Nuclear Energy

Nuclear Energy
($K)

FY 2025 Enacted[1,2]	FY 2026 Enacted[1,2,3]	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted
1,685,000	1,685,000	1,533,735	-151,265

Proposed Appropriation Language for the Office of Nuclear Energy (NE)

For Department of Energy expenses including the purchase, construction, and acquisition of plant and capital equipment, and other expenses necessary for nuclear energy activities in carrying out the purposes of the Department of Energy Organization Act (42 U.S.C. 7101 et seq.), including the acquisition or condemnation of any real property or any facility or for plant or facility acquisition, construction, or expansion, $1,533,735,000 to remain available until expended: Provided, That of such amount, $99,735,000 shall be available until September 30, 2028, for program direction.

Proposed Appropriation Language for the American Energy Independence Fund (AEIF)[4]

Collections credited to the American Energy Independence Fund as discretionary offsetting collections during this fiscal year, as authorized by section 312(a) of title III of division D of Public Law 118-42, shall be available until expended to carry out the purposes of the Fund.

Mission

The Office of Nuclear Energy (NE) works to advance nuclear energy science and technology to meet the nation's energy, environmental, and economic needs. The approach is enabled through the following facets:

- Enable continued operation of existing U.S. nuclear reactors.
- Enable deployment of advanced nuclear reactors
- Develop advanced nuclear fuel cycles.
- Maintain U.S. leadership in nuclear energy technology.

Executive Orders
In May of 2025, the Administration issued several Executive Orders (E.O.) to modernize nuclear regulation, streamline nuclear reactor testing, deploy nuclear reactors for national security, and reinvigorate the nuclear industrial base.

- E.O. 14299 Deploying Advanced Nuclear Technologies for National Security
- E.O. 14300 Ordering the Reform of the Nuclear Regulatory Commission
- E.O. 14301 Reforming Nuclear Reactor Testing at the Department of Energy
- E.O. 14302 Reinvigorating the Nuclear Industrial Base

[1] Funding includes SBIR/STTR funds to be transferred to the Office of Technology Commercialization.
[2] Funding does not reflect the FY 2025 transfer of $92.8M or the FY 2026 transfer of $96.7M from Naval Reactors for operation of the Advanced Test Reactor. Comparisons throughout the document also exclude these transfers.
[3] Includes Use of Prior Year balances
[4] The American Energy Independence Fund (AEIF), stewarded by the Office of Nuclear Energy, supports advanced nuclear fuel availability, including low-enriched uranium (LEU) and high-assay low-enriched uranium (HALEU). This appropriation language is necessary for DOE to be able to access funds collected in FY 2027 from the sale of uranium, so that the AEIF can function as a revolving fund as intended.

The executive orders seek to accelerate deployment of new nuclear reactor technologies and expand American nuclear energy capacity from around 100 GW in 2025 to 400 GW by 2050. To execute this vision, DOE is working with industry to facilitate 5 gigawatts of power uprates; leveraging the Department's Energy Dominance Financing Office to support reactor restarts and finish partially completed construction projects; improving nuclear supply chains; and supporting efforts to have 10 new large reactors with complete designs under construction by 2030. Additionally, the Department is evaluating reprocessing and recycling of used nuclear fuel from DOE- and DoW-managed reactors and recommending improvements to those processes to make efficient use of the recovered materials, including disposition of surplus plutonium by making it available for advanced reactor fuel fabrication.

In FY 2027, NE will continue its efforts to usher in a nuclear renaissance and expand America's energy dominance agenda including but not limited to:

- Generating data to accelerate nuclear reactor licensing;
- Facilitating activities to enable addition of new U.S. nuclear capacity;
- Complementing efforts to deploy U.S. reactors for national security applications;
- Funding near-term technologies to affect commercial plant safety and capacity enhancements in regards to Accident Tolerant Fuels;
- Engineering studies, targeted research, technology development, and program planning for the long-term disposition of UNF and HLW; and
- Increasing access to the national labs for nuclear energy students.

Overview

Nuclear energy is a critical part of unleashing energy dominance at home and abroad. With 95 licensed units in 28 states, the U.S. nuclear reactor fleet provides reliable, affordable, safe, and secure power to American families and businesses. Expanded deployment of advanced nuclear power promises to minimize land-use and transmission requirements while offering regional economic benefits, job opportunities, and unique capabilities for technological innovation. U.S. nuclear energy leadership also plays key national security and global strategic roles for the United States, including supporting the highest international standards for safety, security, and nonproliferation.

The United States pioneered the development and peaceful use of civil nuclear power and the nuclear fuel cycle to produce around-the-clock, reliable baseload electricity generation. The Office of Nuclear Energy now leads and supports research, development, and demonstration (RD&D) activities enabling (1) continued operation of existing reactors, (2) deployment of new reactors, and (3) a secure and sustainable nuclear fuel cycle. NE executes its mission through investments in RD&D that leverage the tremendous innovation capacity of the United States' national laboratories, universities, and advanced nuclear technology developers to transform the global energy landscape. NE is also responsible for ensuring the secure operational availability of Idaho National Laboratory (INL) as a national asset supporting a broad range of civilian and national security research.

The FY 2027 Request helps to advance U.S. leadership in critical technologies and upgrade America's research infrastructure. It supports the civilian nuclear energy programs of the U.S. Government to research and develop nuclear energy technologies, including generation, safety, and security technologies, to assist in unleashing America's energy dominance through strategic, innovative RD&D activities. The NE FY 2027 Request will expand the impact of our RD&D funding through innovative funding mechanisms - such as prizes, competitions, technical assistance, and programs targeted to small businesses.

Additionally, the FY 2027 Request strives to develop and demonstrate the advanced fuel cycle technologies needed to enhance U.S. global leadership in the nuclear industry by addressing gaps in the domestic nuclear fuel supply chain for both existing and advanced nuclear reactors to assure the supply of low enriched uranium (LEU), including high assay low enriched uranium (HALEU), needed by U.S. reactors and those of our allies. The FY 2027 Request also supports used nuclear fuel management activities.

Nuclear Energy
Funding by Congressional Control ($K)

	FY 2025 Enacted[5,6]	FY 2026 Enacted[5,6,7]	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted	
				$	%
University and Competitive Research Programs	140,000	146,100	128,841	-17,259	-12%
Power Reactor Optimization	*44,500*	*37,000*	*35,000*	*-2,000*	*-5%*
Advanced Reactor Technologies	*73,800*	*78,800*	*92,059*	*+13,259*	*+17%*
Advanced Small Modular Reactor RD&D	*-*	*45,000*	*-*	*-45,000*	*-100%*
Integrated Energy Systems	*9,500*	*16,000*	*-*	*-16,000*	*-100%*
Total, Reactor Concepts RD&D	127,800	176,800	127,059	-49,741	-28%
Mining, Conversion and Transportation	*1,500*	*1,500*	*1,425*	*-75*	*-5%*
Materials Recovery and Waste Form Development	*33,000*	*57,000*	*52,375*	*-4,625*	*-8%*
Accident Tolerant Fuels	*97,900*	*98,000*	*87,400*	*-10,600*	*-11%*
Fuel Cycle Core R&D	*16,000*	*16,000*	*16,700*	*+700*	*+4%*
Next Generation Fuels	*65,500*	*92,000*	*60,600*	*-31,400*	*-34%*
Advanced Nuclear Fuel Availability	*126,500*	*123,500*		*-123,500*	*-100%*
Used Nuclear Fuel Disposition R&D	*47,000*	*47,000*	*-[8]*	*-47,000*	*-100%*
Integrated Waste Management System	*57,500*	*55,000*	*-[9]*	*-55,000*	*-100%*
Total, Fuel Cycle R&D	444,900	490,000	218,500	-271,500	-55%
Total, Used Nuclear Fuel and High-Level Waste Disposition	0	0	102,000	+102,000	+100%
Advanced Materials and Manufacturing Technologies	*14,082*	*24,000*	*14,000*	*-10,000*	*-42%*
Advanced Sensors and Instrumentation	*5,682*	*5,000*	*5,000*	*-*	*-*
Nuclear Energy Advanced Modeling and Simulation	*28,500*	*28,600*	*28,600*	*-*	*-*
Nuclear Science User Facilities	*34,500*	*45,500*	*36,000*	*-9,500*	*-21%*

[5] Funding includes SBIR/STTR funds to be transferred to the Office of Technology Commercialization.
[6] Funding does not reflect the FY 2025 transfer of $92.8M or the FY 2026 transfer of $96.7M from Naval Reactors for operation of the Advanced Test Reactor. Comparisons throughout the document also exclude these transfers.
[7] Includes Use of Prior Year balances
[8] The budget decrease from FY 2026 reflects subprogram activities previously associated with Integrated Waste Management System and Used Nuclear Fuels Disposition R&D now being funded under the new, combined control point in a separate congressional request titled "Used Nuclear Fuel and High-Level Waste Disposition."
[9] The budget decrease from FY 2026 reflects subprogram activities previously associated with Integrated Waste Management System and Used Nuclear Fuels Disposition R&D now being funded under the new, combined control point in a separate congressional request titled "Used Nuclear Fuel and High-Level Waste Disposition."

	FY 2025 Enacted[5,6]	FY 2026 Enacted[5,6,7]	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted	
				$	%
Gateway for Accelerated Innovation In Nuclear	*11,000*	*10,000*	*10,000*	-	-
Total, Nuclear Energy Enabling Technologies	93,764	113,100	93,600	-19,500	-17%
National Reactor Innovation Center	*63,000*	*65,000*	*51,214*	*-13,786*	*-21%*
Demonstration 1	*30,000*	*5,000*	*10,000*	*+5,000*	*+100%*
Demonstration 2	*30,000*	*5,000*	*10,000*	*+5,000*	*+100%*
Risk Reduction for Future Demonstrations	*137,222*	*130,000[10]*	*115,000*	*-15,000*	*-12%*
Regulatory Development	*17,030*	*25,000*	*18,000*	*-7,000*	*-28%*
Advanced Reactor Safeguards and Security	*9,172*	*9,000*	*12,000*	*+3,000*	*+33%*
23-E-200, LOTUS	*16,112*	*30,000*	*9,786*	*-20,214*	*-67%*
Total, Advanced Reactors Demonstration Program	302,536	269,000	226,000	-43,000	-16%
INL Facilities Operations & Maintenance	*326,000*	*342,000*	*378,000*	*+36,000*	*+11%*
Total, Infrastructure	326,000	342,000	378,000	+36,000	+11%
Idaho Sitewide Safeguards and Security	160,000	160,000	160,000	-	-
Program Direction	90,000	88,000	99,735	+11,735	+13%
Use of Prior Year Balance		-100,000			
Total, Nuclear Energy	**1,685,000**	**1,685,000**	**1,533,735**	**-151,265**	**-9%**

[10] Risk Reduction for Future Demonstration FY 2026 amount includes the Use of Prior Year Balances in the amount of $100M.

Nuclear Energy
Minor Construction Activities ($K)

	Total	Prior Years	FY 2025 Enacted	FY 2026 Request	FY 2027 Request	FY 2027 Request vs FY 2026 Request
Minor Construction Projects (Total Project Cost (TPC)<$30M), Idaho National Laboratory (Direct Funded)						
Fuel Conditioning Facility Hot Repair Area Reactivation (IFM)	7,000	-	-	-	1,500	+1,500
Facility Cooling Water System (IFM)	7,000	-	-	-	-	-
Interfacility Pneumatic Shuttle Transfer System Refurbishment (IFM)	10,000	-	-	-	-	-
Fuels Synthesis Project	15,000	-	-	-	2,000	+2,000
Carbon-based fuels and products synthesis testing capability (IFM)	23,600	-	-	7,600	16,000	+8,400
HALEU Polishing Capability (IRA)	19,397	28,000	-	-	-	-
MFC Mockup Shop Machining Relocation (IRA)	13,500	13,500	-	-	-	-
FCF Criticality Alarm System (IRA)	5,000	5,000	-	-	-	-
System Physics Advanced Reactor Critical (SPARC) Facility	27,500	-	2,500	11,000	12,000	+1,000
NRIC Advanced Reactor Cooldown Pad	15,000	-	-	3,000	12,000	+9,000
NRIC Advanced Reactor Fueling Capability	5,000	-	-	-	5,000	+5,000
Open Architecture Catalyst Test Bed	20,000	-	-	-	20,000	+20,000
Thermal Energy Storage and Management System	20,000	-	-	-	20,000	+20,000
Thermal Island Component Test Bed	32,000	-	-	-	4,000	+4,000
MFC Analytical Laboratory Multi-Zone System Overhaul	5,000	-	-	-	-	-
MFC Private Facility Control Network Infrastructure Upgrades	10,000	-	-	-	-	-
FCF Convert Steam Heat to Electric	5,000	-	-	-	-	-
Total Direct Funded	**239,997**	**46,500**	**2,500**	**21,600**	**92,500**	**+70,900**

	Total	Prior Years	FY 2025 Enacted	FY 2026 Request	FY 2027 Request	FY 2027 Request vs FY 2026 Request
Minor Construction Projects (Total Project Cost (TPC)<$30M), Idaho National Laboratory (Indirect Funded)						
MFC East Corridor Electrical Upgrade	20,000	-	-	-	-	-
MFC Office Building	34,000	-	-	-	2,000	+2,000
Fuel Conditioning Facility Special Nuclear Material Melter	6,539	464	1,585	1,000	3,490	+2,490
Scoville Substation Transformer Replacements and Reliability Upgrades	12,340	-	-	650	6,400	+5,750
CFA Data Center/Dial Room	29,900	-	-	-	3,000	+3,000
CITRC Multi-Purpose Facility	24,900	-	-	-	-	-
CFA Admin Building	30,900	-	-	-	-	-
MFC-786 Substation Repair/Replacement	24,800	-	-	-	-	-
CFA Craft Shop #1	23,900	-	-	-	-	-
ATR General Office Building	24,000	-	-	-	8,000	+8,000
NQA-1 Storage Facility	9,600	-	-	-	-	-
Outer West Loop	22,667	-	-	-	3,307	+3,307
MFC Experimental Development Laboratory	15,000	-	-	-	1,000	+1,000
TRA-653/662 Remodel	21,900	-	-	-	-	-
New ATR Dial Room	16,400	-	3,400	-	7,000	+7,000
CNOH Replacement Glovebox	5,000	-	-	2,800	2,200	-600
Waste Volume Reduction Hot Cell	6,000	-	-	500	3,500	+3,000
HALEU Elution and Reguli Bundling Glovebox	7,750	-	-	500	3,000	+2,500
SMC Sewer Lagoon Upgrade	3,660	-	-	-	500	+500
MFC Flexible R&D Facility	30,000	-	-	-	1,500	+1,500
Development of High Bay Facilities within the Proving Ground	11,350	-	-	-	350	+350
Development of Laboratory Space within the Proving Ground	3,950	-	-	-	350	+350
Thermal Energy Facility	30,000	-	-	-	6,000	+6,000
CFA Substation #7	25,000	-	-	-	3,600	+3,600
NRIC Launch Pad	9,900	-	-	-	1,500	+1,500
MFC Substation #13	25,000	-	-	-	3,600	+3,600

	Total	Prior Years	FY 2025 Enacted	FY 2026 Request	FY 2027 Request	FY 2027 Request vs FY 2026 Request
Switching Substation #111	19,300	-	-	-	1,608	+1,608
Synthetic Fuels and Chemical Facility formerly "CF-686 Buildout"	13,900	5,700	3,000	5,200	-	-5,200
ATR Warm Water Waste Pond	15,200	-	-	8,000	7,200	-800
TTAF Expansion Project	13,000	-	-	-	-	-
CFA Utility Tunnel	9,300	-	-	-	2,500	+2,500
MFC-752 Substation Repair/Replacement	14,750	-	-	-	-	-
Total, Indirect Minor Construction Projects	**559,906**	**6,164**	**7,985**	**18,650**	**71,605**	**+52,955**
Total, Minor Construction Project	**799,903**	**52,664**	**10,485**	**40,250**	**164,105**	**+123,855**

University and Competitive Research Programs

Overview

The University and Competitive Research Programs budget request consolidates and focuses support to universities and small businesses in areas relevant to the Office of Nuclear Energy's (NE) mission. This program funds university-led research, university infrastructure support and revitalization, and technology commercialization efforts for nuclear energy. Efforts are largely awarded through competitive opportunities for researchers, faculty, and small businesses. Additionally, the program provides fuel services, maintenance support, reactor sharing opportunities, and upgrades for U.S. university research reactors and scientific infrastructure. This budget request is organized into three subprograms: (1) Nuclear Energy University Program (NEUP), Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) programs, and the Technology Commercialization Fund (TCF), (2) National Nuclear Talent Development Program (NNTDP), and (3) University Fuel Services (UFS).

Highlights of the FY 2027 Budget Request

- Under the Consolidated Innovative Nuclear Research (CINR) funding opportunity, NE will develop and execute a national laboratory internship opportunity that aims to expand university-national laboratory collaboration and strengthen the U.S. nuclear energy workforce. This addition directly supports Section 5(d) of Executive Order 14302, Reinvigorating the Nuclear Industrial Base, to increase access to the national labs for nuclear energy students.
- Under the NNTDP, NE will expand its support of students at technical colleges, trade schools, and community colleges and their essential role in building the construction, operations, and maintenance workforce required for nuclear deployment at scale.
- University Fuel Services (UFS) will procure fresh fuel elements for universities and ship used nuclear fuel elements to a DOE receipt facility. Notably, some FY 2027 funding will be used to continue fabrication of new fuel assemblies for the North Carolina State University PULSTAR reactor.

NEUP, SBIR/STTR and TCF ($92,237,000)

The NEUP, SBIR/STTR, and TCF subprogram includes competitively awarded opportunities for universities, small businesses, and national laboratories, respectively. The university program seeks to support cutting-edge, innovative research at U.S. universities. Having a single program funding line provides more flexibility to NE's competitive award process; streamlines program execution; and provides enhanced transparency for small businesses, universities, and other stakeholders.

The principal focus areas for FY 2027 include four elements: (1) Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR); (2) Technology Commercialization Fund (TCF); (3) University-led Research and Development; and (4) University Infrastructure.

- SBIR/STTR ($25,010,000) – The SBIR/STTR authorization expired on September 30, 2025. Should the program be reauthorized, NE would support small businesses through the Department's SBIR/STTR program. Participating agencies spend a percentage of the department's extramural research and development (R&D) budget on awards to small businesses. NE's contribution supports scope relevant to NE's R&D mission, for example technologies for improvements of existing reactors, advanced reactors, and fuel cycle systems.
- TCF ($6,257,000) – NE supports the transfer of promising nuclear energy technologies developed at the Department's national laboratories to the nuclear industry for commercialization through TCF. The TCF was established under 42 U.S. Code § 16391, which directed the Secretary to "establish an Energy

Technology Commercialization Fund, using 0.9 percent of the amount made available to the Department for applied energy research, development, demonstration, and commercial application for each fiscal year based on future planned activities and the amount of the appropriations for the fiscal year, to be used to provide matching funds with private sector partners to promote promising energy technologies for commercial purposes."

- University-led Research and Development ($48,970,000) – NE supports nuclear energy research and development being conducted at U.S. colleges and universities through yearly competitive solicitations. The program's goal is to support outstanding, cutting-edge, and innovative research at U.S. universities in the areas of nuclear energy science and technology through the following funding opportunities:
    - Consolidated Innovative Nuclear Research (CINR): NE will utilize the CINR funding opportunity to align nuclear energy research with NE's mission, focusing on strategic needs and priorities including fuel cycle, reactor concepts, and used nuclear fuel management research. The effort will include a new national laboratory internship opportunity that aims to expand university-national laboratory collaboration and strengthen the U.S. nuclear energy workforce. The funding opportunity also offers Integrated Research Projects (IRPs), which are multi-disciplinary and multi-institutional projects that address near-term nuclear energy research challenges, technology innovation needs, or capability gaps. IRPs are intended to integrate across disciplines to achieve solutions to complex research challenges that cannot be addressed by a less comprehensive team.
    - Distinguished Early Career Program (DECP): NE will continue to utilize its most prestigious opportunity for faculty members, DECP. This program will focus on early career faculty conducting transformative research and leadership aligned with NE's mission.
    - CINR Phase II Continuation: NE will utilize the CINR Phase II Continuation Notice of Funding Opportunity (NOFO) to provide support for teams that have performed high quality work through the Nuclear Energy University Program (NEUP) to propose new projects that complement and enhance ongoing NEUP research through a competitive application and review process.
- University Infrastructure ($12,000,000) – NE supports the infrastructure needed at universities to conduct cutting-edge research. NE provides competitively awarded funding to universities through solicitations that will include the following elements to revitalize the existing university nuclear research infrastructure.
    - Scientific Infrastructure Support for CINR
        - *General Scientific Infrastructure:* to focus on equipment, instrumentation, and associated non-reactor upgrades that significantly improve or expand research, instruction, and training capabilities at individual universities and colleges.
        - *Reactor Upgrades:* to improve existing nuclear research and training reactors at individual universities and colleges. It includes the purchase and maintenance of equipment to enhance the safety, security, performance, control, or operational reliability of the research reactor.
    - Reactor Sharing & Outreach: to provide a competitive opportunity to increase the use of university research reactors through support of expanded partnering and public outreach.
    - Infrastructure Revitalization: to competitively award consortium-led efforts to establish and/or enhance nuclear research infrastructure capabilities at U.S. universities. They may include enhancements to existing reactors and the addition of related capabilities such as simulators. This support will help U.S. universities (1) offer hands-on experience with commercially relevant advanced reactor concepts, reflective of those being deployed by industry; and (2) offer research capabilities that address emerging technical challenges. These activities are expected to be led by one or more university-led consortia with appropriate expertise to ensure that the new capabilities will support these goals.

National Nuclear Talent Development Program ($6,962,000) (formerly known as the University Nuclear Leadership Program)

The National Nuclear Talent Development Program (NNTDP) (formerly known as the University Nuclear Leadership Program (UNLP)) provides undergraduate scholarships and graduate fellowships to students attending two and four-year institutions of higher education. In line with Executive Order 14302, Reinvigorating the Nuclear Industrial Base, NNTDP will help build the construction, operations, and maintenance workforce by expanding training opportunities for technical college, trade school, and community college students through industry and society partnerships, utilizing existing networks to develop this essential workforce for nuclear deployment at scale.

University Fuel Services (UFS) ($29,642,000)

University Fuel Services (UFS) supports the continued operation of U.S. university research reactors for the successful execution of the nuclear energy research mission. The program ensures university research reactor fuel is handled in accordance with U.S. and Department of Energy non-proliferation and national security objectives. The primary roles of UFS are focused on the following areas:

- Providing new fuel and removing used fuel from 25 operating research reactors at 24 universities.
- Procuring new university research reactor fuel (e.g. plate, TRIGA, and PULSTAR fuel) from commercial vendors.
- Shipping used nuclear fuel to DOE used fuel receipt facilities and lightly irradiated used TRIGA fuel to universities as needed.

University and Competitive Research Programs
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
NEUP, SBIR/STTR, and TCF	105,140	111,240	92,237
National Nuclear Talent Development Program	6,630	6,630	6,962
University Fuel Services	28,230	28,230	29,642
Total, University and Competitive Research Programs	**140,000**	**146,100**	**128,841**

Explanation of Changes for University and Competitive Research Programs

NEUP, SBIR/STTR, and TCF

The reduction from $111,240,000 to $92,237,000 supports the NEUP programs focus on critical Nuclear Energy (NE) mission objectives by addressing strategic needs and priorities, introducing a new national laboratory internship opportunity to cultivate future talent, continuing essential support for the SBIR and STTR programs to commercialize innovative contributions from small businesses, and maintaining the vital role of the TCF in accelerating the transition of promising nuclear energy technologies from national laboratories to industry.

National Nuclear Talent Development Program (NNTDP) (formerly known as the University Nuclear Leadership Program)

The increase from $6,630,000 to $6,962,000 supports the expansion of training opportunities for students attending community colleges and trade schools through partnerships with industry and societies to leverage existing networks.

University Fuel Services (UFS)

The increase from $28,230,000 to $29,642,000 supports the accelerated procurement and processing of used Training, Research, Isotopes, General Atomics (TRIGA) fuel associated with 12 university research reactors.

Reactor Concepts Research, Development, and Demonstration

Overview

The Reactor Concepts Research, Development, and Demonstration (RD&D) program supports conducting RD&D on existing and advanced reactor designs and technologies to achieve national dominance in nuclear technology. This RD&D enables industry to address technical and regulatory challenges associated with maintaining the existing fleet of nuclear reactors; promoting the development of a robust pipeline of advanced reactor designs, technologies, and associated supply chains; developing technologies for producing fuels and chemicals; delivering process heat and electricity directly to industries; and progressing these advanced reactor designs and technologies towards demonstration when appropriate. Program activities support the May 2025 Executive Orders by addressing technical, economic, safety, and security enhancement challenges associated with the existing commercial light water reactor fleet and advanced reactor technologies, covering large, small, and micro-sized designs across an array of reactor types including light water, fast reactors using liquid metal coolants, and high temperature reactors using gas or molten salt coolants. Pursuant to these Executive Orders, the RD&D program will help usher in a nuclear renaissance and expand America's energy dominance agenda by generating data to accelerate nuclear reactor licensing, facilitating activities to enable addition of new U.S. nuclear capacity, and complementing efforts to deploy U.S. reactors for national security applications.

To maximize the benefits of nuclear power, the following challenges must be addressed:

- Improving economic competitiveness of nuclear energy technologies
- Enhancing safety and reducing technical and regulatory risk
- Managing potential proliferation risks of nuclear materials
- Establishing required supply chain
- Expanding applications and markets of nuclear energy
- Improving the economic outlook for the U.S. nuclear industry

Reactor Concepts RD&D is key to enabling the industry to expand the domestic nuclear energy capacity by regaining a technological and market leadership role. Through cost-shared RD&D activities, related technical assistance, and cross-cutting innovative research and development (R&D), the Department will enable industry to accelerate the timeline for commercialization of new, advanced, and more economical reactor technologies that will expand the domestic nuclear industry and advance America's leadership role in the global nuclear sector.

The Reactor Concepts RD&D program continues to support RD&D efforts focused on advanced reactors and the existing fleet in FY 2027. The Power Reactor Optimization (formerly Light Water Reactor Sustainability) subprogram conducts research in support of existing commercial nuclear power plants to provide affordable, safe, and reliable energy. The goal is to enable industry to enhance the energy supply from the existing nuclear power plant infrastructure through capacity expansion, power uprates, restart of closed plants, and enabling new reactor deployment at existing nuclear sites. The subprogram also promotes the efficient and economic performance of current nuclear power plants while enabling their extended operation. A critical element of the subprogram is the development of advanced methodologies and tools for industry use in resolving highest priority and highest uncertainty technical issues.

The Integrated Energy System (IES) subprogram conducts R&D on nuclear energy pathways for transportation, industrial, and commercial sectors through electrical, thermal, and chemical energy forms. This subprogram focuses on developing technologies that provide multiple nuclear energy products including fuels, processing heat, electricity, and chemicals. These technologies broaden the market and improve long-term economics of nuclear power plants.

The Advanced Reactor Technologies (ART) subprogram conducts targeted R&D on advanced reactor technologies, including molten salt reactors, liquid metal-cooled reactors, high temperature gas-cooled reactors, and microreactors. The subprogram also supports work on cross-cutting R&D applicable to multiple advanced reactor concepts, including non-light water reactor small modular reactors (SMRs). Focus areas of this subprogram include fundamental technologies and design methods for advanced reactors, interactions of diverse reactor coolants with materials and components, advanced energy conversion, research to enhance safety and reduce regulatory risk, experimental validation of models, advanced materials qualification, and continued international collaborations. The ART subprogram will also support competitively awarded projects to aid the progression of emerging advanced reactor designs and technologies.

With the November 2023 cancellation of the Carbon Free Power Project, no funding is requested to continue the Advanced SMR RD&D subprogram in FY 2027.

Highlights of the FY 2027 Budget Request

In FY 2027, the Microreactor Applications, Research, Validation and Evaluation (MARVEL) microreactor will achieve dry criticality at the Idaho National Laboratory. MARVEL will serve as a nuclear test bed to de-risk microreactor operations and demonstrate end-use applications. The FY 2027 Budget Request supports activities to complete the design and assembly of the Bearing Test Article for future testing in the Mechanisms Engineering Test Loop, to enable use of compact in-vessel fuel handling machines that will reduce capital costs. Additionally, the High Dose Graphite-2 experiment irradiation is expected to begin to generate material qualification data supporting licensing of high temperature reactors. The Advanced Reactor Concepts, LLC Advanced Reactor Concepts 2020 (ARC-20) award will be complete in FY 2027, resulting in a preliminary design of the ARC-100 concept. This marks the completion of the ARC-20 program which significantly reduced technical and regulatory risks for advanced reactor designs that could have a significant impact on energy markets as soon as the mid-2030s.

Advanced Small Modular Reactor (SMR) Research, Development, and Demonstration (RD&D) provided support to help re-establish U.S. leadership in nuclear energy by maturing SMR concepts toward commercial readiness. A range of significant technological accomplishments were achieved in developing advanced SMR designs. No funding is requested in the FY 2027 budget for the Advanced SMR RD&D subprogram.

Power Reactor Optimization (PRO), formerly Light Water Reactor Sustainability, conducts R&D on technologies and other solutions that can improve economics, increase energy production, sustain safety, and maintain the technical reliability of the current domestic fleet of commercial nuclear power plants. The focus of the subprogram is on conducting R&D that addresses the nuclear industry's economic challenges, promoting domestic nuclear energy expansion through restarts of closed plants, greater energy production of operational plants, and continued long-term operation to meet domestic energy demands. PRO directs national laboratory research and collaborates with nuclear power plant owner-operators, vendors, suppliers, industry support organizations, other research organizations, and the Nuclear Regulatory Commission (NRC) to closely coordinate research that both supports industry needs and maximizes taxpayer benefits.

The Power Reactor Optimization subprogram consists of the following R&D areas:

1. **Plant Optimization:** R&D to address nuclear power plant economic viability and optimize plant performance in current and future energy markets by increasing efficiency through the implementation of digital technologies, machine learning, and Artificial Intelligence (AI). The products will enable modernization of plant systems and processes across the industry by enabling a shift from a labor-centric to a technology-centric business model that supports improved performance at a lower cost.

2. **Capacity Expansion:** R&D to expand nuclear energy production and use, accelerate near-term capacity expansion opportunities, and extend nuclear power applications beyond the traditional electricity markets. This area will focus on increasing plant uprates, improving plant capacity factors, restarting closed plants, and enabling the deployment of new plants at existing nuclear sites.
3. **Protection and Assurance:** R&D that will develop and deploy advanced methods and tools to be used to implement cost-effective nuclear power plant security regimes. This R&D enables companies across industry to reduce excessive conservatism in security modeling, leverage automation as force multipliers, optimize security postures, enhance efficiency, and develop additional means to risk-inform approaches in evaluating security changes.
4. **Long-term Performance:** R&D to ensure the performance of vital systems, structures, and components (SSC) in their in-service environments and develop techniques and methods for long-term management. The R&D products will be used to define operational limits and aging mitigation approaches for materials in nuclear power plant SSCs, providing key input to both regulators and industry, and develop novel approaches for continued maintenance and operation of the plants.

In FY 2027, the Power Reactor Optimization subprogram will leverage the national laboratory system, coordinate priorities with industry stakeholders, provide technical support to previously funded industry awards, and engage regulators through an existing MOU to focus on the conduct of R&D to resolve industry's highest priority and highest uncertainty challenges, and to identify areas of capacity expansion and plant power uprates. The subprogram will incorporate advanced models, methods, machine learning, and artificial intelligence to address these challenges and provide solutions to improve the current business model and associated practices of the current fleet. Application of these new technologies will enable the existing nuclear power plant fleet to manage the aging of SSCs, improve performance metrics, expand capacity, and pursue larger power uprates.

Advanced Reactor Technologies (ART) conducts essential R&D activities to reduce technical risks associated with advanced reactor technologies and systems. The subprogram's R&D scope reflects input from advanced reactor stakeholders with a goal of enabling industry to mature and ultimately demonstrate advanced reactor technologies. The ART subprogram focuses on industry-informed R&D priorities that would provide widely applicable benefits across many different advanced reactor concepts to enhance the likelihood of future demonstration and commercialization of emergent advanced reactor technologies and stimulate new ideas for transformational future concepts. The ART subprogram continues support for international collaborations on advanced reactor operations and safety promoting the development of advanced reactors in the United States and supporting deployment and export of U.S. technologies in the global marketplace. The ART subprogram leverages artificial intelligence tools to accelerate the development and future deployments of advanced reactors, including activities to enable autonomous control of advanced reactors.

ART R&D efforts support innovative reactor concepts and supporting capabilities, including:

1. **High temperature gas-cooled reactors (HTGR)**: Supports advanced alloy qualification, scaled integral experiments, and development and validation of modeling and simulation tools to support design and licensing.
2. **Fast reactors**: Demonstrates feasibility of advanced systems and component technologies to enhance performance and economic competitiveness and validates methods and codes to support design and licensing.
3. **Molten salt reactors (MSR)**: Investigates fundamental salt properties as well as materials, models, fuels, and technologies to reduce technical uncertainties for MSRs to enable development and demonstration.
4. **Microreactors**: supports non-nuclear and nuclear integrated system testing as well as maturation of innovative components. Supports the MARVEL microreactor which will be a nuclear microreactor test platform to test microreactor technologies and end-use applications.

5. **Graphite qualification**: Supports R&D activities to irradiate, characterize, and qualify nuclear grades of graphite and to establish design rules to enable use of graphite in high temperature reactors. Supports activities to establish a domestic nuclear graphite supply chain for high temperature reactors.
6. **Space Reactors**: In coordination with NASA, supports research and development of nuclear reactor technologies for space applications to: (a) power space exploration by further advancing nuclear reactor technology capabilities of fission power for spacecraft and surface systems; (b) further evolve space nuclear technology to support US national security interests; and (c) enable the safe, secure, productive, and profitable development of the U.S. commercial space industry.

Industry-led, cost-shared R&D activities are supported through competitively selected industry awards to reduce technical and regulatory risks associated with advanced reactor designs. Specifically, in FY 2021, DOE announced the selection of three awards to support the development of designs that could have significant impact on the energy market in the mid-2030s or later. The three concepts selected for award were:

- Advanced Reactor Concepts, LLC: Development of a conceptual design of a seismically isolated advanced sodium-cooled reactor facility
- General Atomics: Development of a fast modular reactor conceptual design with verifications of key metrics in fuel, safety, and operational performance
- Massachusetts Institute of Technology: Maturing the Modular Integrated Gas-Cooled High Temperature Reactor (MIGHTR) from a pre-conceptual stage to a conceptual stage (currently in the closeout process)

Integrated Energy Systems activities will be narrowed in FY 2027 to focus on completing high-priority projects such as planning the testing facilities necessary to enable the export of nuclear heat to industry and refining cost estimations of nuclear plants. These activities will be supported by FY 2026 appropriations to the Integrated Energy Systems (IES) subprogram. Outcomes of this subprogram include technical and economic assessments of nuclear energy applications; thermal distribution and control systems capable of delivering heat directly to major industrial and commercial applications; power system designs for managing load transients and reliability for directly supplying heat and electricity to industry and data centers; and validating process economics of converting nuclear energy into fuels and chemicals.

The IES subprogram consists of four pillars of R&D:

1. **National Impact of Nuclear IES:** Assesses the potential for nuclear energy on a national level based on market competition, enacted policies, and resource limitations for all energy sources.
2. **Nuclear Applications R&D:** Assesses economic opportunities for supplying energy to a variety of industrial plants. Cost optimization for near-term opportunities substituting energy imports with nuclear energy and longer-term opportunities of retrofitting industrial plants with advanced processes for nuclear energy applications.
3. **Thermal Systems R&D:** Conducts research on utilizing nuclear heat for industry. This effort analyzes industrial requirements to develop cost-effective and reliable thermal system designs that include heat exchangers, thermal storage, fluid system components, turbine engines, and control systems.
4. **Chemical Systems R&D:** Focuses on developing nuclear e-fuels that are distributed and used by the existing transportation infrastructure and developing economically competitive processes for producing a range of chemical commodities with nuclear power.

Reactor Concepts Research, Development, and Demonstration
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Advanced Small Modular Reactor RD&D	-	45,000[1]	-
Power Reactor Optimization	44,500	37,000	35,000
Advanced Reactor Technologies	73,800	78,800	92,059
Integrated Energy Systems	9,500	16,000	-
Total, Reactor Concepts Research, Development, and Demonstration	**127,800**	**176,800**	**127,059**

Explanation of Changes for Reactor Concepts Research, Development, and Demonstration

The increase in the ART budget from $73.8 million to $92.059 million reflects increased activities to enable initiation of dry criticality of the MARVEL microreactor in addition to the development of artificial intelligence tools to accelerate the deployments of advanced reactors.

No funding is being requested for IES in FY 2027. Activities will continue at a reduced level by utilizing prior year appropriations.

[1] No funding was requested for Advanced Small Modular Reactor RD&D in FY 2026.

Fuel Cycle Research and Development

Overview

The Fuel Cycle Research and Development (FCR&D) program conducts applied research and development (R&D) on advanced fuel cycle technologies that improve resource utilization and energy generation, and limit proliferation risk. The FCR&D program also contributes to the Department's policies and programs for ensuring a secure, reliable, and economic nuclear fuel supply for both existing and future reactors.

The FCR&D program also has the responsibility for the disposition of U.S. used nuclear fuel (UNF) and high-level radioactive waste (HLW), as stated in the Nuclear Waste Policy Act of 1982, Public Law 97–425, as amended. The Department remains committed to fulfilling its legal obligation to properly manage and dispose of this material, thereby reducing the Federal Government's estimated UNF liabilities. The program also supports R&D on multiple advanced fuel technologies that hold promise for enhanced performance and improved economics or are an important element in the development of the next generation of reactor designs.

A critical focus of the FCR&D program is supporting the availability of High-Assay Low-Enriched Uranium (HALEU) for civilian domestic research, development, demonstration, and commercial use. The program is ensuring HALEU is available in the near-term while establishing a long-term commercial HALEU and strengthened LEU supply chain capable of supporting deployment of advanced reactor technologies and continued operation of the existing commercial nuclear fleet.

Highlights of the FY 2027 Budget Request

The Material Recovery and Waste Form Development (MRWFD) subprogram will focus on advancements in nuclear fuel recycling and waste treatment technologies. Key areas of development include aqueous and vapor phase actinide separation, recovery of HALEU from Advanced Test Reactor (ATR) used nuclear fuel (Recovery of Critical Assets Pilot Program or RECAPP), off-gas and waste form improvements, and pyro/molten salt processing techniques. The overall goal is to develop more efficient, scalable, and cost-effective methods for nuclear fuel recycling, separation of valuable materials, and waste reduction. MRWFD program also coordinates with the private industry to offer public-private partnerships through competitive, cost-share program to pilot approaches to reprocess used nuclear fuel for use in new energy applications, such as medicine and industry applications. MRWFD program will be restructured to realign the subprograms to fit with domestic reprocessing and recycling options to close the fuel cycle to support long-term sustainability and efficient waste management in the U.S.

The Accident Tolerant Fuels (ATF) subprogram focuses on industrializing nuclear fuel technologies, including testing support for industrial design and licensing needs. Commercial reactor irradiated fuel will be shipped to national laboratories, and industrial contracts for ATF will be continued based upon annual appropriations. The National Reactor Testbed will be utilized to support ATF industrial partners' licensing needs, and Post Irradiation Examination (PIE) on ATF commercial reactor irradiated fuel will continue. Separate effects testing on ATF samples will also continue. Progress will be made toward establishing and enhancing experimental infrastructure to support commercial nuclear reactor research demands.

In FY 2027, the Next Generation Fuels (NGF) subprogram will focus on advanced nuclear fuel research and will concentrate on several key areas to enhance reactor performance and safety. Research will be performed on advanced nuclear fuel systems that support a range of advanced LWR and Non-LWRs. Metallic fuels will focus on qualification, improved fabrication, safety testing, and next-generation technologies for sodium-cooled fast reactors. Molten salt fuel research will focus on development of synthesis and purification technologies,

establishment of fuel standards, and implementation of comprehensive irradiation testing. Silicon-carbide cladding will undergo continued fabrication development, testing, and performance code development. NE will issue a call for proposals for innovative fuel systems to enhance LWR performance. Research on coated fuel particles (TRISO) will involve completing post-irradiation examination and safety testing while also developing future testing plans. Finally, advanced physics testing will focus on developing the System Physics Advanced Reactor Critical (SPARC) reactor physics test platform and a five-year plan for critical experiments.

In FY 2027, the Advanced Nuclear Fuels Availability (ANFA) subprogram will be funded using carryover appropriations from previous fiscal years. The subprogram supports the availability of HALEU for civilian domestic research, development, demonstration, and commercial use. Activities include recovery and down-blending of limited excess quantities of Department of Energy (DOE) uranium inventories.

The ANFA subprogram complements activities funded under the Inflation Reduction Act of 2022 (Public Law 117-169, August 16, 2022), Section 50173 (the IRA), and activities authorized by; the National Defense Authorization Act for Fiscal Year 2024 (Public Law 118-31, December 22, 2023), Section 3131 (the NDAA) and funded under Section 312 of the Consolidated Appropriations Act for FY 2024 which reallocates funds from the Civil Nuclear Credit program under the Infrastructure Investment and Jobs Act (Public Law 117-58) to directly support the supply chains for both LEU and HALEU.

Fuel Cycle Laboratory R&D subprogram will focus on key areas to include innovative nuclear materials research aimed at next-generation fuel cladding through advanced manufacturing and novel coatings; enhanced capabilities in Innovative Process Control (IPC), focusing on quantitative measurements and fission product removal; advancements in Materials Protection, Accounting, and Control Technologies (MPACT), including holdup monitoring, analyzing data obtained from molten salt sampler and microcalorimeter, and nuclear material accounting for fuel fabrication; and comprehensive Systems Analysis and Integration (SAI) efforts to develop nuclear outlooks (coordinated with the Integrated Energy Systems program), support the assessment of recycling fuel cycle economics, facilitate rapid deployment of advanced reactors, and support HALEU market sustainability.

Material Recovery and Waste Form Development ($52.4 million)
The Material Recovery and Waste Form Development (MRWFD) subprogram conducts applied R&D on advanced fuel recycling technologies that have the potential to improve resource utilization and energy generation by maximizing the recovery and reuse of valuable components in used nuclear fuels, reduce waste generation significantly reducing the amount of geological waste, and manage potential proliferation risks. The subprogram includes developing advanced fuel recycling technologies aimed at technology transfer to industry and addressing fundamental materials separations and recovery challenges that present significant degrees of technical risks and financial uncertainties. These recycling facility demonstrations will compliment broader DOE priorities and R&D.

MRWFD provides unique nuclear chemistry expertise and technical capabilities in separation technologies to a broad range of applications by seeking a fundamental understanding of various chemical challenges related to civil nuclear applications. FY 2027 planned activities include scale-up of advanced chemical decladding (RECAPP), advanced voloxidation and direct extraction to kg engineered scale with UNF and at fractional pilot scale (e.g 1/4 or 1/3 scale) using surrogate materials

Specific R&D includes:

- Development of advanced separations technologies to maximize the recovery and reuse of useful components in used nuclear fuel;
- Exploit principles of coordination chemistry to simplify actinide separations (e.g. first-of-a-kind aqueous, pyro, and hybrid technologies);
- Understand and manage radiation effects on materials and processes;
- Develop advanced waste forms to efficiently immobilize fission products;
- Design robust materials for separations of gas-phase species; and
- Support United States commercial industry, leveraging safeguards and security by design, to recover useful materials that support domestic supply chain resiliency in nuclear fuels, medical, and industrial applications.
- Development of improvements to pyrochemical unit operations to bridge technical gaps to commercial deployment, improve efficiencies, and provide additional processing options for advanced reactor fuel cycles.

Mining, Conversation, and Transportation ($1.4 million)

The Office of Nuclear Energy (NE) supports uranium mining R&D to continuously revitalize and strengthen the domestic uranium mining industry to benefit the entire front-end of the U.S. nuclear fuel cycle. De-risking the uranium mining technology will help fulfill the Department's goal in unleashing commercial nuclear power in the United States.

In-situ recovery (ISR) technology is the most cost effective and environmentally acceptable uranium mining method in the United States. The Mining, Conversion, and Transportation subprogram has assembled a technical assistant team with ISR experts from Brookhaven, Idaho, Los Alamos, Oak Ridge, and Pacific Northwest National Laboratories. The subprogram goals are to support the uranium mining industry to reduce ISR technology costs and technical uncertainties, accelerate advances, and regain American leadership in ISR technology.

Specific R&D efforts supported by this subprogram include:

- advanced in-situ sensors and monitoring systems and characterization capabilities,
- groundwater solution chemistries and associated biological effects,
- subsurface geological conditions and geo-physical characterization, and
- modeling and computation with an emphasis on using artificial intelligence and machine learning tools.

In FY 2027, this subprogram will continue supporting technical experts at DOE national laboratories to develop innovative technologies to improve in-situ uranium extraction efficiency and resource utilization for domestic uranium mining industry.

Accident Tolerant Fuels ($87.4 million)

The Accident Tolerant Fuels (ATF) subprogram mission is to enable near-term Light Water Reactor (LWR) nuclear fuel technologies to support the commercial nuclear industry to enhance the performance and safety of commercial U.S. reactors. In collaboration with nuclear fuel vendors, the ATF subprogram conducts fundamental research and testing, develops and modernizes laboratory infrastructure, and performs post-irradiation examinations (PIE) through testing in commercial light water reactors (LWR) as well as through use of national laboratory irradiation and testing infrastructure. The subprogram will meet the objectives of the Nuclear Energy Innovation and Modernization Act (NEIMA) (Public Law 115-439), and as re-established by the ADVANCE Act of 2024 (division B of Public Law 118-67) towards making commercial nuclear reactor

fuel more resistant to transients and lowering the cost of electricity. Both the NEIMA and ADVANCE Act provide objectives for the near-term ATF technologies towards enhanced safety and economics.

Nuclear fuel designs with enhanced accident tolerance are intended to provide further safety and performance benefits in comparison to the current UO_2-Zircaloy systems used by the nuclear industry today. These benefits may include in-reactor performance enhancements in normal, transient, and abnormal conditions. In additional benefits may include reduced handling or storage requirements by reducing discharged-from-service UNF assemblies. Additionally, the use of ATF will enable utilities to consider additional power uprates, a significant potential for improved utility economics that directly supports U.S. energy dominance.

The U.S. nuclear fuel suppliers are developing near-term concepts towards industrialization in the areas of coated claddings and nuclear fuel. In FY 2027 Phase 3, commercialization, continues focusing on performance testing of near-term irradiated samples, including from commercial reactors, and PIE. The primary objective of Phase 3 is for near-term technologies to reach industrialization whereby industry will lead further deployment activities. By the end of Phase 3, one or more nuclear fuel vendors will have succeeded in using ATF near-term technologies to affect commercial plant safety and capacity enhancements consistent with recent executive orders.

Next Generation Fuels ($60.6 million)
The Next Generation Fuels (NGF) subprogram mission is to perform R&D to revolutionize performance and safety of existing commercial U.S. reactors and advanced LWRs including Small Modular Reactors (SMR) and non-LWRs in coordination with industrial stakeholders, including early engagement with regulatory bodies, as appropriate. NGF laboratory-based R&D lays the groundwork for nuclear fuel designs that significantly outperform today's fuel, focusing on long-term, high-reward nuclear fuel concepts and will continue to drive innovation over the long term.

As a single subprogram with a common purpose, NGF is focused on long-term fuel development efforts including:

- Silicon carbide cladding for LWR applications,
- Long-term Innovative Fuel Systems (IFS),
- Metallic fuel,
- Advanced coated particle fuel technologies,
- Molten salt fuels, and
- System Physics Advanced Reactor Critical (SPARC).

IFS are long-term high-risk high-reward technologies nuclear fuel system concepts that have great potential to provide even better performance than the near-term ATF subprogram activities described in the preceding section.

Metallic fuel development can assist industry in qualifying the fuel for use in demonstration reactors with long-term improvements. The Leading Innovation in Fuel Technology (LIFT) activity develops the data and methods that support industry and non-LWR advanced reactor developers, such as Sodium-cooled Fast Reactors. Metallic fuel is also important for recycle-driven fuel cycle scenarios under consideration in the United States and can build on these research activities. The subprogram will establish a reference fuel performance using legacy data and modern tools to fill the knowledge gaps.

Investigation of coated particle fuel technologies may extend the existing Tristructural-isotropic (TRISO) particle fuel development and qualification activities and support non-LWR designs. TRISO fuel also has applications for other reactor concepts such as molten salt-cooled high temperature reactors, microreactors, and

nuclear thermal propulsion. Irradiation, safety testing, and PIE of TRISO fuel continue to provide data for fuel development and qualification in support of industry efforts to establish a domestic commercial TRISO fuel fabrication capability.

Molten salt fuels are of interest to advanced molten salt reactor developers and require R&D to increase technology readiness levels and derisk commercial deployment. Molten salt fuels activities support the development of optimized and scalable fuel salt synthesis and purification technologies, fuel salt specifications, methods of quantifying fuel salt impurities, and comprehensive irradiation and post-irradiation testing capabilities.

Advanced physics testing in the System Physics Advanced Reactor Critical (SPARC) will enable new fuel designs, configurations, and materials performance to be tested in a physics experiments facility established at the Idaho National Laboratory (INL), in a reactor building once used for the historic Special Power Excursion Reactor Test IV studies. This type of zero-power reactor will provide key benchmarking data for designing, optimizing and licensing advanced reactors and the fuel concepts while providing critical safety data important to the manufacture, shipping, and storage of advanced nuclear fuel systems. SPARC Horizontal Split Table (HST) will represent the nuclear physics of reactors fueled with advanced LWR fuel assemblies, TRISO fuel composites, metallic fuel fast reactor designs, and captures the physics needs of essentially all other systems of interest.

Advanced Nuclear Fuels Availability ($0)
The FY 2027 Budget assumes receipts credited to the American Energy Independence Fund (AEIF) as discretionary offsetting collections during this fiscal year, as authorized by section 312(a) of title III of division D of Public Law 118-42, shall be available until expended to carry out the purposes of the Fund. Activities under the ANFA subprogram will be funded using receipts credited to AEIF and any carryover appropriations from previous fiscal years.

- Under the ANFA subprogram in FY 2027, activities will continue to support recovery and down-blending of limited excess quantities of DOE uranium inventories to meet the needs and schedules of advanced reactor developers. At INL, activities will continue to support accelerated treatment of EBR-II driver fuel to produce HALEU metal and enable a successful outcome to the commitment established between DOE and the State of Idaho for completing EBR-II driver fuel treatment prior to December 31, 2028, as stipulated in the 2019 Supplemental Agreement to the 1995 Idaho Settlement Agreement. Activities to support purification of EBR-II reguli and conversion to produce HALEU oxide will also continue.
- At Savannah River Site (SRS), activities will continue to support downblending limited separated inventories of purified HEU solution in H-Canyon storage to produce HALEU as uranyl nitrate solution. Final scope of production is limited to approximately 3.1 MTU HALEU, funded by NE, will begin in FY 2028, and is governed by the February 2023 Memorandum of Agreement between NE and the Office of Environmental Management, Savannah River Operations Office.
- At the American Centrifuge Plant in Piketon, Ohio, HALEU produced by the HALEU enrichment demonstration cascade in previous fiscal years will be stored in FY 2027 and outyears until licensed transportation packaging and a deconversion capability is available.

The ANFA subprogram complements activities funded under IRA Section 50173 including:

- Supporting the availability of HALEU for civilian domestic research, development, demonstration, and commercial use,
- Development of criticality benchmark data in support of the U.S. Nuclear Regulatory Commission (NRC),
- Grant opportunities for research, development, and acquisition of NRC certification for HALEU transportation packages, and
- Grant opportunities for innovative technologies to address gaps, enhance current processes, and advance new technologies to produce HALEU.

Finally, the ANFA subprogram complements authorizations under the NDAA to support domestic uranium mining, conversion, and enrichment, including domestic production of LEU and HALEU to meet the needs of advanced reactor developers and the consortium. In FY 2026, the Department announced competitive Task Order awards for domestic commercial LEU enrichment and HALEU enrichment funded under Section 312 of the Consolidated Appropriations Act for FY 2024 which reallocates funds from the Civil Nuclear Credit program under the Infrastructure Investment and Jobs Act (Public Law 117-58) to directly support the supply chains for both LEU and HALEU.

Fuel Cycle Laboratory ($16.7 million)

This subprogram supports research activities that advance knowledge of nuclear fuel cycles and provide transformative innovations to accelerate development of civil nuclear technologies, including consideration of fuel cycle impacts from the potential deployment of advanced reactor technologies. It includes activities in Materials Protection, Accounting and Control Technologies (MPACT), Systems Analysis and Integration (SAI), Innovative Nuclear Materials (INM), and Innovative Process Control (IPC).

MPACT develops innovative technologies, analysis tools, and advanced integration methods to enable U.S. domestic nuclear materials management, to enable safeguards for emerging nuclear fuel cycles and to address vulnerabilities in current nuclear systems while managing potential proliferation risks. Addressing U.S. energy security needs requires innovative approaches to material control and accounting (MC&A) to ensure that nuclear material is not misused, diverted, or stolen. In FY 2027 MPACT will optimize TRISO fuel fabrication MC&A plans and apply MPACT-developed technology to address U.S. industry needs including measurement technology, models, and educational approaches.

SAI activities include strategic planning and analysis as well as integrated evaluation of Fuel Cycle Laboratory R&D subprogram activities. It provides the critical capability needed to analyze complex fuel cycle system options, project nuclear fuel and demand for grid electricity under various scenarios, assess overall nuclear technology readiness, evaluate fuel cycle cost to ensure nuclear energy competitiveness and economic viability, and improve understanding of the interdependencies between various subsystems and associated technologies. In FY 2027, SAI aims to further develop strategies to enhance the resilience and capacity of the fuel supply chain for deploying advanced reactors, including ongoing techno-economic market analysis, site assessments, and updating the compendium report on advanced nuclear technologies.

INM activities continue focusing on longer-term cladding and in-core materials discovery and development for advanced nuclear energy systems applications. The goals are to develop new tools, techniques, and capabilities at national laboratories to accelerate the pace of new materials discovery, building on recent advances in artificial intelligence, machine learning, theory, modeling, and computing, and advanced characterizations. More specifically, innovative approaches are needed to develop advanced metallic alloys and composite materials that are optimized to meet new reactor performance targets within the reactor core and fuel cladding, and includes recycling of Zircaloy cladding material, which is the second largest mass in used fuel assemblies.

In FY 2027, INM will complete a new cladding barrier development and demonstrate its capability to inner-wall coating to cladding tubes; enhance fabricating reactor grade thin wall tubes by solid phase processing and pilgering; conduct engineering work to test INM fast reactor cladding materials in existing test reactors and perform further post-irradiation examination (PIE).

Innovative Process Control (IPC) activities support foundational research to innovate the fuel cycle process and associated control technologies. The goals are to enhance advanced fuel recycle processes through development of lower-TRL technologies to maximize the potential of future U.S. advanced recycling deployments. In FY 2027, IPC will develop supporting technologies, such as salt management techniques, for molten salt systems, simplified but advanced processes that reduce the cost of plant construction and operations.

Fuel Cycle Research & Development
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Material Recovery & Waste Form Development	33,000	57,000	52,375
Mining, Conversion, & Transportation	1,500	1,500	1,425
Accident Tolerant Fuels	97,900	98,000	87,400
Next Generation Fuels	65,500	92,000	60,600
Advanced Nuclear Fuels Availability	126,500	123,500	0
Fuel Cycle Laboratory R&D	16,000	16,000	16,700
Integrated Waste Management	57,500	55,000	0
Used Nuclear Fuels Disposition R&D	47,000	47,000	0[1]
Total, Fuel Cycle Research & Development	**444,900**	**490,000**	**218,500**

Explanation of Changes for Fuel Cycle Research & Development

Material Recovery & Waste Form Development (-$4.6 million)
The budget decrease from FY 2026 reflects the program's shifting priority to close the gap between R&D and demonstration. The technologies have the potential to improve resource utilization and energy generation, reduce waste generation by maximizing the recovery and reuse of valuable components and manage potential proliferation risk.

Mining, Conversion, & Transportation (-$75 thousand)
The budget decrease from FY 2026 reflects a continuation of ongoing activities.

Accident Tolerant Fuels (-$10.6 million)
The budget decrease from FY 2026 reflects industry commercialization of ATF technologies. The Department will continue to prioritize R&D that supports industry toward high-reward nuclear fuel concepts that will enhance reactor safety and performance.

[1] The budget decrease from FY 2026 reflects subprogram activities previously associated with Integrated Waste Management System and Used Nuclear Fuels Disposition R&D now being funded under the new, combined control point in a separate congressional request titled "Used Nuclear Fuel and High-Level Waste Disposition."

Next Generation Fuels (-$31.4 million)
The budget decrease from FY 2026 reflects anticipated commercialization of technologies. The Department will continue to prioritize long-term, high-reward R&D towards nuclear reactor enhancements in the area of safety and performance.

Advanced Nuclear Fuels Availability (-$123.5 million)
The budget decrease from FY 2026 reflects activities under the ANFA subprogram will be funded using carryover appropriations from previous fiscal years. The FY 2027 Budget assumes receipts credited to the AEIF as discretionary offsetting collections during this fiscal year.

Integrated Waste Management System (-$55 million)
The budget decrease from FY 2026 reflects subprogram activities previously associated with Integrated Waste Management System and Used Nuclear Fuels Disposition R&D now being funded under the new, combined control point in a separate congressional request titled "Used Nuclear Fuel and High-Level Waste Disposition."

Used Nuclear Fuels Disposition R&D (-$47 million)
The budget decrease from FY 2026 reflects subprogram activities previously associated with Integrated Waste Management System and Used Nuclear Fuels Disposition R&D now being funded under the new, combined control point in a separate congressional request titled "Used Nuclear Fuel and High-Level Waste Disposition."

Used Nuclear Fuel and High-Level Waste Disposition

Overview

The Used Nuclear Fuel and High-Level Waste Disposition program is critical to ensuring the safe and secure long-term management of the nation's used nuclear fuel (UNF)[1] and high-level radioactive waste (HLW), fulfilling the mandate established by the Nuclear Waste Policy Act of 1982, Public Law 97–425, as amended. The Department remains committed to fulfilling its legal obligation to properly manage and dispose of this material, thereby reducing the Federal Government's estimated UNF liabilities. The program supports development and implementation of a Federal integrated waste management system. This system encompasses the structured and coordinated processes for the safe, secure, and environmentally responsible storage, transportation, and eventual permanent disposal of UNF and HLW. Additionally, the program evaluates storage, transport, and disposal considerations and costs for advanced reactor nuclear fuel forms, higher burnup, and higher enrichment fuels.

Highlights of the FY 2027 Budget Request

The Used Nuclear Fuel & High-Level Waste Disposition program is dedicated to advancing the responsible management of the nation's UNF and HLW. This involves prioritizing critical path activities, such as supporting the current commercial nuclear fleet by shipping and opening the high burnup research cask to collect data on the safety of higher burnup fuel, performing generic engineering and scientific studies for future geologic repositories, funding the Center for Used Fuel Research, and continuing the development of necessary infrastructure for a Federal integrated waste management system.

Used Nuclear Fuel and High-Level Waste Disposition ($102 million)
The current budget structure delineates the Used Nuclear Fuel Disposition (UNFD) and Integrated Waste Management System (IWMS) subprograms within the Fuel Cycle R&D congressional control. The FY 2027 Budget proposes to combine the UNFD and IWMS subprograms into a single congressional control: 'Used Nuclear Fuel & High-Level Waste Disposition.' This consolidation aims to streamline operations and enhance strategic focus on the nation's disposition mission, establishing it as an independent congressional control, distinct from Fuel Cycle R&D.

This Used Nuclear Fuel and High-Level Waste Disposition subprogram supports the development and implementation of Federal plans for the long-term management of UNF and HLW. It conducts engineering studies, targeted research, technology development, and program planning for the long-term disposition of UNF and HLW, in line with Executive Order 14302, "Reinvigorating the Nuclear Industrial Base," and consistent with the Nuclear Waste Policy Act of 1982, Public Law 97–425, as amended.

UNF and HLW Disposition focused activities include:

- In line with the Nuclear Waste Policy Act, conduct generic engineering studies and limited modeling for siting a future Federal deep geological repository;
- Public outreach and communication related to long-term management of UNF and HLW;
- Shipping the high burnup research cask from Virginia to Idaho in fall of 2027;
- Funding the Center for Used Fuel Research to address identified high risk technical issues to the long-term management and disposal of UNF; and

[1] The term "used nuclear fuel" is intended to be synonymous with the term "spent nuclear fuel" as used and defined in the Nuclear Waste Policy Act of 1982, as amended, and the Standard Contract for the Disposal of Spent Nuclear Fuel and/or High-Level Radioactive Waste (10 CFR Part 961).

- Focusing the design of a Federal staging facility(ies) and associated transportation system(s) to serve as an initial step towards either a repository, reprocessing facility, or interim storage.

Used Nuclear Fuel and High-Level Waste Disposition
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Used Nuclear Fuel Disposition	47,000	47,000	-
Integrated Waste Management System	57,500	55,000	-
Used Nuclear Fuel and High-Level Waste Disposition	-	-	102,000

Explanation of Changes for Used Nuclear Fuel and High-Level Waste Disposition

Used Nuclear Fuels Disposition R&D (-$47 million)
The budget decrease reflects the merger of the Integrated Waste Management System and Used Nuclear Fuel Disposition subprogram activities previously under the Fuel Cycle R&D congressional control to a separate congressional control Used Nuclear Fuel & High-Level Waste Disposition.

Integrated Waste Management System (-$55.0 million)
The budget decrease reflects the merger of the Integrated Waste Management System and Used Nuclear Fuel Disposition subprogram activities previously under the Fuel Cycle R&D congressional control to a separate congressional control Used Nuclear Fuel & High-Level Waste Disposition.

Used Nuclear Fuel and High-Level Waste Disposition (+$102 million)
The budget increase reflects the merger of the Integrated Waste Management System and Used Nuclear Fuel Disposition subprogram activities previously under the Fuel Cycle R&D congressional control to a separate congressional control Used Nuclear Fuel & High-Level Waste Disposition.

Nuclear Energy Enabling Technologies

Overview

The Nuclear Energy Enabling Technologies (NEET) program conducts research and development (R&D) and makes strategic investments in research capabilities to develop innovative and crosscutting technologies that resolve nuclear technology development issues to enable continued operation of existing U.S. nuclear reactors, enable deployment of advanced nuclear reactors, and enable the development of advanced nuclear fuel cycles. The NEET program budget request is organized into five subprograms: (1) Advanced Materials and Manufacturing Technologies (AMMT), (2) Advanced Sensors and Instrumentation (ASI), (3) Nuclear Energy Advanced Modeling and Simulation (NEAMS), (4), Nuclear Science User Facilities (NSUF), and (5) Gateway for Accelerated Innovation in Nuclear (GAIN).

Highlights of the FY 2027 Budget Request

- NEAMS will demonstrate basic operational transient capabilities for thermal and fast molten-salt reactors (MSRs) by coupling reactor physics, thermal hydraulics, and evolving chemistry.
- AMMT will complete the development of ASME 316H laser powder bed fusion code case and continue irradiation and post-irradiation examinations of alloy 709 and laser powder bed fusion 316H for nuclear reactor applications.

Advanced Materials and Manufacturing Technologies (AMMT) ($14,000,000)

Advanced Materials and Manufacturing Technologies (AMMT) accelerates the development, qualification, demonstration, and deployment of advanced materials and manufacturing technologies in support of the U.S. leadership in a broad range of nuclear energy applications. The vision of AMMT is the expansion of reliable and economical nuclear energy enabled by advanced materials and manufacturing technologies. Four major technical areas were established to realize the mission and vision of the AMMT program:

- Advanced Materials and Manufacturing - addresses stakeholders' needs through integrated material and manufacturing technologies development to accelerate readiness and provide effective, economic solutions for the nuclear industry.
- Rapid Qualification - establishes a qualification framework for new materials to enable their timely deployment in advanced reactors more rapidly than current standards.
- Environmental Effects - addresses materials degradation for topics that are not covered by current codes and standards, including corrosion and irradiation effects on mechanical properties allowing for long term predicted performance.
- Technology Maturation - advances a technology by increasing its technology readiness level by moving it from concept through technology demonstration and validation to a reliable and scalable solution ready for real-world applications.

Advanced Sensors and Instrumentation (ASI) ($5,000,000)

Advanced Sensors and Instrumentation (ASI) conducts R&D of sensors, instrumentation and controls to support the continued operation of the existing reactor fleet, to address critical measurement technology gaps identified by the advanced reactor developer community, and to support nuclear fuel cycle development. By leveraging engagement with the U.S. national laboratories, universities, and private industry, ASI coordinates R&D to foster technology maturation from initial concept to commercial product. ASI engages directly with other programs in the Office of Nuclear Energy (NE) and with advanced reactor developers to inform its R&D, with its goals and R&D priorities published in the Advanced Sensors and Instrumentation Roadmap, updated annually.

- Develop high performance and rugged sensors for the harsh environments of advanced reactors to measure parameters such as pressure, temperature, and radiation.
- Enhance novel measurement methods and sensor performance in irradiation experiments for nuclear fuels and sensor qualifications.
- Develop methods for sensor integration into existing and future advanced reactor control systems to enhance operational efficiency and safety for the broader industry.
- Expand the development of artificial intelligence (AI) and machine learning (ML) techniques for nuclear industry applications, such as for autonomous control systems, digital twins, and sensor architecture improvements.

Nuclear Energy Advanced Modeling and Simulation (NEAMS) ($28,600,000)

Nuclear Energy Advanced Modeling and Simulation (NEAMS) develops and deploys a set of predictive modeling and simulation tools to support deployment of new nuclear reactor designs and more economic operation of existing nuclear reactors. NEAMS tools provide fundamental insights that are unattainable through experiment alone, inform experiment selection, drive design, and minimize the cost of research, development, and deployment. These modeling and simulation capabilities are extremely flexible and able to accommodate different reactor types and designs.

- For the existing fleet, NEAMS tools address core performance optimization issues and accelerate development of fuels with enhanced accident tolerance to help assure the long-term availability and market competitiveness of nuclear energy.
- For advanced reactor technologies, NEAMS tools help industry accelerate development and meet otherwise cost-prohibitive data needs.
- These tools also help support Nuclear Regulatory Commission (NRC) efforts to address its confirmatory analysis needs.

Nuclear Science User Facilities (NSUF) ($36,000,000)

The Nuclear Science User Facilities (NSUF) is the foremost mechanism for gaining access to user facilities for nuclear energy research. As a consortium of partner sites, NSUF provides users from industry, laboratories, and universities access through competitive solicitations to highly specialized nuclear energy capabilities and infrastructure. On an annual basis, researchers propose projects to be conducted at these unique facilities, with timelines ranging from a few months to several years. When projects are awarded, the NSUF funds the technical experiment and laboratory services at the partner user facilities.

The principal focus areas include awarded research for irradiation and post-irradiation examination, high-performance computing (HPC), and capability development as follows:

- The NSUF competitively supports irradiation and post-irradiation examination user access projects to accelerate emergent and innovative nuclear fuel and materials research. User projects include access to research and test reactors such as the Advanced Test Reactor at Idaho National Laboratory, hot cells, beamline capabilities, irradiation capabilities, irradiation experiment design, test fabrication support, and expert technical support.
- HPC supports scientific computing capabilities to enable nuclear energy advanced energy modeling and simulation, artificial intelligence, and digital twin activities. Four HPC supercomputers are planned to be in operation at Idaho National Laboratory including NE's flagship system called Teton.
- Capability development includes the Nuclear Fuels and Materials Library which supports the curation of a collection of high-value neutron irradiated fuel and material specimens accessible to industry and other users from prior irradiation test campaigns and real-world components retrieved from decommissioned power reactors. The NSUF program also supports the development of artificial intelligence tools and autonomous laboratory capabilities to reduce the time and cost for irradiation and post-irradiation examination testing with the goal to accelerate nuclear energy research and deployment.

Gateway for Accelerated Innovation in Nuclear ($10,000,00)

The Gateway for Accelerated Innovation in Nuclear (GAIN) facilitates access for industry and other stakeholders to the technical, regulatory, and financial support necessary to move advanced nuclear technologies toward commercialization and ensure the continued reliable and economic operation of the existing fleet.

GAIN provides direct support to the nuclear industry by:

- Supporting nuclear technology cost projection updates and capacity expansion modeling efforts
- Curating and maintaining legacy documents from demonstration reactors and other significant experiments dating back to the 1950s
- Examining and enhancing contracting mechanisms to more effectively collaborate with industry; and
- Hosting topic-specific workshops and coordinating National lab visits for industrial partners.

In addition, GAIN provides technical assistance to a wide range of stakeholder groups considering nuclear energy as an appropriate fit for their unique energy needs and objectives. In FY 2027, the Department expects that these activities will increase in importance as more States and local communities consider nuclear energy deployment.

On a quarterly basis, GAIN provides competitive opportunities for cost-shared research at the Department's national laboratories to resolve specific technical issues hindering the deployment of nuclear technologies.

Nuclear Energy Enabling Technologies
Funding ($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Advanced Materials and Manufacturing Technologies	14,082	24,000	14,000
Advanced Sensors and Instrumentation	5,682	5,000	5,000
Nuclear Energy Advanced Modeling and Simulation	28,500	28,600	28,600
Nuclear Science User Facilities	34,500	45,500	36,000
Gateway for Advanced Innovation in Nuclear	11,000	10,000	10,000
Total, Nuclear Energy Enabling Technologies	**93,764**	**113,100**	**93,600**

Explanation of Changes for Nuclear Energy Enabling Technologies

AMMT – The reduction (-$10,000,000) from $24,000,000 to $14,000,000 reflects a rebaselining after a limited directed increase for the specific purpose of continuing the development of additive manufacturing from forest product feedstock and secondary supporting materials, including metals, ceramics, polymers, and others, aiding in developing a U.S. supply chain for energy system technologies and small modular nuclear reactors.
NSUF – The decrease (-$9,500,000) from $45,500,000 to $36,000,000 reflects a reduction in support for computational user support, advanced computational architecture hardware, and artificial intelligence tool activities. Computational user support and hardware reduction (-$6,000,000) is associated with an adjusted program focus on supporting existing HPC systems at Idaho National Laboratory such as the Teton supercomputer. The artificial intelligence tool reduction (-$3,500,000) reflects a shift to only support the initial development of artificial intelligence tools associated with accelerating irradiation and post-irradiation examination testing.

Advanced Reactor Demonstration Program

Overview

The Advanced Reactor Demonstration Program (ARDP) focuses Departmental and non-federal resources on supporting the development of commercially promising advanced reactors that have the potential for near and mid-term demonstration and commercial deployment and addressing challenges hindering their deployment. The elements of the ARDP program are consistent with the Administration's energy dominance agenda by developing and deploying advanced commercial nuclear power plants for domestic utilities that are safe, economical, and reliable and to reestablish the United States as the leader in nuclear technologies, in accordance with the May 2025 nuclear energy Executive Orders. Pursuant to these Executive Orders, ARDP will help unleash American energy by accelerating advanced reactor testing, accelerating deployment of new nuclear reactor technologies, and enabling regulatory reform.

The ARDP research and development elements leading to demonstration include these four major elements:

- National Reactor Innovation Center (NRIC) – Supports testing, demonstration, and performance assessment to accelerate deployment of advanced reactors through development of advanced nuclear energy technologies by utilizing the unique DOE national laboratory facilities and capabilities
- Risk Reduction for Future Demonstrations – Supports cost-shared (up to 80% government, not less than 20% industry) partnerships with U.S.-based teams to address technical, operational, and regulatory challenges to enable development of a diverse set of advanced nuclear reactor designs for future demonstration
- Regulatory Development – Coordinates activities with the Nuclear Regulatory Commission (NRC) and U.S. industry to address and resolve key regulatory framework and licensing technical issues that directly impact the "critical path" to advanced reactor demonstration and deployment
- Advanced Reactor Safeguards and Security – Evaluates safeguards and security issues that are unique to advanced reactors to help reduce roadblocks by solving regulatory challenges, reducing safeguards and security costs, and utilizing the latest technologies and approaches for plant monitoring and protection

The ARDP demonstration element supports cost-shared (up to 50% government, not less than 50% industry) demonstration projects designed to facilitate U.S. private industry's development of advanced reactors that are safe, reliable, licensable, and commercially viable. The two ongoing ARDP Demonstration projects and the five Risk Reduction projects are working to overcome barriers to future deployments to unleash American energy and prosperity, through affordable, reliable, and secure energy.

Highlights of the FY 2027 Budget Request

In FY 2027, the first test of a microreactor concept in the NRIC Demonstration of Microreactor Operations (DOME) test bed will be completed.

In FY 2027, execution of the Holtec Risk Reduction award will be complete to advance design, engineering, and licensing activities to accelerate future demonstration of its light water-cooled small modular reactor (SMR).

National Reactor Innovation Center (NRIC) enables and accelerates the testing and demonstration of advanced reactors by utilizing the unique capabilities of U.S. national laboratories. NRIC ensures that the strategic infrastructure and assets of the national laboratories are available to enable physical validation of advanced nuclear reactor concepts, resolve technical uncertainties, and generate data relevant to safety, resilience, security, and functionality of advanced nuclear reactor concepts. NRIC works closely with R&D

programs within the Office of Nuclear Energy to avoid duplication. NRIC does not conduct R&D; it ensures the connectivity necessary to enable the demonstration of selected nuclear reactor technologies and designs.

The NRIC subprogram activities include interactions with reactor developers who are considering options for demonstrating their reactor technologies as well as development of national laboratory capabilities for hosting advanced reactor demonstrations and tests. While NRIC is led by Idaho National Laboratory (INL) with significant activities at the INL Site, resources at other national laboratories and potential nuclear reactor demonstration sites play an important role in achieving NRIC's objectives.

NRIC helps accelerate technology readiness of advanced reactors to meet the energy needs of the future. Key support to be provided by NRIC includes:

- Continuing execution of NRIC Launch Pad to provide an enduring capability for the rapid development and implementation of advanced nuclear technologies by private industry. Launch Pad builds on DOE's reactor and fuel line pilot programs (Established per Executive Order 14301) and expands beyond authorization to include the testing and operation necessary to scale first-of-a-kind technologies toward widescale commercial deployment.
- Establishing and maintaining testing capabilities at DOE national laboratories to enable development and future demonstration of advanced reactor technologies
- Developing complementary technologies, in conjunction with relevant Nuclear Energy R&D programs, such as application of digital engineering philosophies and development and proof of concept of advanced construction technologies, to reduce the cost and schedule risks associated with the deployment of advanced reactors
- Assisting with environmental reviews, as appropriate, and DOE authorization related to testing of advanced reactor technologies
- Developing a resource network of sites, facilities, and capabilities suitable for performing key R&D, experiments, tests, or fabrications, and for hosting advanced reactor demonstrations
- Identifying and facilitating resolution of experimental capability gaps which are vital to advanced reactor development and demonstration

A key FY 2027 activity for NRIC includes support for establishing infrastructure for the testing of multiple advanced reactor concepts. The Demonstration and Operation of Microreactor Experiments (DOME) test bed will be capable of hosting experiments to support testing and development of microreactor technologies. DOME is located at the former Experimental Breeder Reactor II facility at INL to support this new mission. NRIC has partnered with several microreactor developers to complete engineering and experimental design activities to enable future testing of their technologies in DOME to generate data to support design and licensing activities. In FY 2027, the first test of a microreactor concept in DOME will be completed. Activities to support the establishment of the Laboratory for Operations and Testing in the United States (LOTUS) test bed are described in the Construction section of the ARDP program. It should be noted that Other Project Costs (OPCs) for the LOTUS project are reflected in the NRIC subprogram, while Total Estimated Costs (TECs) are reflected in line item 23-E-200, LOTUS.

Demonstration Reactors: The Advanced Reactor Demonstration element of ARDP supports two advanced reactor demonstrations through cost-shared (up to 50% government, not less than 50% industry) that were competitively awarded through financial assistance solicitation. These projects are designed to facilitate U.S. private industry's development of advanced reactors that are safe, reliable, licensable, and commercially viable. The program goals include affordability in construction and operation compared to competing, alternative sources of energy in the near- and mid-term and provide significant improvements in safety, security, economics, and environmental impacts over current nuclear power plant designs. The program is designed to

have the ability to design, site, license, procure, construct, and operate a fuel fabrication facility and reactor, with the ability to demonstrate a path to achieving commercial operation with a customer.

The two ARDP projects are:

- **Demonstration 1:** X-energy plans to demonstrate a 320 MWe, 4-unit Xe-100 High Temperature Gas-Cooled Reactor (HTGR) at the Dow Chemical Company's Long Mott Generating Station site in Seadrift, Texas.

  X-energy's FY 2027 primary activities focus on advancing plant detailed design towards construction readiness; preparation of the operating license application; continuing long-lead material procurements; supporting the NRC's review of the commercial-scale TRISO fuel fabrication facility (TX-1); completing construction of the TX-1 fuel fabrication facility in Oak Ridge, Tennessee; conducting systems testing at the Helium Test Facility and the X-energy Test Facility in Frederick, Maryland; and continuing TRISO fuel pebble irradiation test experiments at Idaho National Laboratory.

- **Demonstration 2**: TerraPower, LLC, plans to demonstrate a 345/500 MWe Natrium Sodium Fast Reactor (SFR) commercial plant at the Kemmerer, Wyoming demonstration site.

  TerraPower's FY 2027 primary activities focus on preparing to submit the Kemmerer Unit 1 Final Safety Analysis Report and Application for License to Operate to NRC; construction of Kemmerer Unit 1; construction of the Kemmerer Training Center; advancing the plant design to Final Design level of maturity; advancing the design of the Natrium advanced fuels; support the NRC's review of the Fuel Fabrication Facility Category II Facility License Amendment; and progressing the design and licensing to construct a large scale HALEU fuel fabrication facility.

Risk Reduction for Future Demonstration supports advanced reactor concepts with the potential for future demonstration through cost-shared (up to 80% government, not less than 20% industry) competitively awarded (through a financial assistance solicitation) projects that are designed to maximize the utility of the results across the nuclear energy industry. The projects are aimed at reducing risk and technical uncertainty for a broad range of advanced reactor designs. Project activities may include R&D to address technical challenges associated with development of technologies and methods to improve the timelines for advanced reactor deployments; the cost and schedule for delivery of nuclear products, services, and capabilities supporting these nuclear technologies; design and engineering processes; and resolution of certification challenges potentially impeding the introduction of these technologies into the marketplace. This subprogram coordinates closely with the Reactor Concepts Research, Development & Demonstration program and other relevant programs to avoid duplication, leverage existing expertise, and maximize synergies.

The five projects are:

1. Kairos Power, LLC (Alameda, CA) will work to design, construct, and operate its Hermes reduced-scale test reactor. Hermes is intended to lead to the development of Kairos Power's commercial-scale fluoride salt-cooled high temperature reactor (FHR), a novel advanced nuclear reactor technology that leverages TRI-structural ISOtropic particle fuel (TRISO) fuel in pebble form combined with a low-pressure fluoride salt coolant

2. Westinghouse Electric Company, LLC (Cranberry Township, PA) will advance the design of a heat pipe-cooled microreactor

3. BWXT Advanced Technologies, LLC (Lynchburg, VA) will mature a commercially viable transportable microreactor conceptual design focused on using TRISO fuel particles to achieve higher uranium loading and an improved core design using a silicon carbide (SiC) matrix

4. Holtec Government Services, LLC (Camden, NJ) will focus on early-stage design, engineering, and licensing activities to accelerate the development of its light water-cooled small modular reactor (SMR); and
5. Southern Company Services Inc. (Birmingham, AL) will lead a project to design, construct, and operate the Molten Chloride Reactor Experiment (MCRE), a critical nuclear test supporting molten salt reactor systems and components demonstrations.

FY 2027 activities focus on continuing design, manufacturing, and construction activities; supporting further interactions with the NRC on high impact regulatory related topics; conducting activities to resolve technical, operational, and regulatory challenges; and developing and executing plans for establishing infrastructure and support capabilities to enable execution of the Risk Reduction projects and future commercialization activities. In FY 2027, execution of the Holtec Risk Reduction award will be complete.

Regulatory Development coordinates with NRC and industry to address and resolve key regulatory framework issues that directly impact the "critical path" to advanced reactor demonstration and deployment. Part of the subprogram focuses on regulatory modernization activities such as developing adaptations of light water reactor (LWR)-based regulations for non-LWR advanced reactors, finalizing the establishment of risk-informed and performance-based license application guidance, and establishing clear expectations for license application content and review criteria. The Regulatory Development subprogram supports limited R&D aimed at producing broadly applicable results that can be used by an array of private sector companies to inform their regulatory requirements. Design-specific regulatory gaps for advanced reactors, including fast reactors, gas-cooled reactors, and molten salt reactors, are also addressed. The Regulatory Development Program is supporting key activities to accelerate advanced reactor licensing including exploring the use of Artificial Intelligence to reduce licensing times. In FY 2027, the Regulatory Development subprogram will continue to provide resources for cost-share grants to applicants for the purpose of funding a portion of NRC fees for pre-application and licensing application review activities. Additionally, in FY 2027, the subprogram will continue coordination with the NRC to support harmonization of regulatory processes as NRC and DOE pursue regulatory reform, as required by Executive Orders 14300 and 14301, respectively.

Advanced Reactor Safeguards and Security (ARSS) evaluates safeguards and security issues unique to advanced reactor designs. R&D is strongly aligned with vendor needs to drastically reduce physical and cybersecurity costs and inform materials accountancy design for new fuels and reactor types. The research within the ARSS subprogram supports DOE efforts to enable the rapid deployment and export of next-generation nuclear technology and improves U.S. energy security. ARSS promotes robust efficient physical security and cybersecurity protection for advanced reactors through new technologies and approaches. Program research also provides assurance that nuclear material will be tracked and secured from theft or diversion.

All three major elements, physical security, cybersecurity, material control and accountability (MC&A), work to mature areas of R&D and program activities through vendor engagements. Through collaborative efforts with advanced reactor developers, the ARSS program generates lessons learned and deliverables to strategically approach incorporation of security requirements into the design of future reactors. The ARSS subprogram also coordinates with the NRC, Nuclear Energy Institute (NEI), National Nuclear Security Administration (NNSA), nuclear industry, and university community to collaborate on the development of technologies and methods to ensure security of advanced reactors.

Key FY 2027 activities include expanding cybersecurity work toward demonstration of wireless remote monitoring and operations, developing physical protection system, MC&A, and Cyber by design recommendations reports for all classes of advanced reactors, demonstrating new measurement technologies on

surrogate salt materials representative of molten salt reactor fuel, and collaboration with the NRC on consequence analysis for microreactors to tailor on-site responder requirements.

Construction: 23-E-200, Laboratory for Operations and Testing in the United States (LOTUS)
The LOTUS Project will enable and support the development and deployment of advanced nuclear systems by providing the infrastructure for advanced reactor developers to securely test fueled experiments that utilize Safeguards Category I materials for operation, in contrast to facilities like DOME, which can accommodate Category II materials and below. First-of-a-kind nuclear technology developers need a location for testing, validating, and maturing new technologies or concepts, and for validating the safety and workability of systems or components individually or as part of the overall system. Advanced reactor developers also need to generate data on key phenomena relevant to the design and safe operation of their designs to aid in future licensing and commercial deployment of these technologies. Although not required for the commercial concepts, some experiments require higher enrichment fuel to keep the size of the experiment small while ensuring that neutronics and thermal hydraulics are representative of commercial designs. The intent of the LOTUS Project is to make available a robust facility that can provide the appropriate containment capabilities and supporting infrastructure. The anticipated first user of the NRIC-LOTUS test bed is the Molten Chloride Reactor Experiment (MCRE) under development by Southern Company Services, TerraPower and INL. Modification of the Zero Power Physics Reactor (ZPPR) facility at INL was originally selected as the preferred alternative to meet the LOTUS mission need.

Based on the completion of final design for the LOTUS ZPPR alternative and receipt of construction bids, the cost estimate to complete the LOTUS project has increased. The cost increase is due to many factors including a better understanding of the increased complexity associated with modification of the existing facility and changing construction market conditions. Given the cost increases, DOE re-evaluated the selection of the ZPPR facility as the preferred alternative to meet the LOTUS mission need, with consideration of recent changes to regulatory requirements. That analysis showed that building a new facility at INL (LOTUS 2.0) will be faster, less complicated and cheaper. The FY 2027 request reflects transition to LOTUS 2.0.

Advanced Reactor Demonstration Program
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
National Reactor Innovation Center	79,112	65,000	51,214
Demonstration 1	30,000	5,000	10,000
Demonstration 2	30,000	5,000	10,000
Risk Reduction for Future Demonstration	137,222	130,000[1]	115,000
Regulatory Development	17,030	25,000	18,000
Advanced Reactor Safeguards and Security	9,172	9,000	12,000
Construction: 23-E-200, LOTUS	16,112	30,000	9,786
Total, Advanced Reactors Demonstration Program[2]	**318,648**	**269,000**	**226,000**

[1] Risk Reduction for Future Demonstration FY 2026 amount includes the Use of Prior Year Balances in the amount of $100M.
[2] Balance of program totals does not include Infrastructure Investment and Jobs Act (IIJA) funding being repurposed in FY 2026.

Explanation of Changes for Advanced Reactor Demonstration Program

The decrease in the NRIC budget from $65 million to $51.2 million reflects completion of construction of the DOME test bed.

The decrease in the Risk Reduction for Future Demonstrations budget from $130 million to $115 million reflects completion of one of the five Risk Reduction awards.

The decrease in the Regulatory Development budget from $25 million to $18 million reflects resolution of some key advanced reactor policy issues as advanced reactors move to the demonstration phase.

The increase in the Advanced Reactor Safeguards and Security budget from $9 million to $12 million reflects the necessity to expand on cybersecurity research to ensure robust approach to securing advanced reactor technologies including wireless monitoring and operation.

Advanced Reactor Demonstration Program
Construction Projects Summary
($K)

	Total	Prior Years	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted
Total Estimated Cost (TEC)	110,150	54,252	16,112	30,000	9,786	-20,214
Other Project Costs (OPC)[3]	14,850	8,557	2,000	4,293	-	-4,293
Total Project Cost (TPC) Project Number 23-E-200	**125,000**	**62,809**	**18,112**	**34,293**	**9,786**	**-24,507**
Total Estimated Cost (TEC)	110,150	54,252	16,112	30,000	9,786	-20,214
Total Other Project Costs (OPC)	14,850	8,557	2,000	4,293	-	-4,293
Total Project Cost (TPC) All Construction Projects	**125,000**	**62,809**	**18,112**	**34,293**	**9,786**	**-24,507**

[3] OPC funding for 23-E-200, LOTUS is included within the National Reactor Innovation Center subprogram line.

23-E-200, Laboratory for Operations and Testing in the United States
Idaho National Laboratory
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The fiscal year (FY) 2027 Budget Request for the Laboratory for Operations and Testing in the United States (LOTUS) project is $9,786,000 of Total Estimated Cost (TEC) funding and $0 of Other Project Costs (OPC) funding. The Total Project Cost (TPC) range for the design and construction of LOTUS is $85,000,000 to $125,000,000 and the project completion date estimate of 4Q FY 2029. The LOTUS project will provide a dynamic test bed to support testing of fueled experiments consistent with DOE safety and security requirements.

The requested capital funding in FY 2027 supports execution of construction activities and preparation for operational readiness.

Significant Changes

This Construction Project Data Sheet (CPDS) is an update of the FY 2026 CPDS and does not include a new start for FY 2027.

The project achieved Approval of Alternative Selection and Cost Range on June 1, 2023. The approved alternative was to modify the existing Zero Power Physics Reactor (ZPPR) facility at the Materials and Fuels Complex (MFC), Idaho National Laboratory (INL), and the TPC range was defined as $65,600,000 to $98,200,000, with a project completion date of 2Q FY 2030, including schedule reserve and contingency. The project completed final design on September 18, 2024, and received multiple construction subcontract bids.

The final design reflected a better understanding of the increased complexity associated with modification of the existing facility, including additional requirements for meeting nuclear facility seismic requirements, establishment of the new access tunnel to support the installation of advanced reactors, and retaining the confinement capability of the structure. There was a 6-month delay in completion of preliminary/final design, primarily driven by the detailed seismic analysis and design required to ensure that the existing structure could meet current nuclear facility requirements. This delay resulted in project cost escalation.

On February 27, 2025, the project received Approval of Long Lead Procurement, and initiated a phased procurement approach to mitigate risks and adequately integrate the delivery of certain items into the construction phase.

On March 21, 2025, the Secretary of Energy issued a memorandum to Heads of Departmental Elements and National Laboratory Directors revising delegated project authority within DOE Order 413.3B from $50 million to $300 million specific to the National Laboratories managed under Management and Operating Contracts. Given the cost range for the LOTUS project is under $300 million, project authority was delegated to Idaho National Laboratory. DOE will continue to employ project management best practices to ensure judicious management of the project while ensuring efficiency and flexibility in successfully executing this critical project.

The received construction bids reflected increased costs associated with excavation and more extensive shoring of the new access tunnel necessary to maintain the structural integrity of immediately adjacent nuclear material storage capabilities; the installation of micro-piles to underlying basalt to provide seismic stability of the new access tunnel and hatch; additional rock removal and drainage based on improved understanding of field

conditions; increased costs due to overall market demand for fabricated items, specialty nuclear components (e.g., isolation valves), and electrical/instrumentation and controls components; the higher costs associated with conducting extensive construction activities within a highly secure area; and prevailing regional construction market conditions.

Given the significantly increased costs reflected by the received construction bids, DOE did not update the TPC in the FY 2026 Project Data Sheet and elected to reassess the project. DOE carefully reviewed and considered the construction bids and INL performed an independent review of the received bids in late FY 2025. The received construction bids and independent review indicated a TPC of $207.5M. Based on the results of the independent review and increased regulatory flexibility in response to the May 23, 2025, Executive Order 14301 *Reforming Nuclear Reactor Testing at the Department of Energy,* NE reconsidered alternatives for the project. NE also halted all long-lead procurements while reconsidering alternatives.

While a new build was considered but not selected as part of the initial Critical Decision-1 process, subsequent DOE-NE regulatory reform actions (i.e., facility safety [NE Order 420.1] and security [NE Order 470.1]) makes a new build faster, less complicated, and cheaper than re-purposing the existing ZPPR. A new build reflects more straightforward construction, and initial analysis indicates this will yield significantly lower construction costs and an expedited project completion date of 4Q FY 2029. Modifying the one-of-a-kind ZPPR structure presents unknown conditions that would be encountered during construction. New construction will utilize conventional building techniques, improve efficiency by building outside the MFC secure area, implement performance-based security measures, and will not require extensive excavation adjacent to critical facilities. The preliminary TPC for the new build alternative reflects a TPC range of $85M to $125M and includes sunk costs associated with the project to-date.

The FY 2027 LOTUS PDS reflects the transition to the new build alternative.

Critical Milestone History

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	Final Design Complete	CD-1R/2/3	D&D Complete	CD-4
FY 2027	3/8/2022	1/13/2022	6/1/2023	9/18/2024	3Q FY 2026	N/A	4Q FY 2029

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range
Conceptual Design Complete – Actual date the conceptual design was completed (if applicable)
CD-1 – Approve Alternative Selection and Cost Range
Final Design Complete – Estimated/Actual date the project design will be/was complete(d)
CD-1R/2/3 – Reevaluation of Selected Alternative, Approve Performance Baseline, and Approve Start of Construction
Construction Complete – Completion of construction
CD-4 – Approve Start of Operations or Project Closeout

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3B
FY 2027	TBD	2/27/2025	N/A

CD-3A – Approve Long-Lead Procurements, Original Scope
CD-3B – Approve Long-Lead Procurements, Revised Scope (as needed)

Project Cost ($K)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Total	TPC
FY 2027	16,496	93,654	110,150	14,850	125,000[a]

a. This is strictly a breakdown of the project's TPC and not affected by funding.

No construction will be performed until the project performance baseline is validated and start of construction is approved.

2. Project Scope and Justification

Scope

Laboratory for Operations and Testing in the United States (LOTUS) will provide a dynamic test bed to support testing of fueled experiments. The test bed will be designed and constructed to meet the following minimum requirements:

- The test bed capability must have the supporting infrastructure to safely test fueled advanced reactor experiments and interface, as necessary, with reactor support systems.
- The test bed will provide approximately 14,000 square feet of new constructed area to support access roads and concrete pads, not enclosed or covered, for necessary equipment.
- The test bed capability must be able to satisfy Natural Phenomena Hazard (NPH) criteria. As a Hazard Category 2 nuclear facility, the test bed must meet the NPH requirements of DOE Order 420.1C, "Facility Safety", including seismic, wind, flood, and volcanic hazards. Design and construction must ensure that systems, structures, and components will perform safety functions during and after design basis NPH events.
- The test bed capability must be able to provide confinement capability during postulated accident and design basis events. Specifically, it must prevent or control radioactive material release to the environment either in operation or from an accident; and it must ensure air supply and exhaust are controlled, and typically filtered. Confinement may be provided by some combination of leak tightness in the structure and active ventilation to maintain a negative pressure.
- The test bed capability must have the infrastructure (physical and resource) to appropriately control safeguards category I materials.
- The test bed capability must provide the minimum features necessary to conduct an experiment to validate an advanced reactor design. The test bed capability must be available for advanced reactor testing for a minimum of 20 years from the start of operation.

Key Performance Parameters (KPPs)

A KPP is a vital characteristic, function, requirement, or design basis that, if changed, would have a major impact on the facility or system performance, scope, schedule, cost, risk, or the ability of an interfacing project to meet its mission requirements. The preliminary threshold KPPs represent the minimum acceptable scope for successful delivery of the Laboratory for Operations and Testing in the United States (LOTUS) project. Achievement of KPPs will be a prerequisite for approval of project completion. Final KPPs will be established when the project's Performance Baseline is established.

Preliminary Threshold KPPs

Performance Measure	Threshold
Provide the facility infrastructure to support the operation of experimental/test reactors that utilize fuels requiring enhanced security requirements.	Establishment of core infrastructure needed to support operation of experimental/test reactors in the test bed, with clearly defined boundaries: • Electrical supply and back-up power (as necessary) • Ventilation/exhaust for test bed cell • Support systems (e.g., compressed air, argon, fire protection, oxygen monitoring, criticality monitoring, chilled water loop system) • Establishment of control room area with appropriate data connections
Establish a Hazard Category 2 nuclear facility capable of supporting tests using safeguards category I quantities of material	Establishment of equipment access capability with required confinement and security features Approved Safety Analysis Report addressing test bed capability Completion of DOE Operational Readiness Review for the test bed capability in accordance with DOE Order 425.1E Completion of Vulnerability Assessment demonstrating compliance with applicable security requirements

Completion of operational readiness activities for first reactor tests utilizing LOTUS will not be requisite for determining successful project completion.
Funds appropriated under this data sheet may be used to provide independent assessments related to project planning and execution.

Justification

Following the advent of nuclear power generation, the United States was an international leader in the development and testing of advanced nuclear reactor technologies. DOE and its predecessor organizations appropriately provided nuclear fuels and materials development capabilities and large-scale demonstration facilities in support of currently deployed nuclear reactor technologies. However, the existing industrial and DOE test bed facilities are not Safeguards Category I facilities and therefore are not currently capable of supporting fueled advanced reactor tests using high security materials and international facilities are not an option due to concerns with access, transportation, and technical equivalencies. Lack of domestic advanced reactor test bed capabilities is hampering the U.S. ability to move forward in the development of next generation nuclear reactors.

The Nuclear Energy Innovation Capabilities Act of 2017 (P.L. 115-248) (NEICA), Section 958, Enabling Nuclear Energy Innovation, authorized the National Reactor Innovation Center (NRIC) as a program to enable the testing and demonstration of reactor concepts to be proposed and funded, in whole or in part, by the private sector. As a result, the DOE Office of Nuclear Energy launched the NRIC in August 2019. NRIC is charged with developing the infrastructure needed for the testing and demonstration of multiple advanced reactor concepts. To fulfill that charge, NRIC has been exploring options to develop test bed capabilities to provide industry partners the infrastructure to startup, test, and operate fueled advanced reactor experiments in a safe and economical manner.

Establishment of the LOTUS capability will provide industry with the infrastructure necessary to support development and testing of fueled experiments requiring safeguards category I materials for operation. Testing of these reactor experiments will provide real data that can be used to validate models and support subsequent licensing activities to bring the reactors to market.

3. Financial Schedule ($K)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design			
FY 2022	2,252	2,252	0
FY 2023	8,992	8,992	1,529
FY 2024	252	252	9,967
FY 2025	0	0	0
FY 2026	5,000	5,000	5,000
Total, Design (TEC)	**16,496**	**16,496**	**16,496**
Construction			
FY 2023	11,008	11,008	0
FY 2024	31,748	31,748	0
FY 2025	16,112	16,112	1,989
FY 2026	25,000	25,000	12,000
FY 2027	9,786	9,786	42,000
Outyears	0	0	37,665
Total, Construction (TEC)	**93,654**	**93,654**	**93,654**
Total Estimated Costs (TEC)			
FY 2022	2,252	2,252	0
FY 2023	20,000	20,000	1,529
FY 2024	32,000	32,000	9,967
FY 2025	16,112	16,112	1,989
FY 2026	30,000	30,000	17,000
FY 2027	9,786	9,786	42,000
Outyears	0	0	37,665
Total TEC	**110,150**	**110,150**	**110,150**
Other Project Costs			
FY 2021	3,957	3,957	1,037
FY 2022	600	600	2,674
FY 2023	1,000	1,000	802
FY 2024	3,000	3,000	658
FY 2025	2,000	2,000	567
FY 2026	4,293	4,293	3,500

	Budget Authority (Appropriations)	Obligations	Costs
FY 2027	0	0	2,000
Outyears	0	0	3,612
Total OPC	**14,850**	**14,850**	**14,850**
Total Project Costs (TPC)			
FY 2021	3,957	3,957	1,037
FY 2022	2,852	2,852	2,674
FY 2023	21,000	21,000	2,331
FY 2024	35,000	35,000	10,625
FY 2025	18,112	18,112	2,556
FY 2026	34,293	34,293	20,500
FY 2027	9,786	9,786	44,000
Outyears	0	0	41,277
Grand Total	**125,000**	**125,000**	**125,000**

4. Details of Project Cost Estimate ($K)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design			
Design	15,496	13,180	TBD
Contingency	1,000	2,420	TBD
Total, Design	16,496	15,600	TBD
Construction			
Site Work	7,600	2,735	TBD
Equipment	13,554	0	TBD
Construction	52,500	43,285	TBD
Other, as needed	0	0	TBD
Contingency	20,000	11,380	TBD
Total, Construction	93,654	57,400	TBD
TOTAL TEC	110,150	73,000	TBD
Contingency, TEC	21,000	13,800	TBD
Other Project Cost (OPC)			
OPC except D&D			
Conceptual Design/Planning	4,917	4,620	TBD
Other OPC Costs	7,933	17,680	TBD
Contingency	2,000	2,900	TBD
TOTAL, OPC	14,850	25,200	TBD
Contingency, OPC	2,000	2,900	TBD

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Project Cost (TPC)	125,000	98,200	TBD
Contingency (TEC+OPC)	23,000	16,700	TBD

5. Schedule of Appropriation Requests ($K)

Request Year	Type	Prior Years	FY 2027	FY 2028	FY 2029	FY 2030	Outyears	Total
FY 2027	TEC	100,364	9,786	0	0	0	0	110,150
	OPC	14,850	0	0	0	0	0	14,850
	TPC	115,214	9,786	0	0	0	0	125,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy (fiscal quarter or date)	4Q FY 2029
Expected Useful Life (number of years)	20
Expected Future Start of D&D of this capital asset (fiscal quarter)	4Q FY 2049

Related Funding Requirements ($M)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations and Maintenance	22.4	10.4	575	495.9

Life-cycle operations and maintenance costs include escalation.

7. D&D Information

The new LOTUS test bed facility will be sited over an existing modular office building. The displaced office space is anticipated to be replaced via a leased modular office building (not included in data below).

	Square Feet
New area being constructed by this project at INL	Approximately 14,000
Area of D&D in this project at INL	13,451
Area at INL to be transferred, sold, and/or D&D outside the project, including area previously "banked"	0
Area of D&D in this project at other sites	0
Area at other sites to be transferred, sold, and/or D&D outside the project, including area previously "banked"	0
Total area eliminated	0

Site location, building name or numbers, and square footages of existing facilities to be replaced: INL, Materials and Fuels Complex, MFC-1727, Modular Office Building – 13,451 sq ft.

As an advanced reactor test bed (laboratory facility), the proposed LOTUS test bed facility is not subject to Freeze the Footprint (>50% lab space).

8. Acquisition Approach

As a Hazard Category 2 nuclear facility, design, and construction of the LOTUS must be integrated with ongoing nuclear operations activities. Design and construction must also be coordinated/integrated with nuclear research and development programs. A design-build project delivery method managed by the INL management and operating contractor will be used for the design and construction of LOTUS. A firm, fixed-price construction subcontract is anticipated for construction of the LOTUS test bed.

Infrastructure

Overview

Infrastructure consists of the Idaho National Laboratory (INL) Facilities Operations and Maintenance (IFM) subprogram.

The mission of the IFM subprogram is to manage the planning, acquisition, operation, maintenance, and disposition of the multi-program nuclear facilities and capabilities owned by the Office of Nuclear Energy (NE) along with the supporting infrastructure at INL. The IFM subprogram maintains the Department of Energy (DOE) mission-supporting facilities and capabilities at INL in a safe and compliant status (with DOE Orders, federal laws and regulations, and state agreements) to enable technological advancement in the existing nuclear fleet, advanced reactor pipeline, and fuel cycle missions. These facilities and capabilities support the NE research and development (R&D) necessary to revitalize and unleash nuclear energy in the United States. These key assets also provide unique testing of Naval Reactors (NR) fuels and reactor core components supporting existing and future fleet needs, support a diverse range of national security technology programs for the National Nuclear Security Administration (NNSA), provide isotope production for the Office of Science, and support other federal agencies in critical infrastructure protection, nuclear nonproliferation, and incident response. The IFM subprogram integrates and closely coordinates with DOE, NNSA, and industry-driven research programs to ensure proper alignment and prioritization of infrastructure investments, as well as availability of infrastructure for programmatic work.

Highlights of the FY 2027 Budget Request

In FY 2027, the IFM subprogram will focus on:

- Maintaining safe and compliant operation of INL nuclear research reactors, non-reactor nuclear facilities, and radiological research facilities to support a wide range of customers at both the Advanced Test Reactor (ATR) Complex and Materials and Fuels Complex (MFC).
- Continuing procurements and preparation for the next ATR Core Internals Changeout (CIC) cycle and initiating major restoration activities to sustain ATR operations beyond 2045.
- Continuing community and technical activities supporting the Agreement in Principle (AIP) with the Shoshone-Bannock Tribes, the Idaho Department of Environmental Quality, and environmental reviews and data collection to support future permits.
- Continuing compliance with Federal and State environmental laws and regulations applicable to INL as well as the 1995 Settlement Agreement with the State of Idaho, the Supplemental Agreement signed by DOE and the State of Idaho in November 2019, and the Waiver of Section K.1 of the 1995 Settlement Agreement signed in April 2025.
- FY 2027 will be the first full year of operations for the Sample Preparation Laboratory (SPL) following project completion in FY 2026. SPL operations funding is accounted for under INL Non-Reactor Nuclear Research Facility Operations and Maintenance.

INL Nuclear Research Reactor Operations and Maintenance ($168,263,000)

This subcategory provides funding to support operations and maintenance of the nuclear research reactors at the ATR Complex and MFC, including the ATR, the ATR Critical Facility (ATRC), the Neutron Radiography Reactor (NRAD), and the Transient Reactor Test Facility (TREAT). ATR remains the nation's only high flux thermal neutron irradiation test reactor and is the primary research reactor at INL, supporting test programs and experiments sponsored by NE, NR, and NNSA. ATR is also the primary scientific capability of the Nuclear Science User Facilities (NSUF) and supports universities, laboratories, and private industry. There continues to be significant R&D demand for thermal neutron irradiation at ATRC and neutron radiography and small component test irradiation at NRAD. The TREAT reactor, an air-cooled thermal spectrum test facility,

continues to address technical challenges for reactor fuels related to nuclear fuel performance and qualifications. All programmatic work is funded by sponsoring federal programs, and cost to other users is determined in accordance with DOE regulations and depends upon the demands on the reactor and nature of the user.

Activities for this subcategory in FY 2027 include:

- Achieving ATR availability of 80% with a target of 200 irradiation days for the first time in over a decade in FY 2027 to satisfy the needs of planned ATR users.
- Initiate plans to reorganize used ATR nuclear fuel providing additional storage space allowing continued operations beyond the next CIC.
- Continuing procurements to support the next ATR CIC and initiating major component and system replacements (e.g., primary coolant heat exchangers, primary system valves and reactor plant motor control centers) to restore the reliability of ATR for operation beyond 2045.
- Continuing thermal neutron irradiation at ATRC, neutron radiography and small component testing at NRAD, and transient testing operations at TREAT consistent with approved research plans.

INL Non-Reactor Nuclear Research Facility Operations and Maintenance ($186,094,000)

This subcategory provides funding for operations, maintenance, and support of non-reactor nuclear and radiological research facilities primarily located at the MFC. Activities within this category sustain or improve unique nuclear and radiological capabilities essential to multiple NE R&D programs.

The non-reactor nuclear research facilities support core programmatic capabilities for inspecting, fabricating, and processing a myriad of radioactive and non-radioactive materials including:

- Post Irradiation Examination (PIE) and Fresh Fuel Characterization – Receipt of irradiated fuels and materials, non-destructive examinations, destructive examinations and analyses, and mechanical testing of highly radioactive materials.
    - In late January 2026, the Sample Preparation Laboratory began operations, completing the suite of facilities (along with the Hot Fuels Examination Facility and Irradiated Materials Characterization Laboratory) fulfilling near-term advanced post-irradiation examination needs that will serve as a center for advanced fuels and materials characterization, as well as development of new processes, tools, and instruments to further research. The initiation of SPL operations continues nuclear capability expansion in line with NRIC and DOE programmatic objectives and provides world-class structural material analysis capabilities focusing on non-fuel sample preparation, mechanical properties and failure modes, and micro/nano structural materials characterization.
- Experimental Fuel Fabrication – R&D on fabrication of multiple fuel types at various enrichment levels.
- Advanced Separation and Waste Form – Separation, pre-treatment technology development, electrochemical separation, and engineering scale waste form development.

This subcategory also provides funding for management of NE-owned special nuclear material (SNM) and support for Nuclear Regulatory Commission cask certifications.

Activities for this subcategory in FY 2027 include:

- Operating and maintaining MFC infrastructure, facilities, and equipment to support facility availability for programmatic activities.
- Performing maintenance and refurbishment activities within MFC nuclear facilities and infrastructure consistent with the approved safety basis and continuing prioritized infrastructure investments to improve reliability and availability of key MFC facilities.

- Continuing off-site disposition of excess NE-owned uranium- and plutonium-bearing contact-handled material consistent with the May 23, 2025, Executive Orders *Deploying Advanced Nuclear Reactor Technologies for National Security* and *Reinvigorating the Nuclear Industrial Base,* as well as programmatic needs and approved nuclear material allotment forecasts.

INL Engineering and Support Facility Operations and Maintenance ($5,375,000)

This subcategory provides funding for community and technical activities supporting the Agreement in Principle (AIP) with the Shoshone-Bannock Tribes, the Idaho Department of Environmental Quality, and environmental reviews and data collection to support future permits. This subcategory also funds Payment in Lieu of Taxes (PILT), Institute of Nuclear Power Operations, and Departmental cross-cutting infrastructure reporting requirements.

Activities for this subcategory in FY 2027 include:

- Continuing to support federally funded activities to maintain operations at INL, such as PILT; environmental review and data collection to support future permits; and community support for local Shoshone-Bannock Tribes.

INL Regulatory Compliance ($18,268,000)

The subcategory provides funding for activities for continued compliance with Federal and State environmental laws and other regulations applicable to INL. Compliance activities focus on air, soil, and water monitoring and waste disposal consistent with Federal and State permit requirements and agreements such as the INL Site Treatment Plan. Regulatory activities also include efforts that support compliance with the 1995 Settlement Agreement with the State of Idaho, which governs management and disposition of used nuclear fuel and transuranic wastes at INL. In November 2019, DOE and the State of Idaho signed a Supplemental Agreement to the 1995 Idaho Settlement Agreement that reaffirmed DOE's and Idaho's commitment to remove Cold War legacy waste and special nuclear materials from Idaho. In April 2025, a Waiver of Section K.1 of the 1995 Settlement Agreement was signed updating the agreement.

Activities for this subcategory in FY 2027 include:

- Continuing regulatory compliance program management.
- Meeting the INL Site Treatment Plan milestone for annual treatment of two cubic meters of mixed low-level waste (MLLW).
- Processing a minimum of 8 treatment batches of EBR-II fuel.
- Conducting environmental surveillance and monitoring activities.

Infrastructure
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
INL Facilities Operations and Maintenance[1]	326,000	342,000	378,000
Total, Infrastructure	**326,000**	**342,000**	**378,000**

[1] Funding does not reflect the transfer of $92,800,000 in FY 2025 and $96,740,000 in FY 2026 from Naval Reactors for maintenance and operation of the Advanced Test Reactor.

Explanation of Changes for Infrastructure

The increase in total funding between INL Facilities Operations and Maintenance FY 2027 Request and FY 2026 Enacted is primarily driven by continued procurements to support the next ATR CIC and initiation of ATR restoration through major component and system replacements to reliably operate ATR beyond 2045.

The ATR must replace internal core components every 7-10 years due to neutron irradiation damage. This replacement requires numerous long lead procurements to be made during the timeframe between CICs, and the next CIC is anticipated to occur around FY 2032.

The ATR has operated for almost 60 years, and many major components and systems are reaching the end of their design life or have obsolescence concerns. Maintaining this unique capability beyond 2045 requires major investments to replace systems and components like the primary coolant heat exchangers, primary coolant pump check valves, the cooling tower structure, and the plant protection system.

Idaho Sitewide Safeguards and Security

Overview

The Idaho Sitewide Safeguards and Security (S&S) program enables Office of Nuclear Energy (NE) research and development (R&D) missions at Idaho National Laboratory (INL) by securing nuclear material, classified matter, and other vital assets from theft, diversion, espionage, unauthorized access, and other hostile acts that could cause unacceptable impacts to national security or the health and safety of the public. Located on an 890-square-mile site in eastern Idaho, INL serves as the lead nuclear energy research and development laboratory, advancing nuclear energy, national security, and other applied energy solutions in support of nuclear energy objectives. The Idaho Sitewide Safeguards and Security program supports the NE mission by providing a safe and secure environment for critical innovation and nuclear development activities.

The FY 2027 Budget Request provides direct funding for NE's S&S base program. Strategic Partnership Projects (SPP) contribute an allocable share through full cost recovery. Extraordinary security requirements, such as dedicated security for non-NE infrastructure and special projects or exercises, will be funded by SPP customers and recovered by the S&S program. Other Department of Energy (DOE) programs at INL are responsible for directly funding their S&S costs.

Highlights of the FY 2027 Budget Request

In FY 2027, the S&S program will maintain high confidence in the protection of NE-owned INL assets and provide excellent customer service through strategic, performance-based integration of advanced technologies and specialized security personnel, proactive systems maintenance, and a robust cybersecurity program. Key investment areas include protecting special nuclear material (SNM), deploying emerging security technologies, and enhancing cybersecurity capabilities to focus on the critical task of deterring, responding to, and neutralizing threats.

<u>Program Initiatives</u>

The Idaho Sitewide Safeguards and Security program is split into the following security disciplines:

- Protective Forces: Provides security personnel 24/7 across the site to deter, detect, delay, and respond to threats, ensuring asset protection during normal and emergency conditions.
- Security Systems: Maintains and tests physical security systems, including intrusion detection, access control, barriers, lighting, and other security equipment.
- Information Security: Protects and controls classified and sensitive information through various measures, including technical security counter measures and controlled unclassified information programs.
- Cybersecurity: Secures classified and unclassified information and electronic operations using a risk-based approach, protecting against data loss or compromise.
- Personnel Security: Manages access to sensitive information and positions through clearances, security awareness, U.S. citizen and foreign visitor control, the Human Reliability Program and psychological/medical assessment programs.
- Material Control and Accountability (MC&A): Controls and accounts for special nuclear materials to prevent diversion.
- Program Management: Provides policy oversight, security planning, vulnerability assessments, incident investigations, and ensures program compliance with Departmental security requirements.

Idaho Sitewide Safeguards and Security
($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Protective Forces	98,464	103,847	103,847
Security Systems	14,420	15,247	15,247
Information Security	3,100	-	-
Cybersecurity	23,916	27,133	27,133
Personnel Security	7,300	-	-
Material Control & Accountability	7,400	8,173	8,173
Program Management	5,400	5,600	5,600
Total, Idaho Sitewide Safeguards and Security	**160,000**	**160,000**	**160,000**

Explanation of Changes for Idaho Sitewide Safeguards and Security

The FY 2027 request remains at the same level as in FY 2025 and FY 2026.

Funding at this level maintains existing program activities. Subprogram levels are summarized below:

- **Protective Force**: The request level maintains functional staffing levels and associated equipment mandated by departmental security requirements and contractual wage commitments.
- **Security Systems**: The request level supports preventative maintenance for security systems. This level does not support technological investment initiatives such as artificial intelligence and other advanced detection capabilities.
- **Cybersecurity:** The requested funding level sustains current cybersecurity investments in compliance with departmental mandates. The request level does not include investments in artificial intelligence capabilities required to advance Zero Trust Architecture implementation, thereby limiting enhancements to the laboratory's defensive cyber posture.
- **Material Control & Accountability:** This request level maintains program personnel, equipment, and services. The funding level does not include investments in technological improvements.
- **Information Security:** The request represents full cost recovery for this program.
- **Personnel Security:** The request level represents full cost recovery for this program.

Idaho Sitewide Safeguard and Security
Reimbursable Costs

The FY 2027 Budget Request provides direct funding for NE's S&S base program. Strategic Partnership Projects (SPP) contribute an allocable share through full cost recovery. In FY 2026, the Information and Personnel Security functions transitioned from direct funding to full cost recovery. Information regarding SPP full cost recovery estimates is provided on the table below:

Reimbursable Costs
($K)

	FY 2025	FY 2026	FY 2027	FY 2027 vs FY 2026	
				$	%
Idaho National Laboratory	**16,035**	**30,234**	**31,015**	**+781**	**+3**

Program Direction

Overview

Program Direction provides the federal staffing resources and associated costs required to support the overall direction and execution of the Office of Nuclear Energy (NE) programs. NE has staff strategically located in Washington, D.C. Headquarters and at the Idaho Operations Office. Activities within the site office support inherently federal functions that facilitate the efficient execution of Department of Energy (DOE) programs or directly execute DOE mandated safety, security, business functions, and public outreach. In addition to NE federal personnel, Program Direction supports select federal staff and support for the Office of Human Capital Service Center and the Office of Management.

The Support Services subprogram allows the Department to cost-effectively hire the best available industry experts to support federal staff in managing the nuclear programs and complex activities. The ability to acquire expertise quickly and on an as needed basis provides flexibility in team composition as the needs of NE evolve. Program Direction also includes the Other Related Expenses subprogram, which provides NE's directed funding contribution to the Department's Working Capital Fund (WCF). The WCF supports specific Departmental services and activities that are shared across DOE including employee health and testing services and consolidated training and recruitment initiatives, established in previous fiscal years and supported in FY 2027.

In addition to appropriated funds, NE manages approximately $450 million annually from other activities such as: reimbursable funding from agencies such as the National Aeronautics and Space Administration (NASA) and the Department of Homeland Security (DHS), as well as working/coordinating with other agencies to support DOE/NE's mission.

The FY 2027 Request will allow the Office of Nuclear Energy to support its mission, address succession planning for critical technical positions, and support the International Nuclear Energy Cooperation program.

Highlights of the FY 2027 Budget Request

NE continues to assess and refine the workforce levels needed to effectively execute the robust Research, Development, and Infrastructure activities under its purview. This effort includes ensuring the federal workforce can support implementation of the Administration's Executive Orders to modernize nuclear regulation, streamline nuclear reactor testing, deploy reactors for national security purposes, and strengthen the nuclear industrial base. NE plans to achieve a staffing level of up to 300 FTEs in FY 2027. Program Direction funds the full cost of federal workforce staffing, including salaries, benefits, travel, training, and other related expenses to include contractor services managed under federal oversight.

Program Direction
Funding ($K)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Salaries and Benefits	33,881	31,501	35,551
Travel	605	750	1,500
Support Services	5,578	5,537	7,033
Other Related Expenses	3,217	5,815	9,000
Total, Washington Headquarters	**43,281**	**45,603**	**53,084**
Salaries and Benefits	1,569	338	338
Travel	-	-	-
Support Services	-	-	-
Other Related Expenses	50	115	115
Total, Nevada Field Office	**1,619**	**453**	**453**
Salaries and Benefits	30,519	28,944	32,104
Travel	188	200	500
Support Services	5,628	5,085	5,094
Other Related Expenses	5,765	6,715	7,500
Total, Idaho Operations Office	**42,100**	**40,944**	**44,463**
Salaries and Benefits	65,969	60,783	67,993
Travel	793	950	2,000
Support Services	11,206	10,622	12,127
Other Related Expenses	9,032	12,645	16,615
International Nuclear Energy Cooperation	3,000	3,000	1,000
Total, Program Direction	**90,000**	**88,000**	**99,735**
Technical Support	2,241	2,124	2,425
Management Support	8,965	8,498	9,702
Total, Support Services	**11,206**	**10,622**	**12,127**
Working Capital Fund	3,781	7,815	8,959
Rent, Utilities, and Facilities	2,553	2,553	2,553
Training	105	215	215
Other Services	2,593	2,062	4,888
Total, Other Related Expenses	**9,032**	**12,645**	**16,615**
Federal FTEs	**277**	**236**	**300**

Program Direction
Activities and Explanation of Changes
($K)

FY 2026 Enacted	FY 2027 Request	Explanation of Changes FY 2027 Request vs FY 2026 Enacted
Program Direction		
88,000	**99,735**	**+11,735**
Salaries and Benefits		
60,783	*67,993*	*+7,210*
Provides salaries and benefits for up to 236 FTEs.	Provides salaries and benefits for up to 300 FTEs.	This increase of up to 64 FTEs reflects the organization's efforts to identify the staff levels necessary to meet critical requirements for the Department of Energy.
Travel		
950	*2,000*	*+1,050*
Provides for travel by the federal staff including any necessary permanent change of station (PCS) costs.	Provides for travel by the federal staff including any necessary PCS costs.	This increase is due to the estimated costs to support activities such as PCS and other travel requirements.
Support Services		
10,622	*12,127*	*+1,505*
Provides for technical and administrative support services for the NE federal staff.	Provides for technical and administrative support services for the NE federal staff.	This funding continues to provide technical and administrative support services for NE federal staff.
Other Related Expenses		
12,645	*16,615*	*+3,970*
Provides for NE's share of goods and services procured through the Department's Working Capital Fund (WCF); rents and utilities associated with the Idaho Operations Office; federal training expenses; and other miscellaneous expenses.	Provides for NE's share of goods and services procured through the Department's Working Capital Fund (WCF); rents and utilities associated with the Idaho Operations Office; federal training expenses; and other miscellaneous expenses.	This increase supports WCF, Energy Information Technology Service (EITS), and general training costs associated with Federal workforce expenses.
International Nuclear Energy Cooperation		
3,000	*1,000*	*-2,000*
Provides funding in support of NE's International Nuclear Energy Cooperation program focused on increasing nuclear exports and enhancing global competitiveness.	Provides funding in support of NE's International Nuclear Energy Cooperation program focused on market access.	Reflects a reduction of funding to focus on market access.

DEPARTMENT OF ENERGY
Funding by Site Detail
TAS_0319 - Nuclear Energy - FY 2027
(Dollars in Thousands)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Ames Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	0	184	0
Total Ames Laboratory	**0**	**184**	**0**
Argonne National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	80	555	0
Advanced Reactor Technologies	10,140	11,500	13,000
Integrated Energy Systems	1,960	5,000	0
Reactor Concepts RD&D	12,100	16,500	13,000
Materials Recovery and Waste Form Development	2,840	2,840	2,457
Accident Tolerant Fuels	30	30	26
Fuel Cycle Laboratory R&D	1,760	1,760	1,760
Advanced Nuclear Fuel Availability	250	0	0
Used Nuclear Fuel Disposition R&D	360	2,000	0
Integrated Waste Management System	2,000	2,000	0
Next Generation Fuels	500	500	400
Fuel Cycle Research & Development	7,740	9,130	4,643
Used Nuclear Fuel and High-Level Waste Disposition	0	0	3,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	3,000
Nuclear Energy Advanced Modeling and Simulation	6,855	6,805	6,800
Nuclear Science User Facilities	230	0	500
Advanced Materials and Manufacturing Technologies	3,531	3,531	3,500
Advanced Sensors and Instrumentation	288	260	260
Nuclear Energy Enabling Technologies	10,904	10,596	11,060
National Reactor Innovation Center	3,380	3,000	3,000
Regulatory Development	1,750	1,165	1,500
Advanced Reactor Safeguards	885	800	1,000
Advanced Reactors Demonstration Program	6,015	4,965	5,500
Total Argonne National Laboratory	**36,839**	**41,746**	**37,203**
Brookhaven National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	0	200	0
Accident Tolerant Fuels	305	305	262
Fuel Cycle Laboratory R&D	521	521	521
Next Generation Fuels	500	500	400
Fuel Cycle Research & Development	1,326	1,326	1,183
Advanced Reactor Safeguards	200	200	200
Advanced Reactors Demonstration Program	200	200	200
Total Brookhaven National Laboratory	**1,526**	**1,726**	**1,383**

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(Dollars in Thousands)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Chicago Operations Office			
Nuclear Science User Facilities	1	0	0
Nuclear Energy Enabling Technologies	1	0	0
Total Chicago Operations Office	**1**	**0**	**0**
Idaho National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	25,084	30,574	31,517
Light Water Reactor Sustainability	15,335	0	0
Advanced Reactor Technologies	45,850	48,600	59,859
Integrated Energy Systems	5,665	10,500	0
Power Reactor Optimization (formerly LWR Sustainability)	0	18,650	18,705
Reactor Concepts RD&D	66,850	77,750	78,564
Materials Recovery and Waste Form Development	19,763	14,263	38,127
Accident Tolerant Fuels	21,044	21,044	20,000
Fuel Cycle Laboratory R&D	7,072	7,072	7,072
Advanced Nuclear Fuel Availability	39,405	0	0
Used Nuclear Fuel Disposition R&D	6,000	7,000	0
Integrated Waste Management System	6,000	6,000	0
Next Generation Fuels	44,654	44,654	41,025
Fuel Cycle Research & Development	143,938	100,033	106,224
Used Nuclear Fuel and High-Level Waste Disposition	0	0	20,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	20,000
Nuclear Energy Advanced Modeling and Simulation	11,600	11,550	11,435
Nuclear Science User Facilities	26,834	41,990	33,320
Advanced Materials and Manufacturing Technologies	3,957	3,957	4,500
Gateway for Accelerated Innovation in Nuclear	4,549	6,000	4,500
Advanced Sensors and Instrumentation	3,842	3,020	3,020
Nuclear Energy Enabling Technologies	50,782	66,517	56,775
National Reactor Innovation Center	58,386	25,955	35,000
Risk Reduction for Future Demonstrations	17,000	25,363	40,000
Regulatory Development	3,325	1,830	2,300
Advanced Reactor Safeguards	1,347	900	1,150
23-E-200 LOTUS Project	16,112	30,000	9,786
Advanced Reactors Demonstration Program	96,170	84,048	88,236
INL Facilities Operations and Maintenance	321,473	336,942	372,700
Infrastructure	321,473	336,942	372,700
Idaho Sitewide Safeguards & Security (050)	158,600	158,600	158,600
Program Direction - Nuclear Energy	2,744	4,250	4,250
Total Idaho National Laboratory	**865,641**	**858,714**	**916,866**

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	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Idaho Operations Office			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	19,877	8,805	7,637
Light Water Reactor Sustainability	17,225	0	0
Advanced Reactor Technologies	544	1,700	700
Integrated Energy Systems	75	94	0
Power Reactor Optimization (formerly LWR Sustainability)	0	7,650	5,250
Reactor Concepts RD&D	17,844	9,444	5,950
Materials Recovery and Waste Form Development	0	25,000	0
Accident Tolerant Fuels	59,535	59,535	52,614
Advanced Nuclear Fuel Availability	5,558	0	0
Used Nuclear Fuel Disposition R&D	13,955	12,500	0
Integrated Waste Management System	5,000	9,000	0
Next Generation Fuels	220	26,720	300
Fuel Cycle Research & Development	84,268	132,755	52,914
Used Nuclear Fuel and High-Level Waste Disposition	0	0	20,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	20,000
Nuclear Energy Advanced Modeling and Simulation	685	225	250
Nuclear Science User Facilities	230	360	230
Advanced Materials and Manufacturing Technologies	100	100	0
Advanced Sensors and Instrumentation	121	60	60
Nuclear Energy Enabling Technologies	1,136	745	540
National Reactor Innovation Center	95	500	500
Risk Reduction for Future Demonstrations	0	93,037	75,000
Regulatory Development	225	10,225	10,225
Advanced Reactor Safeguards	70	120	120
Advanced Reactors Demonstration Program	390	103,882	85,845
INL Facilities Operations and Maintenance	3,808	3,558	3,800
Infrastructure	3,808	3,558	3,800
Idaho Sitewide Safeguards & Security (050)	1,400	1,400	1,400
Program Direction - Nuclear Energy	34,245	34,245	34,245
Total Idaho Operations Office	**162,968**	**294,834**	**212,331**
Lawrence Berkeley National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	0	400	0
Used Nuclear Fuel Disposition R&D	3,000	0	0
Fuel Cycle Research & Development	3,000	0	0
Used Nuclear Fuel and High-Level Waste Disposition	0	0	5,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	5,000
Nuclear Energy Advanced Modeling and Simulation	150	150	150

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	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Nuclear Energy Enabling Technologies	150	150	150
Total Lawrence Berkeley National Laboratory	**3,150**	**550**	**5,150**
Lawrence Livermore National Laboratory			
Used Nuclear Fuel Disposition R&D	300	0	0
Integrated Waste Management System	25	0	0
Fuel Cycle Research & Development	325	0	0
Used Nuclear Fuel and High-Level Waste Disposition	0	0	310
Used Nuclear Fuel & High-Level Waste Disposition	0	0	310
Total Lawrence Livermore National Laboratory	**325**	**0**	**310**
Los Alamos National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	0	327	0
Advanced Reactor Technologies	1,495	1,300	1,300
Reactor Concepts RD&D	1,495	1,300	1,300
Materials Recovery and Waste Form Development	250	250	216
Accident Tolerant Fuels	5,275	5,275	4,526
Fuel Cycle Laboratory R&D	1,473	1,473	1,473
Used Nuclear Fuel Disposition R&D	1,500	0	0
Next Generation Fuels	2,500	2,500	1,875
Fuel Cycle Research & Development	10,998	9,498	8,090
Nuclear Energy Advanced Modeling and Simulation	3,475	3,475	3,965
Advanced Materials and Manufacturing Technologies	720	720	700
Nuclear Energy Enabling Technologies	4,195	4,195	4,665
Advanced Reactor Safeguards	490	500	500
Advanced Reactors Demonstration Program	490	500	500
Total Los Alamos National Laboratory	**17,178**	**15,820**	**14,555**
National Laboratory of the Rockies			
Integrated Energy Systems	186	107	0
Reactor Concepts RD&D	186	107	0
Total National Laboratory of the Rockies	**186**	**107**	**0**
Nevada Field Office			
Program Direction - Nuclear Energy	1,880	1,675	1,675
Total Nevada Field Office	**1,880**	**1,675**	**1,675**
Oak Ridge National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	500	835	0
Light Water Reactor Sustainability	5,000	0	0
Advanced Reactor Technologies	4,939	4,500	6,000

(Dollars in Thousands)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Power Reactor Optimization (formerly LWR Sustainability)	0	6,000	6,125
Reactor Concepts RD&D	9,939	10,500	12,125
Materials Recovery and Waste Form Development	1,965	1,965	2,000
Accident Tolerant Fuels	9,066	9,066	9,452
Fuel Cycle Laboratory R&D	2,049	2,049	2,049
Advanced Nuclear Fuel Availability	485	0	0
Used Nuclear Fuel Disposition R&D	5,500	7,500	0
Integrated Waste Management System	9,000	8,500	0
Fuel Cycle Research & Development	28,065	29,080	13,501
Used Nuclear Fuel and High-Level Waste Disposition	0	0	16,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	16,000
Nuclear Energy Advanced Modeling and Simulation	4,415	4,415	4,400
Nuclear Science User Facilities	0	1,950	1,000
Advanced Materials and Manufacturing Technologies	4,245	4,245	4,300
Gateway for Accelerated Innovation in Nuclear	20	30	0
Advanced Sensors and Instrumentation	1,067	1,000	1,000
Nuclear Energy Enabling Technologies	9,747	11,640	10,700
National Reactor Innovation Center	100	45	100
Risk Reduction for Future Demonstrations	0	11,600	0
Regulatory Development	1,020	1,075	1,100
Advanced Reactor Safeguards	825	870	1,020
Advanced Reactors Demonstration Program	1,945	13,590	2,220
Total Oak Ridge National Laboratory	**50,196**	**65,645**	**54,546**
Oak Ridge Office			
Advanced Nuclear Fuel Availability	13	0	0
Next Generation Fuels	15,126	15,126	12,150
Fuel Cycle Research & Development	15,139	15,126	12,150
Program Direction - Nuclear Energy	172	0	0
Total Oak Ridge Office	**15,311**	**15,126**	**12,150**
Pacific Northwest National Laboratory			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	190	765	0
Advanced Reactor Technologies	2,350	4,700	4,700
Reactor Concepts RD&D	2,350	4,700	4,700
Materials Recovery and Waste Form Development	2,640	2,640	2,200
Accident Tolerant Fuels	395	395	468
Fuel Cycle Laboratory R&D	1,347	1,347	1,347
Used Nuclear Fuel Disposition R&D	6,000	6,000	0
Integrated Waste Management System	16,000	15,000	0
Next Generation Fuels	1,000	1,000	850

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	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Fuel Cycle Research & Development	27,382	26,382	4,865
Used Nuclear Fuel and High-Level Waste Disposition	0	0	17,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	17,000
Nuclear Science User Facilities	0	200	200
Advanced Materials and Manufacturing Technologies	1,255	1,255	1,000
Advanced Sensors and Instrumentation	187	300	300
Nuclear Energy Enabling Technologies	1,442	1,755	1,500
Regulatory Development	280	215	300
Advanced Reactor Safeguards	600	850	950
Advanced Reactors Demonstration Program	880	1,065	1,250
Total Pacific Northwest National Laboratory	**32,244**	**34,667**	**29,315**
Portsmouth Gaseous Diffusion Plant			
Advanced Nuclear Fuel Availability	30	0	0
Fuel Cycle Research & Development	30	0	0
Total Portsmouth Gaseous Diffusion Plant	**30**	**0**	**0**
Sandia National Laboratories			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	0	100	0
Light Water Reactor Sustainability	2,695	0	0
Advanced Reactor Technologies	5,150	6,000	6,000
Power Reactor Optimization (formerly LWR Sustainability)	0	4,000	4,200
Reactor Concepts RD&D	7,845	10,000	10,200
Accident Tolerant Fuels	60	60	52
Fuel Cycle Laboratory R&D	571	571	571
Used Nuclear Fuel Disposition R&D	8,785	6,500	0
Integrated Waste Management System	5,500	5,000	0
Fuel Cycle Research & Development	14,916	12,131	623
Used Nuclear Fuel and High-Level Waste Disposition	0	0	8,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	8,000
National Reactor Innovation Center	0	500	500
Regulatory Development	200	200	225
Advanced Reactor Safeguards	4,488	3,810	4,010
Advanced Reactors Demonstration Program	4,688	4,510	4,735
Total Sandia National Laboratories	**27,449**	**26,741**	**23,558**
Savannah River National Laboratory			
Fuel Cycle Laboratory R&D	207	207	207
Advanced Nuclear Fuel Availability	810	0	0
Used Nuclear Fuel Disposition R&D	1,300	2,978	0

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	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Integrated Waste Management System	6,475	8,000	0
Fuel Cycle Research & Development	8,792	11,185	207
Used Nuclear Fuel and High-Level Waste Disposition	0	0	6,000
Used Nuclear Fuel & High-Level Waste Disposition	0	0	6,000
Advanced Reactor Safeguards	200	300	400
Advanced Reactors Demonstration Program	200	300	400
Total Savannah River National Laboratory	**8,992**	**11,485**	**6,607**
Savannah River Site			
Advanced Nuclear Fuel Availability	2,190	0	0
Fuel Cycle Research & Development	2,190	0	0
Total Savannah River Site	**2,190**	**0**	**0**
Washington Headquarters			
Light Water Reactor Sustainability	675	0	0
Advanced Reactor Technologies	675	500	500
Power Reactor Optimization (formerly LWR Sustainability)	0	700	720
Reactor Concepts RD&D	1,350	1,200	1,220
Mining, Conversion, and Transportation	1,500	1,500	1,425
Materials Recovery and Waste Form Development	5,542	10,042	7,375
Accident Tolerant Fuels	2,190	2,290	0
Fuel Cycle Laboratory R&D	1,000	1,000	1,700
Advanced Nuclear Fuel Availability	77,759	123,500	0
Used Nuclear Fuel Disposition R&D	300	2,522	0
Integrated Waste Management System	7,500	1,500	0
Next Generation Fuels	1,000	1,000	3,600
Fuel Cycle Research & Development	96,791	143,354	14,100
Used Nuclear Fuel and High-Level Waste Disposition	0	0	6,690
Used Nuclear Fuel & High-Level Waste Disposition	0	0	6,690
Nuclear Energy Advanced Modeling and Simulation	1,320	1,980	1,600
Nuclear Science User Facilities	7,205	1,000	750
Gateway for Accelerated Innovation in Nuclear	6,431	3,970	5,500
Advanced Sensors and Instrumentation	177	360	360
Nuclear Energy Enabling Technologies	15,133	7,310	8,210
National Reactor Innovation Center	571	1,000	1,000
Regulatory Development	0	1,000	350
Advanced Reactor Safeguards	6	650	650
Advanced Reactors Demonstration Program	577	2,650	2,000
INL Facilities Operations and Maintenance	719	1,500	1,500
Infrastructure	719	1,500	1,500
Program Direction - Nuclear Energy	50,959	47,830	59,565
Total Washington Headquarters	**165,529**	**203,844**	**93,285**

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	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request
Undesignated LPI			
University and Competitive Research Program (formerly NEUP, SBIR/STTR and TCF)	94,269	103,355	89,687
Advanced Small Modular Reactor RD&D	0	45,000	0
Light Water Reactor Sustainability	3,570	0	0
Advanced Reactor Technologies	2,657	0	0
Integrated Energy Systems	1,614	299	0
Reactor Concepts RD&D	7,841	45,299	0
Advanced Materials and Manufacturing Technologies	274	10,192	0
Nuclear Energy Enabling Technologies	274	10,192	0
National Reactor Innovation Center	468	34,000	11,114
Demonstration 1	30,000	5,000	10,000
Demonstration 2	30,000	5,000	10,000
Risk Reduction for Future Demonstrations	120,222	0	0
Regulatory Development	10,230	9,290	2,000
Advanced Reactor Safeguards	61	0	2,000
Advanced Reactors Demonstration Program	190,981	53,290	35,114
Total Undesignated LPI	**293,365**	**212,136**	**124,801**
Total Funding by Site for TAS_0319 - Nuclear Energy	**1,685,000**	**1,785,000**	**1,533,735**