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Analysis of the President's FY 2021 Budget Request for Federal Research, Health, and Higher Education Programs

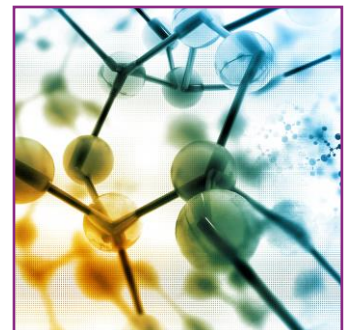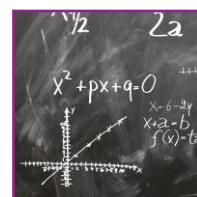# Prepared by Lewis-Burke Associates LLC
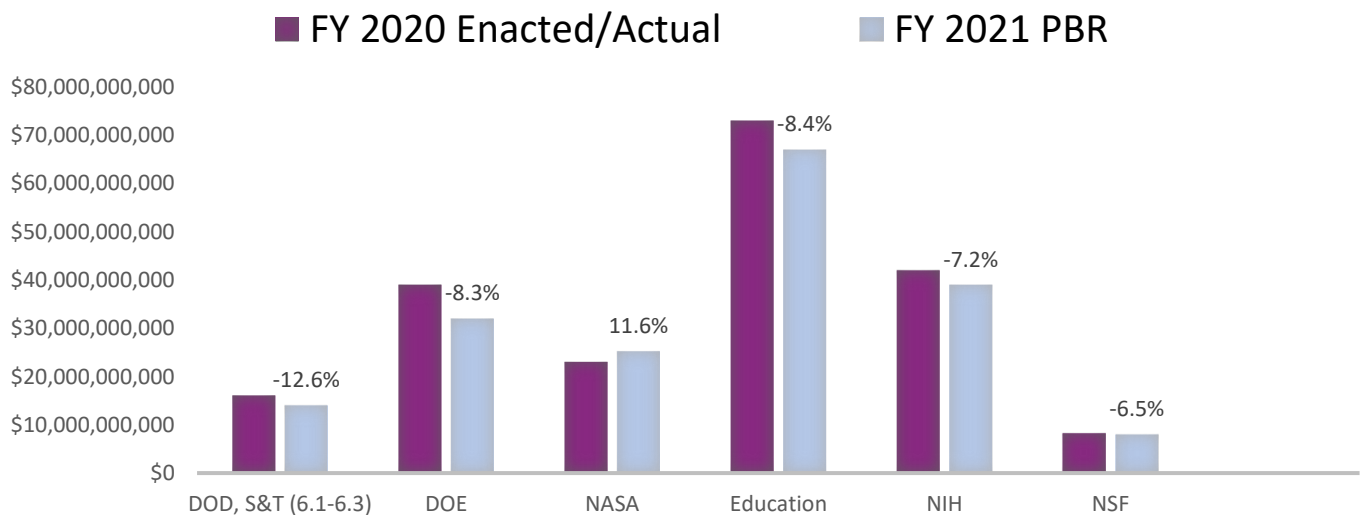# February 13, 2020

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Executive Summary

On February 10, 2020, President Trump released his fourth budget proposal to Congress. The fiscal year (FY) 2021 budget request reflects the political priorities of the Trump Administration and kicks off the congressional appropriations process. Similar to prior years, the request proposes drastic cuts to many of the non-defense federal agencies of interest to the research, education, and healthcare communities to help pay for increases in defense spending. However, Congress is expected to continue the trend of rejecting most of the proposed budget cuts. It is ultimately up to Congress to decide which proposals to embrace, modify, or reject as part of the annual appropriations process.

President Trump's top FY 2021 budget priority is growing military spending. Consistent with the two-year budget agreement signed into law last year, the budget proposes spending $740.5 billion on defense—a $2.5 billion increase over the FY 2020 enacted level. However, President Trump proposes significant cuts to nondefense spending to pay for increases in national security spending, a border wall, and making individual tax cuts set to expire in 2025 permanent. The budget request proposes $590 billion for non-defense programs, which is far below the FY 2021 non-discretionary cap of $634.5 billion agreed to in last year's budget deal, and would reflect a cut of $42 billion or 7 percent from current spending. These proposed cuts to non-defense programs will result in confrontation with Congress and in particular a Democratic-controlled House.

The graphic below shows proposed FY 2021 funding levels for major federal research agencies compared to the FY 2020 enacted levels.

KEY AGENCIES AT A GLANCE (IN BILLIONS)

FY 2021 Trump Administration Science and Technology Priorities

While the FY 2021 President's budget request proposes significant cuts to science and technology programs across the federal government, increased investments are proposed for Industries of the Future, including:

- quantum information science,
- artificial intelligence and machine learning,
- strategic computing,
- 5G/advanced communications,
- advanced manufacturing,
- biotechnology,
- next-generation microelectronics, and
- space exploration.

For example, the budget request proposes significant new investments in AI R&D, including:
- $850 million at NSF for traditional grants and additional National AI Research Institutes,
- $125 million for the DOE Office of Science,
- $100 million for USDA's AFRI competitive grants program to use AI for precision agriculture, and
- $50 million for NIH to use AI to tackle chronic diseases.

While Congress will decide final funding levels for FY 2021 and is likely to reject many proposed cuts, the budget request still provides a useful window into major Administration priorities, some of which have bipartisan support. For example, there is broad bipartisan support for increasing investments in science and technology, especially in the Industries of the Future, such as Artificial Intelligence (AI) and quantum information science (QIS), to maintain U.S. leadership and competitiveness. The budget request justifies these proposed increases by highlighting that "R&D investments in AI and QIS, in particular, act as innovation multipliers and employment drivers, not only by promoting S&T progress across many disciplines, but also by helping to build a highly-skilled American workforce." Other proposed investments, such as upgrading infrastructure, implementing criminal justice reform, and combating the opioid epidemic will also likely garner bipartisan support.

While there may be some areas of bipartisan agreement, major goals of the overall budget request also include shrinking the federal workforce, cutting burdensome regulations, and eliminating up to 60 federal advisory committees. The budget also proposes major policy changes that will likely be rejected by Congress, such as curbing food stamp benefits, changing student loan repayment rules, implementing Medicaid work requirements, and eliminating clean energy federal tax breaks.

The budget request proposes significant changes to education and workforce programs. These changes include proposed cuts or elimination to numerous federal student aid and competitive grant programs at the Department of Education and substantial changes to the student loan programs. While cuts and proposed eliminations are likely to be rejected by Congress, proposals around career and technical education and increased engagement of institutions of higher education in workforce development may have interest from Congress.

Given major funding and policy disagreements during a Presidential election year, there is little prospect of completing spending bills before the new fiscal year begins on October 1. The House and Senate Appropriations Committees will advance individual spending bills over the next few months and push forward their own spending priorities, but a Continuing Resolution which maintains FY 2020 funding levels for federal agencies will likely be required until after the elections in November. There is also less

incentive to complete appropriations this year because out of $1.4 trillion in discretionary spending, only an additional $5 billion is available to distribute to federal programs.

While many federal agencies have not released detailed budget justifications explaining how the funding would be fully allocated, the overview below contains an analysis of the information currently available for relevant agencies and programs of interest to the higher education, research, and healthcare 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). Funding for these agencies is proposed for either total elimination or sharp decreases. The Department of Commerce overall would receive $7.9 billion in discretionary funding, a $7.3 billion, or a 48 percent decrease, from the FY 2020 enacted level.

National Oceanic and Atmospheric Administration

At the time of this writing, the NOAA FY 21 Blue Book was not available. Below reflects the information that is currently available in the OMB budget appendices for the Department of Commerce.

The NOAA ORF account would receive a $598.8 million cut (15.9 percent) and the PAC account would receive a $64,221 million cut (4.2 percent) compared to the FY 2020 level. The main extramural research office, OAR would be cut by $221 million (40.3 percent) compared to the FY 2020 level.
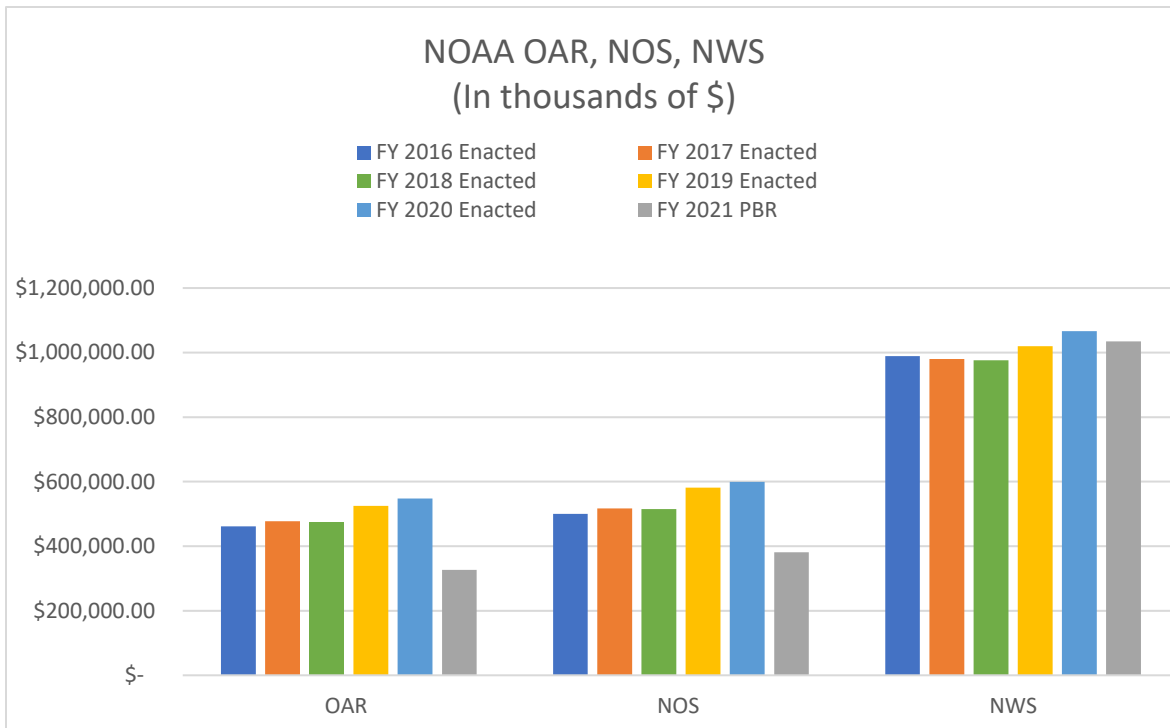
Quick Take: Consistent with the past three years, the Administration has proposed the elimination of extramural research programs throughout the Agency, totaling $287 million. The rationale is that these grants are not optimally targeted and are intended to support local activities that should be left to the states while NOAA should focus on providing technical support and resources through core activities.

Major Cuts/Eliminations: Steep cuts are proposed for extramural research grants at OAR and the NOS. For the fourth year in a row, the president's budget request would terminate the following signature programs: National Sea Grant Program, Coastal Zone Management grants, National Estuarine Research Reserve, and the entire Office of Education. Congress has historically protected these programs and often, provided small increases.

Signature Initiatives: The narrative indicates that the Administration prioritizes weather satellites and core NOAA programs only. Exemplifying this, the National Environmental Satellite, Data, and Information Systems (NESDIS) is the only major program to receive an operational increase (3.4 percent), and the procurement account received the smallest cut of 1.4 percent. The President has also provided $188 million for mapping the United States Exclusive Economic Zone and the shoreline and nearshore of Alaska, an initiative that has been one of the administration's priorities since November of 2019. This funding will likely come from the National Ocean Service (NOS) line.

The Bottom Line

NOAA topline extramural research will likely remain stagnant, as congressional champions will fight to protect signature programs and individual Members will advocate for specific regional Cooperative Institutes (CI) but will not likely push for any topline growth beyond those programs. The NWS and NESDIS will likely continue to be the most prioritized line office, due to concern over extreme weather events.

NOAA OAR, NOS, NWS
(In thousands of $)

Legend:
- FY 2016 Enacted
- FY 2017 Enacted
- FY 2018 Enacted
- FY 2019 Enacted
- FY 2020 Enacted
- FY 2021 PBR

Source: Information and figures provided from OMB FY 2021 budget appendices for the Department of Commerce at https://www.whitehouse.gov/wp-content/uploads/2020/02/com_fy21.pdf.

Information about specific programs are available in the president's full budget at https://www.whitehouse.gov/wp-content/uploads/2020/02/budget_fy21.pdf *and the Major Savings and Reforms supplement at* https://www.whitehouse.gov/wp-content/uploads/2020/02/msar_fy21.pdf.

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

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
Operations, Research and Facilities (ORF)	**3,763, 939**	**3,165,124**	**-598,815 (15.9%)**
Oceanic and Atmospheric Research (OAR)	548,000	327,000	-221,000 (40.3%)
National Ocean Service (NOS)	599,000	381,000	-218,000 (36.4%)
National Weather Service (NWS)	1,066,000	1,035,000	-310,000 (2.9%)
National Marine Fisheries Service (NMFS)	948,000	842,000	-106,000 (11.2%)
Procurement, Acquisition, and Construction (PAC)	**1,530,890**	**1,466,669**	**-64,221 (4.2%)**
National Environmental Satellite, Data, and Information Systems (NESDIS)	1,252,000	1,234,000	-18,000 (1.4%)

National Institute of Standards and Technology

The President's FY 2021 budget request proposes $738 million for NIST, which would be a decrease of $296 million or 28.6 percent below the FY 2020 enacted level.

Quick Take: This year's budget request is in line with previous requests of the Trump Administration and proposes cuts across the board. The Administration cites the need to prioritize resources to rebuild the military and "keep the nation on a responsible fiscal path" as justifications for making these cuts. NIST priorities for FY 2021 include a focus on artificial intelligence, quantum information science, 5G and advanced communications, advanced manufacturing, and biotechnology. These priorities are aligned with the Administration's focus on supporting the "Industries of the Future" (IOTF).

Major Cuts/Eliminations: The President proposed steep cuts to NIST's Industrial Technology Services account, and as in previous years would terminate the Hollings Manufacturing Extension Partnership (MEP) program.

The Bottom Line
The FY 2021 budget request is similar to previous requests and proposes steep cuts across the board. However, Congress is unlikely to support these cuts and is anticipated to maintain steady funding for the agency.

Major NIST Programs
(In thousands)

Proposed Reductions and Terminations

Hollings Manufacturing Extension Partnership

As for previous budget requests, the FY 2021 request would eliminate federal funding for the NIST MEP program.

Scientific and Technical Research and Services
The Scientific and Technical Research and Services (STRS) account would see a 13.5 percent cut under the budget request compared to the FY 2020 enacted level. The bulk of NIST's research, funded under this account, is done internally or with established partners, but this cut could impact any future extramural opportunities.

University Centers of Excellence
The request would eliminate funding for the Advanced Materials Center of Excellence at Northwestern University, the Forensic Science Center of Excellence led by Iowa State University, and the Community Resilience Center of Excellence led by Colorado State University.

New and Signature Initiatives

Manufacturing USA
The Manufacturing USA program would be funded at $25.3 million, an increase of $9.3 million or 57.8 percent above FY 2020. This would be the only program under the Industrial Technology Services account that would not be eliminated in the FY 2021 budget request. Within this, NIST would provide $20 million to compete and support one **new Manufacturing USA Institute** in FY 2021. NIST would also stop funding for the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL).

Interagency Working Group for Technology Transfer
NIST will continue to convene the Interagency Working Group for Technology Transfer, as part of the Agency's effort to increase the return on investment from federally funded R&D, and serve as the host agency for the Federal Laboratory Consortium.

Ongoing Areas of Interest

NIST is anticipated to continue focusing on research related to artificial intelligence, quantum information science, 5G and advanced communications, advanced manufacturing, and biotechnology.

Source: The NIST budget document is available at
https://www.nist.gov/system/files/documents/2020/02/11/FY2021-NIST-Budget-Book.pdf.

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

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
NIST, Total	1,034,000	738,000	-296,000 (28.6%)
Scientific and Technical Research and Services	724,500	652,027	-101,973 (13.5%)
Industrial Technology Services	162,000	25,252	-136,748 (84.4%)

Manufacturing USA	16,000	25,252	9,252 (57.8%)
Hollings Manufacturing Extension Partnership	146,000	0	-146,000 (100.0%)

Economic Development Administration $

Under the FY 2021 budget request, the Trump Administration once again proposes the elimination of EDA. The budget request would provide $31.6 million for an orderly closeout of agency functions in FY 2021.

Quick Take: The President's FY 2021 budget request would eliminate EDA. The Trump Administration states that the Agency's termination is a difficult but necessary decision in line with its vision to change the role and size of the federal government and "keep the Nation on a responsible fiscal path." This change has been proposed in every budget request under the Trump Administration, with varying justifications. For example, the President's budget request in FY 2019 also called for the agency's elimination, at the time citing the expiration of EDA's authority in 2008 and a perceived lack of transparency in awarding grants as justifications to eliminate the Agency. The elimination of EDA would be a major setback to the federal government's support for programs to advance public works projects and stimulate innovation-based economic growth.

The Bottom Line

The Administration's proposal to eliminate EDA, which is consistent with every previous budget request from the Trump Administration, is a setback to federal economic development efforts. However, Congress has rejected the President's proposed cuts every time, most recently having approved a 9.5 percent increase for EDA and a 40.4 percent increase for programs relevant to universities and research institutes, such as the Regional Innovation Program, in FY 2020. It is expected that Congress will again reject these cuts.

Source: EDA's budget request can be found at https://www.commerce.gov/sites/default/files/2020-02/fy2021_eda_congressional_budget_justification.pdf. *The Department of Commerce's full budget request is be available at* http://www.osec.doc.gov/bmi/budget/.

Department of Defense

The research, development, test, and evaluation (RDT&E) account would be funded at approximately $106 billion, an increase of almost $1.8 billion or 1.7 percent compared to the FY 2020 enacted level and more than $3.5 billion above the amount the Administration requested in FY 2020. Although the FY 2021 budget contains DOD's largest RDT&E budget 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 across the board by approximately $2 billion or 12.6 percent compared to the FY 2020 appropriated level which contains a significant amount of one-year congressional increases.

Quick Take: The Administration continues to invest in RDT&E with an emphasis on readiness and modernization by focusing spending on *2018 National Defense Strategy (NDS)* priorities—including nuclear modernization, space, cyber, missile defense, hypersonics, artificial intelligence (AI), 5G, and prototyping. The relatively flat budget request aligns with anticipated top-line funding levels for defense in the FY 2020 two-year budget deal and presents a path for executing Secretary Mark Esper's defense-wide review to reprioritize DOD funding in **advanced research and development and procurement** rather than early-stage research, trading foundational science and technology efforts that bolster long-term U.S. technological superiority for near-term capabilities to compete against great powers such as China and Russia.
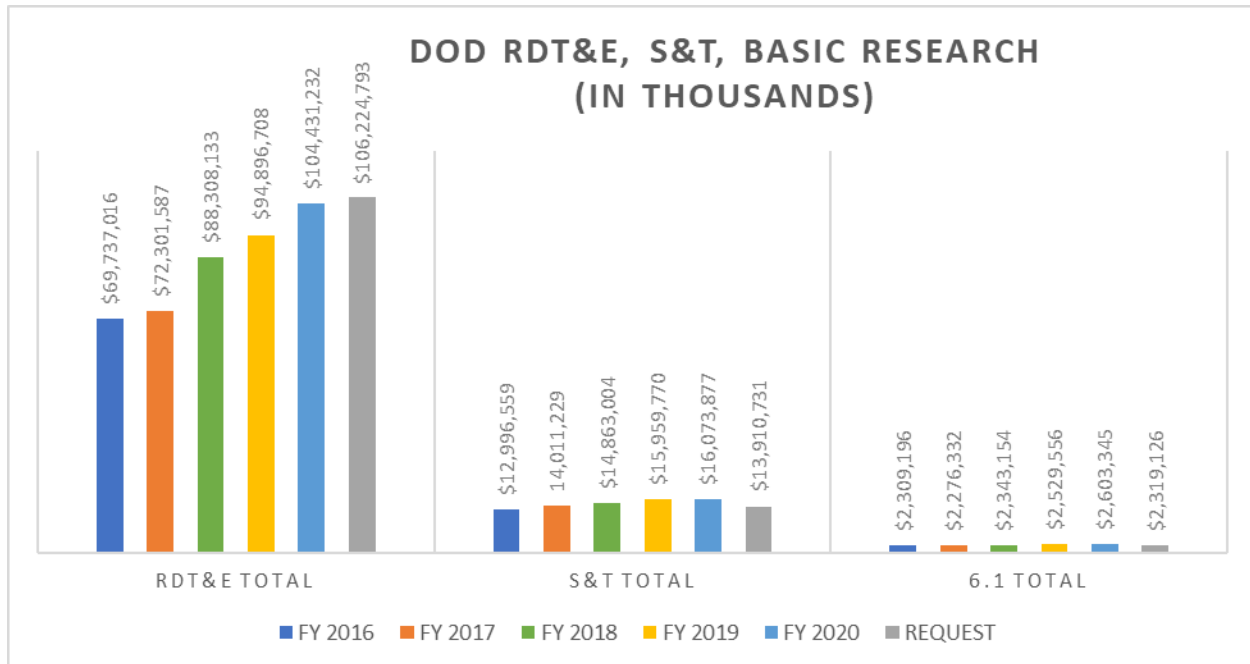
Major Cuts/Eliminations: The budget request would decrease funding for 6.1, 6.2, and 6.3 S&T accounts, relative to FY 2021 enacted levels, across the Services and defense-wide, demonstrating the Administration's prioritization of more advanced RDT&E and high-profile weapons programs.

New Initiatives/Priorities: The budget request would prioritize investments in line with the NDS, shifting funding to improve military readiness and modernize the Warfighter, including funding for advanced R&D of crucial emerging technologies, referred to as **Advanced Capabilities Enablers (ACEs)**:

- **Hypersonics:** $3.2 billion to accelerate the development of Army Long Range Hypersonic Weapon; increase funding for Navy Conventional Prompt Strike; focus on Air Force Advanced Rapid Weapon.
- **Microelectronics/5G:** $1.5 billion to continue addressing trusted and assured supply of microelectronics; hasten adoption of "ubiquitous connectivity" and sharing more data at greater network bandwidth.
- **AI:** $800 million to continue investments in the Joint Artificial Intelligence Center (JAIC) and Project Maven.
- **Autonomy:** $1.7 billion to enhance the speed of maneuver and lethality in contested environments; develop human/machine teaming.

The Bottom Line
The President's FY 2021 budget request for the Department of Defense is essentially flat, proposing $705.4 billion - $800 million above the FY 2020 enacted level – and would prioritize advanced R&D of new systems that will transition to procurement in the near term for an "irreversible" implementation of the *2018 National Defense Strategy*. Although the RDT&E budget request is the largest in history, it fails to boost investments in long-term basic and applied research accounts, which would receive cuts across the board. Congress continues to support increased DOD-academic engagement and will likely continue to reject many of the proposed cuts.

DOD RDT&E, S&T, BASIC RESEARCH (IN THOUSANDS)

RDT&E TOTAL:
- FY 2016: $69,737,016
- FY 2017: $72,301,587
- FY 2018: $88,308,133
- FY 2019: $94,896,708
- FY 2020: $104,431,232
- REQUEST: $106,224,793

S&T TOTAL:
- FY 2016: $12,996,559
- FY 2017: 14,011,229
- FY 2018: $14,863,004
- FY 2019: $15,959,770
- FY 2020: $16,073,877
- REQUEST: $13,910,731

6.1 TOTAL:
- FY 2016: $2,309,196
- FY 2017: $2,276,332
- FY 2018: $2,343,154
- FY 2019: $2,529,556
- FY 2020: $2,603,345
- REQUEST: $2,319,126

S&T Accounts

The S&T accounts (6.1 – 6.3) would be funded at approximately $14 billion, a decrease of about $2 billion or 12.6 percent compared to the FY 2020 enacted level of $16 billion. The Army, Navy, and Air Force **basic research accounts** would decrease by $111.1 million, $47.7 million, and $57.5 million, respectively, compared to FY 2020 enacted levels. The Army, Navy, and Air Force **applied research accounts** would decrease by $338.5 million, $206.6 million, and $246.4 million compared to FY 2020 enacted levels, respectively. The reductions in basic and applied research demonstrate DOD's realignment in funding to support more advanced R&D that can transition to the warfighter quickly.

Defense Wide RDT&E

Defense Wide RDT&E would be funded at $24.3 billion, a $1.7 billion decrease or 6.4 percent cut compared to the FY 2020 actual level. The budget request appears to shift and realign certain programs within the Advanced Technology Development (6.3) accounts through consolidation and relocation to 6.4 and above. The request also includes a new $35 million program for **Defense Technology Innovation** that may be used to fund innovative research that supports the priority technology areas in within the DOD Research and Engineering enterprise. The budget request would also reduce funding for the **Defense-wide Manufacturing S&T program** by 52.5 percent, **National Defense Education Program** by 30.4 percent, and **Basic Research Initiatives** by 49.8 percent compared to FY 2020 actual levels.

New and Signature Initiatives

Research Priorities Across the Services
- The **Army's** research portfolio would include new programs in biomedical technologies, countering improvised devices, space, and hypersonics while continuing to shift resources to the Army's modernization priorities, including soldier lethality, synthetic training environment, network, air and missile defense, and future vertical lift. Of note, the Army modernization priorities of next generation combat vehicles and long-range precision fires received significant cuts relative to the FY 2020 enacted budget.

- The **Navy's** research portfolio would include common picture, undersea warfare, and future naval capabilities.
- The **Air Force's** research portfolio would include substantial cuts in applied research in order to fund new efforts that enable the **Air Force 2030 S&T strategy** which includes the following priorities:
  - Air Force Foundational Development/Demonstrations
  - Future Air Force Integrated Technology Demonstrations
  - Next Generation Platform Development/Demonstrations
  - Persistent Knowledge, Awareness, & Command and Control (C2) Technology
  - Next Generation Effects Development/Demonstrations

In addition, the budget would provide funding for **Space Force RDT&E** activities through the creation of a separate account including space situational awareness, GPS follow on, weather systems, and space technology testing programs.

Cyber

The budget request would invest $9.8 billion in cyber activities to support DOD's digital modernization effort in four key areas: **AI; cloud; command, control, and communications (C3)**; and **cybersecurity and cyberspace operations**. Technology investments in cyberspace would focus on resiliency and lethality against adversaries, and the budget request would provide $5.4 billion for cybersecurity-focused projects.

Space

The Administration would continue investment in strengthening the U.S. space domain. The budget request would provide $18 billion to support U.S. operations in space. The request would provide more than $10 billion to fund the recently established **U.S. Space Force**, including $111 million for personnel growth. The budget would also provide $288 million for the **Space Development Agency**, an increase of $193 million compared to FY 2020 actual level.

5G

The budget request would provide $449 million for DOD's **Next Generation Information Communications Technology Initiative**, which seeks to develop 5G and next generation wireless technologies to support DOD's operations. This is expected to focus on testing of specific use cases for wireless technologies at various DOD installations, though it may also include coordination with other agencies such as NSF and NIST to advance basic research on what the next generation of wireless may look like.

Ongoing Areas of Interest

The **Defense Advanced Research Projects Agency (DARPA)**, which is under Defense-wide RDT&E, would receive approximately $3.6 billion, a $108 million or 3.1 increase relative to the FY 2020 actual level. Within DARPA, increases are proposed for defense research sciences, biomedical technology, information and communication technology, materials and biological technology, command, control and communications systems, network-centric warfare technology, and sensor technology.

The budget request would also provide funding for the **Defense Threat Reduction Agency (DTRA)** at $663 million, an increase of $95 million above the FY 2020 actual level. However, DTRA's basic research initiatives would be funded at 14.6 million, a decrease of $11.4 million or 43.8 percent less than the FY

2020 actual level. Instead, funding would be realigned to more applied efforts, such as countering weapons of mass destruction.

Finally, the **Defense Health Program RDT&E** would receive $562.5 million, a decrease of 30 percent compared to the President's FY 2020 budget request of $732 million and a significant decrease of 76 percent from the FY 2020 actual level of $2.3 billion. 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 2021 Budget Summary and Background Information is available at https://comptroller.defense.gov/Portals/45/Documents/defbudget/fy2021/fy2021_Budget_Request.pdf

Department of Defense
(in thousands of $)

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
RDT&E, total	104,431,232	106,224,793	1,793,561 (1.7%)
S&T, Total	16,073,879	14,041,605	-2,032,274 (12.6%)
6.1, Total	2,603,345	2,319,126	-284,219 (10.9%)
6.2, Total	6,069,767	5,391,069	-678,698 (11.2%)
6.3, Total	7,312,097	6,331,410	-980,687 (13.4%)
Army RDTE	12,543,435	12,587,343	43,908 (0.4%)
Army 6.1	574,484	463,359	-111,125 (19.3%)
Army 6.2	1,259,374	920,881	-338,493 (26.9%)
Army 6.3	1,531,516	1,203,590	-327,926 (21.4%)
Navy RDTE	20,155,115	21,427,048	1,271,933 (6.3%)
Navy 6.1	650,800	603,087	-47,713 (7.3%)
Navy 6.2	1,159,739	953,175	-206,564 (17.8%)
Navy 6.3	807,280	760,396	-46,884 (5.8%)
Air Force RDTE	45,566,955	37,391,826	-8,175,129 (17.9%)
Air Force 6.1	549,761	492,294	-57,467 (10.5%)
Air Force 6.2	1,656,126	1,409,749	-246,377 (14.9%)
Air Force 6.3	1,066,453	778,548	-287,905

			(27.0%)
Space Force RDTE*	**0**	**10,327,595**	**N/a**
*Space Force 6.2***	0	130,874	N/a
Defense Wide RDTE	**25,938,027**	**24,280,891**	**-1,657,136 (6.4%)**
Defense Wide 6.1	828,300	760,386	-67,914 (8.2%)
Defense Wide 6.2	1,994,528	1,976,390	-18,138 (0.9%)
Defense Wide 6.3	3,906,848	3,588,876	-317,972 (8.1%)
Defense Health R&D	**2,306,095**	**562,465**	**-1,743,630 (75.6%)**

*The Space Force RDT&E and 6.2 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

Funding for the discretionary programs within Department of Education (ED) would be down $6.1 billion (-8.4%) compared to the FY 2020 enacted level of $72.7 billion. The Pell Grant program would be maintained with a maximum award $6,345 for the 2021-2022 school year.
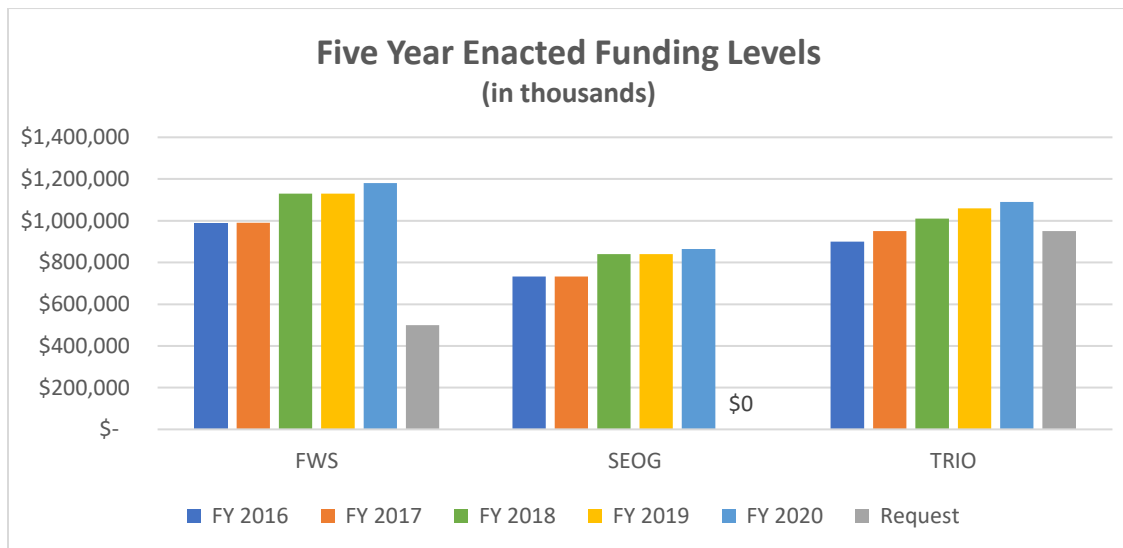
Quick Take: The budget request for ED again proposes significant cuts to student aid and competitive grant programs while focusing proposed investments in K-12 school scholarships and Career and Technical Education (CTE) programs.

Major Cuts/Eliminations: There are numerous programs proposed for elimination, such as the Federal Supplemental Educational Opportunity Grants (SEOG) program, the Graduate Assistance in Areas of National Need (GAANN) program, the International Education and Foreign Language programs, Teacher Quality Partnership (TQP), and others.

New Initiatives/Priorities: The request proposes $150 million, an over $137 million increase, for the Minority Science and Engineering Improvement Program (MSEIP), specifically to support STEM activities led by HBCUs and Minority-Serving Institutions (MSIs) located in designated Opportunity Zones. The request also proposes nearly $900 million of new investments in CTE programs. The proposal suggests ED will assess the transfer of the Office of Federal Student Aid (FSA) into a separate federal organization.

The Bottom Line

This is a terrible budget request for higher education. The drastic cuts proposed in the budget would significantly impact student aid, institutional aid, and student support programs. Similar to past years, Congress is likely to wholeheartedly reject the president's proposal.

Five Year Enacted Funding Levels
(in thousands)

Legend: FY 2016, FY 2017, FY 2018, FY 2019, FY 2020, Request

Proposed Reductions and Terminations

Student Aid
The budget request recommends level funding for the **Pell Grant,** for a maximum grant award of $6,345 for the 2021-2022 school year but proposes significant cuts to other federal student aid programs. The budget proposes a $680 million cut to the **Federal Work Study (FWS)** program and proposes revisions to the current institutional allocation formula for FWS funding based on an institution's level of Pell-eligible students and focuses FWS on workforce and career-oriented training opportunities. The **Federal Supplemental Educational Opportunity Grant (SEOG)** program would be eliminated.

The budget request proposes to offer financial aid administrators the ability to set borrowing limits and the ability to require financial literacy training. It also would consolidate loan programs to have one loan program per sector – undergraduate, graduate, and parents – while eliminating **subsidized Stafford undergraduate loans** and lowering the borrowing limits for Parent and Graduate **PLUS loans**. The budget request also proposes to streamline and replace current **income-driven loan repayment plans** with a single plan with an increased monthly payment cap of 12.5 percent of discretionary income. Additionally, the budget request would eliminate the **Public Service Loan Forgiveness (PSLF) program** for new loans originating after June 2021.

Higher Education Grant Programs
As mentioned above, the president's FY 2021 request proposed eliminations include several competitive grant programs, such as the **Gaining Early Awareness and Readiness for Undergraduate Programs (GEAR UP),** the **Teacher Quality Partnership (TQP)** grant program, and the **Graduate Assistance in Areas of National Need (GAANN)** program. The request also proposes to reduce and transform the **TRIO programs** into a formula-based state block grant.

As included in last year's Administrative proposal, the FY 2021 budget recommends consolidating several existing minority-serving institution programs under Title III and Title V, including **Developing HSIs** and **Strengthening Asian American and Native American Pacific Islander-serving Institutions** programs, into a single Minority-Serving Institutions (MSI) Grant program.

Education Research
The FY 2021 budget request would cut funding for the **Institute of Education Sciences (IES)** overall by to $565.4 million, nearly $58 million less than from the FY 2020 enacted level. Specifically, the budget request proposes level funding for the Research, Development, and Dissemination activities and Research in Special Education programs, but proposes eliminating funding for the Regional Educational Laboratories and Statewide longitudinal data systems.

Additionally, the request proposes to eliminate and consolidate many K-12 focused competitive grant programs authorized by the Elementary and Secondary Act into an Elementary and Secondary **Education for the Disadvantaged Block Grant (ESED Block Grant)**, including the **Education Innovation and Research (EIR)** grant program and **Promise Neighborhoods** grant program, both of which can include higher education institutional partners.

New and Signature Initiatives

In addition to the new priority areas and consolidation proposals outlined above, the FY 2021 budget request also proposes numerous policy changes such as expanding Pell Grant access to short-term

programs and incarcerated students. While Pell expansion and loan limit changes reflect the Administration's policy preferences, ultimately many policy proposals in the request are under the jurisdiction of Congress and would likely need to be addressed through a reauthorization of the *Higher Education Act* or other legislation.

Source: ED's FY 2021 Budget Summary and Background Information is available at https://www2.ed.gov/about/overview/budget/budget21/index.html *and ED budget justifications can be found at* https://www2.ed.gov/about/overview/budget/budget21/justifications/index.html.

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

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
Department of Education[†]			
Promise Neighborhoods	80,000	0	-80,000 (100%)
Innovation and Improvement			
Education Innovation and Research	190,000	0	-190,000 (100%)
Student Financial Assistance[†]			
Pell Grant[‡]	6,345	6,345	--
SEOG	865,000	0	-865,000 (100%)
Federal Work-Study	1,180,000	500,000	-680,000 (57.6%)
Higher Education[†]			
Title V Aid for Developing HSIs [§]	143,081	0	-143,081 (100%)
Promoting Post-Baccalaureate Opportunities for Hispanic Americans[§]	12,838	0	-12,838 (100%)
Title VI International Education and Foreign Language Studies (Domestic and Overseas)	76,164	0	-76,164 (100%)
TRIO Programs	1,090,000	950,000	-140,000 (12.8%)
GEAR UP	365,000	0	-365,000 (100%)
GAANN	23,047	0	-23,047 (100%)
Teacher Quality Partnerships	50,092	0	-50,092 (100%)
Child Care Access Means Parents in Schools	53,000	15,134	-37,866 (71.4%)

Institute of Education Sciences	623,462	565,440	-58,022 (9.3%)
Research, Development and Dissemination	195,877	195,877	--
Research in Special Education	56,500	56,500	--
Regional Education Laboratories	56,022	0	-56,022 (100%)
Statewide Longitudinal Data Systems	33,000	0	-33,000 (100%)

[†] Categories included for ease of reading the chart.

[‡] 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.

[§] Existing Title III and Title V programs, including Strengthening Alaska Native and Native Hawaiian serving Institutions, Strengthening Predominantly Black Institutions, Strengthening Asian American and Native American Pacific Islander-serving Institutions, Strengthening Native American Nontribal-serving Institutions, Developing Hispanic-Serving Institutions, and Promoting Postbaccalaureate Opportunities for Hispanic Americans would be eliminated, and a new Consolidated Minority-Serving Grant program is proposed.

The amounts shown for FY 2020 enacted are taken from the Department of Education's Fiscal Year 2021 Budget Summary.

Department of Energy

The President's FY 2021 budget request would fund DOE at a level of $35.4 billion, a $3.2 billion or 8 percent cut compared to the FY 2020 enacted level.
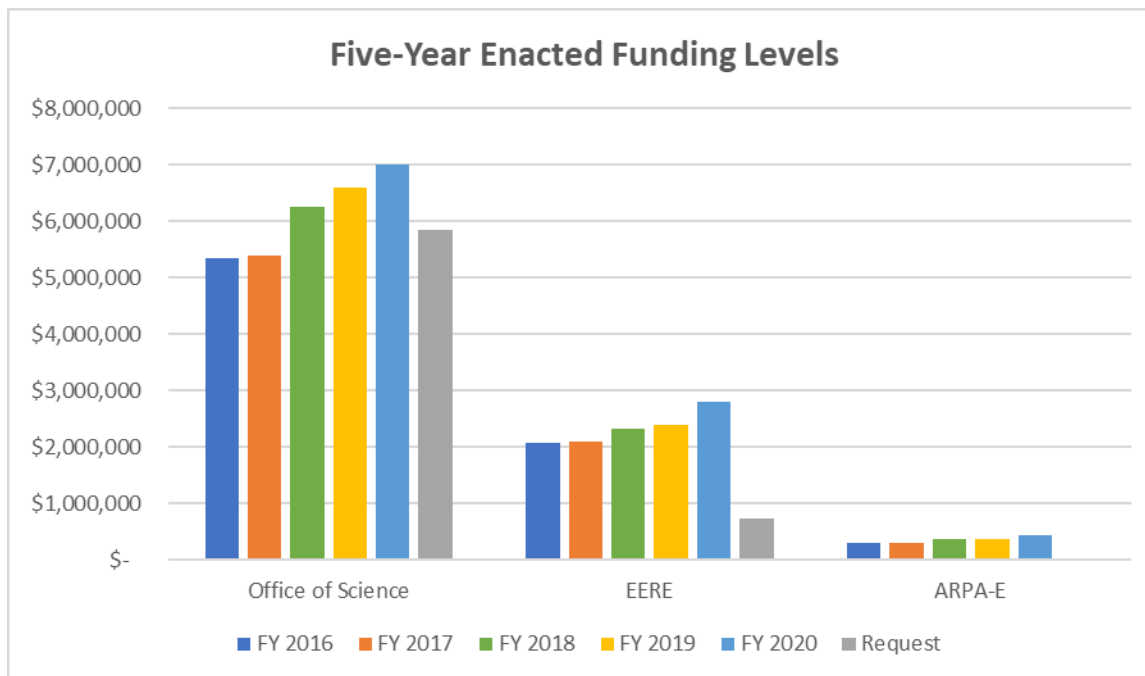
Quick Take: The budget request proposes to cut the Office of Science, the largest federal funder of the physical sciences, by $1.2 billion (17 percent) and applied energy programs by $3.2 billion (43 percent) compared to FY 2020. The budget would prioritize DOE's national security activities, with a proposed increase of $3.1 billion (25 percent) for nuclear weapons programs under the National Nuclear Security Administration. Overall, national security activities would make up 75 percent of DOE's total budget. This would come at the expense of fundamental research and applied energy programs.

Major Cuts/Eliminations: Similar to prior years, ARPA-E is proposed for elimination. All fundamental research and all applied energy programs, with the exception of grid cybersecurity and modernization efforts, would be targeted for significant cuts. The Office of Science would be down $1.2 billion (17 percent). The most severe cuts are proposed for renewable energy and energy efficiency programs, which would be down $2.1 billion (75 percent).

New Initiatives/Priorities: The budget request proposes significant boosts in funding for artificial intelligence, quantum information science, and microelectronics under the Office of Science. This would include a new initiative to launch a national quantum internet. DOE also proposes making major investments in advanced energy storage and a new critical minerals initiative. DOE also would boost funding for early-stage research and development activities to improve cybersecurity and resilience.

The Bottom Line
DOE's research and development programs are targeted for major cuts. However, Congress is likely to reject the proposed cuts. There are numerous newly proposed or growing research areas that have bipartisan Congressional support, which include quantum information science, artificial intelligence and machine learning, microelectronics, next generation computing, energy storage, advanced nuclear reactors, and grid cybersecurity and modernization.

Five-Year Enacted Funding Levels

Proposed Reductions and Terminations

Office of Science
The budget request would cut the Office of Science by $1.2 billion, or 17 percent, compared to the FY 2020 enacted level. Cuts are proposed for five major Office of Science programs. The only exception is an $8 million increase to **Advanced Scientific Computing Research** to support the exascale computing initiative and advance its leadership role in DOE's Artificial Intelligence initiative. Similar to prior years, the most significant reduction would be for climate change research under **Biological and Environmental Research,** which would be down $233 million, a 31 percent cut. Another major proposed cut would be to **Fusion Energy Sciences**, which would be down $246 million (37 percent), primarily due to reducing U.S. contributions to the ITER international fusion project. The smallest reduction is for **Nuclear Physics**, which would be reduced by $60 million or 8 percent, as major construction activities end while the project prepares for the construction of a new international electron collider. Proposed cuts would significantly increase the costs of major construction projects and delay the commissioning of world-class science facilities as well as reduce research funding for universities and national laboratories, thus curtailing access of academic researchers to the 27 DOE-funded user facilities.

ARPA-E
Similar to the three prior Trump Administration budget requests, ARPA-E would be terminated, and the remaining funding would be used to complete current projects. ARPA-E operations would cease by the end of FY 2022, the last year of funding for current three-year projects. More than $200 million in unspent funds to date would be rescinded and returned to the Treasury.

Applied Energy Programs
Almost all applied energy programs would face significant cuts, with the exception of those supporting grid modernization and cybersecurity efforts. The most severe cuts would be to **renewable energy programs** which would be reduced by $2.1 billion or 75 percent compared to the FY 2020 enacted level.

This would include programs that currently support research, development, and demonstration of renewable energy technologies such as solar, wind, geothermal, fuel cells, hydrogen, and bioenergy. The smallest proposed reduction would be to **fossil energy research and development**, with a proposed cut of $19 million or 3 percent compared to FY 2020 as part of the Trump Administration's efforts to help coal miners and coal-fired power plants.

New and Signature Initiatives

Despite significant cuts proposed to fundamental research programs in the Office of Science, the budget request prioritizes and proposed sizeable increases to research programs that support the Industries of the Future:

- **$475 million for Exascale Computing:** requested funding for exascale computing is less than prior years as the project nears completion. The $475 million request would allow the deployment of the first exascale-capable computer at Argonne National Laboratory in 2021 and at Oak Ridge National Laboratory by 2022. It would also support the ongoing development of applications and software for exascale systems.
- **$237 million for Quantum Information Science:** the budget request proposes increasing investments in quantum information science from $195 million in FY 2020 to $237 million in FY 2021. Funding would be used to support core fundamental research projects in quantum information science across all six Office of Science programs, new National Quantum Centers that will be awarded in Summer 2020, and a new initiative to build a national quantum internet.
- **$125 million for Artificial Intelligence (AI):** the budget request proposes nearly doubling the investments in AI from $71 million in FY 2020 to $125 million in FY 2021. Areas of focus would 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. The budget request would also grow the budget of the new Artificial Intelligence and Technology Office from $1.2 million in FY 2020 to $5 million in FY 2021 to improve coordination across DOE and fund crosscutting research and development projects.
- **$45 million for Microelectronics:** the budget request proposes increasing investments in microelectronics from $25 million in FY 2020 to $45 million in FY 2021; microelectronics are critical underpinnings for DOE's high-performance computing and simulation capabilities to support DOE missions in energy, the environment, and national security. 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. The overarching goal of this expansion would be 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.

DOE also proposes to expand or launch new applied energy initiatives. These initiatives are led by the Office of Energy Efficiency and Renewable Energy, but will include funding and coordination from the Offices of Electricity, Fossil Energy, and Nuclear Energy as well as the Office of Science, including:

- **Energy Storage Grand Challenge:** The budget request proposes $190 million for the Advanced Energy Storage Initiative (AESI). To implement the Energy Storage Grand Challenge DOE announced in January 2020, the goal of AESI is to take a more holistic approach to energy

storage, including more flexible generation and improved reliability and resiliency of the grid. As an evolution of the Beyond Batteries Initiative, DOE plans to explore new approaches to energy storage, which could include hybrid technologies such as pairing hydropower with solar or wind energy in order to provide a stable, dispatchable energy supply. DOE also plans to leverage batteries, pumped storage, controllable loads, distributed energy resource management, microgrids, power system planning and operations, hybrid systems, and power plant dispatchability.

- **Materials in Harsh Environments:** The budget request proposes $60 million to leverage improvements in materials, integrated sensors, and component manufacturing to benefit thermoelectric power plants.
- **Critical Minerals Initiative:** This new initiative would boost research and development funding to find low cost alternatives, improve recycling, and address supply chain issues related to critical minerals needed for energy technologies. DOE also proposes establishing a national laboratory-led team modeled after the Grid Modernization Laboratory Consortium to coordinate critical minerals activities across DOE.

Grid Modernization and Cybersecurity
The only applied energy programs proposed for increases are the Office of Electricity (OE) and the Office of Cybersecurity, Energy Security, and Emergency Response (CESER) that support grid modernization and cybersecurity efforts. OE would be increased by $5 million or 3 percent primarily to advance the North American Energy Resilience Model (NAERM)—a collaboration between DOE, the National Laboratories, and industry to develop a comprehensive resilience modeling system for the North American energy sector infrastructure, which includes the United States and interconnected portions of Canada and Mexico. CESER would be increased by $29 million or 19 percent for cyber and energy security initiatives to address threats to critical energy infrastructure. The proposed funding would grow support for early-stage research and development activities to improve cybersecurity and resilience throughout the supply chain and protect critical infrastructure from both natural and man-made events.

Nuclear Energy
The budget request proposes a new $150 million uranium reserve program. The goal of the program is to strengthen the U.S.'s nuclear fuel supply chain through domestic production and conversion of uranium; this back up supply of uranium would be an insurance policy against a significant market disruption. For the first time in three years the budget request contains no funding for the Yucca Mountain spent nuclear fuel repository and instead requests $28 million for an interim storage program. The budget request also significantly increases funding for the construction of the Versatile Fast Reactor for a total of $295 million.

Source: Preliminary details on DOE's FY 2021 budget request is available at
https://www.whitehouse.gov/wp-content/uploads/2020/02/budget_fy21.pdf page 43.

Department of Energy
(in thousands of $)

	FY 2020 Enacted	FY 2021 Request	FY 2020 Request vs. FY 2019
DOE, Total	**38,586,316**	**35,361,669**	**-3,150,847 (8.2%)**
Science	**7,000,000**	**5,837,806**	**-1,162,194 (16.6%)**
Advanced Scientific Computing Research	980,000	988,051	8,051 (0.8%)
Basic Energy Sciences	2,213,000	1,936,000	-277,000 (12.5%)
Biological and Environmental Research	750,000	517,000	-233,000 (31.1%)
Fusion Energy Sciences	671,000	425,000	-246,000 (36.7%)
High Energy Physics	1,045,000	818,000	-227,000 (21.7%)
Nuclear Physics	713,000	653,000	-60,000 (8.4%)
Workforce Development for Teachers and Scientists	28,000	21,000	-7,000 (25.0%)
Science Laboratories Infrastructure	301,000	174,000	-127,000 (42.2%)
ARPA-E[1]	**425,000**	**0**	**-425,000 (100%)**
EERE	**2,790,000**	**719,563**	**-2,070,437 (74.2%)**
Hydrogen and Fuel Cell Technologies	150,000	44,000	-106,000 (70.7%)
Bioenergy Technologies	259,500	83,000	-176,500 (68.0%)
Solar Energy Technologies	280,000	117,000	-163,000 (58.2%)
Wind Energy Technologies	104,000	37,000	-67,000 (64.4%)
Geothermal Technologies	110,000	52,000	-58,000 (52.7%)
Water Power Technologies	148,000	64,000	-84,000 (56.8%)
Vehicle Technologies	396,000	97,000	-299,000 (75.5%)

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[1] The FY 2021 budget request proposes eliminating ARPA-E and using its unobligated balances to execute its termination.

Building Technologies	285,000	94,000	-191,000 (67.0%)
Advanced Manufacturing Technologies	395,000	128,000	-267,000 (67.6%)
Electricity	**190,000**	**195,045**	**5,045 (2.7%)**
Cybersecurity, Energy Security, and Emergency Response	**156,000**	**184,621**	**28,621 (18.3%)**
Nuclear Energy	**1,493,408**	**1,179,931**	**-313,477 (21.0%)**
Fossil Energy R&D	**750,000**	**730,601**	**-19,399 (2.6%)**
National Nuclear Security Administration	**16,704,592**	**19,800,000**	**3,095,408 (18.4%)**
Weapons Activities	12,457,097	15,602,000	3,144,903 (25.2%)
Defense Nuclear Non-proliferation	2,164,400	2,031,000	-133,400 (6.2%)

Department of Health and Human Services

The president's FY 2021 budget request would provide $87 billion in discretionary funding for activities at the Department of Health and Human Services, including the FDA, NIH, and other programs.

National Institutes of Health

The budget request would fund the National Institutes of Health (NIH) at $38.7 billion, cutting funding for the agency by $3 billion (7.2 percent) compared to the FY 2020 enacted level. This would include cuts to most NIH Institutes and Centers of around 9 percent.

Quick Take: Although the Trump Administration once again proposes a large funding cut for NIH, bipartisan support for the agency remains strong and Congress will not enact these cuts.

Major Cuts/Eliminations: As in prior years, the Administration proposes to limit the amount of an investigator's salary that can be paid for by an NIH grant to Executive Level V ($160,100), a reduction from the current Executive Level II ($197,300).

New Initiatives/Priorities: The Administration's budget request proposes a new initiative to use artificial intelligence (AI) and other computational approaches to tackle the diagnosis and treatment of chronic diseases and conditions, providing $50 million for this initiative in FY 2021. In addition, the Administration proposes $30 million in new funding for an industry-academic-federal consortium focused on gene therapy innovation.

The Bottom Line

Congress strongly supports the NIH and is likely to reject the proposed cuts. NIH would continue to support Administration priorities such as addressing the opioid public health crisis, developing a universal influenza vaccine, ending HIV, and advancing the Childhood Cancer Data Initiative.

Proposed Reductions and Terminations

The Administration once again proposes consolidating the **Agency for Healthcare Research and Quality (AHRQ)** into the NIH. The new institute would be named the National Institute for Research on Safety and Quality and would be funded at $355 million in FY 2021. Similar proposals have been made in the three prior Trump Administration budget requests, but each was rejected by Congress.

Consistent with prior Administration proposals, the FY 2021 budget request again proposes lowering the **investigator salary cap** from Executive Level II ($197,300) to Executive Level V ($160,100). Although NIH

leadership is generally supportive of reducing, over time, the amount of an investigator's salary that can be supported by grant funding, Congress has consistently rejected these proposals and has maintained the cap at Executive Level II.

New and Signature Initiatives

The Administration proposes a new initiative to use **artificial intelligence (AI) and other advanced computational techniques** (e.g. machine learning and deep learning) to deepen our understanding of the underpinnings of chronic diseases and to identify promising treatments for these conditions. The budget request includes $50 million for this initiative in FY 2021. In the first year of this effort, NIH would develop key AI and computational data resources and new career pathways for recruiting and training investigators working at the intersection of AI, data science, and biomedicine. This proposal follows the December 2019 Advisory Committee to the Director (ACD) Working Group on Artificial Intelligence report that identified opportunities for NIH investment at the intersection of AI and biomedicine.

In addition, the budget request proposes $30 million in new funding for NIH to establish a **consortium focused on gene vector production and innovation**. Gene editing and gene therapy, both promising approaches for a growing number of otherwise intractable diseases and conditions, use vectors as vehicles to deliver genes to targeted locations within the body. The proposed consortium, consisting of university, industry, and federal stakeholders, will scale and improve the efficiency of vector production to speed gene therapy trials and accelerate the development of gene therapy treatments.
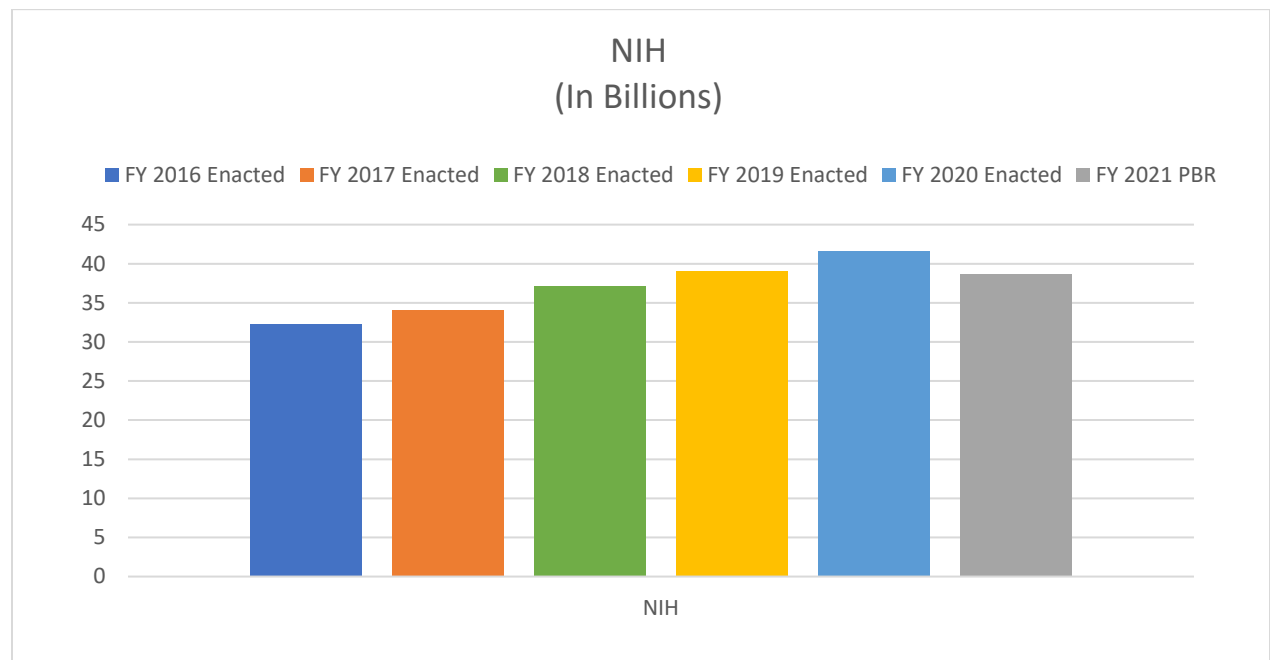
Ongoing Areas of Interest

The budget request prioritizes research to respond to the **opioid public health crisis** and other addiction and substance abuse issues and would provide $1.4 billion across the NIH to support opioid and pain research. This includes $533 million for the **Helping to End Addiction Long-term (HEAL) Initiative** and more than $900 million for ongoing opioids research. In addition, the budget would allocate $50 million to support the development of medication-assisted and other types of treatment to reduce the use of methamphetamine and other stimulants.

In addition, the budget request includes ongoing support for research priorities defined in the *21st Century Cures Act* (Cures), providing $404 million for these programs in FY 2021, consistent with the mandatory funding from the NIH Innovation Account authorized in the Cures legislation. The budget request would provide $109 million for the *All of Us* **precision medicine research program**, $100 million for the **BRAIN Initiative**, and $195 million for the **Cancer Moonshot**.

The budget request would provide $50 million for the second year of the National Cancer Institute's (NCI) **Childhood Cancer Data Initiative**, which is aimed at supporting a robust data infrastructure for pediatric cancer research to promote data sharing and improve care and treatments for children with cancer. The budget request would also provide $16 million in FY 2021 for the second year of the Administration's **Ending the HIV Epidemic Initiative**. This funding would support Centers for AIDS Research to develop and evaluate prevention and treatment strategies in locations and settings where new HIV infections are most likely to occur.

Consistent with ongoing priorities, the Administration's budget request prioritizes the development and modernization of vaccines for influenza and would provide $423 million for research to improve the

diagnosis, treatments, and prevention of influenza. To better protect against future pandemics, the budget would provide $200 million for research to develop a **universal flu vaccine** suitable for adults and children. In addition, the budget would provide $115 million in FY 2021 to accelerate research on **tick-borne diseases**. This funding would support basic, translational, and clinical research to more fully understand the complex relationships between ticks and hosts and the development of vaccines for tick-borne diseases and associated conditions.

Sources:

HHS Budget in Brief is available at https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf

NIH's FY 2021 Budget Justification is available at https://officeofbudget.od.nih.gov/pdfs/FY21/br/1-OverviewVolumeSingleFile-toPrint.pdf

National Institutes of Health

(in thousands)

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020 Enacted
NIH, Total	41,685,000	38,693,631	**-2,991,369 (7.2%)**
National Cancer Institute (NCI)	6,440,438	5,881,173	**-559,265 (8.7%)**
National Heart, Lung, and Blood Institute (NHLBI)	3,625,258	3,298,004	**-327,254 (9.0%)**

National Institute of Dental and Craniofacial Research (NIDCR)	477,679	434,559	**-43,120 (9.0%)**
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)	2,265,146	2,074,211	**-190,935 (8.4%)**
National Institute of Neurological Disorders and Stroke (NINDS)	2,446,577	2,245,110	**-201,467 (8.2%)**
National Institute of Allergy and Infectious Diseases (NIAID)	5,876,195	5,445,886	**-430,309 (7.3%)**
National Institute of General Medical Sciences (NIGMS)	2,937,218	2,672,074	**-265,144 (9.0%)**
Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)	1,556,909	1,416,366	**-140,543 (9.0%)**
National Eye Institute (NEI)	823,325	749,003	**-74,322 (9.0%)**
National Institute of Environmental Health Sciences (NIEHS)	883,598	803,835	**-79,763 (9.0%)**
National Institute on Aging (NIA)	3,545,869	3,225,782	**-320,087 (9.0%)**
National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)	624,889	568,480	**-56,409 (9.0%)**
National Institute on Deafness and Other Communications Disorders (NIDCD)	490,692	446,397	**-44,295 (9.0%)**
National Institute of Mental Health (NIMH)	2,042,966	1,844,865	**-198,101 (9.7%)**
National Institute on Drug Abuse (NIDA)	1,457,724	1,431,770	**-25,954 (1.8%)**
National Institute on Alcohol Abuse and Alcoholism (NIAAA)	546,696	497,346	**-49,350 (9.0%)**
National Institute on Nursing Research (NINR)	172,363	156,804	**-15,559 (9.0%)**
National Human Genome Research Institute (NHGRI)	604,118	550,116	**-54,002 (8.9%)**
National Institute of Biomedical Imaging and Bioengineering (NIBIB)	404,638	368,111	**-36,527 (9.0%)**
National Institute on Minority Health and Health Disparities (NIMHD)	335,812	305,498	**-30,314 (9.0%)**
National Center for Complementary and Integrative Health (NCCIH)	151,877	138,167	**-13,710 (9.0%)**

National Center for Advancing Translational Sciences (NCATS)	832,888	787,703	**-45,185 (5.4%)**
John E. Fogarty International Center (FIC)	80,827	73,531	**-7,296 (9.0%)**
National Library of Medicine (NLM)	456,911	415,665	**-41,246 (9.0%)**
Office of the Director (OD)	2,404,387	2,208,063	**-196,324 (8.2%)**
Building Facilities	200,000	300,000	**100,000 50.%**

Department of Health and Human Services (Other)

The president's budget request would provide $94.5 billion in discretionary funding for activities at the Department of Health and Human Services (HHS).
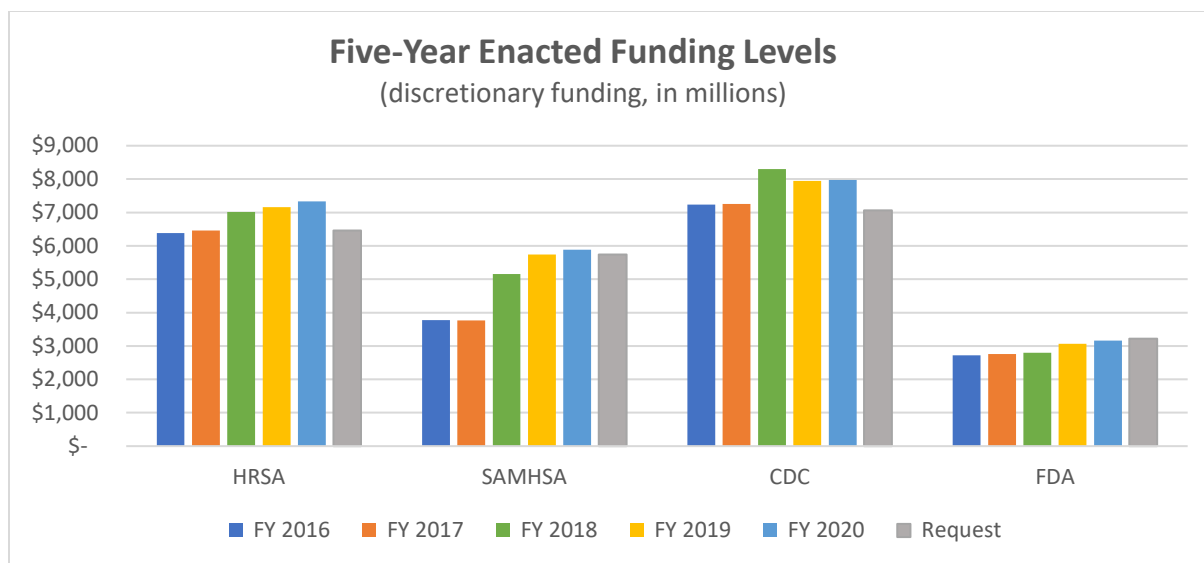
Quick Take: The president's budget request would continue priorities in ending the HIV epidemic and addressing substance use and would support several Administration health initiatives established through executive order or the regulatory process, circumventing Congress. Investments in maternal health, AI, and tick-borne disease initiatives are new to the HHS budget request for FY 2021.

Major Cuts/Eliminations: The budget request again proposes cuts and consolidations seen in previous years. The proposal would eliminate a majority of funding for Title VII health professions programs and Title VIII nursing workforce development programs at HRSA. The proposal would also combine GME programs through Medicare, Medicaid, and Children's Graduate Medical Education into a single program. Additionally, the budget request would also eliminate AHRQ and consolidate its activities within NIH.

New Initiatives/Priorities: The Administration would prioritize tick-borne diseases, investing in surveillance, diagnostics, and prevention at CDC and research at NIH. The request would invest in the "Improving Maternal Health in America" initiative across HHS agencies and emphasizes a Department-wide effort to oversee investments in artificial intelligence. The budget request would expand the Department's focus on opioids to include methamphetamines. The request also proposes creating a new office to oversee regulation of tobacco products and respond to public health concerns.

The Bottom Line

The budget request proposes new investments in Administration priorities such as maternal and rural health, but at the expense of other HHS programs. Expect new funding opportunities related to department-wide proposals on tick-borne diseases, AI, and maternal health. The Administration again proposes eliminating or consolidating agencies and programs important to academic medical centers, including AHRQ, GME, and workforce programs at HRSA. Congress will likely reject these changes again.

Five-Year Enacted Funding Levels
(discretionary funding, in millions)

Chart showing Five-Year Enacted Funding Levels (discretionary funding, in millions) for HRSA, SAMHSA, CDC, and FDA across FY 2016, FY 2017, FY 2018, FY 2019, FY 2020, and Request.

Proposed Reductions and Terminations

Elimination of AHRQ and a New National Institute for Research on Safety and Quality
The budget request would again propose to move activities from AHRQ into a new National Institute for Research on Safety and Quality at NIH, which would be funded at $355 million overall (including $257 million in discretionary funding). While consolidating AHRQ's activities into NIH has previously been proposed and rejected by Congress, this year's budget request does give an indication that AHRQ would have an overall role in the HHS focus on maternal health. According to the budget request, AHRQ will support the overall focus on maternal health at HHS by "partnering with states to improve social service data and provide a 360 degree view of the pregnancy, delivery, and early childhood support systems… creating a predictive analytic program to address data requests… and expanding the Medical Expenditure Panel Survey to include an additional 1,000 interviews."[2] AHRQ would continue activities focused on health services research, data, dissemination, and patient safety.

Health Professions and Graduate Medical Education
As proposed in the previous three budget requests from President Trump, the FY 2021 budget request would significantly reduce funding for Title VII health professions programs and Title VIII nursing workforce development programs at HRSA. Specifically, the request would eliminate programs other than behavioral health workforce programs, the NURSE Corps and National Health Service Corps, and the Centers of Excellence programs. While the budget request would support funding for the Behavioral Health Workforce Education and Training (BHWET) program and the Graduate Psychology Education (GPE)program at HRSA, it would eliminate programs that support training across health professions, including geriatrics, oral health, and nursing, as well as programs that provide scholarship opportunities for individuals from disadvantaged backgrounds.

The budget request again proposes to combine graduate medical education (GME) programs through Medicare, Medicaid, and Children's Graduate Medical Education into a single program that would be distributed based on a formula (calculated using the number of residents and Medicare/Medicaid

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[2] https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf. FY 2010 Budget in Brief, Department of Health and Human Services, 2020 (pg.61).

inpatient stays). Total funding for the new GME program (combining all previous GME payments) would be equal to FY 2017 payments and would then grow at a rate based on the Consumer Price Index for All Urban Consumers (CPI-U) minus one percent. The HHS Secretary would have new authority to focus funding on priority areas such as primary care. Teaching Health Center GME is not included in this new consolidated program. Congress is unlikely to consider specific GME legislative proposals this year, although there has been interest in examining the current GME structure.

New and Signature Initiatives

Maternal Health
The President's budget request highlights new and increased investments in maternal health, noting that an estimated 700 women die each year from pregnancy-related complications, over half of which are preventable. The budget request focuses on the "Improving Maternal Health in America" initiative at HHS, which addresses four goals: "Achieve healthy outcomes for all women of reproductive age by improving prevention and treatment; Achieve healthy pregnancies and births by prioritizing quality improvement; Achieve healthy futures by optimizing, postpartum health; and Improve data and bolster research to inform future interventions." Addressing maternal health is also a priority for Congress.

The President's budget request highlights proposed investments across HHS that support maternal health, including funding to CDC for the expansion of the Maternal Mortality Review Committees to all 50 states (and DC). These committees would support efforts to collect better data at the state level and improve understanding of the causes of maternal mortality. According to HHS, these committees would examine every case of pregnancy-related death to understand the circumstances surrounding the death and identify effective prevention opportunities.[3] In addition, the budget proposal would invest in the Alliance for Innovation in Maternal Health Program and the Rural Maternity and Obstetrics Management Strategies program at HRSA. However, the budget request, while increasing investments in targeted maternal health programs, would decrease overall maternal and child health activities by $25 million at HRSA. Specifically, the budget request would eliminate funding for several federal maternal and child health programs including funding for sickle cell disease programs, the Heritable Disorders in Newborns Program, and the Emergency Medical Services for Children program. These programs would be absorbed by the Maternal and Child Health Block grant program to provide more "flexibility" to states. The budget request would also eliminate funding for autism programs and other developmental disorders programs at HRSA, which Congress just reauthorized through *Autism CARES Act* with increased funding. Congress is not likely to adhere to these cuts.

Artificial Intelligence
The budget request would invest $8 million in new funding to support an agency-wide artificial intelligence (AI) strategy. The strategy is meant to apply AI solutions to enhance food safety and advance consumer-friendly digital health medical devices. In addition to continuing the AI Health Outcomes Challenge at the Centers for Medicare and Medicaid Services (CMS), the budget request would also provide $5 million "to evaluate and oversee Department-wide investments in AI in support of the President's Executive Order on Maintaining American Leadership In Artificial Intelligence."

Ongoing Areas of Interest

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[3]   https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf. FY 2010 Budget in Brief, Department of Health and Human Services, 2020 (pg.50).

Tobacco Oversight Reform

The budget request would eliminate the Food and Drug Administration's (FDA) Center for Tobacco Products, which currently has regulatory authority over tobacco products. Congress has been particularly critical of FDA's oversight of vaping devices and e-cigarettes, especially in response to the recent youth vaping epidemic. The budget request would reform oversight of tobacco products through the creation of a new agency within HHS to encourage the FDA Commissioner to focus strictly on drug, food, and medical product safety. According to the budget request, the new tobacco regulation agency would "strengthen accountability and more effectively respond to related public health concerns[4]."

Rural Health

The budget request would reduce overall funding for rural health at HRSA by $71 million. The budget request proposes eliminating funding for the Rural Hospital Flexibility Grants, the Rural Residency Program, and the State Offices of Rural Health. The community-based Rural Outreach Grants program would receive a $10 million increase. Within CMS, the budget request proposes new policies focused on rural healthcare, including a new prospective payment system for rural health clinics, allowing rural health clinics and FQHCs to be distant sites for Medicare reimbursement, and other policies focused on improving Medicare reimbursement for telehealth.

340B Drug Pricing Program

The President's FY 2021 budget request would provide an increase of $24 million for the 340B Drug Pricing program at HRSA. The increase in funding would come from a new "discretionary user fee." It also requests Congressional appropriations language regarding program integrity and general regulatory authority. According to the budget request, "general regulatory authority would allow for clear, enforceable standards of participation and will help ensure covered entities maintain compliance with 340B program requirements and the program benefits low-income and uninsured patients." [5]Under this provision, HRSA could require entities to report on savings from the program.

Mental Health and Substance Use

The budget request would provide $5.7 billion for the Substance Abuse and Mental Health Services Administration (SAMHSA). The budget request would prioritize the agency's work in treating substance use disorders, addressing serious mental illness, preventing suicide, and supporting mental health needs of students. The State Opioid Response (SOR) program would receive $1.6 billion in funding, a $85 million increase, to address the opioid epidemic. The budget also expands the use of SOR grants to address other substance use disorders, such as those associated with methamphetamine and other stimulants. Within the Centers for Disease Control and Prevention (CDC), the budget request would provide $58 million in funding for jurisdictions to address consequences of drug use and infectious disease. Additionally, the budget request would provide level funding of $110 million to HRSA's Rural Communities Opioid Response Program, which provides substance use supports in high-risk rural communities. However, the budget request would also cut funding for Substance Abuse Prevention at SAMHSA by $109 million, or 52.9 percent, compared to FY 2020 levels. The budget request would provide $1.1 billion, a $42 million increase above the FY 2020 enacted level, to address serious mental illness through evidence-based programs. Additionally, SAMHSA would receive $93 million, a $3 million

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[4] https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf. FY 2010 Budget in Brief, Department of Health and Human Services, 2020 (pg. 26).
[5] https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf , FY 2020 Budget in Brief, Department of Health and Human Services, 2020 (pg.36).

increase, to expand the Zero Suicide initiative which targets hospitals or health systems in need of suicide intervention programs.

Medicare and Medicaid Policy

The budget request reemphasizes several of the Administration's Medicare and Medicaid spending policies of concern to academic medical centers, including site-neutral payments, Medicaid work requirements, Medicaid block grants and funding cuts to Disproportionate Share Hospitals (DSH). The budget proposal again suggests eliminating Medicare payments for bad debt, but only for DSH hospitals and not rural hospitals. The budget proposal also discusses limiting "Medicaid reimbursement for healthcare providers operated by a governmental entity to an amount not exceeding the actual cost of providing those services."[6] It would also require a Medicaid-eligible individual to provide proof of citizenship before they can enroll in Medicaid program. The President's budget request proposes extending coverage to one year postpartum for women who have been diagnosed with a substance disorder. It also creates a new "money follows the person" program state plan option. The budget proposal indicates that CMS will soon release a proposed rule, "Strengthening the Program Integrity of the Medicaid Eligibility Determination Process," to "allow states the option to conduct more frequent eligibility redeterminations, amongst other reforms to improve the integrity of state eligibility determination and renewal processes."[7]

Public Health

The President's budget request would continue to prioritize funding to end the HIV epidemic, now in the second year of the Administration's initiative. The President's budget request prioritizes funding at the CDC for vector-borne diseases, specifically the threat of tick and mosquito born disease, including Lyme disease. However, the budget request would reduce overall funding for Emerging and Zoonotic Infectious Diseases programs. Similar to past Trump Administration requests, the budget request would again propose creating America's Health Block Grant, a $350 million block grant program to states to support chronic disease prevention activities. Congress has shown little interest in this effort from the Administration.

ONC

The Office of the National Coordinator for Health IT (ONC) would receive total funding of $51 million in FY 2021, a cut of $9 million compared to FY 2020. The budget request would prioritize improving transparency, combatting information blocking, and developing and implementing national common standards for health information technology (IT), all of which were also priorities in the past fiscal year.

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[6] https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf , FY 2020 Budget in Brief, Department of Health and Human Services, 2020 (pg.113).

[7] https://www.hhs.gov/sites/default/files/fy-2021-budget-in-brief.pdf , FY 2020 Budget in Brief, Department of Health and Human Services, 2020 (pg.117).

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

	FY 2020 Actual	FY 2021 Request	FY 2021 Request vs. FY 2020
HRSA	**7047**	**6,305**	**-742 (10.5%)**
Title VII	475	167	-308 (64.8%)
Title VIII	260	83	-177 (68.1%)
SAMHSA	**5,737**	**5,598**	**-139 (2.4%)**
Mental Health Services	1,678	1,696	18 (1.1%)
Substance Abuse Treatment	3,838	3,808	-30 (0.8%)
Substance Abuse Prevention	206	97	-109 (52.9%)
AHRQ	**338**	**N/A***	**N/A**
CDC	**6,917**	**5,627**	**-1290 (18.6%)**
Chronic Disease Prevention and Health Promotion	1,240	813	-427 (34.4%)
National Institute for Occupational Safety and Health (NIOSH)	343	190	-153 (44.6%)
Environmental Health	214	182	-32 (15.0%)
FDA, Program Level†	**5,940**	**6,205**	**265 (4.5%)**
ACL	**2,223**	**2,108**	**-115 (5.2%)**
National Institute on Disability, Independent Living, and Rehabilitation Research (NIDILRR)	112	90	-22 (19.6%)
ACF	**24,444**	**20,198**	**-4246 (17.4%)**
ONC	**60**	**51**	**-9 (15.0%)**

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

* Under the budget request, AHRQ would be consolidated into the National Institute for Research on Safety and Quality within NIH

† Includes mandatory funding

Department of Homeland Security

The President's FY 2021 budget request would provide approximately $52.1 billion in discretionary funding for DHS, or 3.3 percent above the FY 2020 enacted level, but would significantly cut science and technology programs of interest to universities and research institutions. *
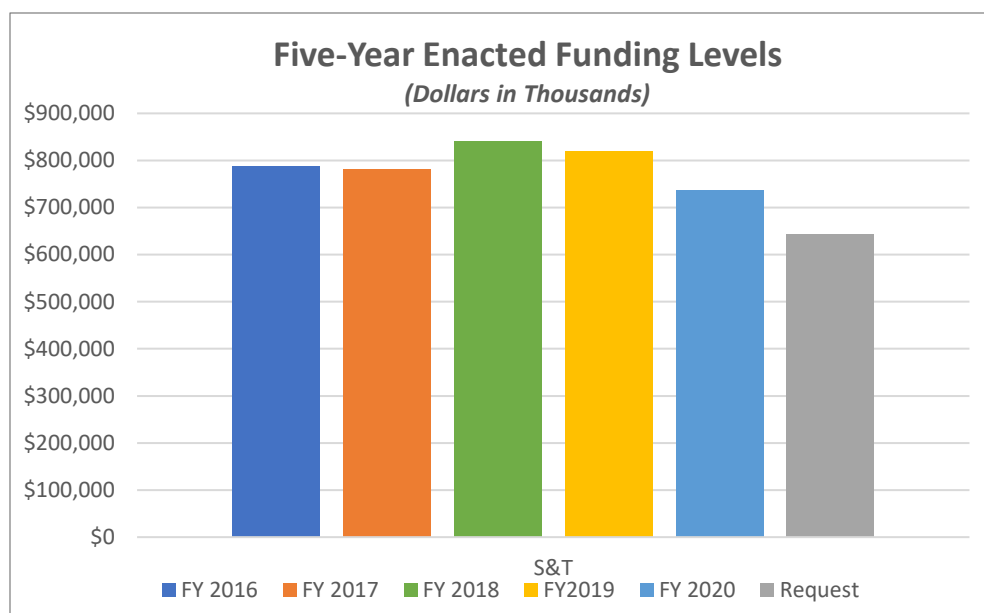
Quick Take: As with previous budget requests, the FY 2021 DHS request would shift substantial funding and resources toward addressing the Trump Administration's priorities of border security and enforcement of immigration laws.

Major Cuts/Eliminations: To further support the President's immigration priorities, the budget request would significantly cut other areas like Federal Emergency Management Agency (FEMA) grant and training programs. Further, the budget estimates major savings by transferring the Secret Service back to the Department of Treasury, a shift that would require legislation that is currently being discussed in Congress. In addition, the Science and Technology (S&T) Directorate would face considerable reductions. Within DHS S&T, the Trump Administration once again proposes cutting the Office of University Programs (OUP) by about $18.8 million.

New Initiatives/Priorities: In addition to discretionary funds to address immigration issues, the Administration requests the creation of new cybersecurity training and reskilling programs to support the federal workforce and a restructuring of FEMA programs for resilient infrastructure development. DHS S&T would also realign new Technology Centers that support the Administration's Industries of the Future, including Quantum Information Science and Artificial Intelligence/Machine Learning research initiatives.

The Bottom Line

As with previous years, the Administration's budget request provides limited regard for the independent science and research programs within DHS S&T that often attract strong university and private sector partnerships to develop solutions for the Homeland Security enterprise. Instead, this request signifies the Department's continued prioritization of investments in near-term solutions over fundamental research. While Congress has lowered funding for S&T in recent years as the agency has deprioritized the Directorate, it will likely restore funding for key initiatives like the university-based Centers of Excellence.

Five-Year Enacted Funding Levels
(Dollars in Thousands)

Proposed Reductions and Terminations

Science and Technology Directorate (S&T)
Funding for research programs in the S&T Directorate would be reduced by nearly $82.4 million below the FY 2020 enacted level. While overall research priorities outlined in the budget request are largely consistent with recent years' requests from the Trump Administration, the budget listed several proposed cuts to various specific initiatives, which include:
- $8.4 million reduction for biological threat characterization;
- $9.6 million reduction to maritime border security research programs;
- $9 million reduction for research on enabling UAS technologies;
- $9.5 million reduction for Homemade Explosives Identification, Detection and Mitigation (HEID&M) research;
- $5 million reduction for research projects to support the Cybersecurity and Infrastructure Security Agency (CISA);
- $8 million reduction for mobile security technologies; and
- $8.5 million reduction to national network security research.

Office of University Programs
The Administration has once again proposed steep cuts to the Office of University Programs (OUP), which funds the Centers of Excellence (COEs) and Minority-Serving Institutions (MSI) program. To accomplish this, OUP would eliminate the following COEs:
- Borders, Trade, and Immigration (BTI) Institution
- Coastal Resilience Center of Excellence (CRC)
- Awareness and Localization of Explosives-Related Threats (ALERT) Center of Excellence
- Terrorism Prevention Counterterrorism Research (TPCR) Center of Excellence, which was competed in the summer of 2019 and the award is still pending.

The request notes that ALERT is scheduled to sunset in FY 2021 and OUP will plan a replacement center that aligns with DHS priorities.

The budget specifically requests funding in FY 2021 for the following existing centers: Critical Infrastructure Resilience Institute (CIRI); Arctic Domain Awareness Center (ADAC); Criminal Investigations and Network Analysis (CINA); Cross Border Threat Screening and Supply Chain Defense (CBTS); and the Center for Accelerating Operational Efficiency (CAOE). Each listed center would be funded at $41,000 below the FY 2020 enacted level. In addition, the request would eliminate the MBA program for Security Technology Transition (STT). While previous Administrations' budget proposals have also proposed cuts to the S&T Directorate, particularly OUP, Congress has recognized the importance of these programs and rejected many of the proposed reductions.

New and Signature Initiatives

This budget request marked the second year in which S&T is seeking to develop new models intended to make it easier for industry to interact with DHS components to facilitate the transfer of new technologies to DHS components. To this end, further restructuring proposals were made that are outlined below, as well as a few specific emerging research thrusts named by the agency. Lewis-Burke will continue to monitor how interactions with universities and research institutes will be altered as S&T continues to carry out its reorganization and revitalization plan.

Technology Centers
Last year, as part of DHS's revitalization plan, S&T launched new Technology Centers. Technology Centers are teams at DHS that focus on immediate technological needs and processes in priority areas and assist stakeholders with implementation. In the FY 2021 request, the Department proposed to take this a step further by consolidating existing centers into more wide-reaching Technology Centers, outlined below. Initially, these changes appear minimal, reprioritizing a few initiatives toward new customer-facing offices. It is uncertain how these new centers will interface with the research community or how Congress will react to the continued consolidation of research programs. Still, these centers represent priority areas for DHS components that could drive continued research investment.

Advanced Computing Technology Centers
The budget would provide $12.1 million to advance S&T's resources and research capacity in several computing domains to improve DHS component readiness and decision-making. The new centers will include the existing Data Analytics Technology Center (DA-TC) and the Modeling and Simulation Technology Center (MS-TC), as well as the following emerging "research activities":

- Quantum Information Science (QIS) Research Activity: Building on a technological priority for the Administration, this thrust will build a community of interest and work across agencies to "promote an understanding of QIS technologies, identify potential mission areas where QIS technologies can provide significant impact, and develop a process, methodology and R&D roadmap to ensure the federal, industry and academic research communities are responsive to DHS and other agency technology needs." DHS will allocate $5 million for this area.
- Artificial Intelligence and Machine Learning Research Activity: This thrust will examine AI research as applicable to DHS priorities. Research activities will focus on the "development of core capabilities that enable trustworthy artificial intelligence to improve core automation capabilities that are secure, private, and trusted for critical homeland security applications."

While little is known about how the Advanced Computing Technology Centers will carry out these proposed "research activities," this could represent a promising shift within DHS toward further

leveraging the S&T Directorate to lead major advanced research and technology thrusts seldom seen under the current DHS leadership, which has prioritized tech foraging and the development of more mature, commercial capabilities.

Enduring Sciences Research Centers
The budget would provide $17.5 million for this initiative that includes the existing Hazard Awareness and Characterization Technology Center (HAC-TC) and Social Science Technology Center (SS-TC). It would prioritize research for the characterization of explosive threats; understanding chemical and biological hazards; and gathering insights behind the causes of mass violence and the development of best practices for prevention.

Innovative Systems Technology Centers
The budget would provide $10.3 million for this initiative that includes the existing Office for Interoperability and Compatibility Technology Center (OIC-TC), Sensors and Platforms Technology Center (SP-TC), and Biometrics and Identity Technology Center (BI-TC). The Centers will prioritize "intelligent sensors and autonomous systems; resilient communications equipment, data, and networks; and enhanced biometrics and identity capabilities."

Public Safety Communications
One of the few new research priorities proposed in the budget request would provide $14.2 million for the development of public safety communications where first responders can effectively communicate across complex networks and share and manage large amounts of data. This would amount to a $6.5 million increase over the enacted level.

Disaster Recovery
The budget would provide $4.5 million for innovations to "streamline and to optimize disaster recovery operations and assistance programs." Through this effort, S&T will work closely with FEMA on projects that address a variety of disaster recovery priorities, including streamlining recovery support; better tracking damage assessments; and enabling decision-making.

Counter Unmanned Aircraft Systems (CUAS)/Non-Traditional Aviation Technologies (NTAT) and Autonomous Systems (AS)
Although the budget request proposed considerable reductions to research on enabling UAS technologies, the request would call for a $22.9 million increase over the enacted level to support research on countering UAS. This prioritization reflects recent legislative authority granted to DHS to further conduct research on mitigating potential threats posed by UAS use. This will likely continue to be a strong priority for the agency going forward.

Ongoing Areas of Interest

Terrorism Prevention
The budget would provide an increase in funding for programs supported by the SAFETY Act, including industry partnerships for research on anti-terrorism technologies from hardening soft targets to protecting the cyber domain.

Opioid/Fentanyl Detection
The request would maintain the enacted level of $8.5 million for opioid and fentanyl detection technologies. Funding will be used to explore the reuse of existing detection technologies for opioids

and to conduct rapid prototyping where technologies do not exist. Funding will be used to "transition algorithms for narcotics anomaly detection on image-based systems and high throughput chemical detection technology for implementation" among DHS components and continue to improve understanding of supply chain logistics to support investigations.

Source: DHS's FY 2021 Budget Summary and Background Information is available at https://www.dhs.gov/publication/congressional-budget-justification-fy-2021.

Department of Homeland Security
(in thousands of $)

	FY 2020 Actual	FY 2021 Request	FY 2021 Request vs. FY 2020
DHS, total	**50,462,000***	**52,127,522***	**1,665,522 (3.3%)**
Science and Technology Directorate	**737,275**	**643,729**	**-93,546 (12.7%)**
University Programs	40,500	21,746	-18,754 (60.3%)

*Approximate adjusted net discretionary funding provided in the "Budget for America's Future" summary document that anticipates a rescission of $2.4 billion for the transfer of the U.S. Secret Service to the Treasury Department.[8]

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[8] https://www.whitehouse.gov/wp-content/uploads/2020/02/budget_fy21.pdf

Department of Justice

The president's FY 2021 budget request would provide $31.7 billion in discretionary funding for the DOJ, $730 million or 2.3 percent below the FY 2020 enacted level, of which $86.5 million would be provided for the Research, Evaluation, and Statistics account, a 9.5 percent increase.

Quick Take: Significant resources would be provided for recent Trump Administration priorities, including criminal justice reform, and combatting illegal immigration, violent crime, and the opioid epidemic.

Major Cuts/Eliminations: The request would provide significant projected cost savings through the proposed elimination of some large planned investments, including halting the construction of a new corrections facility and the elimination of the State Criminal Alien Assistance Program, which the Administration considers an ineffective tool for immigration enforcement.

New Initiatives/Priorities: In addition to massive proposed investments in law enforcement and immigration authorities, the budget request would continue to prioritize investments in corrections procedures to reduce recidivism and improve processes, as outlined in the *First Step Act.*

The Bottom Line

The budget would provide another 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. Overall, the budget will likely be a non-starter with Members of Congress concerned about its calls for strengthened law enforcement and immigration authorities.

New and Signature Initiatives

The budget request would provide a 22.8 percent increase for the National Institute of Justice (NIJ), DOJ's primary research account. This is the second proposed increase for NIJ in a row after years of proposed reductions to research and evaluation programs in support of other priorities. The proposed increase will continue to address Trump Administration priorities of reducing violent crime; improving reentry strategies; officer health, safety and wellness; and the potential application of artificial intelligence to support criminal justice. Among the priorities, $3 million would be set aside for NIJ research on sector-specific human trafficking prevention; $2.5 million would be provided for research on violence against women issues; and $1 million would be provided for research on targeted violent events, particularly cases that were influenced by online forums.

Also, the budget request would prioritize programs to reduce violent crime and illegal drug distribution. To this end, the request would provide $40 million for Project Safe Neighborhoods (PSN), a block grant program through the U.S. Attorneys' Offices in each federal district to promote partnerships between law enforcement and community leaders to implement gang violence and gun crime enforcement; violence prevention and intervention initiatives; and community outreach at the local level.

Proposed Reductions and Terminations

The budget would cut several congressional research priorities that will likely be restored through the appropriations process, including the Center for Restorative Justice, research on school violence, research on sex trafficking for minors, and the National Center for Forensics.

Source: DOJ's FY 2021 Budget Summary and Background Information is available at https://www.justice.gov/doj/fy-2021-congressional-budget-submission.

Department of Justice
(in thousands of $)

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
DOJ, total	**$32,387,263**	**$31,656,515**	**-730,748 (2.3%)**
Research, Evaluation, and Statistics	79,000	**86,500**	**7,500 (9.5%)**
National Institute of Justice	36,000	43,500	7,500 (22.8%)

Department of Labor

Discretionary programs within the Department of Labor (DOL) would be funded at $11.1 billion, down $1.3 billion (-10.5%) compared to the FY 2020 enacted level.

Quick Take: The budget request continues the Administration's efforts to address the "skills gap" through support for apprenticeships.

Major Cuts/Eliminations: Many of the programs proposed for elimination or cuts do not relate to key initiatives of interest to the higher education community.

New Initiatives/Priorities: The request proposes to double the American Competitiveness and Workforce Improvement Act of 1998 fee for the H-1B visa program. Revenue from this increase would support DOL grants to expand apprenticeships, increase support for technical skills instruction in K-12 education and at community colleges, and provide additional support for the Department of Education's Career and Technical Education grants.

The Bottom Line

The Administration continues to signal its interest and commitment to workforce development. The request would continue support for apprenticeships, particularly in sectors like health care, information technology, and advanced manufacturing.

Proposed Reductions and Terminations

The budget request proposes to eliminate or reduce funding for several programs, including the Indian and Native American Program (INAP), Job Corps, and the Occupational Safety and Health Administration's (OSHA) Susan Harwood training grants, among other proposed eliminations and reductions.

New and Signature Initiatives

The budget request includes a legislative proposal to double the American Competitiveness and Workforce Improvement Act (ACWIA) fee for the H-1B visa program. As part of this proposal, DOL is requesting a revision to allow for skills instruction of "in-school youth."[9] This would expand skills instruction and apprenticeship opportunities at secondary and postsecondary institutions.

Additionally, DOL is requesting legislative changes to the Workforce Innovation and Opportunity Act (WIOA), which is the primary federal workforce development legislation. The reauthorization of WIOA is currently being considered by Congress. Among the proposed changes, DOL requests language that

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[9] https://www.dol.gov/sites/dolgov/files/general/budget/2021/CBJ-2021-V1-03.pdf, FY 2021 Congressional Budget Justification Employment and Training Administration Training and Employment Services, 2020 (pg. TES-102).

would grant automatic WIOA training provider eligibility to "institutions of higher education that already qualify as eligible to participate in Federal Student Aid (FSA) programs, such as Pell grants, authorized by Title IV of the Higher Education Opportunity Act."[10] Providers are eligible to receive WIOA funding for vocational training and employment support. DOL is also proposing legislative changes to "address reskilling workers facing automation to allow local areas with low unemployment to use their WIOA Dislocated Worker (DW) funds more flexibly to mitigate the impact of automation."[11]

Ongoing Areas of Interest

The FY 2021 budget request continues the Administration's support for apprenticeships, particularly in "high-growth sectors where apprenticeships are underutilized, including advanced manufacturing, information technology, cybersecurity, and health care."[12] The request also notes DOL's interest "to continue using pilot projects to explore new approaches to delivering job training; increase the use of partnerships with local institutions of higher education and workforce development systems to support recruitment and placement of graduates in jobs in the fields in which they trained."[13] DOL continues its interest in supporting Industry-Recognized Apprenticeship Programs, which have not been funded by Congress.

Source: DOL's FY 2021 Budget Summary and Background Information is available at https://www.dol.gov/sites/dolgov/files/general/budget/2021/FY2021BIB.pdf *and supporting budget explanatory information can be found at* https://www.dol.gov/sites/dolgov/files/general/budget/2021/CBJ-2021-V1-03.pdf.

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

	FY 2020 Enacted*	FY 2021 Request	FY 2021 Request vs. FY 2020
Apprenticeship Program	175,000	200,000	15,000 (14.3%)

*The amounts shown for FY 2020 Enacted are taken from FY 2021 Department of Labor Budget Summary Tables.

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[10] https://www.dol.gov/sites/dolgov/files/general/budget/2021/CBJ-2021-V1-03.pdf, FY 2021 Congressional Budget Justification Employment and Training Administration Training and Employment Services, 2020 (pg. TES-24).

[11] https://www.dol.gov/sites/dolgov/files/general/budget/2021/CBJ-2021-V1-03.pdf, FY 2021 Congressional Budget Justification Employment and Training Administration Training and Employment Services, 2020 (pg. TES-20).

[12] https://www.dol.gov/sites/dolgov/files/general/budget/2021/FY2021BIB.pdf, FY 2021 Department of Labor Budget in Brief, 2020 (pg. 9).

[13] https://www.dol.gov/sites/dolgov/files/general/budget/2021/FY2021BIB.pdf, FY 2021 Department of Labor Budget in Brief, 2020 (pg. 5).
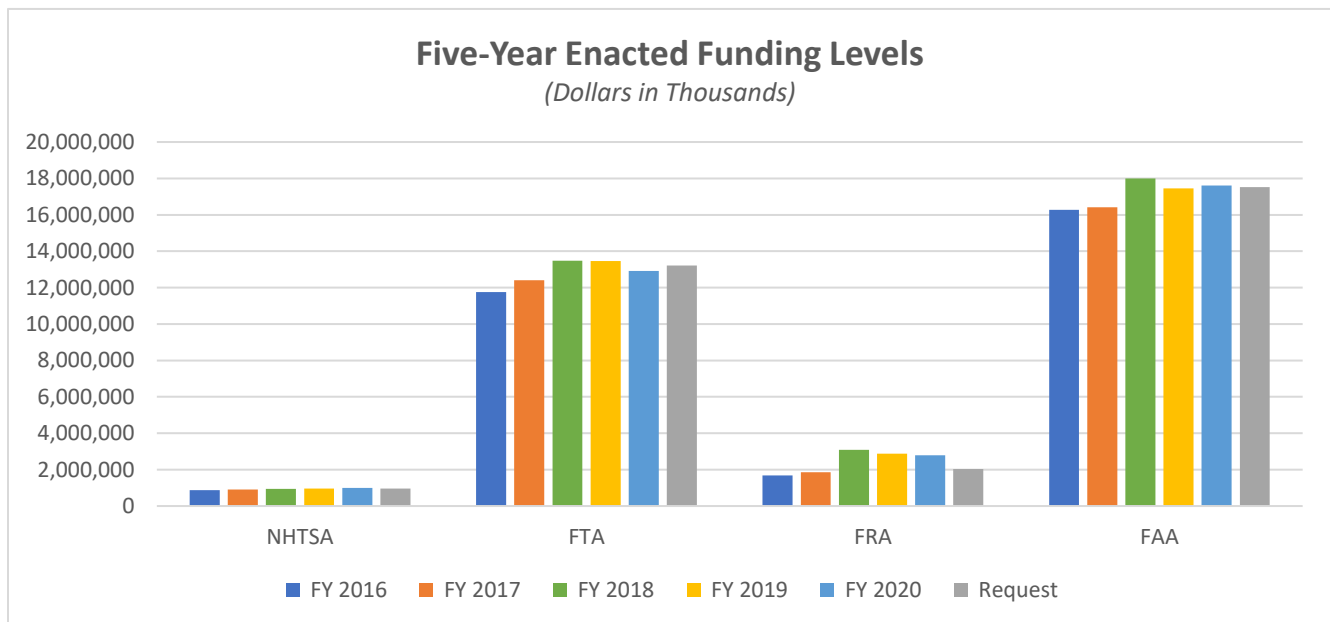
Department of Transportation

The FY 2021 budget requests $88.2 billion for the Department of Transportation (DOT), a 2.3 percent increase above the FY 2020 enacted level.

Quick Take: The Administration's proposal for DOT is consistent with prior year budget requests. Since extramural surface transportation research is allocated through mandatory funding, the request has little impact over hallmark programs of interest to the research community.

Major Cuts/Eliminations: Overall, the request would see most non-mandatory funded research accounts cut or flat funded. This includes those supported through the Federal Aviation Administration (FAA), Federal Railroad Administration (FRA), and National Highway Traffic Safety Administration (NHTSA), and the Federal Transit Administration (FTA).

The Bottom Line

Funding for programs of interest to the research community (such as the University Transportation Centers) are primarily set by surface transportation authorizing legislation. Elsewhere, appropriators have a strong record of restoring funding for programs that see perennial threats of proposed reductions.

Five-Year Enacted Funding Levels
(Dollars in Thousands)

Legend: FY 2016, FY 2017, FY 2018, FY 2019, FY 2020, Request

*FHWA omitted due to its reliance on mandatory funding.

Proposed Reductions and Terminations

While the DOT's topline number would rise by 2.3 percent, this increase is largely due to increases in mandatory funding set by a handful of modal administration's authorizing legislation. Meanwhile, discretionary funding across DOT would see a combined 13 percent cut.

In the Office of the Assistant Secretary for Research and Technology (OST-R), which provides administrative direction across DOT's modal research programs, would be nearly halved. The FY 2021 request would cut the FAA Research, Engineering, and Development (RE&D) program by $22.7 million, an 11.7 percent reduction. Operations and Research at NHTSA would also see a net $49 million cut.

New Initiatives and Ongoing Areas of Interest

The budget request includes a framework for reauthorizing FHWA's mandatory programs and is a preview to a larger comprehensive proposal unveiled at a later date. It describes in general terms a 10-year, $810 billion investment in surface transportation safety, research, and infrastructure. Consistent with statements by DOT Secretary Elaine Chao, a key component of the reauthorization plan includes regulatory relief by reducing environmental review requirements for infrastructure programs and other inefficiencies of federal oversight to speed project delivery. It is also silent on recommended changes to FHWA's research portfolio.

In addition to the FAST Act reauthorization proposal, the budget includes $190 billion for additional infrastructure investments across a range of sectors. While these proposals are ambitious, both lack important details including pay-fors or changes to FHWA's research and innovation programs. Notably, the two taken together total the amount President Trump committed to spending on infrastructure during the 2016 presidential campaign.

Source: DOT's FY 2021 Budget Summary and Background Information is available at https://www.transportation.gov/sites/dot.gov/files/2020-02/BudgetHightlightFeb2021.pdf.

Department of Transportation
(in thousands of $)

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
DOT, Total	86,155,665	88,189,000	2,033,335 (2.36%)
Federal Highway Administration	49,270,232	$50,721,000	1,450,768 (2.94%)
National Highway Traffic Safety Administration	989,317	$964,500	-24,817 (2.51%)
Federal Transit Administration	12,910,348	$13,213,000	302,652 (2.34%)
Federal Railroad Administration	2,793,798	$2,033,100	-760,698 (27.23%)
Federal Motor Carrier Safety Administration	679,136	$702,000	22,864 (3.37%)

Federal Aviation Administration	17,617,665	$17,521,500	-96,165 (0.55%)
Pipeline and Hazardous Material Safety Administration	**279,900**	$276,200	-3,700 (1.32%)
Maritime Administration	1,047,869	$793,700	-254,169 (24.26%)

*The amounts shown for FY 2020 Enacted are taken from the H.R.1865, the FY2020 Further Consolidated Appropriations Act and Joint Explanatory Statement.

The budget request provides $40.8 billion for the State Department and USAID, which would be a 22.2 percent cut from the FY 2020 enacted level of $52.5 billion.
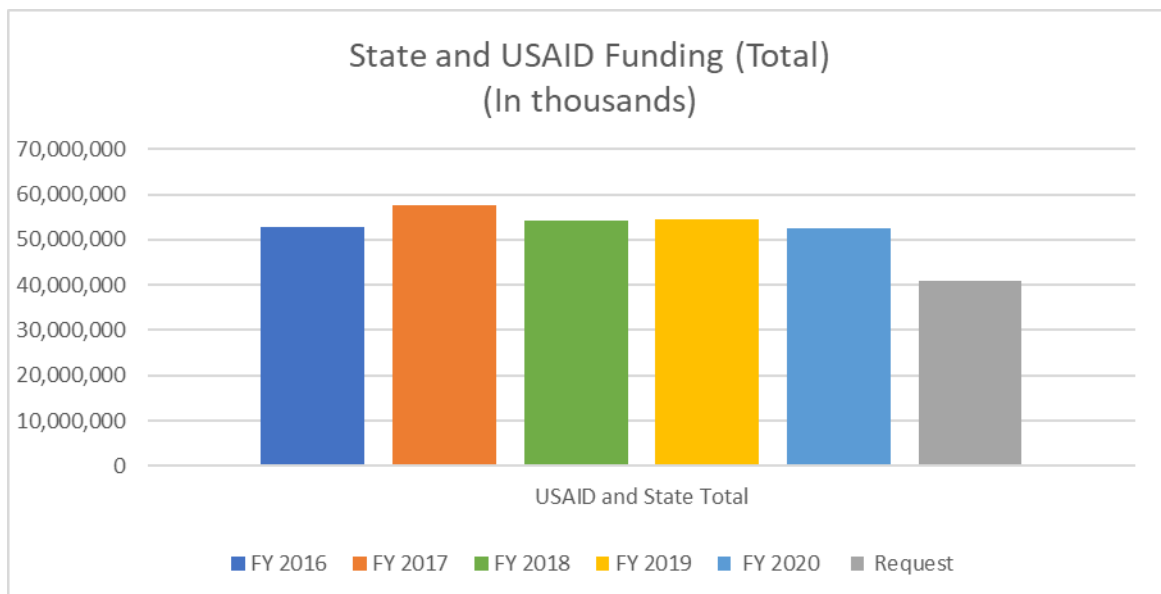
Quick Take: The President's budget request for FY 2021 largely reflects the request for FY 2020, which focuses on addressing the need of U.S. citizens to "ensure their safety, promote their prosperity, preserve their rights, and defend their values" as set out in the National Security Strategy (NSS)[14]. The request highlights in-country partnership to support the *Journey to Self-Reliance* in partner countries.

Major Cuts/Eliminations: Educational and Cultural Affairs (ECA) Programs would see its budget slashed to $310 million in FY 2021, less than half of the FY 2020 enacted level of $730.7 million.

New Initiatives/Priorities: The request highlights priorities around the *Secure Digital Environment* to counter malign foreign influences and advance internet freedom in alignment with the NSS; empowering women advance to advance in the workforce; and promoting trade and investment in Africa.

The Bottom Line

The proposed steep cuts in funding will likely not become reality. Congress has rebuked the President in his previous budget requests when he proposed similar cuts. There is bipartisan support in both the House and Senate for robust funding for the State Department and USAID.

State and USAID Funding (Total) (In thousands)

Legend: FY 2016, FY 2017, FY 2018, FY 2019, FY 2020, Request

Proposed Reductions and Terminations

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[14] https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf, National Security Strategy of the United States of America, 2017 (pg. ii).

The budget request would reduce the **Educational and Cultural Exchange Programs (ECE)** by $420.7 million. The budget request alludes to the Trump Administration's National Security Strategy (NSS) in explaining why proposed cuts to educational and cultural programs are necessary, stating that the budget will be "prioritized for countries, partners, and activities that advance U.S. foreign policy objectives and emerging Administration and Departmental priorities in the strategic thematic areas of the Great Power Competition, the Indo-Pacific Strategy, International Religious Freedom, and Youth Leadership."[15]

As proposed in previous budget requests, the **Development Assistance (DA) Program** would be terminated along with the **Economic Support Fund (ESF)**. However, these two accounts would be consolidated into a new Economic Support and Development Fund (ESDF). ESDF would enable USAID and the Department of State to "advance U.S. interests, target the challenges of a new era of great power competition, and support reliable strategic and diplomatic partners."[16] This mirrors the FY 2019 and FY 2020 requests that would have created the EDSF; Congress did not fund the EDSF in FY 2019 or FY 2020 and instead funded the DA and ESF accounts separately.

As in previous years, the budget request does not mention the **Global Climate Change Initiative (GCCI).**

New and Signature Initiatives

The budget would fund a new "**Bureau for Development, Democracy and Innovation (DDI)**" to support the integration of innovation and private-sector engagement across USAID programs. The request would also create a new "**Bureau for Resilience and Food Security**" to address issues of food-insecurity and reduce poverty.

Ongoing Areas of Interest

Food Security would be funded at $506.1 million to support the implementation of the Global Food Security Strategy (GFSS). Again, this closely mirrors the President's FY 2020 priorities, and the FY 2021 request focuses on enhancing economic growth in the agriculture sector; fostering a well-nourished population; and improving resilience to vulnerabilities. As for the FY 2020 request, a total of $30 million is proposed to support a Resilience Challenge Fund to leverage private-partner investment.

Similar to prior budget requests, the President's FY 2021 request would cut **Global Health Programs (GHP).** The request proposes funding GHP at $6.0 billion, about $3.1 billion less than the FY 2020 enacted level. As for FY 2020 request, much of the same priorities are evident in the FY 2021 request. For example, the GHP request supports programs focused on HIV/AIDS; prevention of child and maternal deaths; and combatting infectious disease.

Source: The U.S. State Department's Congressional Budget Justification https://www.state.gov/wp-content/uploads/2020/02/FY-2021-CBJ-Final.pdf.

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[15] https://www.state.gov/wp-content/uploads/2020/02/FY-2021-CBJ-Final.pdf, Congressional Budget Justification Department of State, Foreign Operations, and Related Programs Fiscal Year 2021, 2020 (pg. 31).
[16] https://www.state.gov/wp-content/uploads/2020/02/FY-2021-CBJ-Final.pdf, Congressional Budget Justification Department of State, Foreign Operations, and Related Programs Fiscal Year 2021, 2020 (pg. 72).

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

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
Total - State Department and USAID	**52,505,402**	**40,832,877**	**-11,672,525 (22.2%)**
Educational and Cultural Exchange Programs	730,700	310,000	-420,700 (57.6%)
USAID Operating Expenses	1,377,246	1,311,866	-65,380 (4.7%)
Development Assistance	3,400,000	--	-3,400,000 (100%)
Global Health Programs, Total	9,092,450	5,997,966	-3,094,484 (34.0%)

Environmental Protection Agency

President Trump's FY 2021 budget request includes $6.7 billion for EPA, which constitutes a $2.4 billion or 26.5 percent cut from the FY 2020 enacted level. Funding for the Science and Technology (S&T) account would be reduced by $232 million or 32.3 percent.
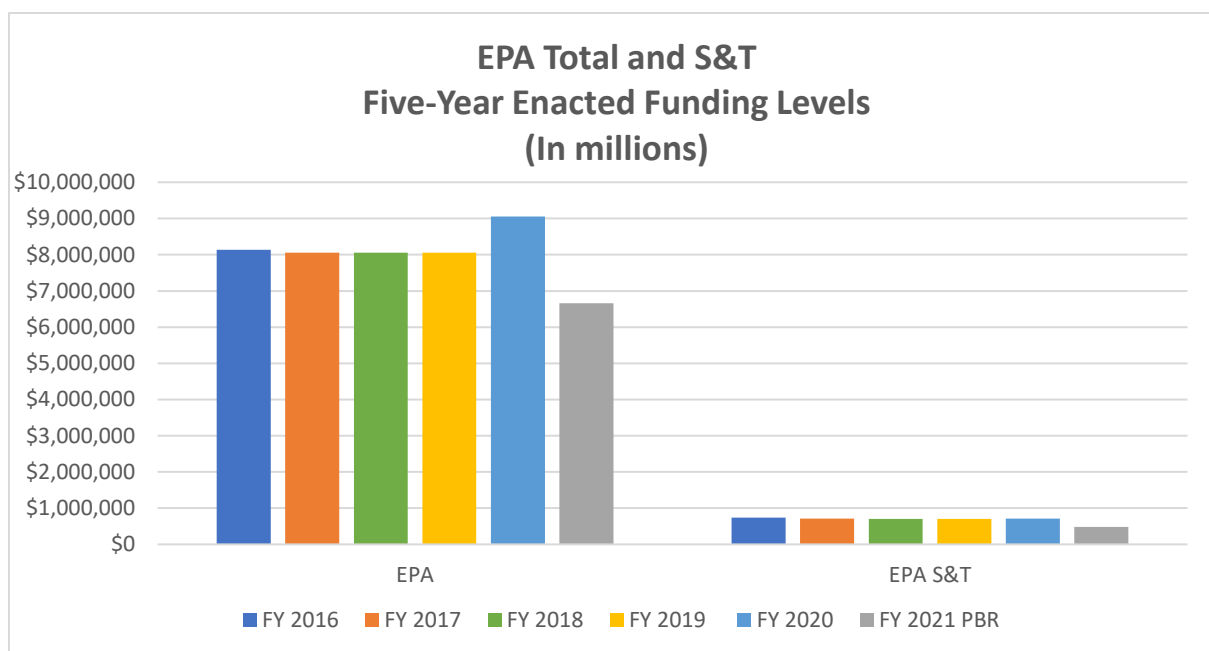
Quick Take: The Trump Administration's FY 2021 proposal calls for sharp decreases and eliminations that would shrink EPA's budget and maintain limited core functions articulated by congressional statute. This is consistent with the Administration's past three budget requests and the Administration's ongoing efforts to transfer authority and financial responsibility to state and local governments for environmental activities.

Major Cuts/Eliminations: The FY 2021 request would significantly reduce budgets across EPA, though the severity of these cuts vary. For example, the Hazardous Substance Superfund account would only be decreased by 9.0 percent as compared to the more substantial cut proposed for S&T. As in prior years, the Administration's request would eliminate the Science to Achieve Results (STAR) program within S&T, which is EPA's primary mechanisms for funding extramural research grants. Overall, eliminated programs and projects would account for over $680 million out of the total $2.4 billion proposed reduction.

New Initiatives/Priorities: In general, the FY 2021 request emphasizes the Administration's interest in streamlining agency functions by reducing spending and closing offices. Exceptions include programs to improve recycling and reduce food waste by half in the coming decade, facilitated by activities including a needs assessment, pilot incentive program, and some research support.

The Bottom Line

The FY 2021 budget request demonstrates that the Trump Administration has not deviated from its efforts to create a leaner, smaller EPA. However, as the past three appropriations cycles have proven, bipartisan opposition to this approach in Congress will likely result in a more measured approach to the agency's budget and protection for programs with broad support, like STAR.

EPA Total and S&T Five-Year Enacted Funding Levels (In millions)

Legend: FY 2016, FY 2017, FY 2018, FY 2019, FY 2020, FY 2021 PBR

Proposed Reductions and Terminations

Proposed agency investments in FY 2021 would be guided by priorities outlined in the *FY 2018 – FY 2022 EPA Strategic Plan* and FY 2020-2021 Agency Priority Goals (APGs). These include reducing childhood lead exposures and per- and polyfluoroalkyl substances (PFAS) risks to the public and improving drinking water and wastewater infrastructure needs, air and water quality, cleanup of contaminated land, and recycling. Programs or activities determined to be outside the scope of these priorities would generally be slated for modest-to-severe cuts or eliminated entirely.

Science and Technology

Many S&T programs are proposed for reductions or terminations in FY 2021, and the account would receive a 32.3 percent cut overall for a total of $484.7 million. Consistent with previous requests, the FY 2021 proposal would eliminate the extramural **Science to Achieve Results (STAR) program** and refocus EPA S&T on intramural research activities.

The **Air and Energy (AE) program** would receive $33.5 million in FY 2021, a significant reduction of $61.0 million from the FY 2020 enacted level. In FY 2021, funding for global climate change research would be eliminated. Instead, AE would prioritize the analysis of existing data and research to support air quality management programs and decision making.

The **Safe and Sustainable Water Resources (SSWR) program** would see a reduction of $31.9 million from the FY 2020 enacted level for a total of $78.9 million in FY 2021. SSWR research in FY 2021 would continue to assist state and local authorities on stormwater and wastewater infrastructure needs; research microplastics in aquatic systems, support access to safe drinking water including research on emerging chemical and biological contaminants, improve monitoring of pathogen proliferation in recreational waters; assess and predict health impacts of algal and cyanobacterial toxins; assisting state and local entities in watershed nutrient management; and providing research support for the reuse of both potable and non-potable water. SSWR would also continue to emphasize research related to pre- and polyfluoroalkyl substances (PFAS), lead exposure, and excessive nutrients in water.

The **Sustainable and Healthy Communities (SHC) program** would receive $58.6 million in FY 2021, a sizable reduction of $73.8 million compared to the estimated FY 2020 enacted level. Similar to SSWR, SHC research would also emphasize PFAS and lead exposure, though SHC would also focus on assessing and sharing with communities information on benefits of remediation, restoration, and revitalization as well as waste and sustainable materials management. This would include $850,000 in research on food waste campaign technologies and effectiveness as part of the agency's initiative on Improving the U.S. Recycling System and Reducing Food Loss and Waste. Support for numerous SHC programs like the Health Impact Assessment (HIA), research on chemical exposure and vulnerable populations, and others would be significantly reduced. As in past requests, funding for the Ecotox database; EPA's Report on the Environment; life cycle research on materials in commerce; and the People, Prosperity, and the Planet (P3) program would again be terminated.

EPA's **Chemical Safety for Sustainability (CSS) program** would receive $91.6 million in FY 2021, a decrease of $34.6 million compared to estimated FY 2020 enacted levels. CSS priorities in FY 2021 would include: High-Throughput Toxicity (HTT) Testing of chemicals; the development of computational and analytical tools for unknown chemical detection and identification; understanding PFAS toxicity; improving understanding of chemical impacts on biological systems; and delivery of chemical information. Funding for high-throughput toxicity testing, chemical evaluation improvements, endocrine disruptor research, and tissue modeling would be cut.

As in prior requests, the FY 2021 proposal would eliminate the **Water Quality Research and Support Grants**. The program is intended to be separate from the STAR program and provides funding to nonprofit organizations conducting water quality research of national scope.

New and Signature Initiatives

New initiatives proposed as part of the FY 2020 request are largely removed from the agency's research enterprise and are instead geared towards assisting state and local authorities in areas such as preventing and responding to Harmful Algal Blooms (HABs), as well as continuing to address water infrastructure and lead exposure. Specifically, $15 million would be available in grants for states for HABs efforts. The Administration would set aside $82 million to help implement the ***America's Water Infrastructure Act of 2018*** and assist communities with drinking water and wastewater issues. EPA would also allocate $50 million for a proposed **Healthy School Grant Program** aimed at addressing environmental hazards at schools. Specific areas would include lead exposure, asthma triggers, integrated pest management, and exposure to other toxic chemicals.

Ongoing Areas of Interest

The budget request would support several programs consistent with the Administration's interest in infrastructure. Consistent with the last two requests, the FY 2020 proposal would allocate $25 million for the **Water Infrastructure Finance and Innovation Fund**, which provides federal credit assistance to finance eligible water and wastewater projects. However, this proposed level is far below the $60 million included in FY 2020 enacted appropriations.

Source: EPA's FY 2021 Budget Justification is available at
https://www.epa.gov/sites/production/files/2020-02/documents/fy-2021-congressional-justification-all-tabs.pdf.

U.S. Environmental Protection Agency

(in thousands of $)

	FY 2020 Enacted*	FY 2021 Request	FY 2021 Request vs. FY 2020
EPA, total	9,057,401	6,658,071	- 2,399,330 (26.5%)
EPA Science and Technology	716,449	484,733	- 231,716 (32.3%)

* The amounts shown for FY 2020 Enacted are taken from H.R. 1865, *Further Consolidated Appropriations Act 2020 and Conference Report.*

Institute of Museum and Library Services

The discretionary programs within the Institute of Museum and Library Services (IMLS) would be funded at $23 million (-90.8%) compared to the FY 2020 enacted level.

Quick Take: The budget request proposes to eliminate the Institute of Museum and Library Services.

Major Cuts/Eliminations: The proposed funding is for the orderly closure of IMLS. Funding would cover administrative expenses for a shutdown of the agency beginning in FY 2021.

New Initiatives/Priorities: IMLS would continue to award FY 2020 grants and use its normal review process for current applications.

The Bottom Line
This is the fourth year that the budget request proposes the elimination of IMLS. Given the consistent funding and Congressional support IMLS has received in recent fiscal years, IMLS is unlikely to be eliminated.

Source: IMLS's FY 2021 Budget Summary and Background Information is available at https://www.imls.gov/sites/default/files/fy21cj.pdf.

Institute of Museum and Library Services
(in thousands of $)

	FY 2020 Enacted*	FY 2021 Request	FY 2021 Request vs. FY 2020
IMLS, total	252,000	23,000	-229,000 (90.8%)

*The amounts shown for FY 2020 Enacted are taken from *A Budget for America's Future – President's Budget FY 2021 Major Savings and Reforms*.

National Aeronautics and Space Administration

The request for NASA is $25.2 billion[17], an increase of $2.7 billion (11.9%) compared to the FY 2020 enacted level. $6.3 billion (-11.7%) is requested for NASA's Science Mission Directorate (SMD).

Quick Take: As one of the big "winners" of the FY 2021 request, NASA exploration would receive increased resources and program orientation around the lunar/Artemis agenda through a mix of public-private partnerships. However, in the science and education portfolios, the budget reiterates previously proposed plans to cancel signature science missions in astrophysics and Earth science as well as STEM education, while expanding new endeavors such as a Mars Sample Return mission.

Major Cuts/Eliminations: The request would again propose the elimination of SMD's WFIRST, SOFIA, PACE, and CLARREO Pathfinder missions, as well as NASA's Office of STEM Engagement.

New Initiatives/Priorities: The FY 2021 budget is the first to include a funding proposal and details associated with NASA's ambitious goal of returning humans to the lunar south pole in 2024 through the Artemis program. The request also unveils a new Moon to Mars campaign that outlines NASA-wide investments in areas that enable follow-on human exploration of Mars. The Space Technology Mission Directorate would remain an independent entity, but as with past budget requests its emphasis would be significantly shifted towards exploration priorities.

The Bottom Line

The NASA request is a bright spot relative other civilian science agencies. The Administration continues its track record of terminating key science missions it knows Congress will ultimately restore and is otherwise largely supportive of the research community's priorities. It remains to be seen if Capitol Hill will view the requested increase to Artemis as a serious proposal or inadequate given the program's ambitious and accelerated timeline.

Proposed Reductions and Terminations

As with prior budgets, the request proposes the elimination of the Astrophysics Division's (APD) Wide Field Infrared Survey Telescope **(WFIRST)** mission and the Earth Science Division's (ESD) Plankton, Aerosol, Cloud, ocean Ecosystem **(PACE)** and Climate Absolute Radiance and Refractivity Observatory **(CLARREO) Pathfinder** missions. The FY 2021 request, for the first time under the Trump Administration, would terminate APD's Stratospheric Observatory for Infrared Astronomy **(SOFIA),** which was previously proposed for elimination by the Obama Administration. Perennial appropriations language from Congress has previously blocked NASA from conducting a Senior Review of SOFIA, and the proposal to terminate the mission outright is sure to draw the ire of its champions on Capitol Hill.

The proposed cut to SMD is attributable to these missions' proposed elimination and reduced funding needs for missions ending their development or operations phases. It is likely that WFIRST, PACE,

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[17] FY 2020 reflects net discretionary funding amounts that rescinded $70 M from FY 2019 unobligated balances in the Science account.

CLARREO Pathfinder, and SOFIA will receive continued funding from Congress given their strong political support.

NASA's **Office of STEM Engagement** is once again proposed for elimination. Congress has pushed back on past attempts to terminate these activities and either restored or increased their funding.

New and Signature Initiatives

The FY 2021 budget request for the first time thoroughly outlines investments across NASA in support of the **Artemis** human exploration program to return humans to the Moon. SMD would contribute to this effort through funding for the **Lunar Discovery and Exploration Program** (LDEP), first established in FY 2019 within the Planetary Science Division (SMD). LDEP would increase 50 percent over its FY 2020 level to $451.5 million in FY 2021. The increased resources would drive continued development of LDEP's Commercial Lunar Payload Services (CLPS) program while supporting a competitive opportunity in FY 2021 for future larger scientific, exploration, and technology payloads to the lunar surface. These payloads would fly on yet-to-be solicited CLPS awardees that include "long-duration rovers that can survive a lunar night and future orbiters that would acquire new key data sets."[18]

While the current request expands on the details associated with Artemis, it also subtly re-emphasizes Mars as an ultimate destination. Towards that end, the budget includes a comprehensive **Moon to Mars campaign**. The new campaign outlines investments NASA is currently supporting or will shortly commence across the Agency that complement or build on activities associated with Artemis. Within SMD, this includes the 2026 launch of a **Mars Sample Return** (MSR) mission and initiating a **Mars Ice Mapper** orbital mission in potential partnership with the Canadian Space Agency. Details on both missions are scant or non-existent. MSR will enter its formulation phase in the summer of this year, and no further information is provided on the Mars Ice Mapper other than its objective to map and profile water ice at the 3-15 meter resolution.

The FY 2021 request embraces the structure of NASA's **Space Technology Mission Directorate** in an apparent departure from the Administration's previous attempts to eliminate and subsume the Directorate's human exploration-oriented activities within a new **Exploration Technology** account. The request notably points out that "Space Technology Mission Directorate is the name of the organization. Exploration Technology is the budget account funding Space Technology Mission Directorate programmatic content."[19] However, details in the request indicate that while the structure of STMD and its longstanding programs remain, its strategy of investing in crosscutting NASA technology gaps would be significantly de-emphasized. For instance, the budget notes that a competition for future **Space Technology Research Institutes** "will target technologies that enable sustainable exploration of the Moon and Mars including a new Lunar Surface Initiative Research Opportunity."[20] Similar language that aligns other longstanding STMD programs to technology gaps associated with Artemis and the Moon to Mars campaign are found elsewhere.

Ongoing Areas of Interest

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[18] https://www.nasa.gov/sites/default/files/atoms/files/fy2021_congressional_justification.pdf
[19] https://www.nasa.gov/sites/default/files/atoms/files/fy2021_congressional_justification.pdf
[20] https://www.nasa.gov/sites/default/files/atoms/files/fy2021_congressional_justification.pdf

The request provides mixed support for most of NASA's **Earth Science Division** (ESD) priorities. Research and analysis would see a slight drop in funding ($25.6 million), but the budget includes new details on implementation of the **Earth Science and Applications from Space 2017 Decadal Survey** (ESAS 2017). ESD intends to initiate Center-led development of the ESAS 2017 top-tier recommended "Designated Observable" mission in one of the four topical areas recommended by the Decadal. ESAS 2017 also recommended NASA establish a technology maturation program, which NASA will execute through a new competitive **Decadal Incubation (DI)** program to be unveiled in FY 2021. The FY 2021 DI program will invest in the Decadal's focus areas of the "Planetary Boundary Layer" and "Surface Topography and Vegetation." As with the previous budget request, SMD would not implement a new "Earth Explorer" class of competitive, PI-led missions that target other key Decadal science goals.

Aside from the proposed cancellations of WFIRST and SOFIA, the request largely maintains **Astrophysics Division** priorities. This includes continued support for development and operations of current missions, a robust increase for APD's Research and Analysis program, and a new Medium Explorer (MIDEX) and Missions of Opportunity call. The budget also includes funding to initiate a new competitive **Astrophysics Probe** mission class in FY 2022 pending recommendation by the ongoing Astronomy and Astrophysics Decadal Survey. Notably, APD would also establish a new small **Pioneer competitive mission class** within the Explorer program. The budget does not provide any further details on timing of a Pioneer competition or its dependence on the Decadal's recommendations.

The **Heliophysics Division** (HPD) would continue development of the Interstellar Mapping and Acceleration Probe (IMAP) mission, and the release of new Solar Terrestrial Probes and Small Explorer (SMEX) with an accompanying Missions of Opportunity competitions. HPD would also sustain implementation of the *Diversify, Realize, Integrate, Venture, Educate* (DRIVE) initiative, although below levels recommended by the most recent Solar and Space Physics Decadal Survey.

The budget largely maintains support for the **Planetary Science Division's** activities separate from those associated with Artemis or the Moon to Mars campaign. Despite congressional backing, PSD would not provide continued investment for the Icy Satellites Surface Technology program.

The Administration would provide $129.9 million, 5 percent below the FY 2019 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 2021. 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.

Source: NASA's FY 2021 Budget Summary and Background Information is available at
https://www.nasa.gov/sites/default/files/atoms/files/fy2021_congressional_justification.pdf.

National Aeronautics and Space Administration
(In thousands)

	FY 2020 Enacted	FY 2021 Request	FY 2020 vs. FY 2021 Request
NASA, total*	**22,559,000**	**25,246,000**	**2,687,000 (11.9%)**
Science	**7,138,900**	**6,306,500**	**-832,400 (11.7%)**
Earth Science	1,971,800	1,768,100	-203,700 (10.3%)
Planetary Science	2,713,400	2,659,600	-53,800 (2%)
Astrophysics	1,306,200	831,000	-475,200 (36.4%)
James Webb Space Telescope	423,000	414,700	-8,300 (2.0%)
Heliophysics	724,500	633,100	-91,400 (12.6%)
Education and Public Outreach (EPO)[21]	45,000	45,600	600 (1.3%)
Aeronautics	**783,900**	**819,000**	**35,100 (4.5%)**
Space Technology	**1,100,000**	**1,578,300**	**478,300 (43.5%)**
Exploration	**6,017,600**	**8,761,700**	**2,744,100 (45.6%)**
Space Operations	**4,140,200**	**4,187,300**	**47,100 (1.1%)**
STEM Engagement	**120,000**	**0**	**-120,000 (100%)**
Aerospace Research & Career Dev.	72,000	0	-72,000 (100%)
Space Grant	48,000	0	-48,000 (100%)
EPSCoR	24,000	0	-24,000 (100%)
Minority University Research and Education Program (MUREP)	36,000	0	-36,000 (100%)
Safety, Security, & Mission Services	**2,913,300**	**3,009,900**	**96,600 (3.3%)**
Construction and Environmental Compliance and Restoration	**373,400**	**539,100**	**165,700 (44.4%)**
Office of Inspector General	**41,700**	**44,200**	**2,500 (6.0%)**

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[21] In keeping with Senate direction and the Administration's request, funding for SMD-wide EPO activities is administered by the Astrophysics Division and included within the Division's budget.

* FY 2020 reflects net discretionary funding amounts that rescinded $70 M from FY 2019 unobligated balances in the Science account.

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) would both be eliminated in the FY 2021 budget proposal.
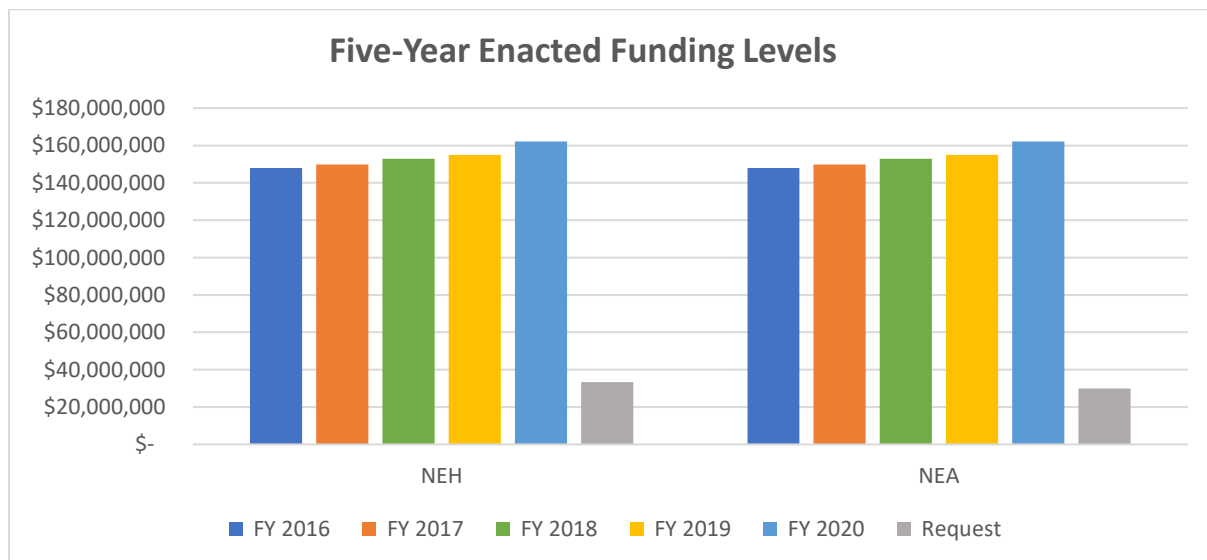
Quick Take: For the third consecutive year, both the National Endowment for the Humanities (NEH) and the National Endowment for the Arts (NEA) would be eliminated under the Administration's budget request. The proposal would fund the NEH at $33.4 million for FY 2021 for an orderly closure of the agency. The NEA would be funded at $30 million for close-out activities. The White House's budget in brief states, "activities funded by NEA/NEH are not considered core Federal responsibilities and make up only a small fraction of the billions spent each year by arts and humanities nonprofit organizations."[22]

Major Cuts/Eliminations: Each agency would be terminated in FY 2021.

New Initiatives/Priorities: None.

The Bottom Line

These proposed eliminations are unlikely to happen. Congress has routinely rebuffed the budget request's proposed eliminations of the NEH and NEA and has either flatly funded the agencies or slightly increased funding levels over the last three fiscal years. For instance, the FY 2020 funding levels for each agency represent the highest levels in a decade. NEH and NEA enjoy broad, bipartisan support in both the House and the Senate.

Five-Year Enacted Funding Levels

Legend: ■ FY 2016 ■ FY 2017 ■ FY 2018 ■ FY 2019 ■ FY 2020 ■ Request

Proposed Reductions and Terminations

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[22] https://www.whitehouse.gov/wp-content/uploads/2020/02/budget_fy21.pdf

Complete terminations of both agencies are proposed in the FY 2021 budget request. The budget request would provide limited funding to both agencies to cover financial obligations of prior awards and the necessary staff oversight and salaries, as well as other related expenses, for closure.

Source: NEH and NEA FY 2020 Budget Requests are available at: https://www.whitehouse.gov/wp-content/uploads/2020/02/budget_fy21.pdf.

National Endowment for the Humanities and National Endowment for the Arts
(in thousands of $)

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
NEH, total	162,250	33,400	-128,850 (79.4%)
NEA, total	162,250	30,000	-132,50 (81.5%)

National Science Foundation

NSF would be funded at $7.74 billion in FY 2021, a 6.5 percent or $537 million cut below the FY 2020 enacted level.
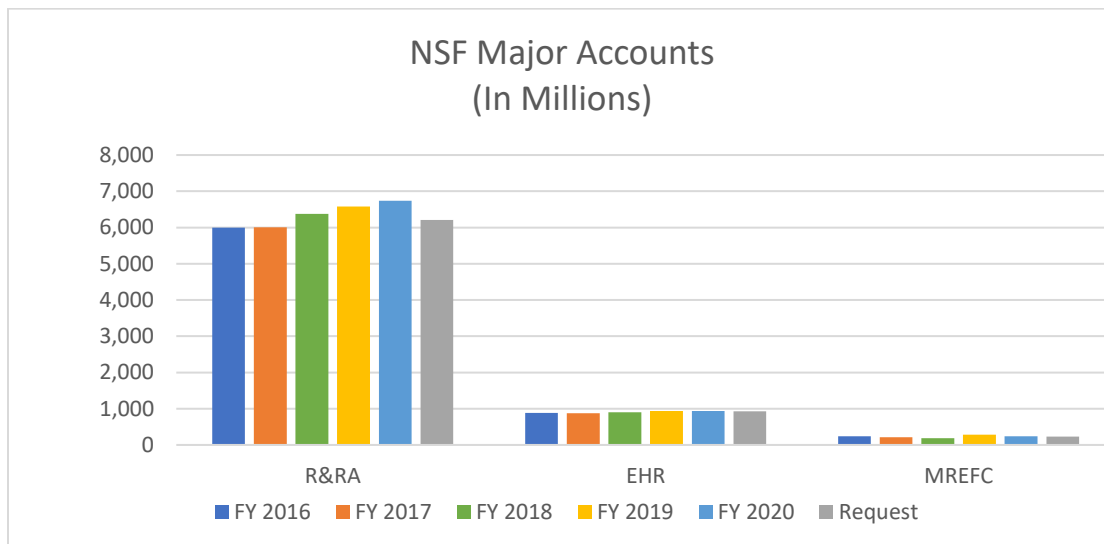
Quick Take: As in previous years, the budget request proposes deep cuts to many parts of NSF. However, the request would protect or expand investments in Administration priority areas such as AI, quantum, STEM education, and mid-scale infrastructure. Overall Research and Related Activities would be cut by 7.8 percent while Education and Human Resources would be relatively flat.

Major Cuts/Eliminations: Most NSF Directorates would face cuts from between 3 percent to 14 percent below FY 2019 levels (individual directorate funding is not yet available for FY 2020). Core research as well as several programs focused on undergraduate education would face the brunt of the reductions.

New Initiatives/Priorities: The request proposes major growth to AI and quantum information science while identifying several new or expanded initiatives such as Coastlines and People, Spectrum Innovation Initiative, and Strengthening American Infrastructure. The request would also keep flat or grow all the Big Ideas for Future Investment and protect facilities investments.

The Bottom Line

The budget request is far out of step with congressional support for NSF and will likely be dismissed by Congress. While quantum, AI, and other Big Idea investments are generally supported, Congress has shown concern in previous years about balance between the Big Ideas and core funding. With this budget request showing the starkest disparity yet between these two, expect intense questions about NSF's ability to support both.

**NSF Major Accounts
(In Millions)**

Legend: ■ FY 2016　■ FY 2017　■ FY 2018　■ FY 2019　■ FY 2020　■ Request

New and Signature Initiatives

Industries of the Future

New for the FY 2021 budget request is a specific focus on Industries of the Future including AI, quantum information science, wireless research, advanced manufacturing, and biotechnology. While some of these efforts overlap with existing NSF efforts through the Big Idea Ideas for Future Investment (see below) or previous Obama-era initiatives, they are called out in their own sections for the first time. NSF plans include:

- **Artificial Intelligence** (AI): NSF plans to increase the budget for AI by 87 percent over the FY 2019 level to $868 million in FY 2021 for AI research, workforce development, access to data and computing infrastructure, and public-private partnerships. Much of this additional funding would go to support the AI Institutes that are currently under competition, as well as an additional round of institutes to be competed in FY 2021. NSF would expand the NSF Research Traineeships (NRT) to include a new track on AI training. In addition to these new investments, NSF plans to continue its existing activities. NSF would continue to expand outreach to new federal agencies and other partnerships for engagement in AI institutes as well as continuing three-year partnerships with DARPA and Amazon for the Real Time Machine Learning (RTML) and Fairness in AI programs that began in FY 2019. Every directorate is planning major increases to their AI funding, with about 60 percent of the proposed budget coming from the Computer and Information Science and Engineering (CISE) directorate. 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 Quantum Information Science would increase by 113 percent over the FY 2019 level to $226 million in FY 2021. Funding would support the Quantum Leap Challenge Institutes currently under competition as well as a new round to be competed in FY 2021. In addition, NSF is exploring numerous activities such as Faculty Summer Schools, Research Coordination Networks, Dear Colleague Letters on quantum sensors, a meta program in Quantum Simulators, Research Experiences for Undergraduates (REU) sites related to quantum, and support for teams focused on quantum interconnects. Several directorates are participating in this effort, but the vast majority (80 percent) of the funding would be through the Directorate for Mathematical and Physical Sciences (MPS).

- **Advanced Wireless Research – Spectrum Innovation Initiative (SII)**: NSF proposes $17 million for a new effort focused on innovations in electromagnetic spectrum management and utilization. SII would include the creation of new National Radio Dynamic Zones ($9 million) for testing of dynamic spectrum utilization, establish a new National Center for Wireless Spectrum Research ($5 million), and enhance other education and integration activities ($2.6 million). This new initiative would connect to existing efforts such as the Platforms for Advanced Wireless Research (PAWR) and Spectrum and Wireless Innovation enabled by Future Technologies (SWIFT) programs.

- **Advanced Manufacturing**: Funding for Advanced Manufacturing would stay relatively flat in FY 2021, growing 2 percent over the FY 2019 level to $303 million. This investment would continue existing activities across many programs such as the Emerging Frontiers in Research and Innovation (EFRI) topics in distributed chemical manufacturing and eliminating end of life plastics, Engineering Research Centers, core programs, and industry partnership mechanisms.

- **Biotechnology**: While biotechnology is called out as an industry of the future, the budget request does not break out proposed investments in this area. Several individual directorates report their levels of funding, which would be essentially flat at $230.75 million (up 0.2 percent over FY 2019 levels). The only significant increase would come from the Biological Sciences Directorate (BIO), which plans to increase investments by 7 percent to $96 million in synthetic

biology, genomics, bioinformatics, other biotechnology, and training. This increase would be offset by proposed declines in most other directorates.

Big Ideas for Future Investment

The FY 2021 budget request continues NSF's focus on the Big Ideas. These themes were first introduced by Director France Córdova in May 2016 and have been the subject of several major funding opportunities since FY 2018. The Big Ideas include:

- Research 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)
    - The Quantum Leap: Leading the Next Quantum Revolution (QL)
    - Understanding the Rules of Life: Predicting Phenotype (URoL)
    - Navigating the New Arctic (NNA)
- Process Ideas
    - Mid-Scale Research Infrastructure
    - NSF 2026: Seeding Innovation
    - 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 again provide at least $30 million in "Stewardship" funding for each of the **research ideas**, which is the same amount as spent in FY 2019. However, several Big Ideas would see growth in these stewardship funds, with HDR and FW-HTF receiving $45 million and QL receiving $50 million. As in previous years, this stewardship funding for each Big Idea would be under a lead directorate, but the initiatives would continue to be led by cross-directorate working groups that would determine specific thrusts and investments. More information on plans for each research big idea is below:

- **Harnessing the Data Revolution (HDR)**: Total funding for HDR including stewardship investments and foundational activities would be $157 million, 10 percent below the FY 2019 level. The decrease reflects CISE, EHR, ENG, GEO, MPS, and SBE all decreasing their foundational activities. $33 million of the $45 million stewardship investment would support Data-Intensive Research in Science and Engineering (DIRSE) institutes, which are currently in a pilot conceptualization phase with planned phase two convergence institutes to be awarded in FY 2021. NSF also plans to establish a DIRSE coordination hub in FY 2021. The remaining funding would be split between Foundations of Data Science ($6 million) supporting TRIPODS and Education and Workforce Development ($6 million) for Data Science Corps.
- **Future of Work at the Human Technology Frontier (FW-HTF)**: Total funding would rise to $162 million, 5 percent above the FY 2019 level based on increased funding for stewardship activities. All participating directorates plan to lower their foundational activities, with overall efforts falling 5.5 percent below the FY 2019 level. FY 2021 stewardship activities are expected to include planning and coordination grants to set the stage for future centers or institute-sized grants in FY 2021 and beyond.
- **Navigating the New Arctic (NNA)**: Navigating the New Arctic would see its funding fall to $41 million, 8 percent below the 2019 level. This decrease is mainly driven by proposed reductions to Engineering foundational activities (down 60 percent). NSF plans to issue another solicitation

for NNA in FY 2021 as well as continuing coordination with external stakeholders and other federal agencies.

- **Quantum Leap (QL):** Funding would increase 44 percent to $84 million. Foundational activities in QL are primarily supported by MPS, which is expected to increase its investment by 33 percent above the FY 2019 level. FY 2021 funding would support awards made under already released QL solicitations such as Q-AMASE-i and Quantum Leap Challenge Institutes. QL is one part of NSF's larger proposed investment in Quantum Information Science as noted above.
- **Understanding the Rules of Life (URoL):** Funding would stay relatively flat at $139 million, 0.7 percent above the FY 2019 level. URoL is expected to run through FY 2023. While most directorates plan small reductions in their foundational investments, MPS expects to grow its funding by 36 percent to $37 million. In FY 2020, NSF expects to release a URoL Research Networks solicitation that will continue in FY 2021. A new solicitation is also expected to support convergent approaches for the discovery of scale-invariant rules that govern living systems.
- **Window on the Universe (WoU):** Funding would grow to $53 million, 11 percent above the FY 2019 level. In addition to the stewardship investment, MPS plans to grow its foundational activities by 19 percent in FY 2021 while the Office of Polar Programs (OPP) would add a new small contribution. WOU is anticipated to be a 10-year effort. For FY 2021, NSF plans to continue the WoU program announced in FY 2018 as well as support current and future large observing facilities.

The request would provide $70 million for the **NSF Convergence Accelerators** (CA), 69 percent over the FY 2019 level and $10 million more than the FY 2020 budget request proposed. FY 2021 activities would include continued funding of previously awarded projects from the completed FY 2019 competition and the upcoming FY 2020 competition, as well as funding for additional tracks to be competed in FY 2021. As in recent months, NSF will look to develop new tracks through community workshops and engagement, roundtables, and analysis of emerging advances related to the Big Ideas. CA would continue to focus on use-inspired research with directed deliverables and translational approaches.

In addition to the funding proposed for the research ideas, NSF would provide investments for each of the process ideas:

- **Mid-Scale Research Infrastructure (Mid-Scale RI):** $118 million would be provided in FY 2021, 96 percent over the FY 2019 level. $98 million of this funding would come from the mid-scale initiative itself while EPSCoR plans an additional $20 million investment for projects in EPSCoR jurisdictions. NSF again proposes to fund larger mid-scale RI-2 efforts (those costing over $20 million) in the Major Research Equipment and Facilities Construction (MREFC) account, while leaving the smaller RI-1 program (for awards between $6 million and $20 million) under the Office of Integrative Activities (OIA). Of the funding available to any jurisdiction, $65 million would be provided for RI-2 and $33 million would be provided for RI-1. NSF intends to fund seven to nine new awards in RI-1 over FY 2021 and FY 2022, while the RI-2 funding will go to projects under the current midscale competition that is expected to produce three to six RI-2 awards.
- **Growing Convergence Research (GCR):** GCR funding would decline slightly to $15.2 million in FY 2021, 3.7 percent below the FY 2019 level. This funding would continue to be used to identify compelling convergent research challenges and fund exploratory science, engineering, and workforce efforts to tackle these challenges. NSF expects to fund up to four capacity-building activities in emerging convergence research themes at up to $150,000 each. NSF will also provide a new round of exploratory grants for six to eight new research collaborations up to

$600,000 per year each. NSF is also looking to recruit additional experts to serve on a College of Reviewers (CoR) to ensure proper merit review for convergence research.
- **NSF INCLUDES**: INCLUDES funding would fall to $18.92 million in FY 2021, a decrease of 6.3 percent below the FY 2019 level, to continue efforts to spur new collaborative paradigms for meeting broadening participation goals. Funding would support ongoing awards made under INCLUDES as well as new Alliance awards.
- **NSF 2026**: See above under Proposed Reductions and Terminations

Coastlines and People
The Geosciences Directorate (GEO) plans to grow this program, which began in FY 2019 to $15 million, a 150 percent increase. NSF plans new research hubs to bring together teams of researchers for multidisciplinary efforts. Overall CoPe will continue its focus on coastline hazards, environmental variability, and earth system prediction.

Strengthening American Infrastructure
The Social, Behavioral, and Economic Sciences (SBE) Directorate plans a new $6 million effort to connect social scientists with infrastructure efforts to enable better infrastructure planning with full consideration of how people will use that infrastructure.

Proposed Reductions and Terminations

Outside of areas related to Industries of the Future, the Big Ideas, and facilities investments, many NSF programs would see reductions. As in previous budget requests, these reductions would include Obama-era initiatives that were already slated to wind down, CAREER awards, and several education programs. NSF is also proposing to roll back congressional increases provided in FY 2019 and FY 2020 appropriations. Note that apart from major cross-cutting initiatives and certain STEM programs, the budget request provides no detail about how or whether individual divisions would apply reductions across their core activities.

Semiconductors and Microelectronics
Led by the Engineering Directorate (ENG), the request would provide $84 million to support fundamental research on the concepts, materials, devices, circuits, and platforms needed to advance semiconductor and microelectronic technologies. Although highlighted as a "strategic research investment," funding across NSF for semiconductor and microelectronic research would be reduced by 9 percent from the FY 2019 level. The request states that outcomes of this research would benefit microelectronics design, architecture, and fabrication, as well as high-performance computing and the broader Industries of the Future.

Understanding the Brain (UtB)
Brain research would be supported at $30.14 million in FY 2021, down 38.9 percent from the FY 2019 level. This funding remains following a planned sunset of the UtB initiative in FY 2020. No detail is provided on specific programs, but the Biological Sciences Directorate would continue to be the top supporter of research in this area at $17.2 million (down 31 percent) with Mathematical and Physical Sciences and Social, Behavioral, and Economic Sciences also reducing their contributions to $8 million and $5 million respectively. Other directorates did not provide a breakdown of their funding in this area.

Additional Proposed Reductions (all comparisons are to FY 2019 levels)

- **CAREER:** Down 30 percent to $254 million.
- **Research Experiences for Undergraduates (REU):** Down 19 percent to $74 million.
- **Improving Undergraduate STEM Education (IUSE)**: Down 13 percent to $88 million.
- **Hispanic Serving Institutions Program (HSI):** Down 64 percent to $14 million as NSF proposes to reverse large increases provided by Congress in recent appropriations bills. Congress appropriated $45 million for HSIs in FY 2020 appropriations.
- **Robert Noyce Scholarship Program:** Down 41 percent to $44 million. Congress provided $67 million in FY 2020 appropriations.
- **Advancing Informal STEM Learning (AISL):** Down 11 percent to $56 million.
- **Alliances for Graduate Education and the Professoriate:** Down 11 percent to $7 million.
- **Long-Term Ecological Research Sites:** Down 16 percent to $28 million.
- **STEM + Computing Partnerships (STEM + C):** Down 100 percent as funding is shifted to Computer Science for All (CSforAll), which previously was funded as part of STEM + C and whose activities would continue at essentially a flat level of $19 million. Inclusive of the new CSforAll funding, overall funding for these activities would fall 70 percent.
- **NSF 2026:** NSF is proposing no funding for this initiative, which was funded at $6.5 million in FY 2019 and recently made prize awards to seven winners to further explore their ideas for potential new big ideas.

Ongoing Areas of Interest

Cybersecurity
The Secure and Trustworthy Cyberspace (SaTC) program would be supported at $125 million in FY 2021, 7.1 percent below the FY 2019 level. Numerous activities are outlined for FY 2021:
- NSF expects to issue a revised SaTC solicitation for FY 2021 with emphasis on protections for increasingly complex and connected devices, as well as privacy related to smart infrastructure and the internet of things.
- NSF plans to fund workshops to broaden the cybersecurity research community across disciplines. In particular, a series of workshops will explore cybersecurity related to quantum computing.
- NSF plans to support two Research Coordination Networks: one related to detecting deep fakes and misinformation in cyberspace and the other to foster industry-academic partnerships.
- Funding for the Cybercorps Scholarships for Service (SFS) program would decline 6 percent below its FY 2019 level to $52 million. SFS would prioritize K-12 education investments and encourage awardees to engage in state level cybersecurity workforce efforts. NSF also plans to support new approaches to re-skilling, cooperative learning, and other practice-oriented models. The budget request additionally notes that NSF is interested in supporting efforts around underrepresented populations and veterans.

Innovation Corps (I-Corps^TM)
The I-Corps program would be funded at $31 million, 4 percent below the FY 2019 level. NSF plans to start a new phase of I-Corps beginning in FY 2020. The new phase will grow the number of teams supported and expand partnerships with other agencies and regional organizations. In addition, NSF plans to create new I-Corps Hubs, which are currently under competition. The Hubs replace previous program elements Nodes and Sites and are intended to have more integrated and sustained operations. NSF continues to be interested 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
Education Core Research would see major increases in the budget request, growing 132 percent to $157 million with a continued effort towards building capacity for future-oriented STEM education research. Advanced Technological Education (ATE) would also see a substantial 7 percent boost to $71 million. Beyond these programs and those discussed above, many NSF STEM programs would see relatively small changes. Broadening participation programs such as the Louis Stokes Alliances for Minority Participation (LSAMP) and Advancement of Women in Academic Science and Engineering Careers (ADVANCE) programs would both be reduced 5 percent, to $44 million and $17 million, respectively. In contrast, NSF's Discovery Research preK-12 (DRK-12) would grow 2 percent to $90 million.

Graduate Education
NSF Research Traineeships (NRT) would grow 14 percent to $62 million. NSF intends to support new NRT tracks in AI and AI engineering and to initiate a new effort on evaluation of NRT investments. Overall, NSF expects to fund 17-20 traineeships and award $8 million for research on graduate education through the Innovations in Graduate Education (IGE) program. In contrast, the Graduate Research Fellowships Program (GFRP) would be down 3 percent to $275 million. Funding would support 1,600 new fellows, down from 1,976 in FY 2019.

Programs funded by H-1B Nonimmigrant Petitioner Fees
These programs are expected to increase as NSF revenue from H-1B fees is projected to be $157 million, 5 percent above FY 2019 revenue and on par with the FY 2020 estimate. In addition, the request again proposes to double the H1-B fee that funds these programs and use the extra funding to "prepare American workers for jobs that are currently being filled by foreign workers."[23] If approved, the request estimates that NSF's S-STEM program would get a smaller percentage of the fee, but absolute amount of funding would remain the same. This proposal would have to be approved through changes to the law authorizing these H1-B fees.
   o **NSF Scholarships in STEM (S-STEM):** Up 2.6 percent to $118 million.
   o **Innovative Technology Experiences for Teachers and Students (ITEST)**: Up 15 percent to $34 million

Source: The full NSF FY 2021 Budget Request can be viewed at:
https://www.nsf.gov/about/budget/fy2021/toc.jsp.

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[23] EHR- page 15: https://www.nsf.gov/about/budget/fy2021/pdf/33_fy2021.pdf

National Science Foundation

(in millions of $)

	FY 2019 Actual	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2019	FY 2021 Request vs. FY 2020
NSF, total	**8,150.23**	**8,278.33**	**7,741.40**	**-408.83 (5.0%)**	**-536.93 (6.5%)**
Research and Related Activities	**6,578.14**	**6,737.20**	**6,213.02**	**-365.12 (5.6%)**	**-524.18 (7.8%)**
Biological Sciences	783.75	TBD	704.95	-78.80 (10.0%)	TBD
Computer and Information Science and Engineering	985.12	TBD	1,062.40	77.28 (7.8%)	TBD
Engineering	991.15	TBD	909.78	-81.37 (8.2%)	TBD
Geosciences	969.88	TBD	836.61	-133.27 (13.7%)	TBD
Mathematical and Physical Sciences	1,490.61	TBD	1,448.32	-42.29 (2.8%)	TBD
Social, Behavioral, and Economic Sciences	271.17	TBD	246.84	-24.33 (9.0%)	TBD
International Science and Engineering	49.00	TBD	44.01	-4.99 (10.2%)	TBD
Office of Polar Programs	488.68	TBD	419.78	-68.90 (14.1%)	TBD
Integrative Activities	547.31	TBD	538.73	-8.58 (1.6%)	TBD
US Arctic Research Commission	1.48	TBD	1.60	0.12 (8.1%)	TBD
Education and Human Resources	**934.53**	**940.00**	**930.93**	**-3.60 (0.4%)**	**-9.07 (1.0%)**
Major Research Equipment and Facilities Construction	**285.27**	**243.23**	**229.75**	**-55.52 (19.5%)**	**-13.48 (5.4%)**
Agency Operation and Award Management	**332.69**	**336.90**	**345.64**	**12.95 (3.9%)**	**8.74 (2.6%)**
National Science Board	**4.32**	**4.50**	**4.21**	**-0.11 (2.6%)**	**-0.29 (6.4%)**
Office of Inspector General	**15.28**	**16.50**	**17.85**	**2.57 (16.8%)**	**1.35 (8.2%)**

*The amounts shown for FY 2019 actual and FY 2020 enacted are taken from the NSF budget request.

**FY 2020 funding for individual directorates and offices has not yet been determined.

The discretionary programs within USDA's National Institute of Food and Agriculture would see an increase of $64 million (4.2%) compared to FY 2020 enacted level. USDA's Agricultural Research Service would be down $189 million (-11.8%).
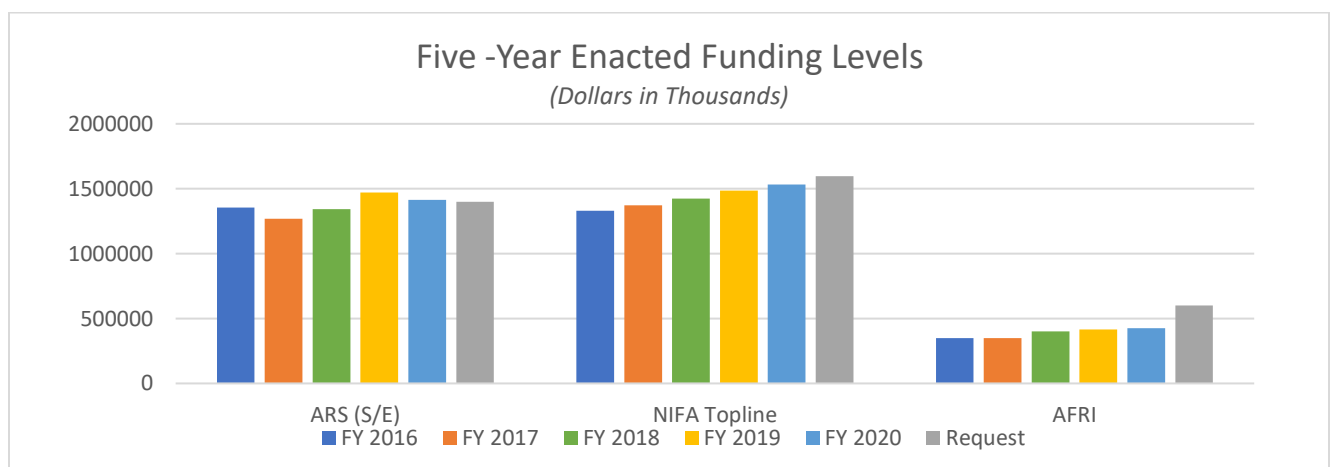
Quick Take: The big winner in the budget request is NIFA's Agriculture and Food Research Initiative, which would be increased $175 million to $600 million. $100 million of this increase would go toward investments in artificial intelligence, machine learning, and predictive science across the three AFRI programs. Unlike previous budget requests, ARS would not see any lab closures, but specific research projects are proposed for elimination.

Major Cuts/Eliminations: NIFA capacity funding programs (Hatch, McIntire-Stennis, Smith-Lever 3(b) and 3(c)) would all be funded at a lower level than FY 2020. There are numerous programs within NIFA proposed for elimination, including aquaculture research and Capacity Building for Non-Land Grant Colleges of Agriculture. As mentioned above, some ARS extramural research projects are targeted for elimination.

New Initiatives/Priorities: In addition to the proposed increase for AFRI, $102.6 million would go towards the ARS National Bio and Agro-Defense Facility—this includes a $15 million increase for operations and maintenance.

The Bottom Line

Similar to the FY 2020 budget request, champions for competitive research will welcome the significant increase to AFRI. However, the proposed reductions to important capacity funding and the proposed elimination of specific ARS projects do not make agricultural research a winner overall. Congress is likely to restore the proposed funding cuts, but budget constraints may limit any large funding increases for FY 2021.

Five -Year Enacted Funding Levels
(Dollars in Thousands)

Proposed Reductions and Terminations

National Institute of Food and Agriculture

Numerous programs throughout NIFA would receive decreases. Specifically, the budget request follows a similar pattern as previous requests and would again include decreases for **Smith-Lever (b) and (c), Hatch Act, and McIntire-Stennis Cooperative Forestry**. The **Hispanic-Serving Institutions Education Grants Program** would be funded at $9.2 million, a decrease of $2 million.

Unlike past budget requests wherein significant decreases were proposed for the **Sustainable Agriculture Research Education and Extension (SARE)** program, SARE would be funded at the FY 2020 level of $37 million. **Crop Protection and Pest Management** activities would also receive flat funding; last year the program was proposed for elimination. While these programs fared better in the FY 2021 request, several programs are proposed for elimination, including Animal Health and Disease Research, Section 1433; Global Change, UV-B Monitoring; **Aquaculture Research**; Potato Research; Alfalfa and Forage Research; Aquaculture Centers; Supplemental and Alternative Crops; Sun Grants**; Capacity Building for Non-Land Grant Colleges of Agriculture; Research Equipment Grants**; Multicultural Scholars, Graduate Fellowship and Institution Challenge Grants; Secondary and 2-year Post-Secondary Education; Veterinary Services Grant Program; Food Animal Residue Avoidance Database; and Food and Agriculture Service Learning. No funding is included for the **Genome to Phenome** program, to which Congress appropriated $1 million in FY 2020.

Agricultural Research Service
The budget request would include an 11.8 percent reduction for ARS discretionary programs compared to the FY 2020 enacted level. Unlike previous years in which numerous ARS facilities were proposed for elimination, no proposed closures are contained in this year's request. Notably, the **Human Nutrition Research** program, which has been targeted for significant cuts in recent years, would receive $90 million, close to its appropriated FY 2020 level of $93 million. While other ARS research areas would receive decreases, the **Livestock Protection** program area would see a $4 million increase. Included in the budget request are **multiple project eliminations or redirections within the various program areas**.

International Food Aid
Consistent with the Trump Administration's continued focus on domestic priorities, the FY 2021 budget request would again propose the elimination of the McGovern-Dole International Food for Education and Child Nutrition Program. Congress has ensured funding for this popular program continues.

New and Signature Initiatives

Agriculture and Food Research Initiative
AFRI is once again directed to focus investments in three areas: sustainable agricultural systems (SAS) ($140 million—FY 2021 RFA expected in January 2021); foundational and applied science ($400 million—FY 2021 RFA expected July 2020); and education and workforce development ($60 million—FY 2021 RFA expected July 2020). New in FY 2021 is the proposed investment of $100 million toward artificial intelligence, machine learning, and predictive science across AFRI's three funding opportunities. Support for new investigators, plant and animal breeding, emerging advanced technologies (gene editing, robotics), climate adaptation research, climate-smart farming, agricultural biosecurity, food and agricultural microbiomes, pollinator health, and fostering interagency connections are all highlighted within the AFRI budget request.

Agricultural Research Service
As noted earlier, the FY 2021 budget request would provide $102.6 million for the ARS National Bio and Agro-Defense Facility, which will replace the DHS Plum Island Animal Disease Center. In addition, there

is $35 million proposed for new initiatives in precision agriculture, artificial intelligence, long-term agroecosystems research, and managing excess water and controlling erosion.

Source: USDA's FY 2021 Budget Summary and Background Information is available at https://www.usda.gov/sites/default/files/documents/usda-fy2021-budget-summary.pdf and USDA budget explanatory notes can be found at https://www.usda.gov/our-agency/about-usda/budget.

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

	FY 2020 Enacted	FY 2021 Request	FY 2021 Request vs. FY 2020
Agricultural Research Service (ARS) (Discretionary)	1,607,066	1,417,970	-189,096 (11.8%)
National Institute of Food and Agriculture (Discretionary)	1,532,000	1,596,017	64,017 (4.2%)
AFRI	425,000	600,000	175,000 (41.2%)
Hatch Act	259,000	243,238	-15,762 (6.1%)
Smith-Lever Act 3(b) and 3(c)	315,000	299,430	-15,570 (4.9%)
McIntire-Stennis	36,000	28,867	-7,133 (19.8%)
Food Safety and Inspection Service (FSIS-Discretionary)	1,054,344	1,092,405	38,061 (3.6%)
Animal and Plant Health Inspection Service (APHIS-Discretionary)	1,045,000	1,035,562	-9,438 (0.9%)

U.S. Geological Survey

The president's FY 2021 budget request includes $971.2 million in discretionary funding for the U.S. Geological Survey (USGS), which would be a reduction of $299.8 million (23.6%) compared to the FY 2020 enacted level.
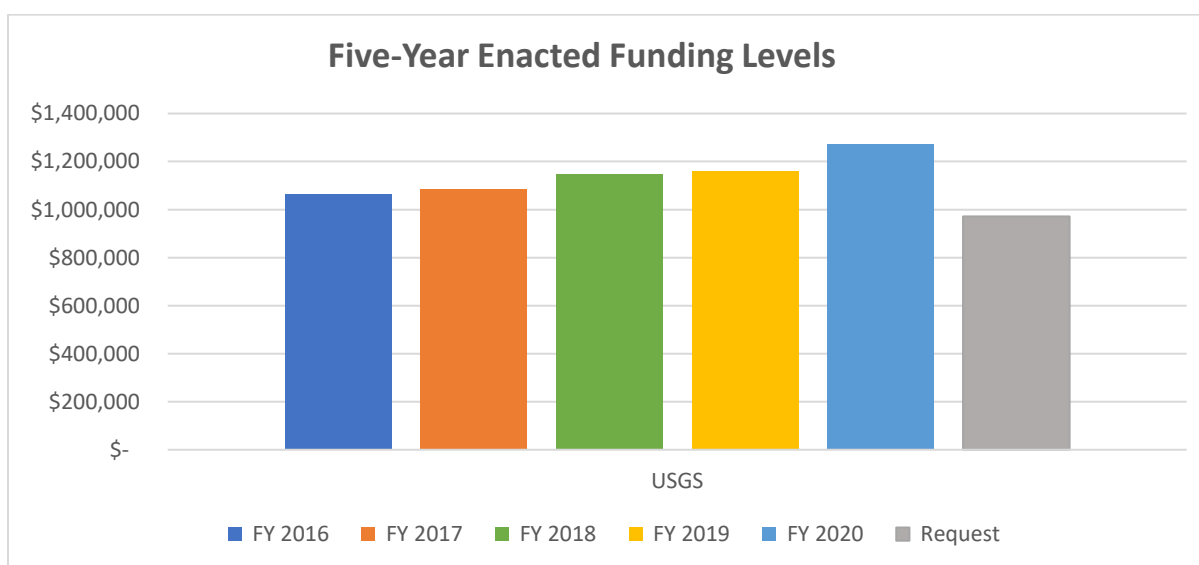
Quick Take: The request would substantially cut USGS programs, with the level of cuts even higher than proposed in FY 2020. The Administration again proposed significant reorganization and consolidation of the Survey though Congress rejected such changes in the FY 2020 enacted appropriations.

Major Cuts/Eliminations: As in President Trump's previous requests, the budget proposes eliminating or reducing programs that provide external funding, such as the Water Resources Research Act program, which supports the Water Resources Research Institutes. The request also again proposes drastic cuts to the Climate Adaptation Science Centers.

New Initiatives/Priorities: The request would restructure and consolidate seven existing mission areas into five and reshuffle programs within many of the mission areas. The request would also establish a Chief Scientist position to provide scientific guidance to USGS leadership across mission areas.

The Bottom Line

The extent of proposed topline cuts are even more extreme than in the prior Trump Administration budget requests. Extramural programs are targeted for dramatic cuts or elimination, although Congress will likely ensure funding for signature programs like Water Resources Research Institutes. While authorizers have allowed restructuring of USGS mission areas in prior years, it's likely they will not be satisfied with the justifications provided.

Five-Year Enacted Funding Levels

Legend: FY 2016, FY 2017, FY 2018, FY 2019, FY 2020, Request

Proposed Reductions and Terminations

The president's FY 2021 budget request proposes reductions and terminations to many of the same signature USGS extramural programs that were included in the Administration's last three budget requests. However, these programs typically receive bipartisan support because of the geographic distribution of their activities and in FY 2020 many of these programs saw significant increases.

As part of the proposed reconfiguration, the **Climate Adaptation Science Centers** would move from the Land Resources mission area to the Ecosystems mission and become part of a broader **Climate Adaptation Science Center** sub activity that would also include **Climate Research and Development**. Though Congress increased enacted funding for the Climate Adaptation Science Centers by over 50 percent to $38.3 million in FY 2020 to support the eight existing centers and a new Midwest center, the president's FY 2021 request appears to fund a single center at $6.4 million. This would be an 83 percent cut and just about half of what the Administration requested last year.

The **Cooperative Research Units**, funded at $24 million in FY 2020, would be eliminated. The **Water Resources Research Act Program**, funded at $10 million in FY 2020, would also be eliminated.

New and Signature Initiatives

This budget request would restructure the agency generally in the same way as was proposed in last year's request. The request proposes restructuring all USGS mission areas, except for Natural Hazards, Science Support, and Facilities. The request would consolidate the programs from the **Environmental Health** and **Land Resources** mission areas into **Ecosystems** and **Core Science Systems** and would eliminate funding for the Environmental Health programs.

Ongoing Areas of Interest

As in previous years, the budget request prioritizes the Administration's focus on energy and critical mineral security. While most programs would see staggering cuts, the **Energy and Mineral Resources** mission area, proposed to be funded at $91.2 million, would essentially stay flat. The 19 percent cut to the overarching **Energy, Minerals, and Environmental Health** mission area reflects the requested elimination of Environmental Health. The **Mineral Resources** program would include level funding of $10.6 million for the **Earth Mapping Resources Initiative** (Earth MRI) for topographic, geological, and geophysical mapping to better understand the subsurface and characterize U.S. mineral resources, particularly critical minerals. The request notes that USGS would work with DOE on research and development on geological energy resources and critical minerals.

Within the **Natural Hazards** program, the budget request would provide $60.3 million for the **Earthquake Hazards** program, a 29 percent decrease compared to the FY 2020 enacted level. The FY 2020 budget request includes $8.5 million for capital investment, operations, and maintenance of the **ShakeAlert Earthquake Early Warning** system for the West Coast, which would be a 67 percent cut compared to FY 2020. The request would cut the **Global Seismographic Network** down by 24.5 percent. The request notes that the Earthquake Hazards program would anticipate providing over $12 million in research grants and cooperative agreements to universities and other entities in 2020, though last year the request said at least $20 million would be provided.

Within the **Ecosystems** account, the **Invasive Species** program would be moved into a new **Biological Threats Research Program**, along with the **Fisheries** and **Wildlife** programs.

Funding for **Core Science Systems** would increase to accommodate transfers from Land Resources, including $85.9 million from the **National Land Imaging Program**. Within this program, **Landsat** would continue to work with NASA to further develop the Landsat 9 ground system for an FY 2021 launch, though the specific funding level is not listed. Additionally, USGS, in coordination with the **3D Elevation Program**, would continue collection of high-resolution light detection and ranging (lidar) elevation data to have national coverage by 2025. The **National Cooperative Geological Mapping Program** would decrease 37 percent from $34.4 million down to $21.8 million.

Source: USGS's FY 2021 Budget Justification can be found at
https://www.doi.gov/sites/doi.gov/files/uploads/fy2021-usgs-budget-justification.pdf.

U.S Geological Survey
(in thousands of $)

	FY 2020 Enacted*	FY 2021 Request	FY 2021 Request vs. FY 2020
USGS, total	1,270,957	971,185	-299,772 (23.6%)
Natural Hazards	170,870	137,999	-32,871 (19.2%)
Earthquake Hazards	84,903	60,310	-24,593 (29.0%)
Global Seismographic Network	7,153	5,397	-1,756 (24.5%)
Ecosystems	170,544	127,337	-43,207 (25.3%)
National and Regional Climate Adaptation Science Centers†	38,335	9,776	-31,953 (83.4%)
Land Resources	166,274	0	-166,274 (100.0%)
Energy, Minerals, and Environmental Health‡	113,536	91,181	-22,355 (19.7%)
Water Resources	234,120	180,809	-53,311 (22.8%)
Water Resources Research Act Program	10,000	0	-10,000 (100.0%)
Core Science Systems	137,902	212,049	74,147 (53.8%)
Science Support	96,828	94,173	-2,655 (2.7%)
Facilities	180,883	127,637	-53,246 (29.4%)

*The amounts shown for FY 2020 Enacted and the mission area structure are taken from the H.R. 1865, *Further Consolidated Appropriations Act 2020 and Conference Report.*
†In the request, this program would move from the Land Resources Mission Area into Ecosystems.

‡The budget request lists this as "Energy and Mineral Resources" and eliminates Environmental Health.

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

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

- o NIOSH – National Institute for Occupational Safety and Health
- o HRSA – Health Resources and Services Administration
- o CHGME – Children's Hospitals Graduate Medical Education
- o CMS – Centers for Medicare and Medicaid Services
- o ACL – Administration for Community Living
- o ERCs – Education and Research Centers
- o CDC – Centers for Disease Control and Prevention
- o SAMHSA – Substance Abuse and Mental Health Services Administration
- o TANF – Temporary Assistance for Needy Families
- o ACA – Patient Protection and Affordable Care Act
- o ASPR – Assistant Secretary for Preparedness and Response
- o SNS – Strategic National Stockpile
- o MCMs – Medical Countermeasures
- o 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
- 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 Transportation (DOT)

- FRA – Federal Railroad Administration
- FWS – Federal Work-Study
- RE&D – Research, Engineering, and Development
- FAA – Federal Aviation Administration
- FMCSA -Federal Motor Carrier Safety Administration
- MARAD – Maritime Administration
- FTA – Federal Transit Authority
- FHWA – Federal Highway Administration
- NHTSA – National Highway Traffic Safety Administration
- PHMSA – Pipeline Hazardous Materials Safety Administration

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
- 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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