



FY 2022 Priorities

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House Appropriations Subcommittee on Energy and Water Development
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On behalf of the 10,000 men and women of the American Nuclear Society, I am pleased to provide our recommendations for FY 2022 appropriations levels for nuclear research, development and demonstration programs under the Subcommittee's jurisdiction.

The American nuclear community is grateful to Congress for its continued, bipartisan support for federal investments to sustain the existing nuclear fleet as well as accelerate the near-term development and deployment of new nuclear energy technologies. Our recommendations are aligned toward a commercial scale-up of advanced nuclear reactors in the 2030 timeframe that 1) supports U.S. clean energy and climate objectives; 2) maintains U.S. leadership in an international marketplace increasingly influenced by Russia and China, and 3) creates hundreds of thousands of stable, high wage jobs.

Our FY 2022 recommendations build on the strong funding levels Congress has appropriated for programs important to the U.S. nuclear community in FY 2021. This year, we do not have the benefit of reviewing the administration's detailed budget request, and as such, reserve the right to amend our recommendations once the request is released.

It is important to recognize that while R&D investments are necessary for the future of U.S. nuclear technology, congressional appropriations alone are not sufficient for success. The new leadership of DOE in this administration must also develop and implement a coherent, strategic vision for how the Department will support and enable the commercialization of U.S. reactors in this decade.

DOE Office of Nuclear Energy (FY 2022 request: \$2.1 billion)

ANS recommends a minimum of \$2.1 billion for DOE Office of Nuclear Energy (NE) programs in FY 2022. This funding is necessary to enhance and strengthen the R&D programs and ensure that nuclear energy is well positioned to provide an increasing amount of carbon-free electricity. Our final recommended funding levels are slightly higher than those included in the recent ANS report, "The U.S. Nuclear R&D Imperative."¹ This is a result of both new information received since the report's release in February, and the inclusion of other non-R&D related programs in our request.

¹ ANS Task Force on Public Investment in Nuclear Research and Development. (Feb. 2021). *The U.S. Nuclear R&D Imperative* (pp. 1-39, Rep.). La Grange Park, IL.
<https://www.ans.org/file/3177/2/ANS%20RnD%20Task%20Force%20Report.pdf>

DOE Office of Nuclear Energy Program Recommendations		
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Program	FY 2021 Enacted (\$ millions)	ANS FY 2022 Request (\$ millions)
Advanced Reactor Demonstration Program (2 Demonstrations)	\$160	\$300
Risk Reduction for Future Demonstrations	\$40	\$95
National Reactor Innovation Center	\$30	\$50
Regulatory Development	\$15	\$15
Advanced Reactor Safeguards	\$5	\$5
ARC-20	\$16	\$16
Advanced SMR R&D	\$115	\$170
Versatile Test Reactor	\$45	\$150
Accident Tolerant Fuels & TRISO Fuel (NE Fuel Cycle R&D)	\$142	\$175
HALEU Fuel Program	-	\$200
Gateway for Accelerated Innovation in Nuclear	\$10	\$12
Light Water Reactor Sustainability (LWRS)	\$47	\$47
Joint Modeling and Simulation Program	\$35	\$35
Advanced Test Reactor (NE Idaho Facilities Management)	\$88	\$90
Transient Reactor Test Facility (NE Idaho Facilities Management)	\$20	\$21
Nuclear Waste Disposal	\$27.5	\$100
NNSA – Uranium Reserve	\$75	\$150

Advanced Reactor Demonstration Program (ARDP) (FY 2022 request: \$300 million)

ANS appreciates and strongly supports Congress’ establishment of the Advanced Reactor Demonstration Program (ARDP) in the FY 2020 minibus as well as the funding provided in FY 2021. Demonstrating the next generation of advanced reactors will support both domestic deployment and export of U.S. technology and enable broad U.S. leadership in new and innovative advanced nuclear technologies. We urge the Committee to increase program funding to allow for consistency with the awards DOE announced in 2020. Private-public partnerships are essential to reduce overall project risk and enable efficient, timely, and cost-effective development, demonstration, and deployment of new technology. In addition, DOE partnerships with industry encourage and spur additional private investment.

Conversely, failure on the part of the government to meet its annual commitments can deter private investment and endanger the success of the projects with long lasting ramifications.

ANS is also concerned that DOE funding for advanced fuel cycle R&D has been in steady decline over the last few fiscal years. The FY 2020 bill initiated a National Academies study on the waste aspects of advanced reactors, however, without sufficient funding for laboratory and university-based R&D, the U.S. is at risk of losing significant human capacity in the near term. We encourage the Committee to ensure that it provides additional FY 2022 funding to this increasingly important area.

Versatile Test Reactor (FY 2022 request: \$150 million)

As authorized by the Nuclear Energy Innovation Capabilities Act of 2017, DOE should continue the effort to design and construct a versatile fast-spectrum test reactor to serve the needs of a broad range of users. Without a domestic location for testing rapid neutron irradiation, challengers to American superiority in materials science, chemistry and nuclear engineering will emerge. DOE has made good progress to date with the completion of Critical Decision 1 in FY 2020 and the publication of the draft EIS in FY 2021. However, due to relatively low appropriations in previous years, the completion date for VTR is likely closer to 2030 than 2026. A significant increase in funding is needed in FY 2022 to begin procurement of long lead items and infrastructure investment activities. In order to broaden the support for the VTR, the DOE should explore the potential for international collaboration and cost-sharing. The Committee should recognize that while the VTR may not be strictly necessary for the near-term licensing of certain advanced reactors, it will absolutely be necessary in the long term to sustain an ongoing cycle of U.S. nuclear innovation.

International Nuclear Energy Cooperation (FY 2022 request: \$8 million)

The Office of Nuclear Energy plays a critical role in facilitating international nuclear energy cooperation. With nearly 30 countries considering nuclear energy for the first time and many others considering expanding their nuclear energy programs to meet their clean energy and energy security goals, re-establishing the International Nuclear Energy Cooperation program with sufficient funding to meaningfully engage potential partner countries will ensure greater international adoption of U.S. advanced energy technologies.

DOE Nuclear Energy University Program (NEUP) (FY 2022 request: Not less than \$60 million)

For the past decade, the NEUP program has served as the primary vehicle through which DOE supports nuclear energy related R&D at America's college and universities. Administered by the DOE Office of Nuclear Energy, NEUP provides peer-reviewed, competitively awarded grants to departments of nuclear engineering and related disciplines for mission-related R&D focused on advancing nuclear energy technologies. These awards have created numerous collaborations between universities, national labs, and industry partners. They have also led to some of the most innovative advanced reactor designs being developed today.

Historically, DOE has generally honored its commitment to dedicate approximately 20 percent of funds appropriated to its R&D programs for "work to be performed" at U.S.

colleges and universities.² In practice, DOE has awarded \$50-60 million in NEUP funding each year since FY 2009. There is one notable exception. In FY 2019, DOE chose to divert \$20 million in funding from NEUP to a sole-sourced HALEU demonstration program. This sudden shift in funding, which occurred after the NEUP funding announcement was already released, caused significant disruption to U.S. nuclear university programs. Congress responded in 2020 by requiring DOE to allocate a full 20 percent of its NE R&D funding to universities, but the enacted language also encompassed programs that were not traditionally subject to the NEUP total, including those with a significant industry cost sharing requirements.

For FY 2022, ANS recommends that Congress permit DOE to set final NEUP funding amounts but subject the Department to a congressionally mandated “floor” of \$60 million. ANS also encourages the Subcommittee to continue monitoring NEUP progress through quarterly briefings with the appropriate DOE staff.

University Nuclear Leadership Program (formerly the Integrated University Program)
(FY 2022 request: \$45 million)

Since 2009, Congress has provided funding for the Integrated University Program as a compliment to the Nuclear Energy University Program (NEUP). While NEUP focuses on creating work scope for universities within DOE mission-specific R&D activities, the IUP provides direct support for university-based programs in nuclear engineering and related disciplines through scholarships, fellowships, and young faculty awards. The federal government, through science-centric agencies such as the National Science Foundation, has consistently provided funding for these activities in other scientific and engineering disciplines. However, NSF has consistently demonstrated an unwillingness to provide support for nuclear engineering and related fields, thus necessitating the dedicated stream of funding that IUP provides. The Energy Act of 2020 reauthorized the program at \$45 million a year through 2025 and renamed it the University Nuclear Leadership Program. ANS recommends full funding in FY 2022.

High Assay Low Enriched Uranium (FY 2022 request: \$200 million for a HALEU availability program and \$10 million for processing of spent HEU fuels)

Consistent with the Energy Act of 2020, it is imperative that the DOE help establish a competitive commercial HALEU fuel supply chain in the U.S. including the development of facilities to modify uranium hexafluoride to uranium oxide or metal and new shipping packages for HALEU in various forms. Efforts at INL to process EBR-II fuel should be continued. In addition, of the funds provided for Idaho Facilities Management, \$10 million should be directed to additional efforts supporting processing of EBR-II fuel. It is important to note that there is a limited amount of HALEU that can be produced from EBR-II fuel and it may not be useable for all advanced reactors.

² “In FY 2009, NE will continue to support R&D activities at university and research institutions through competitive awards focused on advancing nuclear energy technologies. Through its Nuclear Energy Research Initiative process, NE will designate at least 20 percent of funds appropriated to its R&D programs for work to be performed at university and research institutions.” Source: FY 2009 DOE Congressional Budget Justification

Spent Fuel Disposal/Storage (FY 2022 request: \$100 million)

Congress needs to address the used fuel political stalemate. A balance of over \$42 billion remains in the Nuclear Waste Fund and over \$1.5 billion in investment income was earned again last year. Meanwhile, estimated taxpayer liability for DOE's failure to satisfy its obligation has reached over \$39 billion with almost \$9 billion already being paid from the taxpayer funded Judgment Fund. This amount increases by \$500 to \$800 million per year and the rate of growth is likely to increase in the future if the DOE does not begin fulfilling its obligation. This growing liability, and the increasing amount of used fuel stranded at shutdown plants, provides a renewed impetus for action. The current situation should not be allowed to continue. ANS appreciates the \$27.5 million provided for Nuclear Waste Disposal in FY 2021. However, this funding should be increased substantially, and DOE should be directed to re-establish an organization to resume management of the program and to begin implementation of an integrated nuclear waste management approach that takes advantage of private consolidated interim spent fuel storage initiatives.

ANS has in the past made a number of recommendations for addressing this issue, but we recognize the upcoming year is unlikely to see an end to the policy stalemate that has existed for far too long. With an eye towards the possible, ANS has identified a number of near-term productive actions the government should take into consideration that would enable future success - without favoring or foreclosing any policy options. These actions are outlined in the ANS Issue Brief, "A Proposal for Progress on Nuclear Waste Management."³ Enacting at least some of these measures in FY 2022 appropriations would send a positive message that the government is serious about addressing its waste management responsibilities.

National Nuclear Security Administration; U.S. Uranium Reserve (FY 2022 request: \$150 million)

ANS appreciates the funding that was provided in FY 2021 for a national uranium reserve and supports increased funding in FY 2022 from the National Nuclear Security Administration's Weapons Activities account. Given low uranium prices in recent years, many domestic mines have permanently ceased or idled operations. The creation of a uranium reserve is a strategic step in the nation's national security interest which will allow the United States to ensure that some existing uranium mining operations and fuel cycle capabilities are preserved.

DOE; Office of Science, Low-Dose Radiation Research Program (FY 2022 request: \$20 million to support low-dose radiation research activities)

Understanding of the health effects of ionizing radiation at low doses and low dose rates is critically important for the success of a broad range of social endeavors, from medical advancements to space exploration, energy production, and advanced nuclear pioneering. Yet federally sponsored research in this area effectively ended more than a decade ago,

³ ANS Nuclear Waste Policy Task Force. (Feb. 2020). *ANS Issue Brief: A Proposal for Progress on Nuclear Waste Management* (pp. 1-4, Rep.). La Grange Park, IL.
<https://www.ans.org/file/1245/1/Progress%20on%20Nuclear%20Waste%20Management.pdf>

leaving large gaps in our understanding of radiation hazards and human biological protection mechanisms.

Through recent congressional direction, the Department of Energy's Office of Science Biological and Environmental Research is to re-establish a research program devoted to the human health effects of low-dose radiation at a funding level of no less than \$5 million for FY 2021. To maintain progress in FY 2022, ANS recommends \$20 million for the program.

Expanded funding will allow for new technologies and approaches for examining biological mechanisms by which ionizing radiation produces cancer and non-cancer health outcomes, and the integration of mechanistic biological insights with epidemiological data. This funding is also needed to support interdisciplinary training and integrated cross-professional research programs devoted to understanding and quantifying radiation health effects at low doses. The program will also support education and outreach activities to disseminate information and promote public understanding of low-dose radiation.