free Community College and HBCU/MSI Tuition Support

As first described in the AFP proposal, the budget request proposes \$14.3 billion dollars in FY 2022, and \$108.5 billion in mandatory spending over ten years, to provide **Free Community College** through a mandatory first-dollar grant program to States, tribal governments, and territories. Through this program, the federal government would provide funding to cover 75 percent of the cost of community college attendance for eligible students in States and territories and 90% of the cost for Tribes. First time students and those looking to re-skill would be eligible to earn a degree or credential for free through the waiving of their tuition and fees, and they would have three years, plus a potential one-year extension, to complete their program of study. States receiving money from this grant program would have to make “evidence-based institutional reforms” to improve outcomes for students and promote better alignment between high schools and two-and four-year institutions of higher education.

Under a new \$4.6 billion effort called the **Advancing Affordability for Students**, the budget request proposes two years of subsidized tuition for students from families earning less than \$125,000 enrolled in a public or private 4-year HBCUs, TCUs, or MSIs. Institutions would apply annually for a grant to reimburse for the cost of reducing tuition and fees based on the number of eligible students. Also as first mentioned in the AFP, the budget request calls for a **competitive Health Professionals of the Future** grant program for HBCUs, TCUs, and MSIs “to create or expand graduate programs that prepare students for high-skilled jobs in the health care sector and help diversify the healthcare sector pipeline.”

Student Success and Completion Grants

The budget request proposes a new \$68 million grant program, under **the Fund for the Improvement of Postsecondary Education (FIPSE)**, to support the expansion and scaling of innovative “evidence-based approaches designed to improve student access to, success in, and completion of postsecondary education as well as connections to career opportunities.” The proposed multi-tiered grant program would also support projects aimed at institutional change to improve student success, especially for underserved populations.

As outlined under AFP, the budget also proposes \$6.2 billion in FY 2022 for a **Completion Grants Program**, which would provide grants to States and Tribes to invest in completion and retention activities at colleges and universities that serve high numbers of low-income students.” Additionally, the budget request reiterates the AFP proposal for \$2.4 billion in mandatory spending to support **Community College Infrastructure**, including facilities and technology investments.

Mental Health, Diverse Schools, CTE, and Career Pathways

The budget request proposes \$100 million dollars for the creation of the **Fostering Diverse Schools** grant program. This program would provide support to Local Education Agencies (LEAs) to participate in voluntary activities to end persistent achievement gaps and/or socioeconomic and racial segregation within their PreK-12 schools. The budget request includes \$1 billion for a new **School-Based Health Professionals** grant program to support increasing the number of counselors, nurses, and mental health professionals in schools. The budget request also proposes an increase of \$108 million for the **Career and Technical Education (CTE)** National Programs to support an innovation grants initiative focused on youth work-based learning and industry credential attainment.

In addition, \$1.0 billion in mandatory funding via AFP is proposed in order to expand career pathways for middle and high school students, particularly in underserved communities.

Investments in Teacher Professional Development and Training

The budget request includes several proposals to increase investment in teacher preparation and training, including the **Teacher Quality Partnerships (TQP)** program, which would receive an \$80 million dollar increase in discretionary spending for FY 2022. Other investments in teacher training include a proposed \$20 million to fund for the first time the **Hawkins Centers of Excellence** program, which would support efforts at diversifying the educator workforce by increasing the number of high-quality teacher preparation programs at Minority-Serving Institutions.

The request also calls for a one-time, \$1.6 billion dollar investment in the **Supporting In-Demand Credentials for Teachers State Grant Program**, which would allow teachers to earn additional certifications in high-demand subjects like special education, bilingual education, CTE, and STEM and creates a **new Expanding Opportunities for Teacher Leadership Development** program to allow teachers to receive compensation for taking on-the-job leadership roles and mentoring through \$200 million in mandatory funding from the American Families Plan. Also in response to the AFP, a \$280 million increase in mandatory spending for the TQP program and \$40 million in mandatory funds for **the Hawkins Centers of Excellence** program is proposed. Personnel preparation programs authorized by the Individuals with Disabilities Education Act would receive \$250 million in discretionary funding with an additional \$90 million via AFP. Finally, the request calls for the doubling of **TEACH grants** to \$8,000 dollars.

Proposed Funding for Existing Programs of Note

Student Aid

The budget proposes flat funding at the FY 2021 levels for the **Federal Work Study (FWS)** program at \$1.19 billion and the **Federal Supplemental Educational Opportunity Grant (SEOG)** program at \$880 million. The budget request did not make any specific proposals to change the ways student loans, repayment plans, or the Public Service Loan Forgiveness (PSLF) program were administered. Instead, the budget request stated that the Administration hopes to work with Congress through a reauthorization of the *Higher Education Act* to make income driven repayment plans and PSLF more generous and ensure access to federal student aid for DACA recipients.

Higher Education Grant Programs

The President's FY 2022 request provides generous increases for many competitive grant programs, such as the **Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP)**, which would be funded at \$408 million, a \$40 million dollar funding increase from FY 2022. Additionally, the TRIO programs would receive a \$200 million increase. The **Graduate Assistance in Areas of National Need (GAANN)** program would receive flat funding at \$23.5 million dollars. The **Child Care Access Means Parents In School (CCAMPIS)** program would receive an increase of \$40 million for a total of \$95 million in funding. This funding would support 372 continuation awards and 240 new awards.

Unlike last year's budget proposal, the FY 2022 budget does not recommend consolidation of MSI programs under Title III and Title V. Additionally, the budget proposal would provide significant increases for the **Developing HSIs, Strengthening Historically Black Colleges and Universities, Strengthening Asian American and Native American Pacific Islander-serving Institutions, and Promoting Post-Baccalaureate Opportunities for Hispanic Americans programs**. Additionally, the budget request proposes a \$500 million increase in mandatory funding for Title III and V programs covered under the *FUTURE Act*. The **Minority Science and Engineering Improvement Program (MSEIP)** is recommended to receive a \$5 million increase in FY 2022, while the **Strengthening Institutions Program (SIP)** would receive a \$100 million increase.

Department of Education



Education Research

The FY 2022 budget request would increase funding for **the Institute of Education Sciences (IES)** overall to \$737.5 million, a \$95 million increase from the FY 2021 enacted level. Specifically, the budget request proposes increased funding for the Research, Development, and Dissemination activities related to studying learning loss from COVID-19, the National Assessment of Educational Progress (NAEP) to begin research on improving assessment quality while maintaining the current assessment schedule, and for Special Education Studies and Evaluations to conduct a study on special education expenditures. Flat funding was proposed for Regional Education Laboratories and the Statewide Longitudinal Data Systems programs.

In a change from the previous Administration, there were no proposed consolidations or eliminations to K-12 competitive grant programs authorized by the Elementary and Secondary Act. Of the programs which can include higher education partners, the **Education Innovation and Research (EIR)** grant program would be funded at its FY 2021 level of \$194 million and the **Promise Neighborhoods** grant program would receive a \$10 million increase in FY 2022, bringing its funding to \$91.0 million.

Proposed Reductions and Terminations

There were no program cuts or consolidations recommended in the FY 2022 budget request.

Source: ED's FY 2022 Budget Summary and Background Information is available at <https://www2.ed.gov/about/overview/budget/budget22/index.html> and ED budget justifications can be found at <https://www2.ed.gov/about/overview/budget/budget22/justifications/index.html>.

U.S Department of Education (in thousands of \$)

	FY 2021 Enacted	FY 2022 Requested	FY 2021 Enacted vs. FY 2022 Requested
Elementary and Secondary Education*			
Promise Neighborhoods	81,000	91,000	10,000 (9.43%)
Education Innovation and Research	194,000	194,000	--
Personnel Preparation	90,200	250,000	159,800 (177.16%)
CTE National programs	7,421	115,421	108,000 (1455.33%)
Student Financial Assistance*			
Pell Grant*	6,495	8,370	1,875 (28.87%)
SEOG	880,000	880,000	--
Federal Work-Study	1,190,000	1,190,000	--

Department of Education

	FY 2021 Enacted	FY 2022 Requested	FY 2021 Enacted vs. FY 2022 Requested
Higher Education			
Title V Aid for Developing HSIs [‡]	148,732	236,732	88,000 (59.17%)
Promoting Post-Baccalaureate Opportunities for Hispanic Americans	13,845	28,845	15,000 (108.34%)
Strengthening Institutions	109,007	209,007	100,000 (91.74%)
Strengthening Historically Black Colleges (HBCUs)	337,619	402,619	65,000 (19.25%)
Strengthening Asian American- and Native American Pacific Islander-serving Institutions (AANAPISI)	5,120	20,120	15,000 (292.97%)
Strengthening Native American-Serving Nontribal Institutions	5,120	12,120	7,000 (136.72%)
Title VI International Education and Foreign Language Studies	78,164	78,164	--
TRIO Programs	1,097,000	1,297,761	200,761 (18.30%)
GEAR UP	368,000	408,000	40,000 (10.87%)
GAANN	23,547	23,547	--
Teacher Quality Partnerships	52,092	132,092	80,000 (153.57%)
Child Care Access Means Parents in Schools	55,000	95,000	40,000 (72.73%)
Institute of Education Sciences	642,462	737,465	95,003 (14.79%)
Research, Development and Dissemination	197,877	267,880	70,003 (35.58%)
Research in Special Education	58,500	58,500	--
Regional Education Laboratories	57,022	57,022	--
Statewide Data Systems	33,500	33,500	--

[‡] The Pell Grant is listed as the total maximum grant award an individual could receive, including mandatory and discretionary funding. It is not listed in thousands of dollars.

The amounts shown for FY 2021 enacted are taken from the Biden Administration's Fiscal Year 2022 Budget Summary.

The President's FY 2022 budget request would fund DOE at a level of \$46.2 billion, a \$4.4 billion or 10 percent increase compared to the FY 2021 enacted level.

Quick Take: The budget request proposes increases to all DOE fundamental and applied energy programs. The highest priority is on the development, deployment, and demonstration of clean energy technologies with a proposed increase of \$5.8 billion in research and development compared to the FY 2021 enacted level. This supports the Administration's goal of achieving net zero emissions for the electricity sector by 2035. The budget request would also provide \$7.4 billion for the Office of Science, an increase of \$414 million above the enacted level, with the highest priority expanding climate and earth systems science research.

Major Cuts/Eliminations: For the first time in a decade, the nuclear security programs of the National Nuclear Security Administration (NNSA) would be held flat compared to average increases of 10 percent a year. Within NNSA, the Stockpile Research, Technology, and Engineering program, which funds major university programs, would be cut by \$123 million compared to the FY 2021 enacted level.

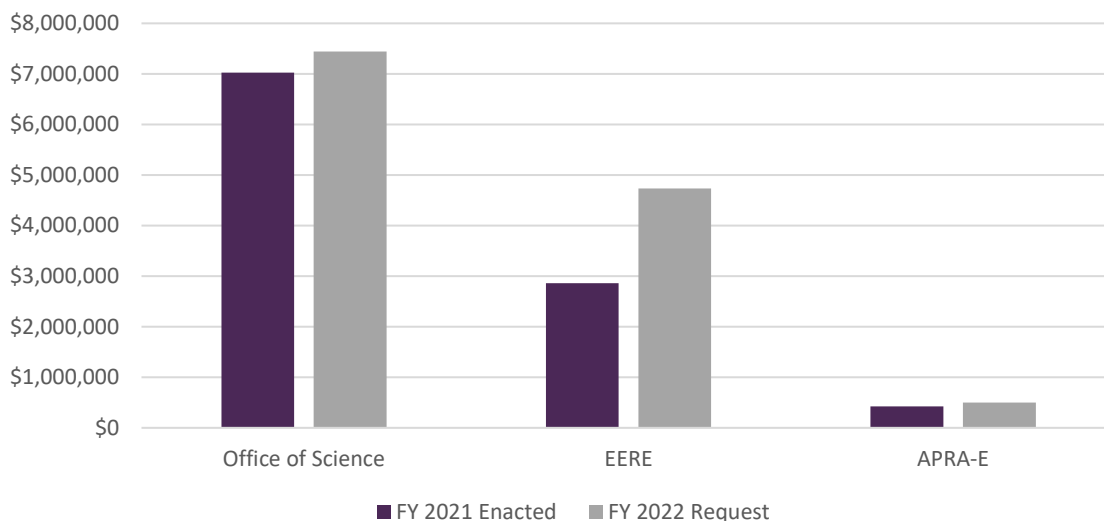
New Initiatives/Priorities: With a major focus on clean energy development and deployment, the budget request proposes \$200 million to establish a new Advanced Research Project Agency-Climate (ARPA-C) to fund climate adaptation and resiliency projects in coordination with other federal agencies. The request also proposes \$400 million to establish a new Office of Clean Energy Demonstration, which would initially focus on energy storage projects in FY 2022. The biggest change in research direction proposed by the budget request would be pivoting fossil energy efforts to focus on carbon capture, utilization, and storage and new investments in mitigating methane leaks, direct air capture, and carbon capture to convert biomass waste to energy. The Office of Science plans to compete new Urban Integrated Field Labs, start new investments in fundamental science to transform advanced manufacturing, launch a new Reaching a New Energy Sciences Workforce (RENEW) initiative to fund undergraduate and graduate training opportunities for students at underrepresented academic institutions, and establish a new National Climate Laboratory or Center affiliated with a Historically Black College or University. DOE also plans to compete two new Clean Energy Manufacturing Innovation (CEMI) Institutes.

The Bottom Line

DOE plans to significantly expand clean energy research and development activities in renewables, energy efficiency, nuclear energy, fossil energy, advanced manufacturing, grid modernization and cybersecurity and proposes new programs focused on demonstration projects and climate adaptation and resiliency. The largest planned growth is for energy storage, carbon management and utilization, and transportation fuels. DOE will also continue major investments in quantum, Artificial Intelligence, microelectronics, and biotechnology.



One-Year Enacted Funding Levels
(In thousands of \$)



Proposed Reductions and Terminations

National Nuclear Security Administration (NNSA)

Compared to the last decade of at least 10 percent growth year over year, the budget request would keep NNSA essentially flat. This is consistent with the Biden Administration's overall budget proposal of flat funding for defense discretionary spending in FY 2022. At budget hearings, Republicans and some leading Democrats have already expressed concern about NNSA's ability to maintain a credible nuclear deterrent and address modernization needs with flat funding.

Given budget constraints and growing costs for life extension projects and building new nuclear facilities, the budget request proposes cutting the Stockpile Research, Technology, and Engineering program, which funds university programs by \$123 million or 4 percent compared to the FY 2021 enacted level. This includes a \$46 million or 8 percent reduction for the Inertial Confinement Fusion program. There is also a \$6 million or 6 percent reduction for Academic Programs that would reduce grants for technical skills-based pre-apprenticeship and apprenticeship programs that provide employer-driven or recognized postsecondary credentials through the DOE National Lab Jobs ACCESS Program. The budget would maintain FY 2021 enacted funding levels for Stewardship Science Academic Alliance programs, like Centers of Excellence and graduate fellowships; the Minority Serving Institution Partnership program; and the Joint Program in High Energy Density Laboratory Plasmas.

New and Signature Initiatives

Office of Science

The budget request would provide \$7.4 billion for the Office of Science, an increase of \$414 million or 6 percent above the FY 2021 enacted level. Unlike the Trump Administration, which prioritized new investments in Industries of the Future, the major focus of the Biden Administration is on supporting fundamental research to advance clean energy technologies and climate modeling.

Major new initiatives and funding increases include:

- **\$422 million for Climate Research:** The budget request would provide \$422 million, an increase of \$71 million or 20 percent above the FY 2021 enacted level, for earth and environmental systems sciences. This increase would support new **Urban Integrated Field Laboratories** in different regions of the country to develop integrated models and tools to improve understanding of the natural and human components of the climate system. These tools would then provide impacted communities with the best possible tools to evaluate the societal and environmental impacts of current and future energy policies. DOE would also launch a **National Virtual Climate Laboratory (NVCL)** to serve as a one stop portal to access climate science at the DOE national laboratories and user facilities. DOE also plans to move forward with a center-level competition for a new **Climate Laboratory** affiliated with a Historically Black College or University (HBCU) or other Minority Serving Institution (MSI).
- **\$55 million in new funding for Clean Energy Research:** The budget request proposes \$449 million, an increase of \$55 million or 14 percent above the FY 2021 enacted level, for materials, chemical, and biosciences in support of new clean energy research. Priority research areas include direct air capture of carbon dioxide, hydrogen production including the use of solar energy, and new materials and chemistries for next-generation electrical and thermal energy storage. This funding includes \$129 million, an increase of \$14 million, for **Energy Frontier Research Centers (EFRC)**. DOE plans to release a \$100 million funding call in Fall 2021 to compete EFRCs and expects to make between 40 and 50 center-level awards. EFRC topics will likely focus on clean energy, advanced manufacturing, and microelectronics.
- **\$25 million for a new Fundamental Science to Transform Advanced Manufacturing Initiative:** This new initiative would focus on fundamental science that drives advanced manufacturing. Priority areas include circular, clean, and scalable synthesis and processing; transformational operando characterization; multiscale models and tools; co-design of materials, processes, and products for functionality and use; and advanced manufacturing for novel polymer upcycling approaches as well as new bio-based materials.
- **\$28 million for a new Reaching a New Energy Sciences Workforce (RENEW) Initiative:** The goal is to leverage expertise and user facilities at national laboratories to provide undergraduate and graduate training opportunities for underrepresented students and academic institutions and advance diversity, equity, and inclusion goals. This includes partnering with Minority Serving Institutions and individuals from groups historically underrepresented in STEM, but also includes students from communities with environmental justice impacts and Established Program to Stimulate Competitive Research (EPSCoR) jurisdictions.

The budget request also includes modest increases for emerging technology areas, including:

- **\$298 million for Quantum Information Science:** The budget request proposes increasing investments in quantum information science from \$270 million in FY 2021 to \$298 million in FY 2022. Funding would be used to support core fundamental research projects in quantum information science across all six Office of Science programs and fully fund the five DOE National Quantum Centers. New funding would be used to support the quantum communications and networking initiative. This includes early-stage research and development needed to establish a Quantum Network, such as transporting and storing quantum information over interconnects and networks and designing new quantum devices.



- **\$130 million for Artificial Intelligence (AI):** The budget request proposes a modest increase for AI activities from \$125 million in FY 2021 to \$130 million in FY 2022. Areas of focus will continue to include improving the robustness, reliability, and transparency of machine learning and big data tools; advancing uncertainty quantification; and developing software tools to more tightly couple simulation, data analysis, and AI for DOE missions.
- **\$48 million for Microelectronics:** The budget request proposes increasing investments in microelectronics from \$30 million in FY 2021 to \$48 million in FY 2022. DOE plans to expand funding for materials research, device physics, design and fabrication, computer engineering of micro-architectures, and computer science and applied mathematics to meet the needs of data intensive and edge computing, future accelerator systems, and other technologies. Most of these funds will expand activities of microelectronics research centers to have a more integrated, end-to-end development process where innovative materials, devices, and architecture requirements are driven by specific applications, algorithms, and software.
- **\$445 million for Exascale Computing:** Funding for this effort would drop from \$480 million in FY 2021 to \$445 million in FY 2022, but this is consistent with prior plans to shift funding to research and development and support ongoing development of applications and software for exascale systems instead of hardware procurements. This level of funding supports the deployment of the first exascale-capable computer at Argonne National Laboratory in 2021 and at Oak Ridge National Laboratory in 2022. The budget request would also fully fund computational materials and chemical sciences centers.

DOE proposes to significantly expand or launch new applied energy initiatives. Major highlights include:

- **\$200 million for a new ARPA-C:** The purpose of ARPA-C is to “invest in climate-related innovations necessary to enable adaptation, increase resilience, and achieve net zero non-energy emissions by 2050.” While managed by DOE, ARPA-C would coordinate closely with other federal agencies and review proposals jointly. The budget request includes another \$300 million in FY 2022 for ARPA-C in the Departments of Agriculture, Commerce, Homeland Security, Housing and Urban Development, Interior, and Transportation, and the Environmental Protection Agency. DOE, in coordination with other federal agencies, plans to fund six new programs:
 1. climate sensors and monitoring to improve greenhouse gas (GHG) detection, climate analysis, and extreme event prediction;
 2. improved tools to assess quantities and permanence of GHG stored in land, underground, or in oceans;
 3. carbon neutral or negative agricultural production;
 4. prevention of GHG emissions from land sources such as permafrost;
 5. carbon neutral waste and recycling; and
 6. resilient infrastructure such as roads, transit, building technologies, self-healing materials, air quality systems and water supply and distribution.Given the lack of details about ARPA-C and the fact that DOE already manages ARPA-E, Congress has already expressed deep skepticism about ARPA-C and there is currently little support.
- **\$500 million for ARPA-E:** The budget request proposes a \$73 million or 17 percent increase for ARPA-E to fund high risk energy technology development. In FY 2022, ARPA-E plans to release up to 15 new funding opportunity announcements in different technology areas including materials for carbon-neutral or carbon-negative buildings; technologies to dramatically reduce high-level nuclear waste; advanced battery electrodes and conductors for high capacity and rapid charge; grid resilience, reliability, and flexibility through approaches in topology and power flow optimization, integration of distributed energy resources into transmission-level operations, and microgrids; and advanced fusion approaches and energy applications.

- **\$400 million for a new Office of Clean Energy Demonstrations (OCED):** The purpose of OCED is to fund commercial-scale clean energy demonstrations focused on crosscutting energy challenges. OCED would “serve as the Department’s hub for accelerating the maturation of near-and mid-term clean energy technologies and systems with the goal of quicker commercial adoption and increased availability.” In FY 2022, DOE would issue at least one competitive solicitation on commercial-scale energy storage demonstrations. DOE then plans to issue at least one technology neutral commercial-scale demonstration solicitation per year.
- **\$4.7 billion for Renewable Energy and Energy Efficiency programs:** The budget request would increase funding for renewable energy and energy efficiency programs by \$1.9 billion or 65 percent. All research and development activities would see significant funding increases ranging from 31 percent (e.g., hydrogen and fuel cell technologies) to 86 percent (e.g., wind energy). Increased funding is meant to accelerate key objectives, including decarbonizing the electricity sector; decarbonizing transportation for air, sea, rail, and road; decarbonizing energy-intensive industries; and reducing the carbon footprint of buildings. DOE also plans to expand efforts to decarbonize the agricultural sector in collaboration with the Department of Agriculture through the development of biofuels, greater efficiency of off-road agricultural vehicles, on-site production of animal waste to clean energy, and better understanding and prediction of water flow to design more water and energy efficient irrigation systems. DOE also would compete two new **Clean Energy Manufacturing Innovation (CEMI) Institutes**.
- **\$890 million for Fossil Energy and Carbon Management:** The budget request would grow research and development for fossil energy by \$140 million or 19 percent to focus on carbon capture, utilization and storage. Major FY 2022 priorities include reducing methane emissions, accelerating zero-carbon and carbon-neutral hydrogen, developing low-carbon supply chains for industries, advancing carbon dioxide removal from the atmosphere, deploying point source carbon capture and storage, advancing critical minerals, and increasing efficient use of big data and artificial intelligence.
- **\$25 million for a new Nuclear Forensics R&D University Consortium:** NNSA, through its Nuclear Nonproliferation Program, plans to establish a new nuclear forensics university consortium to conduct research and development in science, engineering, and other disciplines to address basic research shortfalls and train the next generation of experts needed to support NNSA’s technical nuclear forensics missions.

Source: Preliminary details on DOE’s FY 2022 budget request are available at [doe-fy2022-budget-in-brief.pdf \(energy.gov\)](https://www.energy.gov/oe/doe-fy2022-budget-in-brief).

Department of Energy (in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
DOE, Total	41,865,625	46,189,430	4,323,805 (10.3%)
Science	7,026,000	7,440,000	414,000 (5.9%)
Advanced Scientific Computing Research	1,015,000	1,040,000	25,000 (2.5%)
Basic Energy Sciences	2,245,000	2,300,000	55,000 (2.4%)
Biological and Environmental Research	753,000	828,000	75,000 (10.0%)
Fusion Energy Sciences	672,000	675,000	3,000 (0.4%)
High Energy Physics	1,046,000	1,061,000	15,000 (1.4%)
Nuclear Physics	713,000	720,000	7,000 (1.0%)
Isotope R&D and Production*	--	90,000	--
Accelerator R&D and Production*	--	24,000	--
Workforce Development for Teachers and Scientists	29,000	35,000	6,000 (20.7%)
Science Laboratories Infrastructure	240,000	295,000	55,000 (22.9%)
ARPA-E	427,000	500,000	73,000 (17.1%)
ARPA-C[†]		200,000	200,000 (N/A)

Department of Energy



EERE	2,861,760	4,732,000	1,870,240 (65.4%)
Hydrogen and Fuel Cell Technologies	150,000	197,500	47,500 (31.7%)
Bioenergy Technologies	255,000	340,000	85,000 (33.3%)
Solar Energy Technologies	280,000	386,575	106,575 (38.1%)
Wind Energy Technologies	110,000	204,870	94,870 (86.2%)
Geothermal Technologies	106,000	163,760	57,760 (54.5%)
Water Power Technologies	150,000	196,560	46,560 (31.0%)
Vehicle Technologies	400,000	595,000	195,000 (48.8%)
Building Technologies	290,000	382,000	92,000 (31.7%)
Advanced Manufacturing Technologies	396,000	550,000	154,000 (38.9%)
Electricity	211,720	327,000	115,280 (54.4%)
Cybersecurity, Energy Security, and Emergency Response	156,000	201,000	45,000 (28.8%)
Nuclear Energy	1,507,600	1,850,500	342,900 (22.7%)
Fossil Energy and Carbon Management R&D [‡]	750,000	890,000	140,000 (18.7%)
National Nuclear Security Administration	19,732,200	19,743,000	10,800 (0.1%)
Weapons Activities	15,345,000	15,484,295	139,295 (0.9%)
Defense Nuclear Non-proliferation	2,260,000	1,934,000	-326,000 (14.4%)

* Isotope R&D and Production and Accelerator R&D and Production are not new efforts initiated in FY 2022, but rather efforts within the Office of Science that have been transitioned to new programs.

[†]ARPA-C is a new proposed program for FY 2022.

[‡]The Office of Fossil Energy R&D has been renamed to reflect its expanded mission.

Department of Health and Human Services



The president's FY 2022 budget request would provide \$131.8 billion in discretionary funding and \$1.5 trillion in mandatory funding for activities at the Department of Health and Human Services (HHS), including the Federal Drug Administration (FDA), the National Institutes of Health (NIH), and other programs.

National Institutes of Health



The budget request would fund the National Institutes of Health (NIH) at \$52 billion in FY 2022, an increase of \$9 billion, or 21 percent, above the FY 2021 enacted level. Of this amount, \$6.5 billion is included to establish the Advanced Research Projects Agency for Health (ARPA-H), a new entity that would aim to “drive transformational health research innovation and speed medical breakthroughs.”

Quick Take: The Biden Administration proposes a bold and historic \$52 billion for the NIH in FY 2022. Its signature biomedical research initiative, ARPA-H, has the potential to significantly transform the biomedical research enterprise.

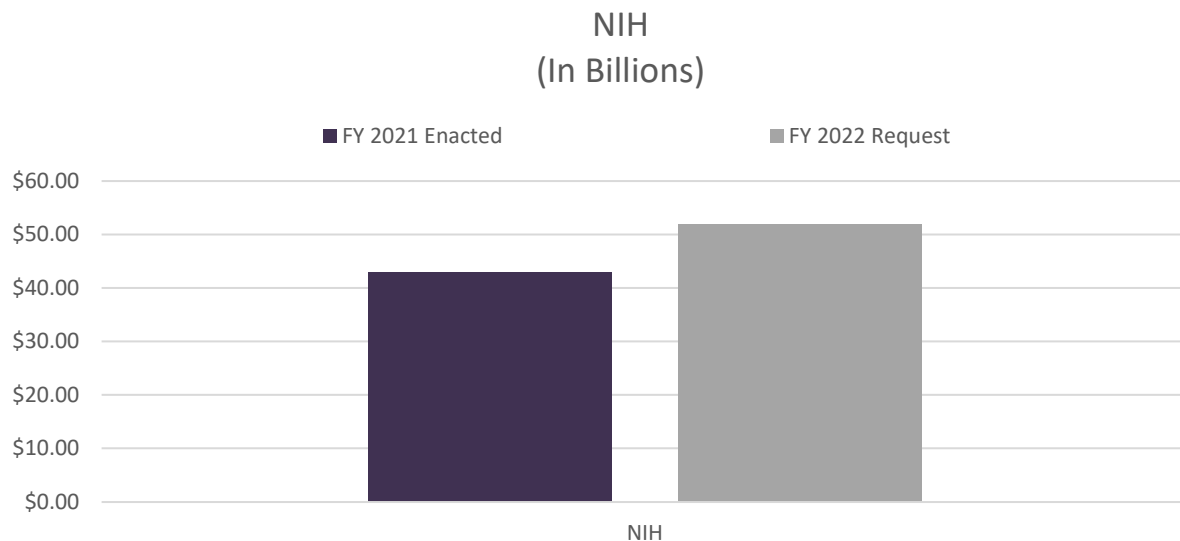
Major Cuts/Eliminations: With the exception of a few programs nearing planned completion, the Biden Administration does not propose significant cuts or eliminations to major NIH programs.

New Initiatives/Priorities: The majority of the proposed increase for NIH, \$6.5 billion, would be used to establish ARPA-H, a new entity within NIH that would use nontraditional research and development (R&D) approaches to invest in highly innovative science with the potential for transformative breakthroughs. If established, ARPA-H has the potential to reshape the nation's biomedical research enterprise. In addition, the Biden Administration would invest in new research priorities related to the impacts of climate change on human health and research to eliminate health disparities and improve health equity.

The Bottom Line

The Biden Administration's proposal of \$52 billion for the NIH reflects the Administration's strong commitment to confronting public health challenges while increasing investments in transformative innovation. NIH enjoys deep bipartisan support and Congress will likely once again increase NIH funding in FY 2022. Although early signs indicate bipartisan Congressional support for the proposed ARPA-H, Congress will need to work out many critical details about ARPA-H's organization, scale, and scope.

Department of Health and Human Services



New and Signature Initiatives

Within the Biden Administration’s FY 2022 proposal for NIH, the most significant proposed initiative is the creation of the **Advanced Research Projects Agency for Health (ARPA-H)**. The request includes \$6.5 billion for ARPA-H in FY 2022, with this amount being available for three years. Modeled after other federal advanced research projects agencies like the Defense Advanced Research Projects Agency (DARPA) and the Advanced Research Projects Agency-Energy (ARPA-E), the proposed ARPA-H would use nontraditional approaches to fund highly innovative projects with the potential for truly transformative scientific breakthroughs in health and medicine. ARPA-H would aim to overcome technical and market barriers to accelerate biomedical innovation and deliver more cures and treatments for more diseases and conditions. Designed to be more nimble and more focused on high-risk high-reward research than NIH’s current Institutes and Centers, ARPA-H would be tasked with developing new cross-sector partnerships to address grand challenges in medicine that require large-scale and sustained coordination; creating new technologies, platforms, and capabilities; and supporting truly high-risk investigation with the potential for paradigm-shifting scientific advances.

ARPA-H would take a more directed approach to biomedical R&D, with a focus on high-risk high-reward projects and the use of time-limited agreements with performance milestones. This would mark a significant departure from NIH’s traditional approach to funding research, which relies heavily on investigator-initiated research that can be risk-adverse and incremental in scope. The Administration’s proposal indicates that ARPA-H would have a distinctive culture and organizational structure relative to the existing NIH Institutes and Centers and would use flexible hiring and procurement authorities like Other Transaction Authority (OTA) to “advance biomedical science quickly and robustly.”

NIH Director Francis Collins has indicated that ARPA-H would complement, and not compete with, NIH’s existing research portfolio. Significant additional details on ARPA-H’s structure, scale, and scope are still lacking, including how such an initiative would differentiate itself from the National Center for Advancing Translational Sciences (NCATS) and the National Institute of Biomedical Imaging and Bioengineering (NIBIB), whose missions revolve around advancing R&D to improve diagnostics and therapeutics across multiple human diseases. However, if

Department of Health and Human Services



established, ARPA-H has the potential to reshape the nation's biomedical research ecosystem.

In addition, the Administration proposes \$110 million, an increase of \$100 million over the FY 2021 enacted level, for NIH's **climate change and human health** program to focus on advancing research on the human health impacts of climate change. The Biden Administration considers climate change and its associated health impacts, including environmental health disparities, one of the top public health challenges currently facing the nation.

The Administration prioritizes research to address **health disparities and eliminate health inequities** and proposes an additional \$330 million to enhance research on health disparities through collaborations and partnerships that support evidence-based science to address and eliminate longstanding health inequities. Of this amount, \$250 million would be directed to the National Institute on Minority Health and Health Disparities (NIMHD). The remaining \$80 million would be targeted for health disparities research at the National Heart, Lung, and Blood Institute (NHLBI), the National Institute on Nursing Research (NINR), and the Fogarty International Center (FIC).

Ongoing Areas of Interest

The budget request prioritizes additional research on the **long-term health impacts of COVID-19**. Specifically, the Administration proposes an additional \$15 million for research related to COVID-19 effects on pediatric populations, including studies on multisystem inflammatory syndrome in children (MIS-C). In addition, the budget request would provide \$25 million to the National Institute of Mental Health (NIMH) for research on the mental health impacts of the pandemic on all Americans, with a focus on understanding the risks, mechanisms, and treatment in response to COVID-19 among individuals with mental disorders.

The Administration's FY 2022 budget request prioritizes research to respond to the **opioid public health crisis** and other addiction and substance abuse issues and would provide \$2.2 billion across the NIH for research on opioids, pain, and stimulants. This would constitute an increase of \$626.6 million over the current FY 2021 enacted level for these activities in the context of NIH's ongoing Helping to End Addiction Long-term (HEAL) Initiative.

The FY 2022 budget request continues to emphasize research on improving **maternal health** and would provide \$30 million for the Implementing a Maternal Health and Pregnancy Outcomes Vision for Everyone (IMPROVE) initiative. IMPROVE would support research on effective mitigation approaches for preventable maternal mortality, decrease severe maternal morbidity, and promote maternal health equity.

The Administration's FY 2022 budget request would double the amount of funding available for **gun violence research**, bringing the total to \$25 million for firearm violence prevention research at NIH.

The Biden Administration would retain the investigator salary cap at Executive Level II (\$199,300). The budget request also includes \$30 million that would support a 27 percent expansion of non-human primate research infrastructure.

Sources:

HHS Budget in Brief is available at <https://www.hhs.gov/sites/default/files/fy-2022-budget-in-brief.pdf>. NIH's FY 2022 Budget Justification is available at <https://officeofbudget.od.nih.gov/pdfs/FY22/br/2022%20CJ%20Overview%20Volume%20May%2028.pdf>.

Department of Health and Human Services



National Institutes of Health (in thousands)

	FY 2021 Enacted	FY 2021 Request	FY 2022 Request vs. FY 2021 Enacted
NIH, Total	42,935,500	51,952,703	9,017,203 (21.0%)
National Cancer Institute (NCI)	6,558,805	6,733,302	174,497 (2.7%)
National Heart, Lung, and Blood Institute (NHLBI)	3,664,703	3,845,681	180,978 (4.9%)
National Institute of Dental and Craniofacial Research (NIDCR)	484,843	516,197	31,354 (6.5%)
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	2,281,931	2,360,748	78,817 (3.5%)
National Institute of Neurological Disorders and Stroke (NINDS)	2,510,913	2,783,300	272,387 (10.8%)
National Institute of Allergy and Infectious Diseases (NIAID)	6,067,071	6,245,926	178,855 (2.9%)
National Institute of General Medical Sciences (NIGMS)	2,991,417	3,096,103	104,686 (3.5%)
Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)	1,837,972	1,942,117	104,145 (5.7%)
National Eye Institute (NEI)	835,521	858,535	23,014 (2.8%)
National Institute of Environmental Health Sciences (NIEHS)	896,168	1,020,647	124,479 (13.9%)
National Institute on Aging (NIA)	3,899,926	4,035,591	135,665 (3.5%)

Department of Health and Human Services



National Institutes of Health (in thousands)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)	634,286	680,186	45,900 (7.2%)
National Institute on Deafness and Other Communications Disorders (NIDCD)	498,073	511,792	13,719 (2.8%)
National Institute of Mental Health (NIMH)	2,105,902	2,213,574	107,672 (5.1%)
National Institute on Drug Abuse (NIDA)	1,480,309	1,852,503	372,194 (25.1%)
National Institute on Alcohol Abuse and Alcoholism (NIAAA)	554,882	570,165	15,283 (2.8%)
National Institute on Nursing Research (NINR)	174,936	199,755	24,819 (14.2%)
National Human Genome Research Institute (NHGRI)	616,012	632,973	16,961 (2.8%)
National Institute of Biomedical Imaging and Bioengineering (NIBIB)	410,726	422,039	11,313 (2.8%)
National Institute on Minority Health and Health Disparities (NIMHD)	391,586	652,244	260,658 (66.6%)
National Center for Complementary and Integrative Health (NCCIH)	154,079	184,323	30,244 (19.6%)

Department of Health and Human Services



National Institutes of Health (in thousands)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
National Center for Advancing Translational Sciences (NCATS)	855,421	878,957	23,536 (2.8%)
John E. Fogarty International Center (FIC)	84,013	96,322	12,309 (14.7%)
National Library of Medicine (NLM)	462,138	474,864	12,726 (2.8%)
Office of the Director (OD)	2,283,867	2,394,859	110,992 (4.9%)
Building & Facilities (Intramural)	200,000	250,000	50,000 (25.0%)
Advanced Research Projects Agency – Health (ARPA-H)	N/A	6,500,000	6,500,000 (N/A)

Department of Health and Human Services (Other)



The budget request would provide \$131.8 billion in discretionary funding and \$1.5 trillion in mandatory funding to the Department of Health and Human Services (HHS).

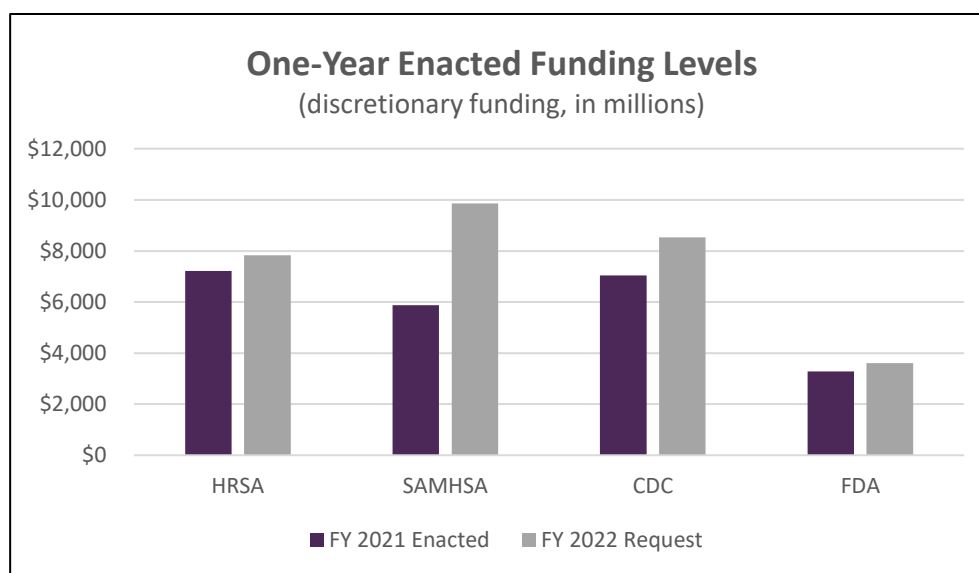
Quick Take: The budget request would invest in initiatives to bolster pandemic preparedness and response efforts, address mental health and substance use disorders, mitigate health inequities, and tackle community violence.

Major Cuts/Eliminations: Funding for Community Health Centers was reduced by \$45 million to \$5.6 billion. The total incorporates a \$94.7 million reduction because of sequestration of direct spending due to the *Balanced Budget and Emergency Deficit Control Act*. Additionally, National Health Service Corps (NHSC) received \$477 million and \$292 million in mandatory funding which would be an \$18 million reduction, also due to sequestration.

New Initiatives/Priorities: The Administration would prioritize efforts to bolster the nation's public health infrastructure and workforce, expand activities across the agency to help eliminate health disparities and promote cultural competency, and enhance support for research and interventions to reduce violence across the nation's communities.

The Bottom Line

The budget request proposes investments in new areas, such as expanding support for public health infrastructure and addressing health inequities, including several policies previously proposed in the President's American Families Plan. However, many of the proposed funding increases will likely fail to gain strong bipartisan support in Congress, particularly initiatives aimed to address environmental health, gun violence, and Medicare reform.



Department of Health and Human Services (Other)



New and Signature Initiatives

Strengthening Public Health Preparedness and Response

The budget request would make significant investments in the nation's public health infrastructure, as well as preparedness and response capabilities, by providing \$8.5 billion in discretionary funding to the **Centers for Disease Control and Prevention (CDC)**, the largest budget authority increase for the agency in almost 20 years. The budget request would build on efforts in the *American Rescue Plan Act of 2021* to bolster the public health workforce, modernize public health data collection, and build international capacity to detect emerging global threats. The budget would provide \$400 million in new funding to support **public health infrastructure activities** across the country with investments across the federal, state, and local levels; an additional \$100 million above the FY 2021 enacted level to support the **CDC's Public Health Modernization Initiative**; and an additional \$50 million to support the agency's **Public Health Workforce and Career Development programs**. The budget request would also include \$35 million for the **Infectious Disease Rapid Response Reserve Fund** which was created by Congress in FY 2019 to help respond to emerging infectious diseases. Additionally, the budget request would provide \$823 million for the **Biomedical Advanced Research and Development Authority (BARDA)**, \$227 million above the FY 2021 enacted level. With respect to medical devices used to respond to the COVID-19 pandemic, the FDA would place an emphasis on the supply chain for such products. The Administration included a proposed \$22 million for the **Resilient Supply Chain and Shortages Program**, which seeks to ensure that patients and providers have access to critical devices and reduce the nation's dependence on devices from other nations. The budget request highlighted that according to FDA, there have been over 600 COVID-19 drug development programs in the planning stages to date, with more than 400 trials that have been reviewed by the agency and 10 treatments authorized for use during the COVID-19 pandemic through Emergency Use Authorizations (EUA). This high number of clinical trials underscores the Biden Administration's view that a strong pharmaceutical pipeline will be needed after the current pandemic, potentially forecasting continuation and/or expansion of the FDA's **Coronavirus Treatment Acceleration Program**, which helps move new medical products to patients as quickly as possible. The budget request would also include \$30 billion over four years across HHS, the Department of Defense, and the Department of Energy to support the **Prepare Americans for Future Pandemics** proposal, which would primarily focus on medical countermeasures manufacturing, job creation, and pandemic preparedness activities.

Addressing Health Inequities

The budget request would invest an additional \$150 million to expand **CDC's Social Determinants of Health Program** through funneling additional funds to states and territories. The budget request would also expand initiatives to address health inequities across various offices within HHS, including the Food and Drug Administration's (FDA) **Office of Minority Health and Health Equity** which would receive a \$5 million increase to support new research efforts in health disparities and health equity through three new full-time employees, additional contracts, and grants. Additionally, the **CDC's Climate and Health Program**, which focuses on public health implications of climate extremes on health risks and the use of evidence-based interventions targeting at-risk and vulnerable populations, would receive an additional \$100 million in FY 2022 to be disseminated to all states and territories. The budget request also includes \$6 million in evaluation funding to create the **Office of Climate Change and Health Equity**, in response to President Biden's Executive Order on Health Equity. The budget would also support \$3 million in new **investigator-initiated research grants focused on equity**, as well as an additional \$1 million in new equity research grant supplements, through the **Agency for Healthcare Research and Quality (AHRQ)**. AHRQ would also commit to revising its own policies and procedures to advance equity internally, and the budget seeks to provide AHRQ with \$1 million in research contract support to enhance diversity, equity, and inclusion at the agency. The **Centers for Medicare and Medicaid Services (CMS)** would also receive \$25 million to advance efforts addressing racial equity, including enhancing research opportunities to improve minority health.

Department of Health and Human Services (Other)



Promoting Injury Prevention Control

Public health initiatives aimed at reducing violence across the U.S. would be expanded under the budget request. Specifically, the CDC would provide \$100 million to a new **Community Violence Intervention initiative** to support implementation of evidence-based violence prevention strategies in the nation's cities with the highest number of homicides per capita. Additionally, the CDC would receive \$25 million for **firearm injury and mortality prevention research activities** to identify effective approaches to prevent firearm related injuries, doubling the FY 2021 enacted level.

Increasing Access to Healthcare

The budget request seeks to make several changes in the *American Rescue Plan Act* (ARP) to calendar year 2021 and 2022 healthcare policy permanent. These changes would include elimination of the requirement that eligibility for **premium tax credits** be limited to individuals earning 400 percent of the federal poverty level (FPL) or lower; assistance for families with incomes over 400 percent of FPL by capping their premium contribution at 8.5 percent of their household income; and elimination of the requirement that individuals and families making 100 to 150 percent of FPL contribute toward their premiums. The Administration believes making these policy changes permanent would cost \$163 billion over ten years.

Calling on Congress to Expand Medicare

The Administration indicated in the budget proposal that the President supports having Congress change current law to allow **Medicare to negotiate the price of certain drugs in Part D**, though no details were included on how such a policy change or program would be structured. The Administration would also call for changes to Medicare coverage to include dental, hearing, and vision, and for providing individuals aged 60 and older the option to enroll in Medicare with the same premiums and benefits as current beneficiaries, but with a separate financing mechanism than the Medicare Trust Fund.

Expanding Home and Community-Based Services

The budget request proposes an **expansion of home and community-based services** in Medicaid. The president's budget request calls on Congress to appropriate \$400 billion for these services, which is also outlined in *the American Jobs Plan*. Additionally, the budget request would provide \$3.1 billion for the **Administration for Community Living**, an increase of \$768 million over the FY 2021 enacted level. According to the Administration, the focus would be on programs that provide critical direct services for individuals to live in their community. The Administration also recognizes the increased demand for these core services because of the COVID-19 pandemic which could persist after the pandemic has ended.

Department of Health and Human Services (Other)



Ongoing Areas of Interest

Tackling Mental Health and Substance Use Disorders

The budget request would include \$11.2 billion across HHS to continue initiatives that address opioid and substance use disorder. The budget request would provide \$165 million for the Health Resources and Services Administration's (HRSA) **Rural Communities Opioid Response Program (RCORP)**, which is a \$55 million increase above the FY 2021 enacted level. Several HRSA workforce and training programs would also receive increases, including the **Behavioral Health Workforce Education and Training (BHWET)** program which would receive \$220 million, an increase of \$75 million. The budget request would also include \$19.5 million to reduce the spread of infectious diseases associated with substance use disorders through the expansion of targeted prevention and surveillance interventions in high-risk areas. This is \$6.5 million above the FY 2021 enacted level. The FY 2022 budget would also include \$713 million for CDC's opioid overdose prevention and surveillance efforts, an increase of \$238 million. The Administration's budget would provide the Substance Abuse and Mental Health Services Administration (SAMHSA) with \$2.3 billion for the **State Opioid Response (SOR)** grant program, an increase of \$750 million over FY 2021 enacted levels. The increased funding would allow the SOR program to expand access to prevention and treatment services in response to the opioid crisis. Included within the budget request is \$6.6 billion for substance use prevention and treatment activities, an increase of \$2.6 billion over FY 2021 enacted level. The budget request also includes \$3.5 billion for the Substance Abuse Prevention and Treatment Block Grant (SABG)— an increase of \$1.7 billion over FY 2021 enacted—to expand implementation of evidence-based treatment and prevention programs for individuals, families, and communities across the nation. The budget request would also provide SAMHSA with \$36 million in rural set-aside funding for **first responder training grants** to combat the opioid crisis, an increase of \$12 million over the FY 2021 enacted level. The program trains and equips firefighters, law enforcement offices, paramedics, emergency medical technicians and other recognized professionals to respond to opioid-related incidents. Additionally, the Biden Administration would also provide an additional \$38 million for FDA to combat opioid use disorder (OUD). Following the HHS-wide directive to combat this pandemic, FDA would work to develop opioid overdose reversal treatments and treatments for OUD; continue their work at international mail facilities; and would use the new funding to develop, evaluate, and advance digital health medical devices to address opioids use disorders.

Strengthening Rural Health

Rural Health programs administered through HRSA would receive a \$71 million increase, totaling \$400 million for FY 2022. The budget request highlights the importance of strengthening the nation's telehealth infrastructure in order to improve healthcare services and delivery in particular. The budget request would provide \$37 million for **telehealth initiatives** at HRSA, a \$3 million increase above the FY 2021 enacted level, with some of the additional funding intended to support new awards under the Evidence-Based Telehealth Network Program.

Improving Maternal Health

The budget request would include \$35 million for the **Office of Women's Health (OWH)** and funds prevention initiatives aimed at addressing maternal health and health disparities for women. OWH coordinates with other government organizations and consumer and health professional groups. For FY 2022, AHRQ will be an integral part of the HHS-wide Improving Maternal Health Initiative and its mission to support, healthy women, healthy pregnancies and births, and healthy futures. AHRQ's role would provide federal, state, and local policymakers data and analytics regarding maternal morbidity and mortality and the nation's health care system. The FDA over the past several years has worked to strengthen its oversight of marketed infant formula. For FY 2022, the president's budget request proposes a \$22 million increase for pre-market reviews of infant formulas, and to support the agency's work for pregnant women, nursing mothers and toddlers.

Department of Health and Human Services (Other)



Supporting Early Childhood Development

The budget request would provide \$30.6 billion for programs in the **Administration for Children and Families**, an increase of \$5.9 billion over the FY 2021 enacted level. Of the total, the budget requests \$12 billion for **Head Start**, an increase of \$1.2 billion over the FY 2021 enacted level.

Source: HHS Budget in Brief is available at <https://www.hhs.gov/sites/default/files/fy-2022-budget-in-brief.pdf>

Department of Health and Human Services (in millions of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
HRSA	7,218	7,834	616 (8.5%)
Title VII Programs	489	577	88 (18.0%)
Title VIII Programs	264	268	4 (1.5%)
SAMHSA	5,870	9,587	3,717 (67.9%)
Mental Health Services	1,792	2,937	1,145 (63.9%)
Substance Abuse Treatment	3,855	6,409	2,554 (66.3%)
Substance Abuse Prevention	208	217	9 (4.3%)
AHRQ	338	380	42 (12.4%)
CDC	7,041	8,537	1,495 (21.2%)
Chronic Disease Prevention and Health Promotion	1,277	1,453	176 (13.8%)
National Institute for Occupational Safety and Health (NIOSH)	345	345	--
Environmental Health	223	333	110 (49.3%)
FDA, Program Level*	6,050	6,527	477 (7.9%)

Department of Health and Human Services (Other)



Department of Health and Human Services (in millions of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2021 Enacted vs. FY 2022 Request
ACL	2,258	3,009	751 (33.3%)
National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR)	113	119	6 (5.3%)
ACF	24,695	30,641	5,946 (24.1%)
ONC	62	87	25 (40.3%)

Note: Unless otherwise listed, all funding amounts above are discretionary funding

•Includes mandatory funding

Department of Homeland Security



The President's FY 2022 budget request would provide approximately \$54.2 billion in discretionary funding for DHS – 0.6 percent below the FY 2021 enacted level. However, the request would significantly increase science and technology programs of interest to universities and research institutions.

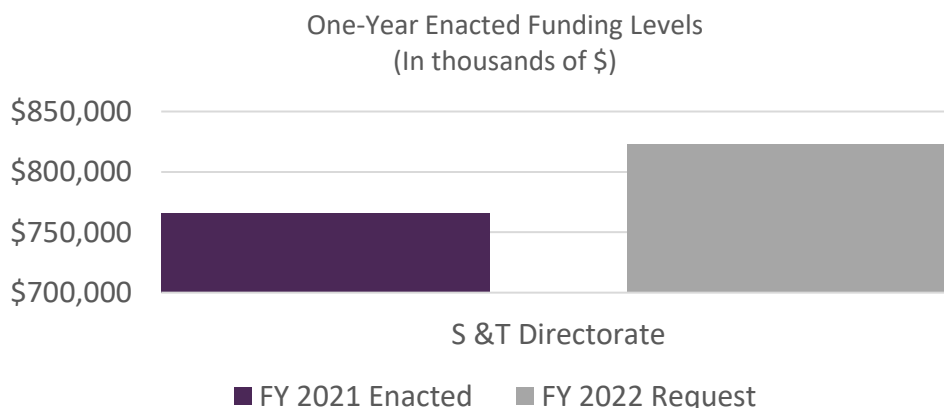
Quick Take: DHS would be one of the few agencies to receive relatively flat funding in the President's FY 2022 budget request. The agency-specific request reflects notable proposed shifts in resources, including diverting funding from some Trump Administration priorities to Biden Administration strategic thrusts like cybersecurity, climate change, and research and development.

Major Cuts/Eliminations: Notably, the budget request would cut several Trump Administration immigration priorities, including the funding for the construction of the border wall, which would lead to savings of over a billion dollars. The Biden Administration's plan for border security would prioritize modernizing points of entry through investments in security technology, providing care to migrants detained at the border, and developing new methods to support visa application processing.

New Initiatives/Priorities: In addition to reimagining border security assets, the Administration has signaled emerging priorities, including grant programs for state and local governments through the Federal Emergency Management Agency (FEMA) to prepare for the impacts of climate change, especially in vulnerable and underserved communities; increased funding to support research and community-driven methods to better understand and mitigate domestic radicalization; additional funding for the Cybersecurity and Infrastructure Security Agency (CISA); and most important for the research community, a stronger focus on overall science and technology investments, including a proposed 10.1 percent increase for the Office of University Programs (OUP), which includes the signature Centers of Excellence (COE) program.

The Bottom Line

Unlike previous years, the Administration's budget request provides significant regard for the independent science and research programs within the DHS Science and Technology Directorate (S&T) that often attract university and private sector partnerships to develop solutions for the Homeland Security enterprise. Notably, the request includes robust support for the university-based Centers of Excellence Program, bucking a trend of proposed cuts to the initiative going back to the Obama Administration. The request also signifies the Department's continued prioritization of investments in near-term solutions over fundamental research, as several proposed initiatives are at high Technology Readiness Levels (TRLs). It remains to be seen if Congress will support the Administration's plans to bolster DHS research initiatives among other competing priorities as they debate one of the most politically-divisive annual appropriations measures.





Proposed Reductions and Terminations

While funding for the S&T Directorate has generally increased, the new Administration's priorities are reflected in the reductions and expansions of various research thrusts.

Border Security

Programs under the Border Security Thrust Area would be over \$10 million, or 8.6 percent, below last fiscal year's enacted level. This is the largest proposed decrease of any research thrust. The biggest cuts would be to research projects focused on port and coastal surveillance; non-intrusive inspection and alternate technologies at points of entry; and Counter Unmanned Aircraft Systems (CUAS).

New and Signature Initiatives

Centers of Excellence

Over the past several budget requests, Administrations have proposed steep cuts to the Office of University Programs (OUP), which supports the Centers of Excellence (COEs) and Minority-Serving Institutions (MSI) program, leaving Congress to restore funding levels. This budget request bucks that trend, proposing a \$6.5 million increase for OUP. The funding would be used to provide up to \$725,000 more to most of the individual COEs and fund two new COEs with proposed competitions in the early FY 2022. Unlike previous requests, which proposed eliminating COEs during their program periods, this request would largely reallocate funding from COEs that were previously set to expire, including the Borders, Trade, and Immigration (BTI) Institution; Arctic Domain Awareness Center (ADAC); and Awareness & Localization of Explosives-Related Threats (ALERT).

Funding for ALERT had already expired and will be used to support the recently competed Engineering Secure Environments from Targeted Attacks (ESE) COE. The request notes that DHS plans to complete the review of applications for the new ESE COE by the third quarter of 2021. Topics for the other new COEs are unknown and will be decided by DHS based on established needs with insight from components.

Community and Infrastructure Resilience

The request would provide nearly \$39 million for community and infrastructure resilience activities, an increase of \$27.6 million or nearly triple the current the enacted level. This funding would invest in "new and emerging technologies to optimize FEMA's disaster resilience and support CISA's mission." This would include \$20 million for a new Climate Adaptation and Resilience Program, which would foster collaborative research with the proposed Advanced Research Projects Agency for Climate (ARPA-C). The request further notes that with this funding, S&T would "lead coordination and formulation of research needs and requirements to the Department of Energy (DOE) for new insurance and economic risk sharing solutions and develop smart materials for more resilient buildings and infrastructure, use of alternative energy vehicles for disaster response, and carbon sequestration technologies for debris removal and risk reduction, such as forest undergrowth thinning." Funding would also be provided for community resilience testbeds and next generation disaster proofing.



Cyber Data Analytics

The request would provide \$53.6 million for cyber data analytics research and activities at S&T, which is nearly double the current enacted level. Most of these investments would focus on “developing and delivering data analytics and machine learning techniques that will enhance CISA’s Threat/Hunt capabilities and enhance the security of federal networks and critical infrastructure.” Activities are expected to be at TRL-2 and above and include partners from academia among other stakeholders. In addition, CISA would launch a new \$20 million Cyber Response and Recovery Fund to enable CISA “to support critical infrastructure in responding to and recovering from a significant cyber incident that exceed the federal government’s standing resources and capacity.”

Transnational Organized Crime and Counter Networks

Despite the proposed cuts to the overall Border Security Thrust, the budget would also reinvest in new programs in this area with the largest new initiative being \$7.6 million for the proposed Transnational Organized Crime (TOC) and Counter Networks initiative. The program will seek to “leverage new forensic tools that take advantage of and data sharing capabilities that will encourage a unified approach to combat global TOC.” Also, according to the request, these new forensic tools and data sharing capabilities would seek to “close the operational gap using a central data hosting, analytics, and collaboration platform where agents can access new vital forensic tools that benefit from artificial intelligence/machine learning and share discoveries, theories and analysis.”

Ongoing Areas of Interest

Technology Centers

Under the previous Administration, S&T launched Technology Centers. Technology Centers are teams at DHS that focus on immediate technological needs and processes in priority areas and assist stakeholders with implementation. The Biden Administration would maintain this new organization and funding for the established centers. It is uncertain how these centers, which support research in areas ranging from advanced computing to social sciences, will interface with the research community going forward.

Public Safety and Violence Prevention

The request would provide \$5.5 million for activities aimed at preventing the spread of extremism, including research on ways to prevent the spread of extremist content and misinformation online; explore how incarceration could lead to radicalization; and understand individuals’ attitude and actions around election security. While this program was around during the previous Administration, combating domestic extremism is a stated priority for the current DHS and topics of interest are likely to continue to evolve over time.

Source: DHS’s FY 2022 Budget Summary and Background Information is available at <https://www.dhs.gov/publication/congressional-budget-justification-fy-2022>.

Department of Homeland Security



Department of Homeland Security (in thousands of \$)

	FY 2021 Actual	FY 2022 Request	FY 2022 Request vs. FY 2021
DHS, Total	54,496,542*	54,197,734*	-298,808 (0.55%)
Science and Technology Directorate	765,558	822,903	57,345 (7.5%)
University Programs	44,511	51,037	6,526 (14.7%)

*Approximate adjusted net discretionary funding provided in the "FY 2020-2022 Annual Performance Report" that anticipates recissions.

Department of Justice



The president's FY 2022 budget request would provide \$35.3 billion in discretionary funding for the Department of Justice (DOJ), which is \$1.9 billion or 5.6 percent above the FY 2021 enacted level. Of these funds, \$86 million would be provided for the Research, Evaluation, and Statistics account, a 4.9 percent increase from FY 2021.

Quick Take: Significant resources would be provided for emerging Biden Administration priorities that seek to broadly promote civil rights and criminal justice reform, as well as address targeted violence and inequities in the criminal justice system, among other areas.

Major Cuts/Eliminations: The request would move away from Trump Administration priorities such as seeking to broadly combat gang violence and curb illegal immigration.

New Initiatives/Priorities: The budget request signals newfound emphasis in several areas including reforming policing, combatting gender-based violence, preventing gun violence, and promoting alternatives to incarceration.

The Bottom Line

The budget calls for a notable increase in funding for the Department's Research, Evaluation, and Statistics account, which often supports university partnerships to develop best practices, technologies, and processes for the administration of justice. The Trump Administration called for similar increases to criminal justice research accounts and Congress has steadily provided additional support over the years. The overall request will likely run into partisan divides over issues like gun control that could threaten compromise on a final bill.

New and Signature Initiatives

The budget request would provide a 4.9 percent increase for the Research, Evaluation, and Statistics account. This increase would include an additional \$4 million for the National Institute of Justice (NIJ), DOJ's primary research account for universities, which would be a 10.8 percent increase over the enacted level. The request specifies that \$10 million would be set aside for NIJ research on the root causes of domestic radicalization; \$2 million would be for a study on Lethality Assessment Programs (LAPs), which are collaborations that are intended to prevent homicides and serious injuries resulting from domestic violence; \$1 million would be for studies on school violence; and \$3.5 million would be provided for research on issues related to violence against women.

The budget also proposes significant funding for new and/or expanded programs to advance Biden Administration priorities. Several of these initiatives call for evidence-based interventions and could potentially include partnerships between state/local entities and research organizations as various DOJ programs have done in the past. Examples of these proposed initiatives include: a new program on community-based alternatives to youth incarceration; a hate crimes prevention training program; the development of law enforcement training on racial profiling and de-escalation; an initiative that "assists state and local justice stakeholders in developing, implementing, and testing innovative and research-based responses that address a range of criminal and juvenile justice system problems using the evidence-informed Justice Reinvestment program model;" and a new \$100 million partnership with the Centers for Disease Control and Prevention (CDC) to implement evidence-based community violence interventions at the local level, among other initiatives. Lewis-Burke will closely monitor implementation of these and other opportunities to support the research community.



Ongoing Areas of Interest

The budget would continue to provide robust support for funding opportunities to curb the opioid epidemic, as well as *Second Chance Act* programs that support effective re-entry initiatives. Both of these areas were also priorities under the Trump Administration.

Source: DOJ's FY 2022 Budget Summary and Background Information is available at <https://www.justice.gov/doj/fy-2022-budget-and-performance-summary>.

Department of Justice

(in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021
DOJ, Total	33,422,875	35,303,916	1,881,041 (5.6%)
Research, Evaluation, and Statistics	82,000	86,000	4,000 (4.9%)
National Institute of Justice	37,000	41,000	4,000 (10.8%)

Department of Labor



Discretionary programs within the Department of Labor (DOL) would be funded at \$14.2 billion, up \$900 million, a 6.8% increase compared to the FY 2021 enacted level.

Quick Take: The budget request seeks to increase apprenticeship resources to expand apprenticeship access to historically underrepresented groups and grow Registered Apprenticeship opportunities in high-growth sectors where apprenticeships are underutilized.

Major Cuts/Eliminations: No major cuts or eliminations are proposed.

New Initiatives/Priorities: The request proposes increases to Workforce Innovation and Opportunity Act (WIOA) programs, \$100 million for the new multi-agency POWER+ Initiative, aimed at reskilling and reemploying displaced coal workers in Appalachian communities, and \$20 million for a new program, developed in collaboration with the Department of Veterans Affairs, focused on helping veterans shift to careers in clean energy.

The Bottom Line

The Biden Administration proposes numerous efforts to support training opportunities, particularly for those from disadvantaged communities. These efforts include creating and expanding sector-based training programs; providing comprehensive supports for dislocated workers; expanding Registered Apprenticeship and pre-apprenticeship opportunities; and building community colleges' capacity to deliver high-quality job training.

New and Signature Initiatives

The budget request proposes \$285 million, a \$100 million increase above the FY 2021 enacted level, to expand Registered Apprenticeship (RA) opportunities. This would support capacity-building and expanding and diversifying RA programs. The budget proposal requests \$3.7 billion, a \$203 million increase over the FY 2021 enacted level, for Workforce Innovation and Opportunity Act State Grants. The request also includes a proposal for a \$100 million investment for DOL's role in the new multi-agency POWER+ Initiative, aimed at assisting workers and communities transitioning away from fossil fuel production. Funding would again be provided for the Strengthening Community Colleges program and grants for workers in the Appalachian region and Lower Mississippi regions (likely the Workforce Opportunity for Rural Communities (WORC) Initiative).

The budget request also includes funding for a new National Youth Employment Program (NYEP). This program, which would be funded at \$50 million, would provide competitive grants to communities to operate summer and year-round youth employment programs through partnerships with employers in high-demand industries and occupations for approximately 20,000 participants in FY 2022. The budget request includes \$20 million for a new program, developed in collaboration with DOL's Veterans' Employment and Training Service (VETS) and the Department of Veterans Affairs, focused on helping veterans shift to careers in clean energy. The budget request also notes that VETS will continue to improve the Transition Assistance Program (TAP) as directed by the FY 2019 National Defense Authorization Act (NDAA).

The budget request would also support the creation of an Office of Diversity and Inclusion in the Office of the Secretary of Labor. Additionally, the request would support efforts by the Office of Federal Contract Compliance Programs (OFCCP) to develop a comprehensive initiative to advance racial equity at work by identify promising practices, evidenced-based research, and innovative initiatives that can lead to more diverse, equitable, and inclusive workplaces.

Department of Labor



The budget request proposes \$6 million the Workforce Data Quality Initiative (WDQI) to support States' development of integrated longitudinal data systems, with a focus on efforts to enable the disaggregation of employment and earnings outcomes by race, ethnicity, and gender. The request would also support a \$5 million increase to the Workforce Information-Electronic Tools-System Building program, to provide small increases to states to train staff in the use of data integration, data analytics, and data visualization software or tools.

American Jobs Plan

The budget request also included additional details on the *American Jobs Plan* (AJP), with a proposed investment in DOL of \$81.5 billion over 10 years. Equity is prioritized within these proposals with workforce investments targeted to underserved groups, including people of color, individuals with disabilities, justice-involved individuals, and low-income people. AJP proposals highlighted in the budget request include:

- \$18 billion for a new Comprehensive Supports for Dislocated Workers (CSDW) program. The CSDW program would provide supports to dislocated workers who are enrolled in a federally-funded training program in order to help them complete their training and move into new jobs. Allowable supports would include income support, childcare, transportation, job search allowances, and relocation benefits, among other benefits;
- \$22 billion for a new Sectoral Employment through Career Training for Occupational Readiness (SECTOR) program. The SECTOR program would support the creation of high-quality training programs in growing sectors such as clean energy, manufacturing, and caregiving. DOL would work closely with other Federal agencies that possess relevant technical knowledge of target sectors to carry out this program. Funding would support the formation of sector partnerships, development and scaling of sector training programs, and establishment of sector-focused career centers. DOL would make grants to consortia of workforce system entities, education providers, employers/industry groups, labor management partnerships, community-based organizations, and unions;
- \$10 billion for Registered Apprenticeship and Pre-Apprenticeship programs. This proposal would create between one and two million new RA slots over the next ten years with a focus on increasing access to RA for historically underrepresented groups, including people of color and women, and diversifying the industry sectors involved in registered apprenticeships;
- \$9 billion for Community College Training Partnerships program. This proposal would provide a capacity building grant to every public community college. These competitive grants would support partnerships between community colleges, local and regional employers, public workforce system entities, unions, and community-based organizations to build high-quality workforce training programs. Out of the \$9 billion total, \$700 million is proposed for FY 2022;
- \$8 billion for an Employment Service State Grant funding stream, with an emphasis on providing high-quality career services;
- \$1 billion for Reentry Training Program. Funds would be used to test novel approaches to providing justice-involved individuals with the career counseling, skills, and employment opportunities;
- \$4 billion for a Subsidized Jobs Program. This program would provide subsidized jobs to workers with barriers to employment and disadvantaged youth and would be targeted to those receiving public assistance;

Department of Labor



- \$7.5 billion for DOL enforcement and worker protection activities; and
- \$2 billion to support phasing out 14(c) of the *Fair Labor and Standards Act*. This program would provide State grants, modeled after the *Transformation to Competitive Employment Act*, that support states in transitioning people with disabilities from subminimum wage to competitive integrated employment.

Source: DOL's FY 2022 Budget Summary and Background Information is available at <https://www.dol.gov/sites/dolgov/files/general/budget/2022/FY2022BIB.pdf> and supporting budget explanatory information can be found at <https://www.dol.gov/general/budget>.

U.S Department of Labor (in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
Adult Employment and Training Activities	862,649	899,987	37,338 (4.2%)
Youth Activities	921,130	963,837	42,707 (4.5%)
Dislocated Workers Employment and Training Activities	1,322,412	1,536,137	356,480 (16.2%)
National Dislocated Workers Grants	280,859	380,859	100,000 (35.6%)
Apprenticeship Program	185,000	285,000	100,000 (42.6%)
Workforce Data Quality Initiative	6,000	6,000	--
National Youth Employment Program	0	50,000	--
Veterans' Clean Energy Training Program	0	20,000	--

*The amounts shown for FY 2021 Enacted are taken from FY 2022 Department of Labor Budget Summary Tables.

Department of State and United States Agency for International Development



The budget request would provide \$58.5 billion for the Department of State (DOS) and U.S. Agency for International Development (USAID), which would be a 10.3 percent increase relative to the FY 2021 enacted level.

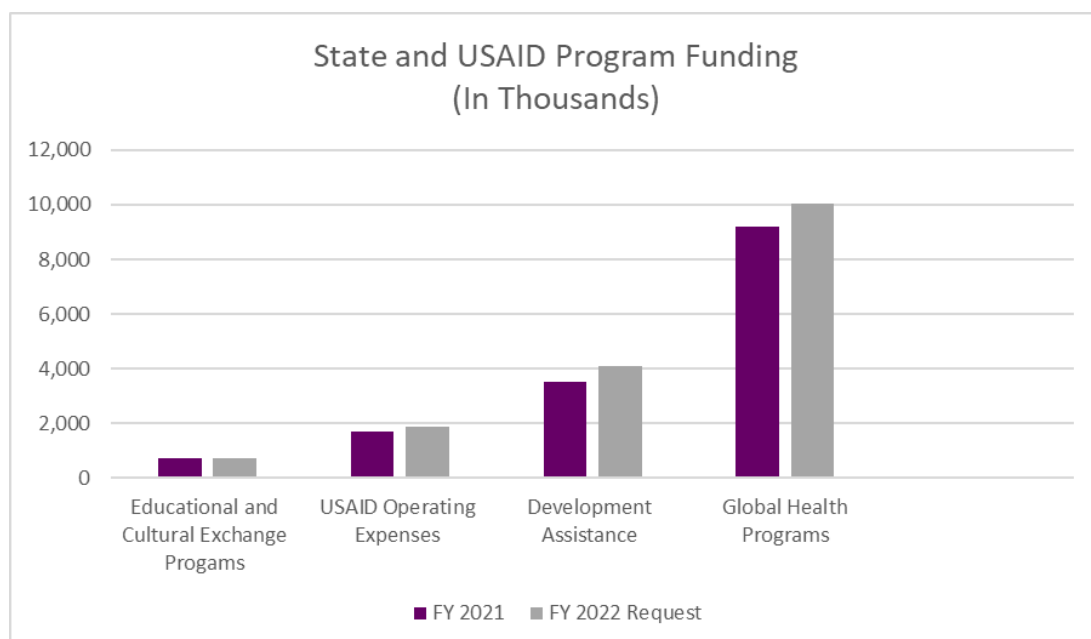
Quick Take: The President’s budget request for FY 2022 promotes the Administration’s intent to engage internationally to address COVID-19 pandemic, combat climate change, and enhance U.S. support to vulnerable regions including Central America. The request for DOS and USAID highlights the desire of this Administration to partner with allies to counter global threats to democracy and the increasing ambitions of U.S. competitors including China. The budget request proposes a 12% increase to foreign assistance programs, which includes a proposed 16% increase for development assistance, a small portion of which may be available to support development focused research.

Major Cuts/Eliminations: With the significant increases across the proposed budgets for the State Department and USAID, there are no major cuts or eliminations that are directly relevant to the academic community.

New Initiatives/Priorities: The request highlights a new focus on global health security, climate change, and in emerging technologies. Of note is a proposed increase to Global Health Programs by \$855 million to enable programming to assist developing countries in responding to the COVID-19 pandemic. There is also a significant increase proposed for international climate programs totaling \$2.5 billion, of which approximately \$700 million would be utilized to support bilateral programming administered by DOS and USAID as compared to the remainder which would be utilized to support U.S. contributions to multilateral organizations

The Bottom Line

The Department of State and USAID budget request affirms the Biden Administration’s intent to work with international partners to address pressing global challenges including the COVID-19 pandemic, climate change, and threats to democracy. While there is typically strong bipartisan support for international aid in the form of both diplomatic and development programs, the overall funding-level and proposed increases to climate programs and international organizations are likely to be especially controversial.



Department of State and United States Agency for International Development



Proposed Reductions and Terminations

Included among the few proposed reductions in the budget request was a slight decrease across three educational exchange programs run out of the DOS Bureau of Educational and Cultural Affairs (ECA): the Fulbright, International Visitor Leadership Program (IVLP), and Citizen Exchanges. These decreases were introduced to offset the increase in salary funding for Exchange Support, so they would not impact available funding should this be enacted by Congress.

New and Signature Initiatives

If the proposed budget is enacted, DOS would enhance its attention to cybersecurity and emerging technology. The request includes \$101 million for DOS to participate in the President's proposed Cybersecurity Reserve, recognizing the Department remains "a prime target of malicious state- and non-state actors." The budget request also proposes funding for increased efforts to address emerging technology, including support for an advisory position within the Office of the Science and Technology Advisor to the Secretary (STAS) in addition to \$1.4 million and three new positions within the Bureau of Political-Military Affairs to "support emerging technology and data analytics, and to optimize workforce, IT, and data analytics to efficiently meet America's foreign policy and national security objectives." In addition, cybersecurity will be included among priority topics for the IVLP educational exchange program.

While not a new initiative, the Biden Administration proposes a significant increase to International Organizations, including the United Nations and peacekeeping operations and other institutions to which the U.S. fell behind on assessed contributions or pledges. To this end, the budget proposes \$1.93 billion for peacekeeping, increased from only \$750 million in FY 2021. There is also an additional \$82.4 million included to pay arrears to multilateral institutions. This proposal is likely to be controversial with Members of Congress.

Ongoing Areas of Interest

The President's FY 2022 request would significantly increase **Global Health Programs (GHP)**, with a request of \$10.05 billion, an \$855 million increase relative to the FY 2021 enacted level. Much of this increased funding would be in support of programs and hiring of new staff to implement the **United States Global Health Security Strategy** to prevent, detect, and respond to infectious disease threats and assist developing countries in enhancing their capacity to respond to the COVID-19 pandemic and/or the next emerging threat. Importantly, funding for other GHP through both USAID and DOS are requested to have flat funding – including research to support work on tuberculosis, neglected tropical disease, and programs to address HIV/AIDS prevention, care, and treatment.

The request would support the implementation of the **Feed the Future (FTF) initiative** to achieve the goals of the **Global Food Security Strategy (GFSS)**. Through FTF, the U.S. will support developing countries address challenges associated with hunger, poverty, and food and water insecurity, including additional issues related to the COVID-19 pandemic, climate change, and conflict. Investments would aim to strengthen the resilience of vulnerable populations and address root problems. While there is not detail in the budget request about the funding level for the FTF Innovation Labs, a popular program among agricultural research universities, the Bureau for Resilience and Food Security would receive \$350 million in development assistance for FY 2022, 3.8 percent increase relative to FY 2020 actuals.

The budget request would provide the **Bureau of Democracy, Development, and Innovation (DDI)** with \$832 million in development assistance for FY 2022, in addition to other funds provided to it through Economic Support Funds and Global Health Programs. This request would represent a significant increase relative to prior years; however, there is no comparator to determine the percent increase since the bureau itself was established in November of 2020.

Department of State and United States Agency for International Development



Nonetheless, this budget increase is significant as DDI houses the **Innovation, Technology and Research Hub**, which administers USAID's university-focused research programs, including those programs supported under the **Higher Education Solutions Network 2.0**.

As described above, President Biden's request would provide \$2.5 billion towards **international climate change programs**, of which approximately \$700 million would be available for USAID and DOS supported bilateral programs. According to the information provided in the budget justification, the Administration will support bilateral climate change programs across three pillars: (1) adaptation and resilience; (2) renewable energy, (3) sustainable landscapes. Programming will also provide people, institutions, and countries "with the essential weather and climate information, science, and analysis to make climate-smart decisions as well as support policies, planning, and actions on the ground that increase climate resilience and reduce risk." Most of these funds will not be research focused, though there is a possibility that some of these bilateral programs could include research components to help determine: how best to create enabling environments for policy innovation; and to increase country capacity to accelerate breakthroughs in technologies to promote climate resilience, carbon capture and storage, advanced energy systems, and maximize resource efficiency.

Source: The U.S. State Department's Congressional Budget Justification https://www.state.gov/wp-content/uploads/2021/05/FY-2022-State_USAID-Congressional-Budget-Justification.pdf

U.S Department of State & U.S Agency for International Development (in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
Total - State Department and USAID	53,056,262	58,519,562	5,378,300 (10.13%)
Educational and Cultural Exchange Programs	740,300	741,300	1,000 (0.1%)
USAID Operating Expenses	1,711,447	1,862,647	151,200 (8.8%)
Development Assistance	3,500,000	4,075,097	575,097 (16.4%)
Global Health Programs, Total	9,195,950	10,050,950	855,000 (9.2%)

Environmental Protection Agency



President Biden's FY 2022 budget request includes \$11.2 billion for EPA, which constitutes a nearly \$2 billion or 21.6 percent increase relative to the FY 2021 enacted level.

Quick Take: The Biden Administration's FY 2022 budget proposal for EPA would represent a significant increase and lead to the largest ever EPA budget if approved. These increases would enhance EPA's investments in research, with funding for the Science and Technology (S&T) account increased by \$100 million, a 13.8 percent boost relative to prior year enacted levels. Increases would also support re-building capacities through a 7.5 percent increase in EPA personnel nationwide. The Administration proposes a 24.1 percent increase to EPA's core regulatory and enforcement programs.

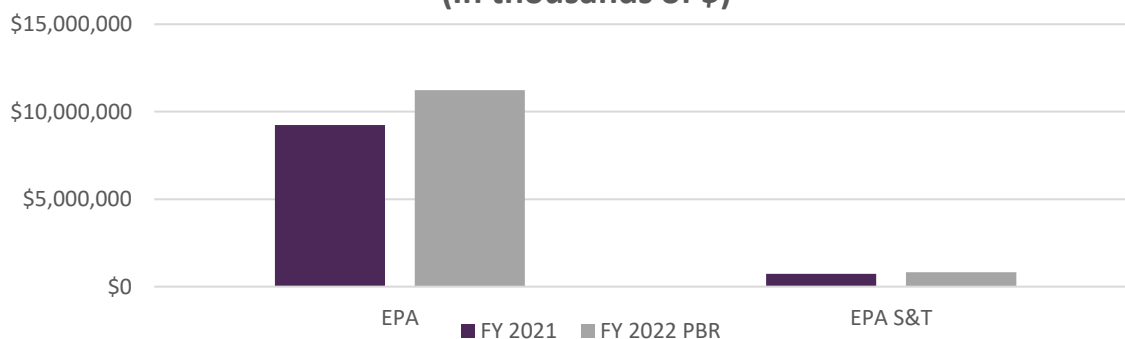
Major Cuts/Eliminations: The FY 2022 request would eliminate support for the Water Quality Research and Support Grants. The budget request notes that the objective of this congressionally directed program, which was funded at \$7.5 million in FY 2021, is duplicative since the research supported could take place under other extramural funding mechanisms like the Science to Achieve Results (STAR) program, which obtains funding through appropriations under the S&T account. In contrast to the Trump Administration proposal, which aimed for deep cuts to the EPA budget, including to many of the research, regulatory, and enforcement programs, there are not any other cuts or eliminations to the proposed FY 2022 EPA budget.

New Initiatives/Priorities: In contrast to budget requests from the previous Administration, EPA's proposed budget puts climate change at the center of its agenda. The budget proposal would provide an increase of \$1.8 billion for climate change focused work, of which \$936 million is devoted to new and existing EPA environmental justice initiatives. In addition, it would also double base funding for climate-focused research which includes an emphasis on air monitoring, national ambient air quality standards, assistance for local clean air plans, and resilience to \$60 million. As a part of this, the Biden Administration envisions the EPA joining other environment agencies to provide \$30 million to the proposed Advanced Research Projects Agency for Climate (ARPA-C), to be hosted at the Department of Energy.

The Bottom Line

The FY 2022 budget request demonstrates EPA's critical role in implementing the Biden Administration policy agenda, which places science and equity at the center of its climate, environmental, and economic initiatives. Despite proposed increases in EPA research, extramural research programs are likely to remain small and highly targeted to EPA's regulatory mission. Although Congress is not likely to adopt this budget as proposed, this ambitious request lays a strong foundation from which to rebuild the agency after multiple years of disinvestment in environmental protection programs.

**One-Year Enacted Funding Levels
(In thousands of \$)**





Proposed Reductions and Terminations

Beyond the termination of the Water Quality Research and Support Grants mentioned above, there are very few reductions and terminations proposed in this budget request. Nonetheless, it is noteworthy that the funding increases proposed for the S&T accounts are on average lower (13.8 percent) than the average increase across the entire EPA budget (21.6 percent). Much of this is attributable to the Biden Administration's focus on growing EPA's capacity, enforcement, and compliance. In addition, this is also reflective of the fact that several sub-programs under the S&T account would receive an equivalent level of funding relative to FY 2021 or very modest increases. For example:

- The Indoor Air: Radon Program was slated to remain flat relative to the FY 2021 enacted level;
- The Research program on Safe and Sustainable Water Resources would receive \$116.6 million, a 3.8 percent increase relative to FY 2021 enacted levels.
- Research: Sustainable and Healthy Communities would receive \$137.4 million, a 3.3 percent increase relative to FY 2021 enacted levels.
- Research: Chemical Safety for Sustainability would receive \$127.0 million, a 6.4 percent increase relative to FY 2021 enacted levels.

New and Signature Initiatives

The EPA budget request for FY 2022 reflects agency priorities across four cross-cutting areas:

1. Tackling the climate crisis through science;
2. Advancing environmental justice;
3. Supporting state, tribal, and local partners; and
4. Expanding EPA capacity through recruitment of new personnel.

The FY 2022 budget request includes a \$936 million investment in new and existing EPA programs as part of a new Accelerating Environmental and Economic Justice Initiative aimed at elevating environmental justice as a top priority across the Agency. The creation of this initiative is aligned with other steps taken by the Biden Administration on environmental justice, including creation of the White House Environmental Justice Interagency Council and the related White House Environmental Justice Advisory Council and nods to environmental justice in his proposed American Jobs Plan for strengthening American infrastructure. The initiative itself would be intended to accelerate environmental and economic justice to clean up pollution and advance environmental justice for underserved communities. This would represent the largest investment in environmental justice in history. Of these funds,

- \$287 million to create new environmental justice programs, including an Environmental Justice Community Grants Program; an Environmental Justice State Grants Program; a Tribal Environmental Justice Grant Program; and a competitive, community-based Participatory Research Grant Program for institutions of higher education working in partnership with community entities;
- \$100 million increase would be for air quality grants to states and tribes to help expand the efforts of air pollution control agencies to implement their programs and accelerate immediate on-the-ground efforts to reduce greenhouse gases; and
- \$100 million would be utilized to develop a community air quality monitoring and notification system intended to produce real-time data to communities and enforcement officials so that locations burdened most significantly by environmental exposures can be prioritized as a part of the EPA's regulatory agenda.

The budget request also proposes the creation of a new Environmental Justice National Program Manager to further elevate this topic within EPA. In keeping with other environmental justice activities spearheaded by the Biden Administration, partnerships with affected communities are emphasized for all research programs proposed in this request.



Ongoing Areas of Interest

The Administration referenced the **STAR Program**, EPA’s primary funding mechanism for extramural research and development, in the budget request; however, it did not stipulate a funding level. Congress is likely to define the funding level for this program this year as it has in the past. FY 2021 enacted appropriations include \$28.6 million for the STAR program in the S&T Account. Congress is likely to keep this program flat or to increase funds relative to FY 2021.

The budget request includes several provisions relevant to protecting public health, including \$75 million for research to inform the regulation of **per- and polyfluoroalkyl substances (PFAS)** and \$15 million to build capacity in managing chemical safety and toxic substances under the **Toxic Substance Control Act**. The budget request would also provide \$882 million for the **Superfund Remedial Program**, an increase of \$293 million relative to the FY 2021 enacted level, to “clean up some of the nation’s most contaminated land, reduce emissions of toxic substances and greenhouse gases from existing and abandoned infrastructure, and respond to environmental emergencies, oil spills, and natural disasters.”

The budget request proposes a \$589 million increase to programs related to **water infrastructure**, including a \$232 million increase for the Clean Water State Revolving Fund, a \$232 million increase for the Drinking Water State Revolving Fund, and \$90 million to implement grant programs authorized by the America’s Water Infrastructure Act of 2018. The budget request also includes a \$15 million increase to the Water Infrastructure Finance and Innovation Fund, bringing total proposed funding for that program to \$80.1 million in FY 2022. Together, these programs provide federal credit assistance to finance eligible water and wastewater projects.

In keeping with the Biden Administration’s commitment to rebuilding the United States’ international relationships related to climate, the budget request proposes increases to support EPA’s engagement in both bilateral and multilateral international environmental affairs. This includes support for EPA’s engagement in the **Group of Seven (G7)**, the **Group of Twenty (G20)**, the **Arctic Council**, and the **Organisation for Economic Co-operation and Development (OECD)** in which major negotiations are taking place on air pollution and toxic chemicals, food waste, marine debris, and air quality.

Source: EPA’s FY 2022 Budget Justification is available at <https://www.epa.gov/sites/production/files/2021-05/documents/fy-2022-congressional-justification-all-tabs.pdf>.

U.S. Environmental Protection Agency

(in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
EPA, Total	9,237,153	11,233,279	1,996,126 (21.6%)
EPA Science and Technology	729,329	829,972	100,643 (13.8%)

Institute of Museum and Library Services



The discretionary programs within the Institute of Museum and Library Services (IMLS) would be funded at \$265 million, a 3.1% increase compared to the FY 2021 enacted level.

Quick Take: The budget request proposes to increase funding for IMLS.

Major Cuts/Eliminations: No funding cuts are proposed.

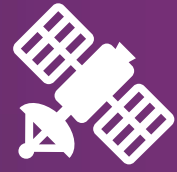
New Initiatives/Priorities: The request includes \$4 million for a grant program authorized by the *National Museum of the American Latino Act*.

The Bottom Line

IMLS is developing a new strategic plan for 2022-2026. Issues that will be a priority for IMLS in FY 2022 include broadband access and the expansion of digital infrastructure, equity, diversity, and inclusion in museums and libraries and their communities, and America 250 (the agency's initiative to celebrate the nation's 250th anniversary), among other initiatives.

Source: IMLS's FY 2022 Budget Summary and Background Information is available at <https://www.ims.gov/sites/default/files/2021-05/fy22cj.pdf>.

National Aeronautics and Space Administration



NASA would be funded at \$24.8 billion, an increase of \$1.5 billion (6.6 percent) above the FY 2021 enacted level.

Quick Take: The Biden Administration proposes significant increases within NASA's budget aligned with the White House's broader emphases of climate action and global competitiveness through technology and innovation. The budget request would provide the Science Mission Directorate (SMD) with the largest dollar increase (\$630.9 million) and Space Technology Mission Directorate (STMD) with the largest percentage growth (30 percent). The budget maintains development of NASA's human exploration and space operations activities.

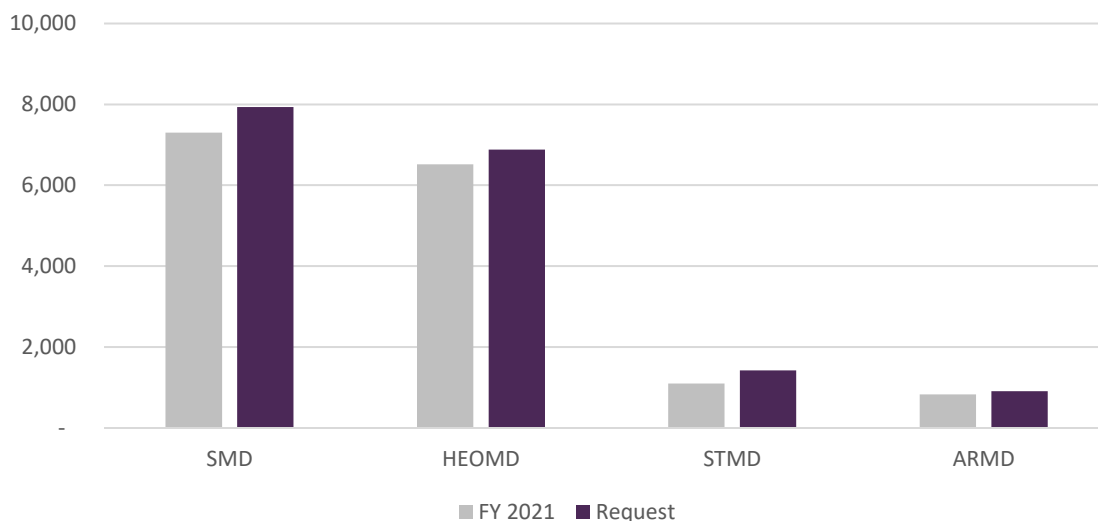
Major Cuts/Eliminations: The Biden Administration does not propose significant cuts or unanticipated eliminations to NASA missions or programs.

New Initiatives/Priorities: The president's budget request includes numerous new programs and initiatives across NASA's portfolio of science and technology development activities. Details are provided below.

The Bottom Line

The budget request reflects the Biden Administration's push to embed climate action and global competitiveness across the federal government. The significant increases to SMD's Earth Science Division (ESD) and STMD would translate to major new programs and competitive mission opportunities of interest to NASA's external stakeholders. The Agency's Artemis and Commercial Low Earth Orbit (LEO) Development programs would see increased funding, albeit to maintain the existing architectures.

NASA Major Accounts
(In Millions)



National Aeronautics and Space Administration



New and Signature Initiatives

With a \$250 million proposed increase, NASA's **Earth Science Division** intends to accelerate development of missions that achieve the top-ranked "Designated Observables" (DO) recommended by the 2017 Earth Science and Applications from Space (ESAS 2017) Decadal Survey: Aerosols; Clouds, Convection, and Precipitation; Mass Change; and Surface Biology and Geology. The budget request states that the fifth DO (Surface Deformation and Change) will remain in a study phase so its design can leverage lessons from the NISAR mission currently in development. ESD would also initiate a new **Earth System Explorers**-class of competed, PI-led missions that address the following "Targeted Observables" prioritized in ESAS 2017: atmospheric winds; greenhouse gasses; ice elevation; ocean surface winds and currents; ozone and trace gasses; snow depth and snow water equivalent; and terrestrial ecosystem structure. An Announcement of Opportunity (AO) for at least one Earth System Explorer mission would be released in early FY 2022.

SMD's **Astrophysics Division (APD)** would establish a new **Astrophysics Probe**-class of large (likely \$750 million to \$1 billion) competed, PI-led missions. Exact funding for FY 2022 is not specified, and the budget request notes NASA would initiate the program next year pending inclusion as a priority recommendation in the 2021 Astronomy and Astrophysics Decadal Survey scheduled for publication in June or July of this year. The *Probe*-class concept has been favorably discussed by NASA and Congress as a flexible mechanism to achieve scientific objectives on par with mission classes in other SMD divisions. They're also viewed as an alternative to NASA's reliance on costly Flagship astrophysics missions that can take many years (or decades) to develop and launch.

\$653.2 million is proposed for the **Mars Sample Return (MSR)** within the Planetary Science Division, an increase of \$406.9 million or 165.2 percent above FY 2021. Congress has funded MSR preliminary development activities in recent years but voiced perennial concerns over the program's lack of details and unknown management structure. The FY 2022 budget request, for the first time, articulates a complex system of four individual components comprising MSR's architecture and establishes the program separate from PSD's Mars Exploration account. MSR would execute its mission in partnership with the European Space Agency and conduct two launches in 2026 to return Martian samples to Earth in 2031.

The **Heliophysics Division (HPD)**, while not the beneficiary of increases on the scale of other divisions, would also establish a new opportunity sought after by the discipline. The budget request would initiate a new \$28.3 million **Heliophysics Technology** account that funds transformative technologies to enable innovative mission designs. HPD previously funded similar activities through elements within the annual Research Opportunities in Space and Earth Science (ROSES) omnibus calls. A new Heliophysics Strategic Technologies Office (HESTO) would be established to solicit proposals from HPD stakeholders and "non-heliophysics technologists" with a goal of adopting successful ideas from other technology development activities funded by other SMD disciplines.

Lastly, the budget request would reject the Trump Administration's prior attempts to shift STMD's focus towards supporting human exploration activities and restore its historical role of catalyzing technologies with cross-agency applications. STMD's Technology Maturation program would establish a new \$85 million **Industry & Commerce Innovation Opportunity**. This new program would fund, via open topic calls, technologies needed by the space industry and support university-led breakthrough R&D "in support of U.S. competitiveness and job creation."

Ongoing Areas of Interest

The president's budget request would provide funding to maintain overall programmatic direction for NASA's activities across the Agency. As such, noteworthy areas of interest are provided below.

National Aeronautics and Space Administration



NASA SMD would be funded at \$7.93 billion, an increase of \$630.6 million or 8.6 percent. Existing missions across SMD would be funded at levels necessary to continue development. Decreases in funding reflect expected mission lifecycle transitions or close-outs. Accounts in each division (excluding HPD) that support individual investigator research would see increased budgets (ESD and APD) or maintain existing levels of funding (PSD).

The budget request would provide the **Planetary Science Division (PSD)** \$3.2 billion in FY 2022, an 18.5 percent increase from the FY 2021 level. The Planetary Science budget would also maintain anticipated funding for the CLPS program and VIPER mission within the Lunar Exploration Program, the Dragonfly, Lucy, and Psyche missions, a Near-Earth Objects Surveyor mission, and the two announced Discovery missions to Venus (Veritas and DAVINCI+). PSD would also provide \$472.1 million for Europa Clipper, which includes \$47 million to mitigate COVID-19 disruptions.

HPD would continue development of the Interstellar Mapping and Acceleration Probe (IMAP) mission and the anticipated start of the Geospace Dynamics Constellation mission. HPD would also sustain implementation of the *Diversify, Realize, Integrate, Venture, Educate* (DRIVE) initiative and would make Phase 2 selections for the DRIVE Science Centers.

The request would provide the **Astrophysics Division** with \$1.4 billion in FY 2022, a 3.2 percent increase above FY 2021 level and includes funding for continued development of the Nancy Grace Roman Space Telescope.

NASA's **Human Exploration and Operations Mission Directorate** would be funded at \$6.88 billion, an increase of \$363 million or 5.6 percent. The request would provide \$1.195 billion, a 28.7 increase from FY 2021 levels, for development of NASA's lunar **Human Landing System (HLS)**. The request would only fund the single awardee NASA selected under the HLS competition; however, the request refers to GAO's ongoing review of the HLS award protest that could force NASA to modify its procurement strategy. The request also includes funding for the Lunar Exploration Transportation Services (LETS) through competitive awards that provide sustainable lunar transportation services. The budget request would maintain support for all of NASA's major Space Launch System, Orion Vehicle, and Exploration Ground Systems work.

The Administration would provide \$148 million, 10.4 percent above the FY 2021 level, for the **Aeronautics Research Mission Directorate's** Transformative Aero Concepts Program (TACP), which supports multidisciplinary research aimed at developing groundbreaking aeronautical concepts. TACP oversees the **University Leadership Initiative (ULI)** program and plans to maintain the annual competition in FY 2022 with a renewed focus on zero-emission aviation. Established in 2015, ULI supports universities or university-led teams conducting research to overcome specific technical challenges while contributing to the aeronautics workforce development pipeline. The Administration would provide funding to ARMD to initiate a Sustainable Flight National Partnership (SFNP) that will partner with universities and industry to develop a full-scale sustainable flight demonstrator X-plane to validate integrated systems and their benefits.

The budget request would provide \$147 million, 13.9 percent above FY 2021 level, for the **Office of Stem Engagement (OSTEM)**, which will continue to lead the Agency's STEM engagement effort. The request provides resources to Minority University Research Research and Education Project (MUREP) to enable greater reach to Minority Serving Institutions (MSIs) and underrepresented minorities in geographical areas where MUREP does not have investments.

Proposed Reductions and Terminations

The request would terminate the Astrophysics Division's **SOFIA** mission. Both Obama and Trump Administrations repeatedly and unsuccessfully attempted to cancel the mission due to expressed concerns over its high operations costs relative to a claim of its low science return. Congress is likely to once again provide funding for the mission in FY 2022.

National Aeronautics and Space Administration



Source: NASA's FY 2022 Budget Summary and Background Information is available at

https://www.nasa.gov/sites/default/files/atoms/files/fy2022_congressional_justification_nasa_budget_request.pdf

National Aeronautics and Space Administration

(In thousands)

	FY 2021 Enacted	FY 2022 Request	FY 2021 vs. FY 2022 Request
NASA, total*	23,271,300	24,801,500	1,530,200 (6.6%)
Science	7,300,800	7,931,400	630,600 (8.6%)
Earth Science	2,000,000	2,250,000	250,000 (12.5%)
Planetary Science	2,699,800	3,200,000	500,200 (18.5%)
Astrophysics	1,356,200	1,400,200	44,000 (3.2%)
James Webb Space Telescope	414,700	175,400	-239,300 (57.7%)
Heliophysics	751,000	796,700	45,700 (6.1%)
Education and Public Outreach (EPO) ¹	45,600	55,600	10,000 (21.9%)
Aeronautics	828,700	914,800	86,100 (10.4%)
Space Technology	1,100,000	1,425,000	325,000 (29.5%)
Exploration	6,517,400	6,880,400	363,000 (5.6%)
Space Operations	3,988,200	4,017,400	29,200 (0.7%)
STEM Engagement	127,000	147,000	20,000 (15.7%)
Space Grant	51,000	57,000	6,000 (11.8%)
EPSCoR	26,000	26,000	0 (0%)
Minority University Research and Education Program (MUREP)	38,000	48,000	10,000 (26.3%)
Safety, Security, & Mission Services	2,936,500	3,049,200	112,700 (3.8%)
Construction and Environmental Compliance and Restoration	428,500	390,300	-38,200 (8.9%)
Office of Inspector General	44,200	46,000	1,800 (4.1%)

National Endowment for the Humanities & National Endowment for the Arts



The National Endowment for the Humanities (NEH) and the National Endowment for the Arts (NEA) both would receive increases under the President's FY 2022 budget proposal.

Quick Take: Unlike under the Trump Administration, which proposed eliminating the National Endowment for the Humanities (NEH) and the National Endowment for the Arts (NEA), President Biden's FY 2022 budget proposal would provide increases to both agencies. For NEH, the budget proposes nearly \$176 million, an over \$10 million increase from FY 2021 enacted levels, while NEA is proposed to receive an even larger \$34 million increase over current levels, for a \$201 million agency top-line in FY 2022.

Major Cuts/Eliminations: None

New Initiatives/Priorities: The Biden Administration has identified thematic NEH priorities of "advancing racial equity and support for underserved communities; confronting the climate emergency; restoring America's global standing; responding to the COVID-19 pandemic and economic crisis; and strengthening our democracy." NEH divisions and programming are expected to have an eye toward these priorities in the coming years. The Biden budget would also expand support for NEH's **A More Perfect Union** initiative, which first started in FY 2019, with a shift in focus of the initiative toward understanding "our quest for a more just, inclusive, and sustainable society."

For NEA, the Biden Administration will emphasize the agency's focus on rebuilding the creative community impacted by the COVID-19 pandemic, continued development of **Creative Forces: NEA Healing Arts Network**, and efforts to advance racial equity, civil rights, and equal opportunity through engagement with underserved communities and rural America.

The Bottom Line

After years of threats of elimination by the previous Administration, the NEH and NEA are now in strong footing with moderate budget increases proposed with the Biden budget request. While the Endowments enjoy bipartisan support in Congress, it is uncertain that Congress will provide those levels of increase.

Proposed Funding for Existing Programs of Note

For NEH, the Biden budget request proposes over \$6 million to support the **A More Perfect Union** initiative projects in preparation for the 250th anniversary of the Declaration of Independence in 2026. Under the initiative, the Biden Administration has particular interest in the impact of climate change on our history, racial and gender equity, civic education, and experiences of Native Americans.

Every NEH division and office would receive an increase under this budget proposal. The NEH Education Division has proposed exploring an expansion of the Humanities Initiatives programs for small and minority serving institutions, as well as new programming for civics education at both the K-12 and postsecondary levels. The NEH Research Division will be exploring increased support for junior faculty fellowships and a new or increased focus on "21st century subjects such as post-humanism, intersectionality, and environmental humanities." The Office of Digital Humanities will explore efforts to bridge technology and humanities through topics such as AI ethics and disinformation. The Office of Challenge Programs will continue its support of infrastructure and capacity building but will also explore starting a new grant program to create

National Endowment for the Humanities & National Endowment for the Arts



partnerships between larger national institutions and local minority-serving organizations and increase support for climate change and civics-focused activities.

Sources: NEH's FY 2022 Budget Request is available at <https://www.neh.gov/sites/default/files/inline-files/NEH%20APPROPRIATIONS%20REQUEST%20FY%202022.pdf>.

NEA's FY 2022 Budget Request is available at <https://www.arts.gov/sites/default/files/NEA-FY22-Cong-Budget-and-Performance-Plan.pdf>.

National Endowment for the Humanities (NEH) and the National Endowment for the Arts (NEA) *(in thousands of \$)*

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021 Enacted
NEH, total	167,500	177,550	10,050 (6.0%)
NEA, total	167,500	201,000	33,500 (20.0%)

National Science Foundation



NSF would be funded at \$10.17 billion in FY 2022, a 19.8 percent or \$1.66 billion increase above the FY 2021 enacted level.

Quick Take: The Biden Administration proposes major increases across NSF, including in Administration research and education priority areas as well as core programs. Overall Research and Related Activities would grow by 18 percent from the FY 2021 estimated level, while Education and Human Resources (EHR) would grow by 16 percent (33 percent including the transfer of all funding for the Graduate Research Fellowship Program to EHR in FY 2022).

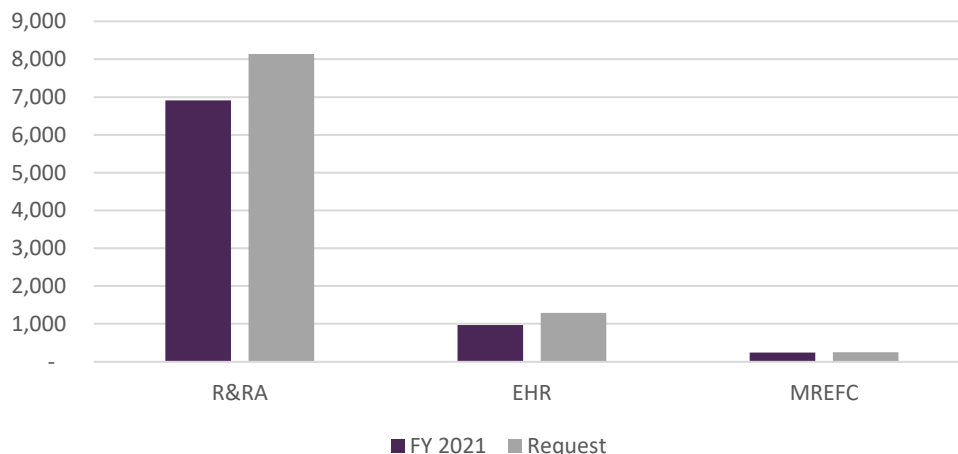
New Initiatives/Priorities: The request proposes the creation of a new Directorate for Technology, Innovation, and Partnerships (TIP), which aims to advance science and engineering research and innovation, accelerate the translation of basic research, solve national and societal problems, and support education pathways. Both the existing directorates of NSF and TIP would fund activities in priority areas such as climate and energy, advanced manufacturing, AI, quantum, advanced wireless research, and biotechnology. Broadening participation programs would also see major growth under the NSF Director's newly named Ensuring Accessibility and Inclusivity pillar.

Major Cuts/Eliminations: With such large growth proposed to the agency, there are no major cuts or eliminations outlined in the request.

The Bottom Line

The budget request's emphasis on TIP aligns with congressional efforts to boost NSF's role in competitiveness and technology development that have received broad bipartisan support. However, it remains to be seen if appropriators will have the resources to deliver such major increases to NSF's budget. If not, tougher choices may need to be made on how much to grow TIP and other priority areas versus protecting core programs.

NSF Major Accounts (In Millions)



National Science Foundation



New and Signature Initiatives

Directorate for Technology, Innovation, and Partnerships (TIP)

The request proposes the creation of a new Directorate for Technology, Innovation, and Partnerships (TIP), which aims to advance science and engineering research and innovation, accelerate the translation of basic research, solve national and societal problems, and support education pathways. NSF plans that TIP will operate in partnership with other NSF Directorates to accelerate the transition to market for innovations across all NSF areas of investment. TIP will catalyze partnerships with academia, industry, the federal government, foundations, and other stakeholders to ensure U.S. leadership in critical technologies and societal challenges. The request highlights that TIP would be aligned with Administration priorities such as “Build Back Better” and its Racial Equity pillar, as well as congressional priorities.

TIP would be composed of three Divisions: Innovation Ecosystems (IE), Technology Frontiers (TF), and Translational Impact (TI) as well as a Partnership Office (PO). The Directorate would include \$200 million to support a new centers program titled, **Regional Innovation Accelerators (RIAs)** supported through IE and TF. NSF plans to fund up to 20 RIAs at \$10 million per year for 10 years for “use inspired, solutions-oriented research and innovation in a range of technology areas (e.g., artificial intelligence, quantum information science, advanced wireless, advanced manufacturing, semiconductors) as well as in a diverse set of national-challenge areas (e.g., climate change and biotechnology) of priority to the Administration and Congress.” TF also plans to use \$90 million to fund translation of research discoveries across NSF. Additional new activities to be included in TIP would be \$50 million for a new program for Accelerating Public Private Partnerships through PO, \$20 million for new NSF Entrepreneurial Fellows, and \$20 million to support racial equity. TIP would also support lab-to-market programs previously housed in the Directorate for Engineering (ENG), such as Partnerships for Innovation (PFI), Innovation-Corps (I-Corps), Small Business Innovation Research (SBIR), and Small Business Technology Transfer (STTR) programs. While I-Corps would be flat funded, PFI (up 32 percent) and SBIR/STTR (up 18 percent) would see major growth. The Convergence Accelerator program, previously housed in the Office of Integrative Activities, would also move to TIP and would be flat funded at \$70 million. Note that the Industry-University Cooperative Research Centers (IUCRC) program would stay in the Directorate for Engineering under the Engineering Education and Centers Division.

Additional information on TIP is available at https://www.nsf.gov/about/budget/fy2022/pdf/52_fy2022.pdf.

Administration Priorities

Across both TIP and existing NSF directorates, NSF would continue prioritization of critical technologies such as AI, quantum information science, wireless research, advanced manufacturing, and biotechnology, while adding new priorities in climate change and clean energy research. Within these priorities, most activities are expanded from previous years as the budget request does not detail many new activities. NSF plans include:

- **US Global Change Research Program (USGCRP):** In a stark contrast to recent budget requests, NSF would look to significantly boost its investments in research connected to understanding climate change and its impacts. Overall, NSF research relating to the interagency USGCRP would grow by 46 percent from the FY 2021 level. All directorates that participate would grow their investments at the same 46 percent from their FY 2021 investments. The largest investments would continue to be by the Geosciences Directorate, which would direct \$482 million to the effort. Also participating are the Directorates for Biosciences (\$212 million); Math and Physical Sciences (\$15 million); Social, Behavioral, and Economic Sciences (\$25 million); and the Office of Polar Programs (\$28 million). USGCRP thrusts would continue to include earth observations, earth and human system understanding, integrated modeling, and science to inform adaptation. The budget request does not outline new activities for this increased investment, but a working group has recently formed to plan how NSF would spend increased resources.

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- **Clean Energy Technology:** NSF proposes to support Clean Energy Technology at \$440 million in FY 2022, an increase of 32 percent above the FY 2021 level. Participating directorates include the Directorate for Engineering, which has the largest share of investments, the Directorate for Mathematical and Physical Sciences, the Directorate for Biological Sciences, and the Directorate for Computer and Information Science and Engineering. The new TIP Directorate would also participate but does not plan on increasing existing investments. The request highlights current and previous NSF clean energy center investments including Centers for Chemical Innovation, Expeditions in Computing, Engineering Research Centers, and Industry-University Cooperative Research Centers programs. Future investments would focus on Foundational Research, Infrastructure, and Workforce Development in a range of priority areas including: generation of renewable and alternative energy sources; manufacture, storage, distribution, and management of renewable and alternative energy sources and systems; energy materials, use and efficiency; and societal and environmental aspects of clean energy.
- **Artificial Intelligence (AI):** NSF would continue its focus on AI, growing investments by 20 percent over the FY 2021 level for AI research, workforce development, access to data and computing infrastructure, and public-private partnerships. A major priority for FY 2022 investment is building AI research capacity at Minority Serving Institutions (MSIs). The biggest growth for AI would be within the new TIP directorate, whose AI efforts would increase 97 percent compared to equivalent activity in other Directorates during FY 2021.¹ AI Institutes would also see continued growth (a 37 percent increase) as NSF funds additional centers under the current competition. NSF will continue to focus on AI within its graduate education programs and overall education-related AI efforts would grow 67 percent. NSF would look to work with other research agencies on how using AI can unlock new insights from federal data sets while protecting privacy and security; a workshop is planned for later this summer to vision this activity. NSF will continue the Fairness in AI programs that began in FY 2019. In contrast to the FY 2021 budget request, only a few directorates are planning to grow their AI investments while others stay flat at FY 2021 levels. The Computer and Information Science and Engineering (CISE) directorate would continue to make the largest investments, but its share is down to 48 percent of total AI funding as TIP takes on the second biggest share. Note that funding for AI includes activities related to the Harnessing the Data Revolution (HDR) and Future of Work at the Human-Technology Frontier (FW-HTF) Big Idea, which are outlined below.
- **Quantum Information Science (QIS):** Funding for QIS would increase by 24 percent over the FY 2021 level to \$260 million in FY 2022. Funding would support multidisciplinary quantum centers, including the Quantum Leap Challenge Institutes, and continue investments in QIS Research Experiences for Undergraduates (REUs) and NSF Research Traineeship (NRT) awards, as well as programs to broaden participation of underrepresented researchers and students in QIS. Several directorates are participating in this effort, including the new TIP Directorate, which would majorly increase investments in activities related to quantum by 163 percent compared to comparable investments made by existing Directorates in FY 2021. A majority (56 percent) of the funding would continue to be through the Directorate for Mathematical and Physical Sciences (MPS), which would increase its QIS funding by 7 percent. The Directorates for Engineering (up 18 percent) and Computer and Information Science and Engineering (up 26 percent) would also grow their investments relative to FY 2021 funding.
- **Advanced Wireless Research:** NSF proposes \$167 million for Advanced Wireless activities in FY 2022, a 28 percent increase over the FY 2021 level. This funding will support the new, currently under competition, Resilient and Intelligent Next-Generation Systems (RINGS) program as well as continuing efforts such as the Platforms for Advanced Wireless Research (PAWR) and Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT) programs. CISE would continue to fund most Advanced Wireless activities at \$93 million, 56 percent of total proposed investments, but TIP would see by far the biggest growth, going from almost no investment to \$30 million.

¹ For comparison purposes, the budget request reassigns FY 2021 funding to TIP for programs that would be transferred to TIP in FY 2022. In this document, any reference to TIP growth refers to comparing to prior year activities in TIP's purview that were previously executed by other parts of NSF.

National Science Foundation



- **Advanced Manufacturing:** Funding for Advanced Manufacturing would increase by 31 percent above FY 2021 to \$418 million in FY 2022. This investment would support Advanced Manufacturing Research, Future Manufacturing Research, Workforce Development, and Transition to Practice. The most significant funding increases relative to FY 2021 investments would be in the Engineering (up 48 percent) and TIP (up 122 percent) Directorates. The Biological Sciences (up 140 percent) and Social, Behavioral, and Economic Sciences (up 600 percent) would also see significant increases, albeit from very small prior investments.
- **Biotechnology:** Funding for Biotechnology would increase by 32 percent over FY 2021 levels to a total of \$382 million in FY 2022. These funds would be allocated primarily to the Biological Sciences Directorate (\$130 million, up 18 percent) and the Engineering Directorate (\$102 million, up 12 percent). The new TIP Directorate would see the biggest growth in its investment to a total of \$69 million, 662 percent over FY 2021 funding. Across Directorates, NSF would invest these funds in foundational research, computing and physical infrastructure, proof-of-concept development, and education and workforce development.
- **National Nanotechnology Initiative (NNI):** NSF would provide \$470.54 million for NNI, an increase of 7 percent above FY 2021. All the growth would be in the Engineering Directorate, bringing its total investment to \$220 million. The Directorate for Mathematical and Physical Sciences also plays a major role in the initiative, although its investments would be flat funded at \$184 million. New NNI research challenges for FY 2022 include COVID-19 (including vaccine development), mitigation of global change, advanced manufacturing, AI, bioeconomy, sustainability, and quantum information science and engineering including quantum biology.
- **Networking and Information Technology Research and Development (NITRD):** NITRD would be supported at \$2.07 billion in FY 2022, an increase of 31 percent above FY 2021. This includes all computing, data, computational, and networking research, infrastructure, and education activities across NSF, including priority areas such as AI and cybersecurity. All activities in the Directorate for Computer and Information Science and Engineering (CISE) are included, as well as contributions from all other Directorates. TIP would see the biggest increase of \$322 million or 423 percent over comparable FY 2021 funding.

Advancing Equity in STEM

NSF would put major emphasis on advancing equity in STEM, growing total investment in these programs by approximately 50 percent, to \$100 million. The INCLUDES program would see major growth of 132 percent to \$46.5 million. New funding would enable additional Alliance awards in FY 2022, expansion of the INCLUDES coordination hub activities and scope, and accelerated development of the Shared Measures System. NSF's focused workforce programs in broadening participation and boosting research capacity at MSIs would also see large increases, including Centers for Research Excellence in Science and Technology (CREST, up 63 percent), Alliances for Graduate Education in the Professoriate (AGEP, up 50 percent), Louis Stokes Alliances for Minority Participation (LSAMP, up 40 percent), Tribal Colleges and Universities Undergraduate Program (TCUP, up 27 percent), Historically Black Colleges and Universities Undergraduate Program (HBCU-UP, up 27 percent), and the Improving Undergraduate STEM Education: Hispanic Serving Institutions program (IUSE:HSI, up 22 percent). The Advancement of Women in Academic Science and Engineering Careers (ADVANCE) program would see smaller growth of 14 percent. Education research efforts focused on broadening participation would also see smaller growth of 8 percent from the FY 2021 level. Individual research directorates would continue recently begun efforts to boost capacity at MSIs, such as the SBE Build and Broaden Initiative and the CISE MSI initiative.

International Engagement

The Office of International Science and Engineering (OISE) would be funded at \$75 million in FY 2022, an increase of 47 percent above FY 2021 level. OISE funds would be used to facilitate international partnerships, provide opportunities for

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“U.S. leadership to shape the global science and engineering agenda,” and to support a globally engaged U.S. workforce. As well as continued support for existing OISE programs, FY 2022 OISE plans include a relaunch of the Partnerships for International Research and Education (PIRE) program in FY 2021 with a focus on climate change or clean-energy research and the launch of a **new \$10 million Global Venture Fund (GVF)** to support new and supplemental awards to facilitate international collaboration.

Predictive Intelligence for Pandemic Prevention (PIPP)

The Biological Sciences Directorate (BIO) and Computer Information Science and Engineering Directorate (CISE), along with the Directorates for Engineering (ENG) and Social, Behavioral, and Economic Sciences (SBE) would support a new initiative that aims to forecast the emergence of infectious disease and prevent future pandemics. PIPP would initially support planning grants followed by new center awards in later years.

Semiconductors and Microelectronics

NSF would provide \$138.89 million for semiconductors and microelectronics in FY 2022, an increase of \$50.23 million or 57 percent above FY 2021. Most of this increase would come from the new TIP Directorate, which would provide \$50.23 million for semiconductor and microelectronics research and education as one of the new Directorate’s focused technology areas. The Mathematical and Physical Sciences Directorate would grow its investments by 66 percent to \$25 million. MPS, along with the Engineering Directorate and other Directorates, will continue to support research on fundamental science and engineering questions on the concepts, materials, devices, circuits, and platforms, to advance progress in this technology area.

Coastlines and People (CoPe)

The Geosciences Directorate (GEO) plans to grow this program, which began in FY 2019 to \$23 million, a 53 percent increase from the FY 2021 level. The budget request would allow NSF to support additional research hubs to bring together teams of researchers for multidisciplinary efforts following many strong proposals being received in the FY 2021 competition. The proposed increase would allow NSF to support additional research hubs to bring together teams of researchers for multidisciplinary efforts following many strong proposals being received in the FY 2021 competition. Overall CoPe will continue its focus on coastline hazards, environmental variability, and earth system prediction.

Ongoing Areas of Interest

Big Ideas for Future Investment

The FY 2022 budget request continues NSF support for most of the Big Ideas that were first introduced by Director France Córdoba in May 2016 and have been the subject of several major funding opportunities since FY 2018. Note that the Quantum Leap and NSF 2026 are no longer included under the Big Ideas.

- Research Big Ideas
 - Harnessing the Data Revolution (HDR)
 - The Future of Work at the Human-Technology Frontier (FW-HTF)
 - Windows on the Universe: The Era of Multi-Messenger Astrophysics (WOU)
 - Understanding the Rules of Life: Predicting Phenotype (URoL)
 - Navigating the New Arctic (NNA)
- Enabling Big Ideas
 - Mid-Scale Research Infrastructure

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- NSF INCLUDES (Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science): Enhancing Science and Engineering Through Diversity
- Growing Convergent Research at NSF

The budget request would provide continued support at relatively flat levels for the Research Big Ideas. Of the Enabling Big Ideas, Mid-Scale Research Infrastructure (Mid-Scale RI) would be supported at \$126 million, an increase of 16 percent above FY 2021, and NSF INCLUDES, which would be increased by 133 percent to \$46.5 million. All the proposed increased funding for Mid-Scale RI would come under Research and Related Activities, supporting the ongoing Mid-Scale RI-1 FY 2021 competition at \$50 million. Mid-Scale RI-2 projects are funded through the Major Research Equipment and Facilities Construction account and would be flat funded at \$76 million. NSF would fund Mid-Scale RI-2 projects from the FY 2019 competition and potentially projects from the ongoing FY 2021 competition, depending on when those projects are awarded. INCLUDES funding is discussed above under the Advancing Equity in STEM priority.

Cybersecurity

The Secure and Trustworthy Cyberspace (SaTC) initiative would be supported at \$153 million in FY 2022, 11 percent above the FY 2021 level. Numerous activities are outlined for FY 2022:

- NSF expects to issue a revised SaTC solicitation for FY 2022 to align with the 2019 Federal Cybersecurity Research and Development Strategic Plan
- NSF plans to fund workshops to broaden the cybersecurity research community across disciplines. In particular, a series of workshops will explore cybersecurity related to healthcare information technology, next generation wireless networks, global pandemics, and sharing of government data with researchers.
- Funding for the Cybercorps Scholarships for Service (SFS) program would increase 17 percent above its FY 2021 level to \$70 million. SFS would continue to prioritize K-12 education investments and would also invest in education and workforce efforts related to cybersecurity and privacy challenges associated with the COVID-19 pandemic.

Innovation Corps (I-Corps™)

The I-Corps program would be funded at \$40 million, the same as its FY 2021 level. NSF continues its new phase of I-Corps that began in FY 2020 focused on teams, hubs, and partnerships. The proposed funding would allow for I-Corps to support 250-300 teams in FY 2022. NSF Hubs would be focused on bringing I-Corps curriculum to innovators and entrepreneurs who are not experienced with NSF funding. In FY 2022 NSF would also emphasize racial equity within the I-Corps program, through a cooperative agreement awarded to the GEM Consortium. The budget request highlights NSF's continued interest in outreach to entrepreneurs, university spinoffs, awardees of other agencies, state and local governments, and non-profit groups.

Science, Technology, Engineering, and Mathematics (STEM) Education

Under the budget request, STEM education programs would see mixed outlooks outside of the broadening participation workforce programs outlined above. Education Core Research would see a substantial 27 percent growth to \$97 million with a continued effort towards building capacity for future-oriented STEM education research. Advancing Informal STEM Learning (AISL) would also see growth of 12 percent. Other programs would not fare as well. Advanced Technological Education (ATE), Discovery Research preK-12, the Robert Noyce Scholarship Program, and Computer Science for All would all be funded at their FY 2021 levels while Improving Undergraduate STEM Education (IUSE) would decrease by 3 percent.

Graduate Education

NSF Research Traineeships (NRT) would be flat funded at \$58 million. NSF expects to fund 15-18 traineeships with a focus on emerging technologies and award up to \$4 million for research on graduate education through the Innovations in Graduate

National Science Foundation



Education (IGE) program. The Graduate Research Fellowships Program (GRFP) would grow 12 percent to \$319 million. Funding would support 2,500 new fellows, up from 2,000 in FY 2021. NSF plans to continue its recent practice of emphasizing AI, quantum, and other emerging technologies in the GRFP solicitation.

Spectrum Innovation Initiative

The Spectrum Innovation Initiative (SII) would be flat funded at \$17 million in FY 2022. Funding would continue to support the National Radio Dynamic Zone, the National Center for Wireless Spectrum Research, and foundational research and education activities.

Strengthening American Infrastructure

The Social, Behavioral, and Economic Sciences (SBE) Directorate plans to continue this effort, begun in FY 2020, at \$8 million in FY 2022. This investment would be 33 percent above the FY 2021 level. The program aims to connect social scientists with infrastructure efforts to enable better infrastructure planning with full consideration of how people will use that infrastructure.

Additional Programs of Interest (all comparisons are to FY 2021 levels)

- **CAREER:** Up 9 percent to \$365 million.
- **EPSCoR:** Up 20 percent to \$240 million.
- **Biological Integration Institutes (BII):** Up 43 percent to \$36 million. The increase will support five new awards.
- **Engineering Research Centers (ERC):** Up 21 percent to \$69 million. The increase will support four new centers currently under competition.
- **Science and Technology Centers (STC):** Up 5 percent to \$61 million. NSF plans to make five new awards in FY 2021 and release a new solicitation in the summer of 2021.
- **Centers for Chemical Innovation (CCI):** Up 15 percent to \$28 million. NSF plans to fund three new Phase I awards and one new Phase II award in FY 2022.
- **Materials Research Science and Engineering Centers (MRSEC):** Up 6 percent to \$57 million. The next MRSEC competition will be in FY 2023.
- **Research Experiences for Undergraduates (REU):** Up 3 percent to \$85 million.
- **Long-Term Ecological Research Sites:** Up 4 percent to \$34 million.

Proposed Reductions and Terminations

Programs funded by H-1B Nonimmigrant Petitioner Fees

After a major boost in FY 2021, these programs are expected to decrease in FY 2022 as NSF revenue from H-1B fees is projected to be \$162 million, 8.2 percent below FY 2021 revenue but 41 percent above the FY 2020 actual level. As required by law, approximately 75 percent of these funds will go to support the Scholarships in STEM program (S-STEM) program. NSF plans to fund 90 awards in FY 2022, with an emphasis on community colleges and enhancing knowledge about scaling STEM degree attainment. 25 percent of the funds will be used to support the Innovative Technology Experiences for Students and Teachers (ITEST) program. NSF plans to fund 25-30 awards in FY 2022. Unlike previous years, the request does not propose changing the percentages of the fees going to the individual programs.

Source: The full NSF FY 2022 Budget Request can be viewed at: <https://www.nsf.gov/about/budget/fy2022/toc.jsp>.

National Science Foundation



National Science Foundation

(in millions of \$)

	FY 2021 Enacted*	FY 2022 Request	FY 2022 Request vs. FY 2021
NSF, total discretionary	8,486.76	10,169.30	1,682.54 (19.8%)
Research and Related Activities§	6,880.48	8,139.71	1,259.23 (18.3%)
Biological Sciences	818.14†	948.51	130.37 (15.9%)
Computer and Information Science and Engineering	1,005.49†	1,116.06	110.57 (11.0%)
Engineering	761.85†	916.79	154.94 (20.3%)
Geosciences	1,004.18†	1,194.92	190.74 (19.0%)
Mathematical and Physical Sciences	1,580.48†	1,690.74	110.26 (7.0%)
Social, Behavioral, and Economic Sciences	282.06†	319.66	37.60 (13.3%)
<i>Translation, Innovation, and Partnerships (TIP)</i>	364.87‡	864.87	500.00 (137.0%)
International Science and Engineering	51.32†	75.32	24.00 (46.8%)
Office of Polar Programs	483.35†	506.29	22.94 (4.7%)
Integrative Activities§	384.88†	504.90	120.02 (31.2%)
US Arctic Research Commission	1.60†	1.65	0.50 (3.1%)
Education and Human Resources§	1,110.26	1,287.27	177.01 (15.9%)
Major Research Equipment and Facilities Construction	241.00	249.00	8.00 (3.3%)
Agency Operation and Award Management	345.64	468.30	122.66 (35.5%)
National Science Board	4.50	4.60	0.10 (2.2%)
Office of Inspector General	17.85	20.42	2.57 (14.4%)

*The amounts shown for FY 2020 actual and FY 2021 enacted are taken from the NSF budget request.

†FY 2021 funding for individual directorates and offices are estimated amounts.

‡FY 2021 TIP funding is adjusted for comparability to reflect the movement of activities to TIP in FY 2022.

§FY 2022 funding for the Graduate Research Fellowship Program has been included entirely within Education and Human Resources whereas previously the program.

U.S Department of Agriculture



The discretionary programs within USDA's National Institute of Food and Agriculture (NIFA) would see an increase of \$386 million (23.9 percent) compared to FY 2021 enacted level. USDA's Agricultural Research Service (ARS) would see an increase of \$358 million (19.3 percent).

Quick Take: Similar to other environmentally-relevant agencies, several USDA research accounts would see significant increases as the Biden Administration aims to develop new ways to foster climate smart agriculture.

Major Cuts/Eliminations: Some NIFA programs are proposed for elimination or decreases, but the vast majority of USDA's extramural research arm would be flat funded. Within ARS, there are no proposed facility closures nor proposed eliminations to ARS research programs.

New Initiatives/Priorities: In addition to the proposed increases for major agricultural research accounts within NIFA and ARS, this would be the first year that the Agriculture Advanced Research and Development Authority (AgARDA) would see funding. The program, authorized in the 2018 Farm Bill, would be funded at \$5 million and would likely support precision and digital agriculture and climate-related research projects.

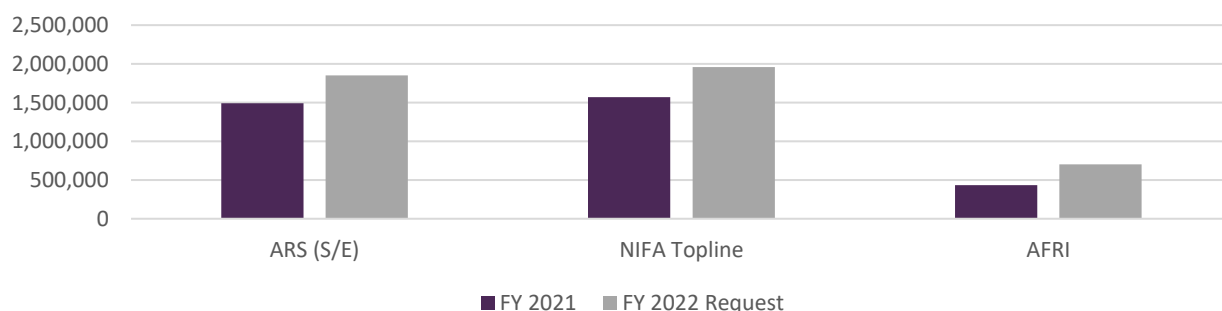
Similarly, USDA would also take part in the newly proposed Advanced Research Projects Agency - Climate (ARPA-C) which would receive a funding level of \$95 million. Notably, this amount marks one of the highest research budgets for ARPA-C of any of the participating agencies. It is not yet clear how ARPA-C would function or what its initial priorities may be (see the introduction for additional details).

The Climate Hubs would be funded at a total of \$23 million, funded jointly through the Forest Service (\$5 million), Natural Resource Conservation Service (\$8 million), ARS (\$5 million), and NIFA (\$5 million).

The Bottom Line

USDA is proposing significant investments in some research programs to combat climate change, but many other NIFA and ARS programs would be funded at the FY 2021 level.

Two-Year Enacted Funding Levels
(Dollars in Thousands)





Proposed Reductions and Terminations

Despite the very positive budget request for some NIFA programs, several would see funding decreases:

- Supplemental and Alternative crops would be decreased by \$337,000; was funded at \$1 million in FY 2021.
- Proposed elimination of the Alfalfa Seed and Alfalfa Forage Systems; Aquaculture Research; and Potato Research.
- The Food Animal Residue Avoidance Database (FARAD) would be funded at \$2 million, down \$500,000.
- Smith-Lever 3(d) New Technologies for Extension would be funded at \$3 million, about \$500,000 less than the FY 2021 level.
- No funding for Genome to Phenome is included in the request. The program was funded by Congress at \$1 million in FY 2021.

New and Signature Initiatives

National Institute of Food and Agriculture

Many of NIFA's signature programs would receive flat funding under the Biden Administration, including: Smith-Lever (b) and (c); Hispanic-Serving Institutions Education Grants Program; Education Grants at 1890s; Scholarships at 1890s; Research Grants at 1994 Institutions; Extension Services at 1890 and 1994 Institutions; Crop Protection and Pest Management; Aquaculture Centers; and Capacity Building Grants for Non Land-Grant Colleges of Agriculture.

However, several programs would see significant increases—particularly those that will play a larger role in the Biden climate priorities:

- Hatch Act, proposed increase of \$70.3 million
- McIntire-Stennis Cooperative Forestry, proposed increase of \$9.7 million
- Sustainable Agriculture Research Education and Extension (SARE), proposed increase of \$20 million
- Evans-Allen (Research at 1890s), proposed increase of \$20 million
- Minor Crop Pest Management (IR-4), proposed increase of \$8 million

Agricultural Research Service

Within NIFA, AFRI would receive the largest increase, \$265 million, to bring the program to its authorized level of \$700 million. Once again, AFRI is directed to focus investments in three areas:

- Sustainable Agricultural Systems (SAS) (\$175 million—FY 2022 RFA expected December 2021), program goals/highlights:
 - Climate-smart agriculture
 - Sources of clean energy and other high-value biobased products
 - Nutrition security
 - \$10 million award size with opportunities for smaller mid-size awards
- Foundational and Applied Science (\$455 million—FY 2022 & FY 2023 RFA expected January 2022), areas of focus:
 - Mitigation and adaptation to climate change
 - Application of AI and climate-smart agriculture
 - Robotics, unmanned aerial systems, cyberphysical systems, big data
 - Increased investments in plant and animal breeding
 - Emerging technologies—gene editing, machine learning, production of new products
 - Biosecurity, microbiome, antimicrobial resistance

U.S Department of Agriculture



- Education and Workforce Development (\$70 million—FY 2022 & FY 2023 RFA expected January 2022) program goals/highlights:
 - Enhancing agricultural literacy
 - Developing pathways for undergraduate students in applicable fields with skills need in the agriculture sector or graduate programs
 - Pre- and Post-doctoral fellowships

No-Year Funding for MSI's

The Biden Administration is also requesting to amend legislation to allow for no-year funding (currently one-year) for Minority Serving Institutions. This will enable “NIFA to redistribute any unused funds to continue to support capacity at these institutions.”

Agricultural Research Service

ARS Salaries and Expenses (S&E) would be funded at just under \$1.9 billion, an increase of \$357.8 million over FY 2021. Contained within this increase is \$291 million in funding for several climate related initiatives that would take place across nearly all S&E accounts: \$92 million would be set aside for climate science research; \$99 million for clean energy research and development; \$5 million for Climate Hubs; and \$95 million for an agreement with the Department of Energy (DOE) for the Advanced Research Projects Agency-Climate (ARPA-C). Of note, the request would also fund the National Bio and Agro-Defense Facility (NBAF) at \$ 118.7 million for FY 2022, a \$37.6 million increase over FY 2021.

Human nutrition would remain essentially flat and would receive \$100 million, a \$1 million increase over FY 2021 enacted. This plus up would be used solely for adjusting for pay inflation and adding funding for the Federal Employees Retirement System (FERS). Notably, and unlike the Trump Administration requests, no cuts or eliminations of ARS human nutrition research facilities or extramural projects are proposed.

Source: USDA's FY 2022 Budget Summary and Congressional Justifications can be found at: <https://www.usda.gov/our-agency/about-usda/budget>.

U.S Department of Agriculture



U.S Department of Agriculture *(in thousands of \$)*

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021
Agricultural Research Service (ARS) (Discretionary)	1,491,784	1,849,590	357,806 (23.9%)
National Institute of Food and Agriculture (Discretionary)	1,570,089	1,955,863	385,772 (24.6%)
AFRI	435,000	700,000	265,000 (60.9%)
Hatch Act	259,000	329,380	70,380 (27.2%)
Smith-Lever Act 3(b) and 3(c)	315,000	315,000	----
McIntire-Stennis	36,000	45,783	9,783 (27.2%)
Food Safety and Inspection Service (FSIS- Discretionary)	1,075,703	1,165,589	89,886 (8.4%)
Animal and Plant Health Inspection Service (APHIS- <u>Discretionary</u>)	1,064,179	1,102,222	38,043 (3.6%)
McGovern-Dole International Food for Education Program	230,000	230,000	---



The President's FY 2022 budget request includes \$1.64 billion in discretionary funding for the U.S. Geological Survey (USGS), which would be an increase of \$327 million (24.5 percent) compared to the FY 2021 enacted level.

Quick Take: The request would substantially increase USGS programs across the board, with particular support included for climate-related programs. All extramural research programs would either see increases or be held flat.

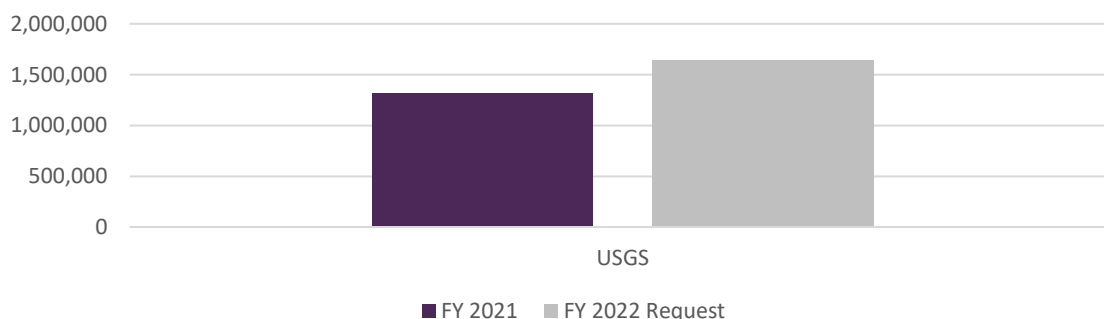
Major Cuts/Eliminations: Unlike President Trump's previous requests, the Biden Administration's budget request for FY 2022 does not propose eliminating or reducing programs, including those that provide extramural funding. This Administration followed the mission area structure established in the FY 2021 enacted appropriations bill that shifted programs from the Land Resources mission area to the Ecosystems and Core Science Systems mission areas.

New Initiatives/Priorities: The request would provide funding for collaborative climate adaptation and resilience research with the proposed new Advanced Research Projects Agency-Climate (ARPA-C) at DOE. In support of the Biden Administration's emphasis on addressing climate change, the Climate Adaptation Science Centers are proposed to receive more than double their current funding. Investments in Energy and Mineral Resources are prioritized and would receive the largest percentage increase of the Survey's mission areas.

The Bottom Line

USGS is proposed for a 25 percent budget increase. New investments include \$205 million for "climate science investments," including more than doubling Climate Adaptation Science Center funding. Overall, the budget would not provide increases to extramural research programs proportionate to the growth of the agency with the Water Resources Research Act Program and Cooperative Research Units proposed for flat funding or minimal growth, respectively. Bipartisan support is expected to continue for USGS extramural research programs. It is unclear what appetite Congress will have to support the level of proposed growth across USGS.

One-Year Enacted Funding Levels
(In Thousands of \$)





Proposed Reductions and Terminations

Unlike the budget requests of the Trump Administration that proposed dramatic cuts, the FY 2022 request does not propose reductions or terminations of any kind. All programs would either be protected at their current levels or see increases.

New and Signature Initiatives

USGS would be one of many agencies across the federal government to partner with DOE on ARPA-C to collaborate on high-risk, accelerated research on climate adaptation and resilience. USGS's role is envisioned to "deliver actionable science products that reduce barriers between science and user application" and the Survey will do this by "investing in mission-spanning infrastructure to apply advancements in technology to pressing societal problems." The budget request elaborates that USGS efforts will focus on five initial areas:

1. "planning tools to understand and predict habitat and biodiversity changes,
2. models for drought prediction,
3. predictive tools for fire and post-fire risk management,
4. coastal change and vulnerability forecasts to support planning and disaster response, and
5. models to assess the potential and risks associated with geologic storage of hydrogen relevant to the potential of clean energy options."

To further advance USGS climate change efforts, the **National and Regional Climate Adaptation Science Centers (CASCs)** are proposed to be funded at \$84.4 million, a dramatic increase of \$43.1 million or 104 percent over the enacted level. Of this increase, \$25 million is proposed to grow support for the Climate Adaptation Science Centers including furthering climate science efforts identified in the DOI Climate Action plan, such as development of climate adaptation services. The budget includes an increase of \$5 million to "Facilitate Synthesis of Regional Findings to National Level," and would prioritize collaborations with Tribal communities with \$10 million proposed for Tribal Climate Adaptation Science to help these communities participate in research and access critical information. Separately, \$20 million is proposed to fund research on biologic, geologic, and coastal blue carbon sequestration.

Ongoing Areas of Interest

The Biden Administration continues to focus on energy and critical resources, an area that was also a priority of the Trump Administration. The request proposes a 55.5 percent increase to the **Energy and Mineral Resources** mission area, which would provide \$140.0 million overall. An increase of \$25 million is proposed "to secure America's competitiveness by locating domestic reserves of critical minerals, researching materials supply chains for green technologies, and supporting mine reclamation with research to determine those with valuable supplies of critical minerals."

The **Ecosystems** mission area, proposed to be funded at \$358.2 million, would see the largest proposed dollar increase of \$99 million. The request would provide \$25.5 million for the **Cooperative Research Units**, an increase of \$500,000 over the FY 2021 enacted level. Within the Water mission area, the request would provide \$11.0 million for the **Water Resources Research Act Program**, which is flat from the FY 2021 enacted level.

Within the **Natural Hazards** program, the budget request would provide \$92.6 million for the **Earthquake Hazards** program, an 8.5 percent increase compared to the FY 2021 enacted level. The FY 2022 budget request includes \$25.7 million for the **ShakeAlert Earthquake Early Warning system** for the West Coast, flat compared to the enacted level. The request would provide a minimal increase of 0.8 percent for the **Global Seismographic Network**. Additionally, the budget proposes a \$1.5 million increase to the **Geomagnetism** program to expand magnetometer observatories to help prepare for space weather events.

U.S Geological Survey



Core Science Systems would increase by \$89.2 million or 35 percent, including \$60 million in the Science Synthesis, Analysis, and Research account for collaborative research with ARPA-C. The budget includes \$2.5 million for “research to address the threats of climate change on biodiversity.” The request would provide \$32 million to support the launch of the Landsat 9 satellite in calendar year 2021 as well as development with NASA of Landsat Next, Landsat’s next iteration of space-based land imaging. The **National Cooperative Geological Mapping Program** would be funded at \$40.6 million, an increase of \$600,000. The Administration is also interested in funding the collection of high-resolution elevation data for the 3D Elevation Program from the American Jobs Plan infrastructure package to promote resilience.

Source: USGS’s FY 2022 Budget Highlights can be found at <https://www.doi.gov/sites/doi.gov/files/fy2022-bib-bh059.pdf>. The full FY 2022 USGS congressional justification is available at <https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/atoms/files/FY2022%20USGS%20Budget%20Justification%20%28Greenbook%29.pdf>.

U.S Geological Survey (in thousands of \$)

	FY 2021 Enacted	FY 2022 Request	FY 2022 Request vs. FY 2021
USGS, total*	1,315,527	1,642,437	326,910 (24.9%)
Natural Hazards	175,484	207,748	32,265 (18.4%)
Earthquake Hazards	85,403	92,637	7,234 (8.5%)
Global Seismographic Network	7,153	7,212	59 (0.8%)
Ecosystems	259,077	258,217	99,140 (38.3%)
Climate Adaptation Science Centers	41,335	84,403	43,068 (104.2%)
Energy and Mineral Resources	90,041	139,973	49,932 (55.5%)
Water Resources	263,120	288,384	25,274 (9.6%)
Water Resources Research Act Program	11,000	11,00	----
Core Science Systems	252,688	341,874	89,186 (35.3%)
Science Support	95,734	121,421	25,687 (26.8%)
Facilities	179,383	184,810	5,427 (3.0%)

* Figures can be found in the USGS FY 2022 Budget Highlights document. The figures in the full congressional justification show different program changes compared to the FY 2021 enacted level as they do not include 2022 fixed costs.

Acronym Glossary

General Terms

- FY – Fiscal Year
- OMB – Office of Management and Budget
- CR – Continuing Resolution

Department of Commerce (DOC)

- NOAA – National Oceanic and Atmospheric Administration
- OAR – Office of Oceanic and Atmospheric Research
- NERRS – National Estuarine Research Reserves Systems
- NWS – National Weather Service
- NEDIS – National Environmental Satellite, Data, and Information Service (NESDIS)
- NOS – National Ocean Service
- NMFS – National Marine Fisheries Service
- NIST – National Institute of Standards and Technology
- MEP – Hollings Manufacturing Extension Partnership
- NIMBL – National Institute for Innovation in Manufacturing Biopharmaceuticals
- EDA – Economic Development Administration

Department of Defense (DOD)

- RDT&E – Research, Development, Test, and Evaluation
- S&T – Science and Technology
- NDS – National Defense Strategy
- DARPA – Defense Advanced Research Projects Agency
- DTRA – Defense Threat Reduction Agency
- OCO – Overseas Contingency Operations

Department of Education (ED)

- SEOG – Supplemental Educational Opportunity Grant
- PSLF – Public Student Loan Forgiveness
- GEAR UP – Gaining Early Awareness and Readiness for Undergraduate Programs
- TQP – Teacher Quality Partnership
- GAANN – Graduate Assistance in Areas of National Need
- IES – Institute of Education Sciences
- HSI – Hispanic Serving Institution
- MSI – Minority Serving Institution
- HBCU – Historically Black Colleges and Universities

Department of Energy (DOE)

- ARPA-E – Advanced Research Projects Agency-Energy
- CESER – Office of Cybersecurity, Energy Security, and Emergency Response
- EERE – Office of Energy Efficiency and Renewable Energy
- NNSA – National Nuclear Security Administration
- OE – Office of Electricity

Acronym Glossary

Department of Health and Human Services (HHS)

- NIH – National Institutes of Health
- F&A – Facilities and Administrative costs
- ICs – Institutes and Centers
- FDA- Food and Drug Administration

Department of Health and Human Services (Other)

- GME – Graduate Medical Education
- AHRQ – Agency for Healthcare Research and Quality
- NIDILRR – National Institute on Disability, Independent Living, and Rehabilitation Research
- NIOSH – National Institute for Occupational Safety and Health
- HRSA – Health Resources and Services Administration
- CHGME – Children’s Hospitals Graduate Medical Education
- CMS – Centers for Medicare and Medicaid Services
- ACL – Administration for Community Living
- ERCs – Education and Research Centers
- CDC – Centers for Disease Control and Prevention
- SAMHSA – Substance Abuse and Mental Health Services Administration
- TANF – Temporary Assistance for Needy Families
- ACA – Patient Protection and Affordable Care Act
- ASPR – Assistant Secretary for Preparedness and Response
- SNS – Strategic National Stockpile
- MCMs – Medical Countermeasures
- IHS – Indian Health Services

Department of Homeland Security (DHS)

- S&T – DHS Science and Technology Directorate
- OUP – Office of University Programs
- CBP – U.S. Customs and Border Protection
- ICE – Immigration and Customs Enforcement
- USCIS – U.S. Citizenship and Immigration Services
- NPPD – National Protection and Programs Directorate
- DACA – Deferred Action for Childhood Arrivals

RD&I – Research, Development, And Innovation

- POE – Port of Entry
- COE – Centers of Excellence
- ALERT – Center for Awareness and Localization of Explosive-Related Threats
- CWMD – Countering Weapons of Mass Destruction

Department of Justice (DOJ)

- FBI – Federal Bureau of Investigation
- DEA – Drug Enforcement Agency
- COPS Office – Office of Community Oriented Policing Services
- OJP – Office of Justice Programs

Acronym Glossary

- CRS – Community Relations Service
- CARA – Comprehensive Addiction Recovery Act
- PSN – Project Safe Neighborhoods
- RES – Research, Evaluation, and Statistics
- NIJ – National Institute of Justice

Department of State and U.S. Agency For International Development (USAID)

- ECE – Educational and Cultural Exchange Programs
- ECA – Bureau of Educational and Cultural Affairs
- IVLP – International Visitor Leadership Program
- DA – Development Assistance Program
- ESF – Economic Support Fund
- GCCI – Global Climate Change Initiative
- USGDL – U.S. Global Development Lab
- GHP – Global Health Programs
- CSD – Countering States Disinformation Program

Environmental Protection Agency (EPA)

- S&T – Science & Technology*
- STAR – Science to Achieve Results
- AE – Air and Energy Program
- SSWR – Safe and Sustainable Water Program
- SHC – Safe and Sustainable Water Resources Program
- SHC – Sustainable and Healthy Communities Program
- CSS – Chemical Safety for Sustainability Program
- LMS – Lean Management System **Institute of Museum and Library Services (IMLS)**

National Aeronautics and Space Administration (NASA)

- STMD – Space Technology Mission Directorate
 - SMD – Science Mission Directorate
 - APD – Astrophysics Division
- WFIRST – Wide-Field Infrared Survey Telescope

Acronym Glossary

- ISS – International Space Station
- ESD – Earth Science Division
- OE – Office of Education
- JWST – James Webb Space Telescope
- ARMD – Aeronautics Research Mission Directorate
- TACP – Transformative Aeronautics Concepts Program
- ULI – University Leadership Initiative
- HEOMD – Human Exploration and Operations Mission Directorate
- PSD – Planetary Sciences Division
- HPD – Heliophysics Division

National Science Foundation (NSF)

- ENG - Directorate for Engineering
- BIO – Directorate for Biological Sciences
- CISE – Directorate for Computer and Information Science and Engineering
- EHR – Directorate for Education and Human Resources
- GEO – Directorate for Geosciences
- MPS – Directorate for Mathematical and Physical Sciences
- SBE – Directorate for Social, Behavioral and Economic Sciences
- ISE - Office of International Science and Engineering
- OIA - Office of Integrative Activities
- OPP – Office of Polar Programs

National Endowment for the Humanities (NEH) and National Endowment for the Arts (NEA)

U.S. Department of Agriculture (USDA)

- ARS – Agricultural Research Service
- NIFA – National Institute of Food and Agriculture
- SARE – Sustainable Agriculture Research Education and Extension
- APHIS – Animal and Plant Health Inspection Service
- NBAF – National Bio and Agro-Defense Facility
- AFRI – Agriculture and Food Research Initiative
- FSIS – Food Safety and Inspection Service

Department of Interior (DOI)

- U.S. Geological Survey (USGS)



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