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SUMMARY

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Policy debate over the role of nuclear power in the nation's energy mix is rooted in the technology's fundamental characteristics. Nuclear reactors can produce potentially vast amounts of useful energy with relatively low consumption of natural resources and low emissions of greenhouse gases and other pollutants. However, facilities that produce nuclear fuel for civilian power reactors can also produce materials for nuclear weapons. In addition, the process of nuclear fission (splitting of atomic nuclei) to generate power produces radioactive material that can remain hazardous for thousands of years and must be contained. How to manage the weapons proliferation and safety risks of nuclear power, or whether the benefits of nuclear power are worth those risks, are issues that have long been debated in Congress. Numerous bills in recent Congresses have focused on nuclear energy as a low-carbon source of electricity and on the potential for advanced reactor designs to reduce costs and increase safety margins.

The 94 licensed nuclear power reactors at 54 sites in the United States generate about 20% of the nation's electricity. Two new reactors, in Georgia, began commercial operation in July 2023 and April 2024. About a dozen more reactors of various designs are planned or proposed. Whether they eventually move forward will likely depend largely on their economic competitiveness with natural gas and renewable energy sources, as well as overall growth in electricity demand. Similar economic forces affect existing reactors. Thirteen U.S. reactors were permanently closed during the period from 2013 through April 2022. However, several states have taken action to prevent reactor shutdowns, and Congress has enacted federal tax credits and other support for existing reactors. Owners of three of the recently closed reactors are planning to restart them within the next four years.

The Department of Energy (DOE) and its predecessor agencies for decades have conducted research on "advanced" reactor technologies, such as fast neutron reactors, that would differ significantly from existing commercial nuclear plants and potentially be far smaller. Proponents of advanced reactors contend that they would be safer, more efficient, and less expensive to build and operate than today's U.S. conventional light water reactors (cooled by ordinary water). Skeptics raise concerns regarding weapons-proliferation risks and cast doubt on advanced reactors' affordability and sustainability. DOE is providing support for several proposed advanced reactor demonstrations, which could indicate whether the anticipated benefits can be realized. Legislation supporting U.S. production of nuclear fuel was enacted by Congress on December 14, 2023, in the National Defense Authorization Act for FY2024 (P.L. 118-31, §3131). The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act of 2024, signed into law July 9, 2024, as Division B of P.L. 118-67, called for greater efficiency in nuclear plant licensing and regulation by the Nuclear Regulatory Commission (NRC). In response to the ADVANCE Act and executive orders signed by President Donald Trump on May 23, 2025, NRC issued new regulations and proposed rules for licensing advanced reactors. Advanced reactor bills in the 119th Congress include proposals for providing cost-overrun support (S. 3814), building demonstration reactors (H.R. 6805), and encouraging spent fuel reprocessing (S. 3016). Highly radioactive spent nuclear fuel that is regularly removed from nuclear reactors is currently stored primarily at power plant sites. Development of a permanent underground repository at Yucca Mountain in Nevada was suspended by the Obama Administration. The Trump Administration requested funding for FY2018, FY2019, and FY2020 to revive the program, but it was not approved by Congress.

The Obama Administration appointed the Blue Ribbon Commission on America's Nuclear Future to recommend an alternative approach to the Nuclear Waste Policy Act's focus on Yucca Mountain for permanent high-level waste disposal. The Commission's recommendations included selecting nuclear waste storage and disposal facilities through a consent-based process. On January 28, 2026, DOE invited states to host Nuclear Lifecycle Innovation Campuses, which could include spent fuel storage and disposal sites. In the meantime, Yucca Mountain remains the sole authorized candidate site for permanent disposal, despite its lack of funding. Nuclear waste bills in the 119th Congress include proposals to require state and local government consent for siting a nuclear waste repository (H.R. 466, S. 101).

Encouraging exports of U.S. civilian nuclear products, services, and technology while making sure they are not used for foreign nuclear weapons programs has long been a fundamental goal of U.S. nuclear energy policy. Recent proposals to build reactors in several countries without nuclear power, including the Middle East, have prompted concerns about the effectiveness of international nonproliferation controls. The ADVANCE Act includes provisions to encourage nuclear-energy-related exports. In the 119th Congress, H.R. 1474 would require U.S. officials at multilateral development banks to advocate for removal of restrictions on nuclear energy assistance.

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Synthesis of Key Issues

The long-running policy debate over the future of nuclear energy is rooted in the technology's inherent characteristics. Initially developed for its unprecedented destructive power during World War II, nuclear energy seemed to hold promise after the war as a way of providing limitless energy to humanity. International diplomacy has focused ever since on finding institutional mechanisms for spreading the perceived benefits of nuclear energy throughout the world while preventing the technology from being used for the proliferation of nuclear weapons. Much of this international effort is focused on key nuclear fuel cycle facilities—plants for enriching uranium in the fissile isotope U-235 and for separating plutonium from irradiated nuclear fuel. Such plants can produce civilian nuclear reactor fuel as well as fissile material for nuclear warheads.

Yet even the use of nuclear power solely for peaceful energy production has proven intrinsically controversial. The harnessing of nuclear fission in a reactor creates highly radioactive materials that must be kept from overheating and escaping from the reactor building, as occurred during the incidents at Fukushima in Japan, Chernobyl in the Soviet Union, and, to a lesser extent, Three Mile Island in Pennsylvania. Spent nuclear fuel that is regularly removed from reactors during refueling must be isolated from the environment for up to 1 million years. Proposed commercial technologies to reduce long-lived nuclear waste through recycling usually involve separating plutonium that possibly could be used for nuclear weapons, although technologies designed to reduce proliferation risks are also the subject of worldwide research and development efforts. All nuclear energy technologies, even with recycling, would still leave substantial amounts of radioactive waste for storage and disposal. Central storage and disposal sites for nuclear waste have proven difficult to develop throughout the world, as illustrated by the long-running controversy over the proposed U.S. waste repository at Yucca Mountain in Nevada and proposed consolidated interim storage facilities in New Mexico and Texas.

The March 2011 disaster at Japan's Fukushima Daiichi nuclear power plant, which forced the evacuation of areas as far as 30 miles away, slowed nuclear power expansion plans around the world, particularly in Japan and Western Europe. Nevertheless, dozens of new reactors are being planned and built in China, India, Russia, and elsewhere.[1] (See

Table 1.) In these areas, nuclear power's initial promise of generating large amounts of electricity without the need for often-imported fossil fuels, along with the more recent desire to reduce greenhouse gas emissions, remains a compelling motivation.

With 94 licensed reactors, the United States has the largest nuclear power industry in the world. But U.S. nuclear power growth has been largely stagnant for the past two decades, as natural gas and renewable energy have captured most of the market for new electric generating capacity and improvements in energy efficiency reduced total electricity demand growth, although total electricity use has recently been spurred by a rise in data centers.[2] Congress enacted incentives for new nuclear plants in the Energy Policy Act of 2005 (P.L. 109-58), including production tax credits, loan guarantees, and insurance against regulatory delays. Those incentives, combined with rising natural gas prices and concerns about federal restrictions on carbon dioxide emissions, prompted announcements by late 2008 of up to 30 new nuclear power reactors in the United

[1] World Nuclear Association, "World Nuclear Power Reactors and Uranium Requirements," April 20, 2026, http://www.world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-and-uranium-requireme.aspx.

[2] Energy Information Administration (EIA), *Short-Term Energy Outlook*, May 2026, https://www.eia.gov/outlooks/steo/pdf/steo_full.pdf.

States.[3] However, subsequent declines in natural gas prices and uncertainty about carbon dioxide controls put most of those projects on hold.

Some of those projects began construction, with mixed results. Two new reactors in Georgia began commercial operation in July 2023 and April 2024. Two identical reactors under construction in South Carolina were canceled in July 2017. The Georgia and South Carolina projects both experienced large cost overruns and schedule delays. An older reactor, Watts Bar 2 in Tennessee, received a Nuclear Regulatory Commission (NRC) operating license on October 22, 2015, after construction had been suspended for two decades and then completed.

Interest in U.S. nuclear power growth in recent years has focused on advanced nuclear reactor designs that would generally be smaller and potentially less expensive than existing plants. A planned advanced nuclear plant in Idaho was terminated by its developers in November 2023 after experiencing numerous delays and cost overruns. However, a growing number of other advanced reactor projects are moving forward under NRC licensing or DOE authorization, and financial support from DOE and the Department of Defense (currently using the secondary designation of Department of War). Some of the reactors that have made the most progress are included in **Table 1**.

Table 1. Planned Advanced Reactor Demonstration Plants

Selected Projects with DOE Funding or Oversight, or NRC License Applications

Reactor Designer	Tech-nology	Reactor Power	Plant Owner	DOE Funding	DOE Cost Share	Plant Location	Approval Status
Terra Power	Sodium-cooled fast reactor	345 MW (electric)	PacificCorp	Up to $1.6 billion	50%	Kemmerer, WY	NRC construction permit approved 3/4/2026
X-energy	High-temperature gas-cooled reactor	80 MW (electric)	Long Mott Energy	Up to $1.2 billion	50%	Seadrift, TX	NRC construction permit application submitted 3/31/2025
Kairos (Hermes 1)	Fluoride-salt-cooled high-temperature reactor	35 MW (thermal)	Kairos	Up to $303 million	48%	Oak Ridge, TN	NRC construction permit approved 12/12/2023
Kairos (Hermes 2)	Fluoride-salt-cooled high-temperature reactor, 2 units	70 MW (thermal), 20 MW (electric) (total for both units)	Kairos	None	0%	Oak Ridge, TN	NRC construction permit issued 11/21/2024

[3] Nuclear Regulatory Commission (NRC), "Expected New Nuclear Power Plant Applications," updated March 28, 2008, https://www.nirs.org/wp-content/uploads/nukerelapse/industry/expectednewrxapplications32808.pdf.

Reactor Designer	Tech-nology	Reactor Power	Plant Owner	DOE Funding	DOE Cost Share	Plant Location	Approval Status
Abilene Christian University	Molten salt research reactor	1 MW (thermal)	Abilene Christian University	None for demonstra-tion; HALEU awarded for fuel	0%	Abilene, TX	NRC construction permit issued 9/16/2024
Holtec (SMR-300) 1&2	Light water PWR	340 MW (electric) per unit	Holtec	Up to $400 million	Not calcu-lated	Covert, MI (Palisades nuclear plant site)	NRC limited work authorization application submitted 12/31/2025
GE Vernova Hitachi (BWRX-300)	Light water BWR	300 MW (electric)	Tennessee Valley Authority	Up to $400 million	7.5%	Oak Ridge, TN	Application for NRC construction permit filed 5/20/2025
Oko (Aurora)	Sodium-cooled fast reactor	75 MW (electric)	Oklo	None	0%	INL	DOE safety oversight and authorization ongoing
BWXT (Project Pele)	Gas-cooled high-temperature mobile micro-reactor	1.5 MW (electric)	Department of Defense	Funded by DOD	0%	Idaho National Laboratory	DOE safety oversight and authorization ongoing
KRONOS	Gas-cooled high-temperature micro-reactor	45 MW (thermal)	University of Illinois	Unspecified	Un-known	Champaign County, Illinois	Application for NRC construction permit submitted 3/31/2026
Previously funded project terminated							
NuScale	Light water PWR	77 MW (electric)	Utah Associated Municipal Power Systems (UAMPS)	Up to $1.4 billion	50%	Idaho Falls, ID (Idaho National Laboratory)	NRC Standard Design Approval issued 5/29/2025

Sources: U.S. Department of Energy (DOE), Nuclear Regulatory Commission (NRC), Department of Defense (DOD, currently using the secondary designation of Department of War) as of July 2025. For a longer list of reactor designs, see Energy Information Administration, "Small Modular Reactors and Microreactors Under Development in the United States," April 27, 2026, https://www.eia.gov/todayinenergy/detail.php?id=67584#. For an interactive table of nuclear projects currently engaging with NRC, see NRC, "Pre-Application Activities for Advanced Reactors," May 20, 2026, https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with/pre-application-activities.

Notes: BWR = boiling water reactor; PWR = pressurized water reactor; SMR = small modular reactor; MW = megawatts; HALEU = high-assay low enriched uranium. NuScale/UAMPS project was terminated by sponsors on November 8, 2023. See NuScale, "Utah Associated Municipal Power Systems (UAMPS) and NuScale Power Agree to Terminate the Carbon Free Power Project (CFPP)," press release, November 8, 2023,

https://www.nuscalepower.com/en/news/press-releases/2023/uamps-and-nuscale-power-agree-to-terminate-the-carbon-free-power-project. Reactors listed with only thermal output will not generate electricity. Excludes DOE-authorized laboratory-scale reactor projects and proposed DOD reactors at military bases.

Existing U.S. nuclear power plants continue to face strong competition from natural gas and renewable energy. Thirteen U.S. reactors were permanently closed from 2013 through April 2022. Three of those units closed because of the need for expensive repairs, three were retired under agreements with state utility regulators, and seven could not compete in their regional wholesale electricity markets. All 13 units had substantial time remaining on their initial 40-year operating licenses or had received, or planned to apply for, 20-year NRC license extensions. (See **Table 2**.)

The shutdowns prompted discussion about the future of other aging U.S. reactors and proposals for federal assistance. Action taken by states has forestalled the announced shutdowns of 20 other U.S. reactors during the past several years. Congress has also enacted federal tax credits and other support for existing and new nuclear power plants. Federal and state assistance, along with anticipated growth in electricity demand, have prompted plans to restart three closed reactors, one each in Michigan, Pennsylvania, and Iowa. Since the most recent round of plant closures in 2013-2022, no permanent reactor shutdowns have been announced.

The extent to which the growth of nuclear power should be encouraged in the United States and around the world continues to be a major component of the U.S. energy policy debate. Numerous bills in recent Congresses have focused on nuclear energy as a low-carbon source of electricity and on the potential for advanced reactor designs to reduce costs and increase safety margins. The Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act of 2024, signed into law July 9, 2024, as Division B of P.L. 118-67, called for greater efficiency in nuclear plant licensing and regulation by NRC. Recent congressional hearings have focused on NRC's implementation of the ADVANCE Act. President Donald Trump signed four executive orders on May 23, 2025, to reform NRC licensing and encourage advanced reactor deployment. The orders included goals of starting construction of 10 new large reactors in the United States by 2030 and quadrupling U.S. nuclear electrical generating capacity to 400,000 megawatts (MW) by 2050.[4]

Other continuing issues in Congress include nuclear safety standards, development of new nuclear power and fuel cycle technologies, and nuclear waste management strategies.

Table 2. U.S. Commercial Reactor Shutdowns Since 2012

Reactor	State	Shutdown Date	Net Summer Generating Capacity (Megawatts)	Start-Up Year	Major Factors Contributing to Shutdown
Crystal River 3	Florida	February 2013	860	1977	Cost of major repairs to reactor containment
Kewaunee	Wisconsin	May 2013	566	1974	Operating losses

[4] Executive Order 14302 of May 23, 2025, "Reinvigorating the Nuclear Industrial Base," 90 *Federal Register* 22595, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09801/reinvigorating-the-nuclear-industrial-base; and Executive Order 14300 of May 23, 2025, "Ordering the Reform of the Nuclear Regulatory Commission," 90 *Federal Register* 22587, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09798/ordering-the-reform-of-the-nuclear-regulatory-commission.

Reactor	State	Shutdown Date	Net Summer Generating Capacity (Megawatts)	Start-Up Year	Major Factors Contributing to Shutdown
San Onofre 2	California	June 2013	1,070	1983	Cost of replacing new steam generators
San Onofre 3	California	June 2013	1,080	1984	Cost of replacing new steam generators
Vermont Yankee	Vermont	December 2014	620	1972	Operating losses
Fort Calhoun	Nebraska	October 2016	479	1973	Operating losses
Oyster Creek	New Jersey	September 2018	614	1969	Agreement with state to avoid building cooling towers
Pilgrim	Massachusetts	May 2019	685	1972	Operating losses, rising capital expenditures
Three Mile Island 1	Pennsylvania	October 2019	803	1974	Operating losses; owner now planning restart to power a data center
Indian Point 2	New York	April 2020	1,020	1974	Low electricity prices; settlement with state
Duane Arnold	Iowa	August 2020	601	1975	Lower-cost alternative power; owner planning restart
Indian Point 3	New York	April 2021	1,035	1976	Low electricity prices; settlement with state
Palisades	Michigan	April 2022	784	1971	Operating losses, end of power purchase agreement; plant owner now working to restart with state and federal support; fuel loading approved by NRC July 24, 2025

Source: Information from company press releases, regulatory filings, and U.S. Department of Energy on the status of reactor shutdowns since 2012.

Notes: NRC = Nuclear Regulatory Commission.

Basic Facts and Statistics

The 94 licensed nuclear power reactors at 54 sites in the United States generate about 20% of the nation's electricity. The oldest of today's operating reactors were licensed in 1969, and the most recent to begin commercial operation were Vogtle 3 and 4 in Georgia in July 2023 and April

2024, respectively.[5] Before that, the most recent reactors to start up were Watts Bar 2 in 2015 and its twin unit, Watts Bar 1, in 1996 in Tennessee.[6] All U.S. reactors were initially licensed to operate for 40 years, and nearly all of them have received or applied for 20-year license renewals by NRC.[7] NRC issued its first "subsequent license renewals," which allow operation for up to 80 years, to the Turkey Point 3 and 4 reactors in Florida in December 2019, and 21 more have since been issued. NRC is currently reviewing subsequent license renewal applications for another 3 reactors and has received letters of intent for at least 30 more.[8] License extensions to 80 years would allow existing U.S. nuclear plants to operate until the 2050s and 2060s.[9]

Whether new reactors will be constructed to replace the existing fleet, or to expand nuclear power's market share, will likely depend largely on costs. The cost of building and operating a new nuclear power plant in the United States is generally estimated to be significantly higher than natural gas combined-cycle plants (which use both combustion and steam turbines to generate electricity) and higher than wind and solar as well. For example, the Energy Information Administration (EIA) estimates that, for plants coming on line in 2031, the average cost of electricity generation from a nuclear power plant would be 8.8 cents per kilowatt-hour (kWh), including tax credits, while advanced combined-cycle gas-fired generation would cost 7.7 cents/kWh. EIA also estimated that electricity from onshore wind would cost 5.7 cents/kWh, solar photovoltaics 5.8 cents/kWh, and geothermal 4.0 cents/kWh (all in 2025 dollars).[10] Such estimates depend on a wide range of variables, such as future fuel costs, regional solar and wind availability, current and future tax incentives, and environmental regulations and mandates. In particular, tax incentives for new electric generating capacity were modified by the FY2025 budget reconciliation act, P.L. 119-21. The specific attributes of each generating technology, such as the intermittent nature of solar and wind, are also important considerations in power plant construction decisions.

The two new U.S. reactors at the Vogtle nuclear plant site in Georgia experienced severe construction delays and cost overruns.[11] As noted above, construction of two new units in South Carolina was terminated in 2019, although the owner of the partially built reactors recently solicited outside proposals to acquire them for completion.[12] Licenses to build and operate six additional reactors were issued by NRC from 2015 to 2017 and remain active, although no plans

[5] Georgia Power, "Vogtle Unit 4 Enters Commercial Operation," press release, April 29, 2024, https://www.georgiapower.com/news-hub/press-releases/vogtle-unit-4-enters-commercial-operation.html.

[6] NRC, *Information Digest, 2020-2021*, NUREG-1350, vol. 34, Appendix A, https://www.nrc.gov/docs/ML2304/ML23047A378.pdf.

[7] NRC, "Status of Initial License Renewal Applications and Industry Initiatives," April 3, 2026, https://www.nrc.gov/reactors/operating/licensing/renewal/applications.html.

[8] NRC, "Status of Subsequent License Renewal Applications," May 12, 2026, https://www.nrc.gov/reactors/operating/licensing/renewal/subsequent-license-renewal.html.

[9] "Looming Retirements," infographic, *Power*, https://www.powermag.com/wp-content/uploads/2020/04/bp_april2020_nuclearreactorage_web.pdf.

[10] EIA, "Levelized Costs of New Generation Resources in the Annual Energy Outlook 2026," April 2026, p 8, https://www.eia.gov/outlooks/aeo/electricity_generation/pdf/LCOE_report.pdf. Levelized costs include the present value of capital costs averaged over the assumed life of the plant, plus fuel and maintenance costs and tax credits, divided by total electricity generated, in 2025 dollars.

[11] Darrell Proctor, "Another Delay for New Unit at Vogtle Nuclear Plant," *Power*, June 17, 2023, https://www.powermag.com/another-delay-for-new-unit-at-vogtle-nuclear-plant.

[12] Anna Flávia Rochas, "Plans to Restart Construction of VC Summer Reactors Gain Traction," Reuters, July 4, 2025, https://www.reuters.com/business/energy/plans-restart-construction-vc-summer-reactors-gain-traction-2025-07-04.

for construction have been announced. Applications for 10 other new reactors have been withdrawn or suspended, and six licenses have been terminated.[13]

Much of the U.S. interest in new nuclear power plants is focused on "advanced" reactors, using different technology from that of existing light water reactors, which use ordinary (light) water as a coolant and moderator to slow the neutrons in the nuclear chain reaction. There is also considerable interest in "small modular reactors," which would be smaller than today's commercial reactors and could use a variety of technologies. NRC is conducting licensing reviews or pre-application activities for several proposed advanced reactors. Construction permits for Kairos Power to build three low-power advanced test reactors in Tennessee were issued in December 2023 and November 2024.[14] Pursuant to President Trump's nuclear energy executive orders, DOE announced on August 12, 2025, that it would use its own statutory authority to certify construction and operation of at least three advanced test reactors by July 4, 2026.[15]

Throughout the world, as of July 2026, there were 439 reactors in service or operable and 80 more under construction. France is the most heavily nuclear-reliant country in the world, with 57 reactors generating 67% of the country's electricity in 2024. In 2024, 32 countries generated at least some of their electricity from nuclear power.[16]

After the Fukushima incident, Germany, which had previously generated about 30% of its electricity with nuclear power, began phasing out its 17 power reactors through early 2023. Japan, which had also generated about 30% of its electricity with nuclear power and had planned to raise that level to 50%, is now planning for that level to be about 20% by 2030. All 54 Japanese reactors were closed within a year after the 2011 earthquake and tsunami, 21 of them permanently. Of Japan's 33 reactors that have not permanently shut down, 15 are currently in commercial service following safety upgrades to meet new regulatory requirements, and 10 others have applied for restart. It is not clear how many of Japan's remaining operable reactors will ultimately resume operation.[17]

Major Nuclear Energy Issues

Advanced Nuclear Technology

Existing commercial nuclear power plants in the United States are based on light water reactor (LWR) technology, in which ordinary (light) water is used to cool the reactor and to moderate, or slow, the neutrons in a nuclear chain reaction. In the chain reaction, neutrons cause the nuclei of uranium and other heavy atoms to fission (split), releasing large amounts of energy and additional

[13] NRC, "Combined License Holders for New Reactors," March 6, 2025, https://www.nrc.gov/reactors/new-reactors/large-lwr/col-holder.

[14] NRC, "Who We're Working With," September 29, 2025, https://www.nrc.gov/reactors/new-reactors/advanced/who-were-working-with.

[15] Department of Energy (DOE), "Department of Energy Announces Initial Selections for New Reactor Pilot Program," August 12, 2025, https://www.energy.gov/articles/department-energy-announces-initial-selections-new-reactor-pilot-program.

[16] World Nuclear Association, "Nuclear Generation by Country," September 30, 2025, http://www.world-nuclear.org/information-library/facts-and-figures/nuclear-generation-by-country.aspx; and World Nuclear Association, "World Nuclear Power Reactors and Uranium Requirements," July 9, 2026, http://www.world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-and-uranium-requireme.aspx.

[17] World Nuclear Association, "Nuclear Power in Japan," April 21, 2026, http://www.world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power.aspx; and "First BWR Restarts in Japan," *World Nuclear News*, October 29, 2024, https://www.world-nuclear-news.org/articles/first-bwr-restarts-in-japan.

neutrons to maintain the reaction. The federal government developed LWRs for naval propulsion in the 1950s and funded the commercialization of the technology for electricity generation.[18] The Department of Energy (DOE) and its predecessor agencies for decades have also conducted research on "advanced" reactor technologies that use different coolants and moderators, as well as fast neutron reactors that have no moderator.

The term "advanced nuclear reactor" is defined by the Energy Act of 2020 (P.L. 116-260, Division Z), as well as other recent laws, as any fusion reactor and a fission reactor that has "significant improvements" over existing commercial reactors. Areas of improvement can include safety, waste generation, performance, resistance to weapons proliferation, "modular sizes," and integration of electric and nonelectric applications (such as heat and hydrogen production). That definition encompasses small modular reactors (SMRs) of any type. Supporters of advanced reactors contend that their potentially lower cost and other advantages over existing commercial reactors could make them highly competitive with other low-emission energy sources and create a vast export market. Several demonstrations of advanced reactor designs are currently planned, which could provide an indication of their commercial viability.

To produce less long-lived radioactive waste than existing reactors, some advanced reactor concepts would involve the reprocessing of spent nuclear fuel to separate uranium, plutonium, and other long-lived radioisotopes to make new fuel for fast reactors.[19] Such reprocessing, or recycling, would also reduce the need for newly mined uranium to fuel a potentially growing worldwide reactor fleet, according to proponents. However, the separation of plutonium from spent nuclear fuel also raises significant concerns about nuclear weapons proliferation. (For more information, see CRS Report R48364, *Considerations for Reprocessing of Spent Nuclear Fuel*, by Lance N. Larson and Mark Holt.)

SMRs would be smaller than today's commercial LWRs, which generally have about 1,000 MW of electric generating capacity or more.[20] Supporters of SMRs contend that they would be small enough so that reactor modules could be mass-produced in factories and shipped to reactor sites, achieving greater construction economies of scale than conventional nuclear plants. In addition, SMRs could reduce the financial risks of building a new nuclear power plant, because each module would cost less than today's large reactors and revenues could begin when the first module was complete, rather than after completion of a much larger unit. However, some analysts

[18] There are two types of light water reactor (LWR). The most common are pressurized water reactors (PWRs), in which reactor cooling water is held under pressure so that it does not boil; the pressurized water passes through a heat exchanger (called a *steam generator*) to a secondary loop of water that is allowed to boil into steam to drive a turbine connected to an electric generator. The second type are boiling water reactors (BWRs), in which reactor cooling water is allowed to boil to make steam. For simplified diagrams, see DOE Office of Nuclear Energy, "Nuclear 101: How Does a Nuclear Reactor Work?," May 18, 2025, https://www.energy.gov/ne/articles/nuclear-101-how-does-nuclear-reactor-work.

[19] Radioisotopes are radioactive isotopes; isotopes are forms of an element that have different numbers of neutrons. Different radioisotopes of the same element will behave the same chemically but have different half-lives and other radioactive characteristics. Long-lived radioisotopes separated from spent fuel could in principle be fissioned or transmuted in a fast reactor into shorter-lived radioisotopes for disposal.

[20] A DOE fact sheet says small modular reactors (SMRs) can "represent a variety of sizes, technology options, capabilities, and deployment scenarios" and are "envisioned to vary in size from tens of megawatts up to hundreds of megawatts." DOE Office of Nuclear Energy, "Advanced Small Modular Reactors (SMRs)," https://www.energy.gov/ne/advanced-small-modular-reactors-smrs. The Infrastructure Investment and Jobs Act (P.L. 117-58, §40321) and the James M. Inhofe National Defense Authorization Act (NDAA) for Fiscal Year 2023 (P.L. 117-263, §320, amending P.L. 117-81, NDAA for FY2022) define SMRs as having generating capacity of less than 300 megawatts (MW). The 300-MW limit is also used by the Atomic Energy Act in setting reactor liability limits for public damages (42 U.S.C. §2210(b)(5)). The International Atomic Energy Agency (IAEA) defines SMRs as having electrical capacity of up to 300 MW. IAEA, "Small Modular Reactor (SMR) Regulators' Forum," https://www.iaea.org/topics/small-modular-reactors/smr-regulators-forum.

contend that SMRs would be too small to achieve the operational economies of scale needed to compete with other generating technologies.[21] None of the currently proposed U.S. designs for SMRs have been constructed, so actual costs and construction times have yet to be demonstrated domestically.[22]

Very small SMRs are often called "microreactors," defined by DOE as having thermal energy capacity below 20 MW. They could provide heat or electric power at remote locations. Self-contained microreactor power units would be assembled in a factory, transported to a site in shipping containers, and set up to generate power within a week, according to DOE. Microreactors would be physically "self-regulating," in that their designs are intended to prevent overheating even without operator intervention.[23]

The Nuclear Energy Innovation Capabilities Act of 2017 (NEICA; P.L. 115-248) authorized the construction of demonstration reactors funded by the private sector at DOE sites and authorized grants to help pay for advanced reactor licensing. The Nuclear Energy Innovation and Modernization Act (NEIMA; P.L. 115-439), enacted in 2019, required NRC to develop a new licensing framework for advanced nuclear technology. Proponents of the law contend that NRC's existing licensing system is too focused on LWR technology and would potentially cause delays in non-LWR applications. NRC's implementation of this law is discussed below.

DOE's Advanced Reactor Demonstration Program (ARDP) supports demonstration plants using advanced nuclear technology and the development of technologies for possible future demonstration.[24] The program was initially funded with $230 million by the Further Consolidated Appropriations Act, 2020 (P.L. 116-94) and was authorized by the Energy Act for funding through FY2025.

In addition to the ARDP projects, DOE announced a cost-shared award of up to $1.4 billion under an earlier program in October 2020 to demonstrate the NuScale water-cooled SMR at Idaho National Laboratory. That project was terminated on November 8, 2023, by NuScale and the intended owner of the plant, Utah Associated Municipal Power Systems (UAMPS). According to a statement by the companies, UAMPS members (mostly small municipal power systems) did not commit to purchasing enough of the SMR plant's planned 462 MW of electric generation to make the project economically viable.[25] The project had experienced a number of delays and cost increases before being terminated.[26]

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[21] David Schlissel and Dennis Wamsted, *Small Modular Reactors: Still Too Expensive, Too Slow and Too Risky*, Institute for Energy Economics and Financial Analysis, May 2024, https://ieefa.org/sites/default/files/2024-05/SMRs%20Still%20Too%20Expensive%20Too%20Slow%20Too%20Risky_May%202024.pdf.

[22] A high-temperature gas-cooled SMR began commercial operation in China in December 2023. The 210 MW (electric) plant took 11 years to construct at a cost that was not announced. See "China's Demonstration HTR-PM Enters Commercial Operation, *World Nuclear News*, December 6, 2023, https://www.world-nuclear-news.org/Articles/Chinese-HTR-PM-Demo-begins-commercial-operation.

[23] DOE Office of Nuclear Energy, "What Is a Nuclear Microreactor?," February 26, 2021, https://www.energy.gov/ne/articles/what-nuclear-microreactor. Electrical output of a reactor can range from about 34%-39% of its thermal output. World Nuclear Association, "Is the Cooling of Power Plants a Constraint on the Future of Nuclear Power?," May 19, 2020, p. 3, https://world-nuclear.org/our-association/publications/technical-positions/cooling-of-power-plants.

[24] DOE, "Advanced Reactor Demonstration Program," https://www.energy.gov/ne/advanced-reactor-demonstration-program.

[25] NuScale, UAMPS, "Utah Associated Municipal Power Systems (UAMPS) and NuScale Power Agree to Terminate the Carbon Free Power Project (CFPP)," press release, November 8, 2023, https://www.cfppllc.com/file/44ac923c-86d2-43de-a87b-2c6e336a0db5.

[26] Zach Bright, "NuScale Cancels First-of-a-Kind Nuclear Project as Costs Surge," *Energywire*, November 9, 2023, https://www.eenews.net/articles/nuscale-cancels-first-of-a-kind-nuclear-project-as-costs-surge.

The Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58), enacted in 2021, appropriated $2.477 billion through FY2025 for ARDP, in addition to annual appropriations. DOE selected two demonstration projects in October 2020 to receive a total of $3.2 billion from the program over seven years, with the project sponsors matching that amount. Five potential future reactor demonstration projects received 80% cost-share awards under ARDP in December 2020, totaling $600 million of DOE funding over seven years.

IRA also included $700 million for DOE to develop supplies of high-assay low enriched uranium (HALEU), needed for some advanced reactor designs, including the two non-LWR demonstration plants that DOE is supporting. HALEU, not currently available commercially, is uranium enriched in the fissile isotope U-235 above the 3%-5% level used by existing commercial reactors but below the 20% threshold for highly enriched uranium. DOE's HALEU program was authorized by the Energy Act of 2020.

The ADVANCE Act included provisions on advanced reactor licensing reviews, licensing of nuclear nonelectric applications, fusion energy regulation, demonstration of advanced reactors at DOE sites, regulatory requirements for microreactors, and NRC efficiency, among other subjects.

Authority under the Price-Anderson Act[27] for NRC to indemnify new reactors against damage to the public caused by major accidents was extended by the Further Consolidated Appropriations Act, 2024 (P.L. 118-47, Division G, §107), signed by the President on March 23, 2024. Indemnification authority under the Price-Anderson liability system, considered crucial for new reactor construction, was extended from the end of 2025 to the end of 2065.

The Biden Administration issued the "U.S. Nuclear Energy Deployment Framework" on November 12, 2024, calling for tripling U.S. nuclear power capacity by deploying an additional 200 gigawatts (GW) by 2050. President Donald Trump called for quadrupling U.S. nuclear capacity to 400 GW by 2050 on May 23, 2025.[28] U.S. nuclear generating capacity currently totals about 97 GW, with existing large commercial reactors each averaging about 1 GW (1,000 MW) of capacity.

Tax Credits

Tax credits for advanced nuclear reactors and other new zero-emissions power plants were included in the law commonly referred to as the Inflation Reduction Act of 2022 (IRA; P.L. 117-169). Qualifying plants can receive a 10-year clean electricity production tax credit (CEPTC) of 3 cents/kWh (2025 value; adjusted annually for inflation) or a 30% clean electricity investment tax credit (CEITC). These credits may be further enhanced through "bonus credit amounts" that can bump the CEPTC as high as 3.6 cents/kWh and make the CEITC as high as 50% of investment costs for qualifying new nuclear facilities.[29]

The FY2025 budget reconciliation act (P.L. 119-21) allowed metropolitan statistical areas which have, or have had since 2010, 0.17% or greater direct employment related to the advancement of nuclear power, to qualify as "energy communities" under the Production Tax Credit (PTC; predecessor to the CEPTC), the Investment Tax Credit (ITC; predecessor to the CEITC), and the CEPTC; this allows PTC and CEPTC amounts to be enhanced 10% and ITC amounts to be

[27] Section 170 of the Atomic Energy Act of 1954, 42 U.S.C. §2210.

[28] Executive Order 14300 of May 23, 2025, "Ordering the Reform of the Nuclear Regulatory Commission," 90 *Federal Register* 09798, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09798/ordering-the-reform-of-the-nuclear-regulatory-commission.

[29] CRS Report R48428, *Inflation Reduction Act (IRA) Wage and Apprenticeship Requirements: Effect on Tax Credit Values*, by Nicholas E. Buffie.

enhanced by 10 percentage points.[30] Finally, certain existing nuclear power facilities may qualify for the zero-emissions nuclear power production tax credit, which equals 1.5 cents per kilowatt-hour of electricity production from nuclear facilities placed in service before August 16, 2022, whenever the price of electricity is below 2.6 cents per kilowatt-hour.[31]

Recent Events

As required by NEIMA, NRC approved a final rule for a "Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors" on March 25, 2026. Applicants for new reactor licenses would have the option to use the new licensing framework, Title 10 of the *Code of Federal Regulations*, Part 53, instead of existing licensing regulations at Parts 50 and 52.[32]

NRC is currently reviewing a design certification application for the NuScale SMR plant, which would consist of six 77-MW (electric) reactors in a large pool of water.[33] NRC approved construction permits for Kairos Power for adjoining test reactors on November 20, 2024.[34] Under ARDP, one of the award recipients, TerraPower, is proposing to build its demonstration plant on the site of a closed coal-fired power plant in Wyoming,[35] while the other, X-energy, is proposing to build a four-unit demonstration plant at a Dow Chemical plant in Texas.[36]

The Department of Defense (DOD) awarded a contract in 2022 to BWX Technologies to build a prototype mobile microreactor as part of Project Pele. An award to develop a second prototype design went to X-energy in 2023. According to DOD's Strategic Capabilities Office (SCO), "By nurturing and developing multiple micro reactor designs, SCO will not just provide options for the military Services, but will also help jumpstart a truly competitive commercial marketplace for micro reactors."[37] The BWX Technologies microreactor is to be transported to DOE's Idaho

[30] This change was not applied to the clean electricity investment tax credit (CEITC). Prior to the changes enacted in P.L. 119-21, "energy communities" were areas that have, or recently had, certain levels of fossil fuel employment; had a coal plant shutter; or had a coal mine shutter. By adding nuclear energy to the list of qualifying energy sources for the "energy communities" bonus credit, P.L. 119-21 did not necessarily subsidize new nuclear plant construction per se, but rather subsidized construction of new wind, solar, geothermal, hydropower, nuclear, or other qualifying power plant in an area with current or past nuclear industry employment. For more information, see CRS Report R48611, *Tax Provisions in P.L. 119-21, the FY2025 Reconciliation Law*, coordinated by Anthony A. Cilluffo.

[31] Reported amounts reflect 2025 tax credit values; amounts are adjusted annually for inflation. For more information, see CRS Insight IN12557, *Nuclear Power Tax Credits*, by Nicholas E. Buffie. As reported in that publication, the tax credit value was 1.5 cents per kilowatt-hour (kWh) whenever the price of electricity was below 2.5 cents/kWh in 2024; due to rules related to the rounding of different values, the former amount remained at 1.5 cents while the latter increased 0.1 cents in 2025.

[32] NRC, "Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors," final rule, March 25, 2026, https://www.nrc.gov/docs/ML2608/ML26084A489.pdf.

[33] NRC, "NuScale US460 Standard Design Approval Application Review," August 1, 2023, https://www.nrc.gov/reactors/new-reactors/smr/licensing-activities/current-licensing-reviews/nuscale-us460.html. The first planned NuScale power plant, at Idaho National Laboratory, was canceled November 8, 2023, but the design review is continuing for other potential projects.

[34] NRC, "NRC to Issue Construction Permits for Kairos Hermes 2 Test Facility in Tennessee," press release, November 20, 2024, https://www.nrc.gov/cdn/doc-collection-news/2024/24-081.pdf.

[35] DOE Office of Nuclear Energy, "Next-Gen Nuclear Plant and Jobs Are Coming to Wyoming," June 7, 2021, https://www.energy.gov/ne/articles/next-gen-nuclear-plant-and-jobs-are-coming-wyoming.

[36] X-energy, "Energy Northwest and X-energy Sign Joint Development Agreement for Xe-100 Advanced Small Modular Reactor Project," July 19, 2023, https://x-energy.com/media/news-releases/energy-northwest-x-energy-joint-development-agreement-xe-100.

[37] U.S. Department of Defense (DOD), "DOD Exercises Option on Second Micro Nuclear Reactor Design," press release, September 13, 2023, https://www.defense.gov/News/Releases/Release/Article/3524458/dod-exercises-option-on-second-micro-nuclear-reactor-design.

National Laboratory in four shipping containers in 2026 and positioned in a concrete shield structure for test operations. Ground was broken at the reactor test site in September 2024.[38] The U.S. Army selected "optimal" military sites for future microreactors as part of the Janus Program in November 2025.[39]

DOE has authority under the Atomic Energy Act of 1954 to authorize and regulate its own reactors, such as test reactors built under DOE contracts at DOE facilities. Proponents of the DOE authorization process contend that it could allow reactor technology to develop faster than under NRC licensing, which is required for reactors intended to demonstrate or produce electricity for the grid.[40] Executive Order 14301, issued by President Trump on May 23, 2025, required DOE to approve the construction and operation of at least three test reactors under a pilot program with a goal of achieving nuclear criticality, a key development milestone, by July 4, 2026.[41] Four test reactors approved by DOE subsequently met the July 4 deadline.[42] Executive Order 14300 required NRC to establish "an expedited pathway to approve reactor designs that the DOD or the DOE have tested and that have demonstrated the ability to function safely."[43]

DOE's nuclear energy research and development program includes reactor modeling and simulation, experimental processing of spent nuclear fuel, development of advanced reactor concepts, and testing of "accident tolerant fuels" for existing LWRs. The Energy and Water Development and Related Agencies Appropriations Act, 2024 (P.L. 118-42, Division D) provided $316 million in new funding for the Advanced Reactor Demonstration Program. It also authorized DOE to spend $900 million in unobligated appropriations from the Infrastructure Investment and Jobs Act (P.L. 117-58) for two SMR demonstrations and up to $2.720 billion to support domestic uranium mining, conversion, and enrichment, and to support the acquisition of HALEU for advanced reactors. DOE awarded $2.7 billion to three uranium enrichment companies on January 5, 2026.[44]

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[38] DOD, "DoD Breaks Ground on Project Pele: A Mobile Nuclear Reactor for Energy Resiliency," press release, September 24, 2024, https://www.defense.gov/News/Releases/Release/Article/3915633/dod-breaks-ground-on-project-pele-a-mobile-nuclear-reactor-for-energy-resiliency.

[39] U.S. Army, "Army Announces Next Steps on Janus Program for Next-Generation Nuclear Energy," November 18, 2025, https://www.army.mil/article/289074/army_announces_next_steps_on_janus_program_for_next_generation_nuclear_energy.

[40] Scott Ferrara, "Nuclear Facility Licensing and Authorization by Nuclear Regulatory Commission and the Department of Energy," Idaho National Laboratory Regulatory Development Organization, April 2024, https://gain.inl.gov/content/uploads/4/2024/06/Ferrara-12021_GAIN_WIW-NRC-Licensing-vs-DOE-Authorization-Master-POST-PRS-TECH-EDIT-R0-KS2.pdf.

[41] Aalo, "Aalo-X Groundbreaking," news release, August 28, 2025, https://www.aalo.com/post/aalo-x-groundbreaking; Oklo, "Oklo Breaks Ground on First Aurora Powerhouse," news release, September 22, 2025, https://oklo.com/newsroom/news-details/2025/Oklo-Breaks-Ground-on-First-Aurora-Powerhouse/default.aspx; Executive Order 14301 of May 23, 2025, "Reforming Nuclear Reactor Testing at the Department of Energy," 90 *Federal Register* 22591, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09799/reforming-nuclear-reactor-testing-at-the-department-of-energy; Aolo, "Aalo Selected by DOE to Test Aalo-X, Targeting Criticality by July 4th, 2026," news release, August 12, 2025, https://www.aalo.com/post/aalo-selected-by-doe-to-test-aalo-x-targeting-criticality-by-july-4th-2026; and DOE, "U.S. Department of Energy Reactor Pilot Program," viewed November 11, 2025, https://www.energy.gov/ne/us-department-energy-reactor-pilot-program.

[42] DOE, "Department of Energy Celebrates Fourth Criticality Ahead of July 4th Goal," July 6, 2026, https://www.energy.gov/articles/department-energy-celebrates-fourth-criticality-ahead-july-4th-goal.

[43] Executive Order 14300 of May 23, 2025, "Ordering the Reform of the Nuclear Regulatory Commission," 90 *Federal Register* 22587, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09798/ordering-the-reform-of-the-nuclear-regulatory-commission.

[44] DOE, "U.S. Department of Energy Awards $2.7 Billion to Restore American Uranium Enrichment," January 5, 2026, https://www.energy.gov/articles/us-department-energy-awards-27-billion-restore-american-uranium-enrichment.

For FY2025, Congress enacted a full-year continuing appropriation (P.L. 119-4) that continued nuclear energy funding at the FY2024 level of $1.685 billion. The FY2026 Energy and Water Development Appropriations Act (P.L. 119-74), signed January 23, 2026, transferred $3.1 billion from IIJA to fund up to two SMR deployments and potential future deployments.[45]

As discussed above, the Trump Administration has taken numerous actions intended to quadruple U.S. nuclear generating capacity by 2050.[46] Energy Secretary Chris Wright issued a secretarial order on February 5, 2025, that said, in part, "As global energy demand continues to grow, America must lead the commercialization of affordable and abundant nuclear energy. As such, the Department will work diligently and creatively to enable the rapid deployment and export of next-generation nuclear technology."[47] DOE issued a compilation of the Trump Administration's actions to support nuclear energy on July 25, 2026, titled, "The Golden Era of American Nuclear Energy Has Arrived."[48]

The Subcommittee on Energy of the House Committee on Energy and Commerce on July 14, 2026, approved the Nuclear REFUEL (Recycling Efficient Fuels Utilizing Expedited Licensing) Act (H.R. 3978) to simplify the licensing of spent nuclear fuel reprocessing plants.

Selected Hearings and Enacted Legislation

Hearing on American Energy Dominance: Dawn of the New Nuclear Era, House Committee on Energy and Commerce, Subcommittee on Energy

Examined federal policies and programs to expand the U.S. nuclear power industry and fuel supplies. Witnesses included nuclear industry officials and researchers. Held January 7, 2026, https://www.congress.gov/event/119th-congress/house-event/118801.

Hearing on Igniting America's Energy Future: The Promise and Progress of Fusion Power, House Committee on Science, Space, and Technology, Subcommittee on Energy

Examined current fusion energy research and development in the United States, the appropriate role of the federal government, and the potential of fusion to transform the energy sector. Held September 18, 2025, https://science.house.gov/2025/9/igniting-america-s-energy-future-the-promise-and-progress-of-fusion-power.

[45] White House, "Biden-Harris Administration Establishes Bold U.S. Government Targets for Safely and Responsibly Expanding U.S. Nuclear Energy and Announces Framework for Action to Achieve These Targets," November 12, 2024, https://bidenwhitehouse.archives.gov/ostp/news-updates/2024/11/12/biden-%E2%81%A0harris-administration-establishes-bold-u-s-government-targets-for-safely-and-responsibly-expanding-u-s-nuclear-energy-and-announces-framework-for-action-to-achieve-these-targets.

[46] DOE, "Fact Sheet: The Energy Department Is Delivering on Accelerating the Deployment of Nuclear Power," January 19, 2026, https://www.energy.gov/articles/fact-sheet-energy-department-delivering-accelerating-deployment-nuclear-power.

[47] Chris Wright, Secretary of Energy, "Unleashing the Golden Era of American Energy Dominance," secretarial order, February 5, 2025, https://www.energy.gov/articles/secretary-wright-acts-unleash-golden-era-american-energy-dominance.

[48] DOE, "The Golden Era of American Nuclear Energy Has Arrived," fact sheet, July 25, 2025, https://www.energy.gov/articles/fact-sheet-golden-era-american-nuclear-energy-has-arrived.

Hearing on the New Atomic Age: Advancing America's Energy Future, House Committee on Oversight and Government Reform, Subcommittee on Economic Growth, Energy Policy, and Regulatory Affairs

Examined licensing reform at the Nuclear Regulatory Commission, the potential of advanced nuclear reactors, and supply of reactor fuel. Held July 22, 2025, https://www.congress.gov/event/119th-congress/house-event/118521/text.

National Defense Authorization Act for Fiscal Year 2026 (P.L. 119-60, S. 1071, Cornyn)

Includes the International Nuclear Energy Act (Section 8366) to encourage civilian nuclear energy-related exports to and technology cooperation with ally or partner nations. Introduced March 14, 2025; signed into law December 18, 2025 (P.L. 119-60).

Energy and Water Development and Related Agencies Appropriations Act, 2026 (P.L. 119-74, H.R. 4553, Fleischmann/S. 3293, Kennedy)

Includes funding for advanced reactor research and demonstration projects. House bill introduced and reported by Committee on Appropriations July 21, 2025; passed House September 4, 2025 (214-213). Senate bill introduced December 1, 2025; referred to Committee on Appropriations. Signed into law January 23, 2026, as Division B of P.L. 119-74 (H.R. 6938).

CRS Reports

CRS Report R45706, *Advanced Nuclear Reactors: Technology Overview and Current Issues*, by Mark Holt.

CRS Report R48364, *Considerations for Reprocessing of Spent Nuclear Fuel*, by Lance N. Larson and Mark Holt.

CRS Report R48362, *ITER—An International Nuclear Fusion Research and Development Facility*, coordinated by Todd Kuiken.

CRS Report R48944, *Energy and Water Development: FY2027 Appropriations*, by Mark Holt and Anna E. Normand.

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"Advanced" Isn't Always Better: Assessing the Safety, Security, and Environmental Impacts of Non-Light-Water Nuclear Reactors, Edwin Lyman, Union of Concerned Scientists, March 2021, https://www.ucsusa.org/resources/advanced-isnt-always-better.

Uranium and Fuel Supply

The nuclear fuel supply chain begins with the mining of uranium, which is found in geological deposits with widely varying concentrations throughout the world. Mined natural uranium is concentrated to the form of an oxide, U_3O_8, known as yellowcake. About 0.7% of the uranium in yellowcake consists of the fissile isotope U-235, while the remaining 99.3% is non-fissile U-238. To make nuclear fuel appropriate for commercial light water fission reactors, the yellowcake must be chemically converted to uranium hexafluoride (UF_6) in a conversion plant and sent to a uranium enrichment plant to increase its percentage of U-235, as discussed below.

The countries with the most uranium mining, in descending order, are Kazakhstan, Canada, Namibia, Australia, Uzbekistan, Russia, China, and Niger, which together accounted for 98% of world production of uranium in 2024. U.S. uranium production in 2024 accounted for 0.15%.[49] Canada was the largest supplier of uranium to U.S. nuclear power plants in 2024, accounting for 33%, followed by Kazakhstan at 22%, and Australia at 15%. After low uranium prices halted most U.S. mine production in 2019 through 2023, better market conditions led to rapid growth in U.S. production through the first quarter of 2026, with recent increases in drilling activity indicating continued growth in the future.[50]

The only U.S. uranium conversion plant, in Metropolis, IL, halted operation in 2017 because of low prices and oversupply. Nuclear reactors in the United States at that point became dependent on conversion plants in Canada and France, conversion conducted in Russia to prepare uranium for enrichment and subsequent export, and secondary supplies from inventories. The Metropolis

[49] World Nuclear Association, "World Uranium Mining Production," January 20, 2026, https://world-nuclear.org/information-library/nuclear-fuel-cycle/mining-of-uranium/world-uranium-mining-production.aspx.

[50] Energy Information Administration, *2024 Uranium Marketing Annual Report*, September 2025, p. 21, https://www.eia.gov/uranium/marketing/pdf/2024%20UMAR.pdf; and Energy Information Administration, *Domestic Uranium Production Report First-Quarter 2026*, June 2026, https://www.eia.gov/uranium/production/quarterly/pdf/dupr.pdf.

plant restarted in mid-2023 after conversion prices doubled, reducing reliance on foreign suppliers. Owned by Solstice Advanced Materials, the plant is currently expanding production.[51]

After conversion, the UF_6 is then sent to a uranium enrichment plant where, in a gaseous state, it is spun in large cylindrical centrifuges to separate U-235 from the slightly more massive U-238. As a result, some of the UF_6 (toward the center of the centrifuge) gains an increased concentration, or enrichment, of U-235. To make fuel for existing commercial light water reactors, the UF_6 is fed into a series of centrifuges until the U-235 enrichment reaches between 3% and 5%. Additional centrifuges and energy would be needed to reach higher enrichment levels, such as the nearly 20% typical for HALEU. Enriched UF_6 is transported to fuel fabrication plants to be made into ceramic uranium dioxide (UO_2) pellets that are inserted into long metal tubes called *fuel rods*. The fuel rods, about 12-15 feet long, are bundled into fuel assemblies to be loaded into reactors to produce energy.

Russia had about 43% of world uranium enrichment capacity in 2025. The United States has one commercial enrichment plant, owned by the European consortium Urenco, with about 8% of the world's capacity. Other commercial enrichment plants are located in France, Germany, the Netherlands, and the United Kingdom.[52] In 2024, Russia supplied 20% of uranium enrichment services purchased by U.S. nuclear power plants, the U.S. enrichment plant provided 19%, and Western European plants provided 48%.[53]

The fuel fabrication stage, in which enriched uranium is made into finished reactor fuel assemblies, does not rely on Russian capacity. Capacity at three U.S. fuel fabrication plants is more than sufficient to supply all U.S. commercial reactors. Western European reactors also do not need Russian fuel fabrication. However, some Eastern European countries with Soviet-designed reactors use fuel fabricated in Russia.[54]

Recent Events

Russia's full-scale invasion of Ukraine in February 2022 led to broad sanctions on Russian exports, including those in the energy sector. However, sanctions were not initially imposed on Russian uranium exports, because of substantial reliance on those exports by the United States and Europe, particularly exports of enriched uranium.[55] The Prohibiting Russian Uranium Imports Act (P.L. 118-62), signed by President Biden on May 13, 2024, banned imports of uranium from Russia starting on August 11, 2024, but allowed DOE to approve waivers through the end of 2027. As described below, DOE has issued such waivers.

[51] Solstice Advanced Materials, "Solstice Advanced Materials Announces Expansion of Uranium Conversion Production to Support Strong Nuclear Industry Customer Demand," February 10, 2026, https://www.solstice.com/us/en/resources/press-releases/2026/02/solstice-advanced-materials-announces-expansion-of-uranium-conversion-production-to-support-strong-nuclear-industry-customer-demand; and William Freebairn, "Conversion, Enrichment Suppliers Worried About Future Oversupply," *Platts NuclearFuel*, October 27, 2023.

[52] World Nuclear Association, "Uranium Enrichment," June 6, 2025, https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/uranium-enrichment.aspx; and Urenco, "Urenco Marks Installation of New US Enrichment Capacity," October 10, 2024, https://www.urenco.com/news/global/2024/urenco-marks-installation-of-new-us-enrichment-capacity.

[53] EIA, "2024 Uranium Marketing Annual Report," Table 16, September 2025, https://www.eia.gov/uranium/marketing/pdf/2024%20UMAR.pdf.

[54] World Nuclear Association, "Nuclear Fuel and Its Fabrication," October 2021, https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/fuel-fabrication.aspx.

[55] For a European perspective, see Ashutosh Pandey, "Why EU Sanctions Don't Include Russian Nuclear Industry," *Deutsche Welle*, July 19, 2023, https://www.dw.com/en/russia-nuclear-industry-eu/a-66275352.

After the invasion of Ukraine, Western uranium enrichment companies began expanding their capacity to provide additional non-Russian supplies. Urenco announced September 10, 2025, that some new capacity at its U.S. enrichment plant in New Mexico had begun operation. When completed in 2027, the expansion project is to increase the plant's uranium enrichment capacity by 15%. "New commitments from U.S. customers for non-Russian fuel underpin this investment," according to a company statement.[56] Another 15% capacity increase was announced by Urenco for its Netherlands plant in 2023, with a further 15% increase announced in October 2025. The company said at the same time that the initial expansion was "well underway" toward completion in 2027 and that the further expansion would come online in 2030. Urenco is also increasing capacity at plants in Germany and the United Kingdom.[57] French nuclear fuel firm Orano announced October 26, 2023, that it would expand its enrichment plant by 30% by 2028, which could include production of HALEU "as driven by demand." The company said the project was proceeding on schedule at the end of 2025.[58] Under a contract with DOE, the U.S. firm Centrus delivered 900 kilograms of HALEU in June 2025 and received a contract extension to deliver 900 kilograms more by June 2026, with further extensions possible.[59]

The Congressional Budget Office estimated that the Russian uranium prohibition would increase the price of nuclear fuel by 13% by prompting "a gradual replacement of Russian suppliers with higher-cost sources of enrichment services under the bill's waiver provisions."[60] The DOE waivers of the Russian ban are allowed up to specified annual limits through 2027 if no alternative supplies are available. DOE issued waivers beginning on July 18, 2024, to allow Centrus Energy to import enriched uranium from Russia through 2027.[61]

The IRA included $700 million for DOE to develop supplies of HALEU, needed for some advanced reactor designs. The Energy and Water Development and Related Agencies Appropriations Act, 2024 (P.L. 118-42, Division D), authorized DOE to spend up to $2.72 billion of unobligated IIJA appropriations to support domestic uranium mining, conversion, and

[56] Urenco, "Urenco's First Capacity Expansion to Be at Its U.S. Site," press release, July 6, 2023, https://www.urenco.com/news/global/2023/urencos-first-capacity-expansion-to-be-at-its-us-site; and Urenco, "Urenco USA Expands U.S. Enrichment Capacity with Second New Cascade," September 10, 2025, https://www.urenco.com/news/usa/2025/urenco-usa-expands-u.s-enrichment-capacity-with-second-new-cascade.

[57] Urenco, "Further Capacity Expansion at Urenco's Site in the Netherlands," news release, October 20, 2025, https://www.urenco.com/news/global/2025/further-capacity-expansion-at-urencos-site-in-the-netherlands.

[58] Orano, "Orano Announces 30% Increase in Uranium Enrichment Capacity by 2028," press release, October 26, 2023, https://www.orano.group/usa/en/our-news/news-releases/2023/orano-announces-30-increase-in-uranium-enrichment-capacity-by-2028; and Orano, "Progress on Orano's Uranium Enrichment Plant Expansion Project: Visit by the European Investment Bank," press release, November 20, 2025, https://www.orano.group/en/news/news-group/2025/november/progress-on-orano-s-uranium-enrichment-plant-expansion-project-visit-by-the-european-investment-bank.

[59] Centrus, "Centrus Energy Secures Contract Extension from Department of Energy to Continue HALEU Production," June 20, 2025, https://www.centrusenergy.com/news/centrus-energy-secures-contract-extension-from-department-of-energy-to-continue-haleu-production.

[60] Congressional Budget Office, "Cost Estimate: H.R. 1042, Prohibiting Russian Uranium Imports Act, as Reported by the House Committee on Energy and Commerce on December 1, 2023," December 5, 2023, https://www.cbo.gov/system/files/2023-12/hr1042.pdf.

[61] Centrus Energy Corp., "Centrus Reports Third Quarter 2025 Results," news release, November 5, 2025, https://investors.centrusenergy.com/news-releases/news-release-details/centrus-reports-third-quarter-2025-results. Also see DOE, "Instructions for Requesting a Waiver from the Secretary of Energy for the Import of Russian Low-Enriched Uranium (LEU) into the United States," 89 *Federal Register* 45871, May 24, 2024, https://www.federalregister.gov/documents/2024/05/24/2024-11392/instructions-for-requesting-a-waiver-from-the-secretary-of-energy-for-the-import-of-russian.

enrichment, and to support the acquisition of HALEU for advanced reactors. DOE awarded three companies $900 million each on January 5, 2026, to build new enrichment plants.[62]

President Trump issued an executive order on May 23, 2025, to require the Secretary of Energy to pursue voluntary agreements under the Defense Production Act (50 U.S.C. 4558(c)(1)) to expand domestic nuclear fuel production capabilities. The order requires that excess uranium and plutonium owned by the U.S. government be made available for that purpose.[63]

Hearings

Hearing on American Energy Dominance: Dawn of the New Nuclear Era, House Committee on Energy and Commerce, Subcommittee on Energy

Examined federal policies and programs to expand the U.S. nuclear power industry and fuel supplies. Witnesses included nuclear industry officials and researchers. Held January 7, 2026, https://www.congress.gov/event/119th-congress/house-event/118801.

Hearing on the New Atomic Age: Advancing America's Energy Future, House Committee on Oversight and Government Reform, Subcommittee on Economic Growth, Energy Policy, and Regulatory Affairs

Examined licensing reform at the Nuclear Regulatory Commission, the potential of advanced nuclear reactors, and supply of reactor fuel. Held July 22, 2025, https://www.congress.gov/event/119th-congress/house-event/118521/text.

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Uranium Enrichment, World Nuclear Association, June 6, 2025, https://world-nuclear.org/information-library/nuclear-fuel-cycle/conversion-enrichment-and-fabrication/uranium-enrichment.aspx.

Disruption and the Nuclear Industry, Cindy Vestergaard, Stimson Center, September 3, 2024, https://www.stimson.org/2024/disruption-and-the-nuclear-industry.

Radioactive Waste Management

After several years in a nuclear reactor, nuclear fuel (primarily uranium) can no longer economically sustain a nuclear chain reaction and becomes highly radioactive and thermally hot. Such spent (or used) nuclear fuel must be periodically removed from operating reactors and stored in adjacent pools of water, which prevents overheating and provides radiation shielding.

[62] DOE, "U.S. Department of Energy Awards $2.7 Billion to Restore American Uranium Enrichment," January 5, 2026, https://www.energy.gov/articles/us-department-energy-awards-27-billion-restore-american-uranium-enrichment.

[63] Executive Order 14302 of May 23, 2025, "Reinvigorating the Nuclear Industrial Base," 90 *Federal Register* 22595, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09801/reinvigorating-the-nuclear-industrial-base.

Spent fuel consists mostly of uranium from the original fuel plus plutonium and other radioactive material produced by the irradiation of uranium. After several years of cooling, the spent fuel can be placed in dry casks for storage elsewhere on the plant site.

When existing U.S. reactors were built, spent fuel had been expected to be taken away for reprocessing (separation of plutonium and uranium to make new fuel) or permanent disposal. However, reprocessing (or recycling) has not become commercialized in the United States, for economic and nonproliferation reasons, and central waste storage and disposal facilities have proven difficult to site. As a result, the vast majority of U.S. commercial spent fuel remains at the nuclear plants where it was generated—estimated at about 99,000 metric tons in May 2026 and increasing at an average rate of about 2,200 metric tons per year.[64]

The Nuclear Waste Policy Act of 1982 (NWPA; P.L. 97-425, 42 U.S.C. §10172), as amended in 1987, named Yucca Mountain in Nevada as the nation's sole candidate site for a permanent high-level nuclear waste repository. NWPA required DOE to study the site and seek a license from NRC to build a repository there.

Citing opposition from the State of Nevada, the Obama Administration announced it would halt the Yucca Mountain project. No new funding has been appropriated for it since FY2010. The Obama Administration appointed the Blue Ribbon Commission on America's Nuclear Future to develop an alternative nuclear waste policy, and its final report was issued in January 2012. DOE largely adopted the Commission's recommendations in a January 2013 waste strategy that called for a consent-based process to select nuclear waste storage and disposal sites and for a surface storage pilot facility to open by 2021.[65] DOE issued a *Draft Consent-Based Siting Process* shortly before the end of the Obama Administration.[66]

On August 13, 2013, a federal appeals court ordered NRC to continue the Yucca Mountain licensing process with previously appropriated funds.[67] In response, NRC issued the final volumes of the Yucca Mountain Safety Evaluation Report (SER), which provided NRC staff's determination that the repository would meet all applicable standards. However, the staff said upon completing the SER that NRC should not authorize construction of the repository until all land and water rights requirements were met and a supplement to DOE's environmental impact statement (EIS) was completed.[68] NRC completed the supplemental EIS in May 2016 and made its database of Yucca Mountain licensing documents publicly available, using nearly all the remaining previously appropriated licensing funds.[69]

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[64] DOE, "Resource Portal for DOE Nuclear Waste Management Information," interactive map, accessed May 27, 2026, https://curie.pnnl.gov/map.

[65] DOE, *Strategy for the Management and Disposal of Used Nuclear Fuel and High-Level Radioactive Waste*, January 2013, http://energy.gov/sites/prod/files/2013%201-15%20Nuclear_Waste_Report.pdf.

[66] DOE, *Draft Consent-Based Siting Process for Consolidated Storage and Disposal Facilities for Spent Nuclear Fuel and High-Level Radioactive Waste*, January 12, 2017, https://energy.gov/sites/prod/files/2017/01/f34/Draft%20Consent-Based%20Siting%20Process%20and%20Siting%20Considerations.pdf.

[67] U.S. Court of Appeals for the District of Columbia Circuit, In re: Aiken County et al., No. 11-1271, writ of mandamus, August 13, 2013, http://www.cadc.uscourts.gov/internet/opinions.nsf/BAE0CF34F762EBD985257BC6004DEB18/$file/11-1271-1451347.pdf.

[68] NRC, "NRC Publishes Final Two Volumes of Yucca Mountain Safety Evaluation," press release 15-005, January 29. 2015, http://www.nrc.gov/reading-rm/doc-collections/news/2015/.

[69] NRC, *Supplement to the U.S. Department of Energy's Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada*, NUREG-2184, Final Report, May 2016, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr2184/; "NRC Staff Issues Volume 3 of Yucca Mountain Safety Evaluation Report," press release 14-069, October 16, 2014, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1949/v3/.

The first Trump Administration largely halted the consent-based siting process and included funding to restart Yucca Mountain licensing in its FY2018, FY2019, and FY2020 budget submissions to Congress. Congress did not fund these requests. The Trump Administration did not seek Yucca Mountain repository funding for FY2021, but only funds for interim storage planning, which were appropriated by Congress. Subsequent appropriations have also focused on storage and disposal planning without a specific site identified.

Recent Events

With no spent fuel disposal or storage facilities currently under development by DOE, two private-sector storage facilities in Texas and New Mexico have been proposed. NRC issued licenses to the Texas facility on September 13, 2021, and the New Mexico facility on May 9, 2023. These near-surface Consolidated Interim Storage Facilities are intended to hold spent fuel from nuclear power plants around the country until a permanent underground repository is available.[70] However, the decisions drew strong opposition from the two proposed host states. New Mexico filed a lawsuit against NRC on March 29, 2021, and the Texas governor signed a law banning new spent fuel storage facilities in the state on August 9, 2021.[71] In a lawsuit filed by Texas, the Fifth Circuit Court of Appeals on August 25, 2023, vacated the license for the Texas site on the grounds that NRC lacks authority to license nuclear waste storage facilities other than those specified by NWPA.[72] The U.S. Supreme Court overturned the circuit court ruling on June 18, 2025, finding that the plaintiffs were not parties to the NRC licensing proceeding and could therefore not seek judicial review.[73] Despite the decision, the developers of the two waste storage projects reportedly are not planning to proceed over state objections.[74]

Under the second Trump Administration, DOE, on January 28, 2026, invited states to host Nuclear Lifecycle Innovation Campuses, which could include spent fuel storage and disposal sites. DOE solicited ideas for such campuses that could "prioritize private and state capital" and "rely on targeted, conditional, and time-limited federal support."[75] Twenty-six states submitted applications, and DOE announced that Idaho, Louisiana, Oklahoma, Tennessee, and Utah had

[70] NRC, "Consolidated Interim Storage Facility (CISF)," December 8, 2020, https://www.nrc.gov/waste/spent-fuel-storage/cis.html; NRC, "NRC Issues License to Interim Storage Partners for Consolidated Spent Nuclear Fuel Interim Storage Facility in Texas," press release 21-036, September 13, 2021, https://www.nrc.gov/docs/ML2125/ML21257A091.pdf; and NRC, "NRC Issues License to Holtec International for Consolidated Spent Nuclear Fuel Interim Storage Facility in New Mexico," press release 23-031, May 9, 2023, https://www.nrc.gov/cdn/doc-collection-news/2023/23-031.pdf.

[71] Texas Governor Greg Abbott, "Interim Storage Partners (ISP) Consolidated Interim Storage Facility Project, Docket ID NRC-2016-0231," November 3, 2020, https://www.nrc.gov/docs/ML2030/ML20309B061.pdf; Texas Legislature Online, Actions, HB7, https://capitol.texas.gov/BillLookup/Actions.aspx?LegSess=872&Bill=HB7; and New Mexico Governor Michelle Lujan Grisham, "Comments from Governor Michelle Lujan Grisham on Docket ID NRC-2018-0052," September 22, 2020, https://www.nrc.gov/docs/ML2026/ML20269A025.pdf.

[72] State of Texas v. NRC, U.S. Court of Appeals for the Fifth Circuit, August 25, 2023, https://www.ca5.uscourts.gov/opinions/pub/21/21-60743-CV0.pdf.

[73] Supreme Court of the United States, Nuclear Regulatory Commission v. Texas and Interim Storage Partners v. Texas, Opinion of the Court, June 18, 2025, https://www.supremecourt.gov/opinions/24pdf/23-1300_b97c.pdf.

[74] "Supreme Court Backs Interim Storage," *Nuclear Engineering International*, June 25, 2025, https://www.neimagazine.com/news/supreme-court-backs-interim-storage/?cf-view; and "Holtec Cancels Plans for New Mexico Interim Storage Facility," *World Nuclear News*, October 10, 2025, https://www.world-nuclear-news.org/articles/holtec-cancels-plans-for-new-mexico-interim-storage-facility.

[75] Department of Energy, "Request for Information on Establishment of Nuclear Lifecycle Innovation Campuses," January 28, 2026, https://sam.gov/workspace/contract/opp/4e30976204964df3b556ff7149dae444/view.

been selected as finalists on July 28, 2026.[76] Tennessee's response, for example, specifically mentioned that "the State has identified potential areas that may be suitable for a long-term geologic repository and is willing to continue exploring seismic and geologic suitability in Tennessee."[77]

Canadian plans for nuclear waste disposal have also generated congressional controversy, because some proposed sites are near the Great Lakes. In 2019, Canada's Nuclear Waste Management Organization (NWMO) narrowed its search for a spent nuclear fuel repository to two sites in Ontario, one located near Lake Huron.[78] The Township of Ignace, Ontario, voted to move forward with the siting process in July 2024, and the municipality of South Bruce, Ontario, followed suit in a referendum on October 28, 2024.[79] NWMO announced the selection of the Ignace site, about 180 miles northwest of Thunder Bay, Ontario, off of Lake Superior, on November 28, 2024.[80]

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High-Activity Nuclear Waste Management Policy: Becoming a Responsible Ancestor, Daniel S. Metlay, Routledge, 2026.

Spent Nuclear Fuel and Reprocessing Waste Inventory, DOE Office of Nuclear Energy, Pacific Northwest National Laboratory, December 2024, https://curie.pnnl.gov/system/files/SNF%20and%20Rep%20Waste%20Inventory%20PNNL%2033938%20Rev.%201.1_0.pdf.

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[76] DOE, "Nuclear Lifecycle Innovation Campuses Contenders Announced," July 28, 2026, https://www.energy.gov/articles/nuclear-lifecycle-innovation-campuses-contenders-announced.

[77] Letter from Tennessee Governor Bill Lee to Energy Secretary Chris Wright on Nuclear Lifecycle Innovation Campuses, March 26, 2026, https://www.tn.gov/content/dam/tn/governorsoffice-documents/governorlee-documents/NON-CONFIDENTIAL_DOE_2026_RFI_for_NLIC_Tennessee_Response_Part_B_D5_Redacted.pdf. See also State of Idaho, "Nuclear Lifecycle Innovation Campus RFI Response," March 31, 2026, https://nuclear.idaho.gov/wp-content/uploads/2026/03/State-of-Idaho_Nuclear-Lifecycle-Innovation-Campus-RFI-Response_03312026-006.pdf; letter from Jesse Bradley, Director, Nebraska Department of Water, Energy, and Environment, to DOE, April 1, 2026, https://dwee.nebraska.gov/sites/default/files/energy/Nebraska%20DOE%20RFI%20Response.pdf; and State of Utah, "Utah and Tooele County explore response to U.S. Department of Energy opportunity for Nuclear Lifecycle Innovation Campus," March 27, 2026, https://governor.utah.gov/press/utah-and-tooele-county-explore-response-to-u-s-department-of-energy-opportunity-for-nuclear-lifecycle-innovation-campus.

[78] Canadian Nuclear Waste Management Organization, "About the Site Selection Process," accessed December 7, 2023, https://www.nwmo.ca/Site-selection.

[79] Canadian Nuclear Waste Management Organization, "Municipality of South Bruce Releases Willingness Referendum Results," October 28, 2024, https://www.nwmo.ca/News/Municipality-of-South-Bruce-Releases-Willingness-Referendum-Results.

[80] Canadian Nuclear Waste Management Organization, "The Nuclear Waste Management Organization Selects Site for Canada's Deep Geological Repository," November 28, 2024, https://www.nwmo.ca/News/The-Nuclear-Waste-Management-Organization-selects-site-for-Canadas-deep-geological-repository.

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Commercial Spent Nuclear Fuel: Congressional Action Needed to Break Impasse and Develop a Permanent Disposal Solution, Government Accountability Office, September 2021, https://www.gao.gov/products/gao-21-603.

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Report to the Secretary of Energy, Blue Ribbon Commission on America's Nuclear Future, January 2012, http://cybercemetery.unt.edu/archive/brc/20120620211605/http:/brc.gov.

Nuclear Plant Economic Viability

U.S. nuclear power plants have faced severe financial pressure caused primarily by competition from low-cost natural gas, growing supplies of renewable energy, and, until recently, stagnant electricity demand. Thirteen U.S. reactors were permanently closed from 2013 through April 2022 (**Table 2**). Plans for up to 30 new U.S. reactors announced during the past 15 years have largely been put on hold, with 2 recently completed and 2 canceled in 2017 after construction had begun.

As of 2026, forecasters are projecting accelerated growth in electricity demand through 2050, primarily because of expected domestic growth in three key areas: data centers, manufacturing, and electrification of buildings and transportation.[81] Several major data center operators have pursued contracts with new and existing nuclear power plants to provide steady supplies of low-carbon electricity.[82] Three power plants are now planning to restart reactors that had been permanently closed; two of these reactors would supply power to data centers. As noted above, U.S. demonstrations of several advanced reactor designs are currently being planned as well.

In response to the reactor shutdowns since 2013, Congress and several states took a variety of actions to keep the existing nuclear fleet operating and to encourage the construction of new reactors. Government support for nuclear power can include loan guarantees, tax credits, clean energy mandates, emissions credits, and electricity market regulations.

[81] EIA, "Data Center Server Energy Use Grows Across the Commercial Building Stock," May 19, 2026, https://www.eia.gov/todayinenergy/detail.php?id=67704; and Cy McGeady, "Strategic Perspectives on U.S. Electric Demand Growth," Center for Strategic and International Studies, May 20, 2024, https://www.csis.org/analysis/strategic-perspectives-us-electric-demand-growth.

[82] For example, see Alexa St. John and Jennifer McDermott, "Amazon, Google Make Dueling Nuclear Investments to Power Data Centers with Clean Energy," Associated Press, October 16, 2024, https://apnews.com/article/climate-data-centers-amazon-google-nuclear-energy-e404d52241f965e056a7c53e88abc91a.

The two new reactors at the Vogtle plant received loan guarantees from DOE in 2014, 2015, and 2019—totaling $12 billion—as authorized by Title 17 of the Energy Policy Act of 2005 (P.L. 109-58).[83] The new Vogtle units also benefited from an extension of federal tax credits for electricity production from new nuclear plants during their first eight years of operation under the Bipartisan Budget Act of 2018 (P.L. 115-123). Before the extension, new nuclear reactors had been required to begin operation before January 1, 2021, to qualify for the production tax credit, which is limited to 6,000 MW of total generating capacity. The extension allowed new reactors to use the credit after that date until the 6,000-MW capacity limit is reached. Along with the extension, the tax credit was modified to allow non-taxpaying partners in a nuclear project, such as public power agencies, to transfer their credits to a project's taxpaying partners.

The appropriate role of nuclear power, if any, in meeting national energy and environmental goals is a key question in debate over providing government incentives and subsidies. Nuclear power supporters generally point to the technology as crucial for providing a secure, domestic source of energy with low greenhouse gas and other emissions. Supporters also see a viable and growing domestic nuclear power industry as crucial in providing a technology base for naval nuclear reactors and other defense nuclear programs, and in providing a base for nuclear power plant exports to counter reactor exports being pursued by Russia and China for geopolitical purposes. Opponents generally counter that safety and proliferation risks, nuclear waste hazards, and high costs outweigh any such benefits.

Recent Events

Congress took a major step to improve the economics of existing nuclear plants for owners and investors by establishing a tax credit in IRA Section 13105. The credit provides up to 1.5 cents/kWh, adjusted for inflation, for electricity generated in 2024 through 2032 by reactors operating before the date of enactment (August 16, 2022, excluding the new Vogtle reactors, which already receive the credit discussed above). IRA Section 13701 makes new nuclear reactors eligible for a similar 10-year clean electricity production credit that is available for facilities placed into service after 2024 (also excluding the new Vogtle reactors).[84] IRA Section 13707 allows nuclear reactors to qualify for a clean electricity investment tax credit of up to 30%, if they do not take the clean electricity production credit. The IRA tax credits for nuclear energy were largely left in place by the FY2025 budget reconciliation act (P.L. 119-21), which repealed several provisions of the IRA and mandated additional restrictions on foreign entities.

IIJA created a Civil Nuclear Credit Program to provide direct financial support to nuclear power plants at risk of closure for economic reasons. Reactors certified by the Secretary of Energy as being at risk of closure could submit bids to receive credits for four years, specifying an amount per megawatt-hour of electricity generated that would be paid for each credit. DOE announced a final Civil Nuclear Credit award totaling up to $1.1 billion to the two-unit Diablo Canyon plant in California on January 2, 2024.[85] Since that time, no other nuclear plants have announced

[83] DOE, "Secretary Perry Announces Financial Close on Additional Loan Guarantees During Trip to Vogtle Advanced Nuclear Energy Project," press release, March 22, 2019, https://www.energy.gov/articles/secretary-perry-announces-financial-close-additional-loan-guarantees-during-trip-vogtle.

[84] Aside from the in-service date requirements, Sections 13105 and 13701 specifically exclude nuclear plants that qualify for the earlier nuclear tax credit.

[85] DOE, "Record of Decision for the Final Environmental Impact Statement for the Civil Nuclear Credit Program Proposed Award of Credits to Pacific Gas and Electric Company for Diablo Canyon Power Plant," 89 *Federal Register* 69, January 2, 2024, https://www.federalregister.gov/documents/2024/01/02/2023-28808/record-of-decision-for-the-final-environmental-impact-statement-for-the-civil-nuclear-credit-program; and DOE, "Biden-Harris Administration Announces Major Investment to Preserve America's Clean Nuclear Energy Infrastructure," November 21, 2022, (continued...)

shutdowns, and Congress transferred the remaining Civil Nuclear Credit funding to reactor demonstration and nuclear fuel projects.[86] Congress also provided $37 million for Light Water Reactor Sustainability—research to improve the economics of existing nuclear power plants—in the FY2026 Energy and Water Development Appropriations Act (included as part of P.L. 119-74), signed January 23, 2026.

As of July 2026, no permanently closed reactors in the United States have ever restarted, although three restarts are currently underway.[87] The one-unit Palisades nuclear power plant in Michigan ceased operation in April 2022. The plant's owner, Holtec, had purchased the plant with the intention of decommissioning it, but decided after the shutdown to try to resume operation. Holtec announced the filing of a restart application with NRC on October 6, 2023, and received a $1.52 billion DOE loan guarantee on September 30, 2024.[88] The owner of Three Mile Island Unit 1, which permanently closed in 2019, announced on September 20, 2024, that it would restart the Pennsylvania reactor to power a Microsoft data center by 2028.[89] The owner of another closed reactor, the Duane Arnold plant in Iowa, has announced plans to restart in 2029.[90]

President Trump issued an executive order on May 23, 2025, to require DOE to prioritize loan guarantees and other financial resources for restarting closed nuclear plants, increasing generation from operating plants, and completing plants whose construction was suspended.[91]

In addition to the federal incentives, several states have taken action to prevent nuclear plant closures. An Illinois law signed September 15, 2021, provides "carbon mitigation credits" to nuclear plants at risk of closure for economic reasons, averting the planned shutdown of two plants with four operating reactors.[92] New York and Illinois provided "zero emission credits" to seven reactors that had been at risk of retirement by 2018.[93] Connecticut enacted legislation in 2017 to make nuclear reactors eligible for a state procurement process for zero-emission electricity sources, upon certification of financial need. New Jersey enacted zero-emission credits

https://www.energy.gov/articles/biden-harris-administration-announces-major-investment-preserve-americas-clean-nuclear.

[86] Funds were transferred to those programs by Sections 311 and 312 of the Energy and Water Development and Related Agencies Appropriations Act, 2024 (Division D of P.L. 118-42). Additional amounts were made available by Section 311 of the Energy and Water Development and Related Agencies Appropriations Act, 2026 (Division B of P.L. 118-74).

[87] Holtec International, "Holtec Formally Initiates Process with NRC to Reauthorize Operations at Palisades Power Plant," October 6, 2023, https://holtecinternational.com/2023/10/06/holtec-formally-initiates-process-with-nrc-to-reauthorize-operations-at-palisades-power-plant.

[88] DOE, "Biden-Harris Administration Bringing Back Clean Nuclear Energy, Creating Clean Energy Union Jobs Across the Midwest," September 30, 2024, https://www.energy.gov/articles/biden-harris-administration-bringing-back-clean-nuclear-energy-creating-clean-energy-union.

[89] Constellation Energy, "Constellation to Launch Crane Clean Energy Center, Restoring Jobs and Carbon-Free Power to the Grid," September 20, 2024, https://www.constellationenergy.com/newsroom/2024/Constellation-to-Launch-Crane-Clean-Energy-Center-Restoring-Jobs-and-Carbon-Free-Power-to-The-Grid.html.

[90] NextEra Energy, "NextEra Energy and Google Announce New Collaboration to Accelerate Nuclear Energy Deployment in the U.S.," October 27, 2025, https://newsroom.nexteraenergy.com/NextEra-Energy-and-Google-Announce-New-Collaboration-to-Accelerate-Nuclear-Energy-Deployment-in-the-U-S?l=12.

[91] Executive Order 14302 of May 23, 2025, "Reinvigorating the Nuclear Industrial Base," 90 *Federal Register* 22595, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09801/reinvigorating-the-nuclear-industrial-base.

[92] Illinois General Assembly, Energy Transition Act (Nuclear Plant Assistance), Public Act 102-0662, https://ilga.gov/legislation/publicacts/102/102-0662.htm.

[93] Nuclear Energy Institute, *Zero-Emission Credits*, April 2018, https://www.nei.org/CorporateSite/media/filefolder/resources/reports-and-briefs/zero-emission-credits-201804.pdf.

for nuclear power in 2018.[94] Ohio enacted subsidies in July 2019 that prompted the owner of the state's two commercial reactors, Davis-Besse and Perry, to rescind the units' previously planned retirements, although the assistance was repealed in March 2021.[95] The planned retirement of the two-unit Beaver Valley nuclear plant in western Pennsylvania was rescinded in March 2020, after Pennsylvania joined the Regional Greenhouse Gas Initiative (RGGI). The plant's owner, Energy Harbor, said RGGI would provide emissions credits "which will begin to help level the playing field for our carbon-free nuclear generators."[96] Michigan enacted legislation on July 31, 2023, to provide $150 million toward restarting the closed Palisades plant.[97]

Federal policy on carbon dioxide emissions could also have a significant impact on the expansion of nuclear power and the economic viability of existing reactors. The Biden Administration set a goal of eliminating carbon emissions for the U.S. power sector by 2035.[98] In 2025, President Trump issued an executive order to terminate many of President Biden's climate change policies.[99]

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[94] Doug Vine, *Solutions for Maintaining the Existing Nuclear Fleet*, Center for Climate and Energy Solutions, May 2018, https://www.c2es.org/site/assets/uploads/2018/05/solutions-for-maintaining-existing-nuclear-fleet.pdf.

[95] "FirstEnergy Solutions Rescinds Deactivation Notices for Competitive Generating Plants in Ohio," PR Newswire, July 26, 2019, https://www.prnewswire.com/news-releases/firstenergy-solutions-rescinds-deactivation-notices-for-competitive-generating-plants-in-ohio-300891786.html. A bill repealing the Ohio nuclear plant assistance was signed by the governor on March 31, 2021. See Mike DeWine, "Governor DeWine Signs Ohio Transportation Budget," press release, March 31, 2021, https://governor.ohio.gov/wps/portal/gov/governor/media/news-and-media/transportation-budget-signed-03312021.

[96] Energy Harbor, "Energy Harbor Corp Rescinds Deactivation Notice for Nuclear Generating Plant in Pennsylvania," press release, March 13, 2020, https://energyharbor.com/en/about/news-and-information/energy-harbor-corp-rescinds-deactivation-notice-for-nuclear-gene.

[97] David Dalton, "Michigan Budget Includes $150 Million to Support Nuclear Reactor Restart," *NucNet*, July 3, 2023, https://www.nucnet.org/news/michigan-budget-includes-usd150-million-to-support-nuclear-reactor-restart-7-1-2023.

[98] White House, "President Biden to Catalyze Global Climate Action Through the Major Economies Forum on Energy and Climate," fact sheet, April 20, 2023, https://www.presidency.ucsb.edu/documents/fact-sheet-president-biden-catalyze-global-climate-action-through-the-major-economies.

[99] Executive Order 14154 of January 20, 2025, "Unleashing American Energy," 90 *Federal Register* 8353, January 29, 2025, https://www.federalregister.gov/documents/2025/01/29/2025-01956/unleashing-american-energy.

Unlocking Reductions in the Construction Costs of Nuclear: A Practical Guide for Stakeholders, Organisation for Economic Co-operation and Development Nuclear Energy Agency, July 2020, http://www.oecd-nea.org/ndd/pubs/2020/7530-reducing-cost-nuclear-construction.pdf.

Strategy to Restore American Nuclear Energy Leadership, Department of Energy Nuclear Fuel Working Group, April 23, 2020, https://www.energy.gov/articles/secretary-brouillette-announces-nuclear-fuel-working-groups-strategy-restore-american.

Safety and Regulation

The 2011 Fukushima Daiichi nuclear plant disaster in Japan, triggered by a 9.0-magnitude earthquake and 45-foot tsunami, greatly increased concerns about safety in the nuclear policy debate. The incident demonstrated the potential consequences of a total loss of power (or "station blackout") at existing commercial nuclear plants. Even when the nuclear reaction shuts down as designed, as at the Fukushima plant after the initial earthquake, residual radioactivity in the reactor core continues to generate "decay heat" that must be removed, typically by electrically driven or controlled cooling systems.

When the tsunami knocked out power at the three Fukushima Daiichi reactors that had been operating when the earthquake struck, the buildup of heat and pressure from residual radioactivity became so great that it melted the reactors' nuclear fuel and exceeded the limits of their containment structures. The decay heat also caused steam to chemically react with the nuclear fuel cladding in the reactor cores, generating additional heat along with hydrogen that escaped into the upper part of the reactor buildings and exploded. Cooling was also lost in Fukushima's spent fuel storage pools, causing concern that they could overheat, although later examination indicated that they did not. Contaminated areas as far as 34 miles from the plant were evacuated, involving an estimated 160,000 people.[100]

Safety requirements for nuclear power plants are established and enforced in the United States by NRC, an independent regulatory agency. The Atomic Energy Act of 1954 requires NRC to ensure that licensed nuclear facilities "provide adequate protection to the health and safety of the public" (42 U.S.C. §2232). NRC may issue safety requirements that exceed the statutory "adequate protection" standard if their benefits are found to exceed their costs (based largely on an assessment of the present value in terms of the discounted monetized value of expected net benefits).

NRC safety regulations address the effects of external events such as earthquakes and floods, equipment failure such as breaks in coolant pipes, and other problems that could lead to radioactive releases into the environment. Critics of nuclear power contend that NRC is often reluctant to impose necessary safety requirements that would be costly or disruptive to the nuclear industry. However, the industry has frequently contended that costly safety proposals are unnecessary and would not significantly increase large existing safety margins.

Following the Fukushima disaster, NRC established a task force to identify lessons applicable to U.S. reactors and recommend safety improvements. The task force's report led to NRC's first Fukushima-related regulatory requirements, on March 12, 2012. NRC ordered all reactors to develop strategies to maintain cooling and containment integrity during external events, such as floods and earthquakes, that were more severe than anticipated by the plants' designs ("beyond

[100] International Atomic Energy Agency, *The Fukushima Daiichi Accident*, August 2015, p. 88, https://www-pub.iaea.org/mtcd/publications/pdf/pub1710-reportbythedg-web.pdf; and Jonathan M. Samet and Dayana Chanson, *Fukushima Daiichi Power Plant Disaster: How Many People Were Affected?*, Green Cross Switzerland, 2015, p.17, https://reliefweb.int/report/japan/fukushima-daiichi-power-plant-disaster-how-many-people-were-affected-2015-report.

design basis"). In addition, NRC required that U.S. reactors of similar design to the Fukushima reactors have "reliable hardened vents" to remove excess pressure from their primary containments, and that better instrumentation be installed to monitor the condition of spent fuel pools during accidents.[101]

The NRC commissioners on March 19, 2013, required NRC staff to study whether to require the newly mandated containment vents to include filters or other means to reduce the release of radioactive material if the vents have to be used. The idea of requiring filters had drawn praise from nuclear critics but opposition from the industry on cost grounds.[102] NRC voted on August 19, 2015, not to proceed with rulemaking on filtered vents.[103]

Some Members of Congress critiqued NRC's final rule for Mitigation of Beyond-Design-Basis Events (MBDBE), announced January 24, 2019.[104] The MBDBE regulation requires nuclear power plants to implement strategies to maintain reactor core cooling when electric power is lost, as occurred during the Fukushima incident. The MBDBE proposed rule, published November 13, 2015,[105] and the draft final rule, released by NRC on January 5, 2017,[106] would have required the equipment used in those strategies to be able to withstand newly evaluated flooding and seismic risks, and that regular drills and exercises be conducted. The final rule excluded those requirements, among other changes.[107] In supporting those exclusions, the Commission's majority asserted that the deleted requirements did not meet NRC's cost-benefit standards.[108] NRC required nuclear plants to document their implementation of all post-Fukushima regulations and orders.[109]

Recent Events

A number of congressional concerns about the efficiency of the NRC licensing process were addressed by the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy

[101] NRC, "Actions in Response to the Japan Nuclear Accident: March 12, 2012," updated May 30, 2012, http://www.nrc.gov/reactors/operating/ops-experience/japan/timeline/03122012.html.

[102] NRC, "Consideration of Additional Requirements for Containment Venting Systems for Boiling Water Reactors with Mark I and Mark II Containments," staff requirements memorandum, SECY-12-0157, March 19, 2013, http://www.nrc.gov/reading-rm/doc-collections/commission/srm/2012/2012-0157srm.pdf; and William Freebairn, "NRC Staff Recommends Ordering Filtered Vents for 31 Power Reactors," *Inside NRC*, November 5, 2012, p. 1.

[103] NRC, "Hardened Vents and Filtration (for Boiling Water Reactors with Mark I and Mark II Containment Designs)," http://www.nrc.gov/reactors/operating/ops-experience/japan-dashboard/hardened-vents.html.

[104] NRC, "NRC to Issue Final Rule for Mitigating Severe Events at U.S. Reactors," press release, January 24, 2019, https://www.nrc.gov/reading-rm/doc-collections/news/2019/19-005.pdf; and Letter from Sen. Tom Carper and Sen. Sheldon Whitehouse to Kristine Svinicki, NRC Chairman, April 1, 2019, https://www.carper.senate.gov/newsroom/press-releases/carper-whitehouse-request-details-surrounding-nrc-s-weakening-of-post-fukushima-rule.

[105] NRC, "Mitigation of Beyond-Design-Basis Events," proposed rule, 80 *Federal Register* 70610, November 13, 2015, https://www.govinfo.gov/content/pkg/FR-2015-11-13/pdf/2015-28589.pdf.

[106] NRC, "Final Rule: Mitigation of Beyond-Design-Basis Events," SECY-16-0142, Enclosure 1, January 5, 2017, https://www.nrc.gov/docs/ML1629/ML16291A186.pdf. For other documents related to the rule, see NRC, "SECY-16-0142: Final Rule: Mitigation of Beyond-Design-Basis Events," January 5, 2017, https://www.nrc.gov/docs/ML1630/ML16301A005.html.

[107] NRC, "Staff Requirements—Affirmation Session," SRM-M190124A, Enclosure 1, January 24, 2019, https://www.nrc.gov/docs/ML1902/ML19024A073.pdf. For other documents related to the rule, see NRC, "SRM-M190124A: Affirmation Session-SECY-16-0142: Final Rule: Mitigation of Beyond-Design-Basis Events (RIN 3150-AJ49)," January 19, 2019, https://www.nrc.gov/docs/ML1902/ML19023A038.html.

[108] NRC, "Views of the Commission," SRM-M190124A, Enclosure 4, January 24, 2019, https://www.nrc.gov/docs/ML1902/ML19023A352.pdf.

[109] NRC, "Plant-Specific Japan Lessons-Learned Activities," December 7, 2021, https://www.nrc.gov/reactors/operating/ops-experience/japan-dashboard/japan-plants.html.

(ADVANCE) Act of 2024, signed into law July 9, 2024 (Division B of P.L. 118-67). Among other provisions, the ADVANCE Act requires NRC to update its mission statement to include licensing efficiency, implement "efficient, timely, and predictable" licensing reviews, strengthen the NRC workforce, and reduce and restrict fees charged to specified nuclear license applicants.

NRC published new emergency planning regulations for SMRs and other new nuclear technologies on November 16, 2023. The new rules allow SMRs and other new technologies (other than conventional large LWRs) to calculate emergency planning zones (EPZs) based on smaller inventories of radioactive materials, lower frequencies of release, and other safety improvements over existing reactors. For existing reactors, the EPZ for direct radioactive exposure (the "plume exposure pathway"), in which planning for evacuations and other protective actions is required, includes the area within about 10 miles from each reactor. Under the calculations specified by the new rules, an EPZ might not extend beyond the boundary of a nuclear plant site. In its explanation of the new rules, NRC said, "In cases where a plume exposure pathway EPZ does not extend beyond the site boundary, even in the absence of NRC requirements for offsite radiological emergency planning, the responsible OROs [offsite response organizations] would continue to take actions to protect the health and safety of the public."[110] The new rules were long supported by the nuclear industry but criticized by groups skeptical about the nuclear industry's safety and security record.[111]

In response to laws such as the ADVANCE Act and a 2025 executive order on "Ordering the Reform of the Nuclear Regulatory Commission," NRC has announced several major safety rules and procedures during the second Trump Administration.[112] As required by NEIMA, NRC approved a final rule on March 25, 2026, "adding a risk-informed, performance-based, and technology-inclusive regulatory framework for commercial nuclear plants."[113] The new licensing framework, at Title 10, Part 53, of the *Code of Federal Regulations*, is intended to provide an option for proposed advanced reactor designs that may be substantially different from existing U.S. commercial light water reactors. License applicants would still have the option of using the existing two-step licensing process under Title 10, Part 50, of the *Code of Federal Regulations*—in which an applicant seeks a construction permit and then, when construction is complete, an operating license—or the one-step licensing process under Title 10, Part 52, of the *Code of Federal Regulations*.

NRC announced its first use of a new environmental review process on March 23, 2026, for four proposed reactors in Texas. The process allows an applicant to develop a draft environmental impact statement for a proposed project under NRC oversight. According to NRC, the process is expected to reduce agency review time by 50% while maintaining environmental compliance.[114]

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[110] NRC, "Emergency Preparedness for Small Modular Reactors and Other New Technologies," final rule and guidance, 88 *Federal Register* 80050, November 16, 2023, https://www.federalregister.gov/documents/2023/11/16/2023-25163/emergency-preparedness-for-small-modular-reactors-and-other-new-technologies.

[111] See, for example, "NRC's Risky Rule Change Ignores History. More Nuclear Emergency Planning Needed, Not Less. Statement by Dr. Edwin Lyman at the Union of Concerned Scientists," August 14, 2023, https://www.ucsusa.org/about/news/nrcs-risky-rule-change-ignores-history-more-nuclear-emergency-planning-needed-not-less; and Nuclear Energy Institute, "NRC Staff Agrees Small Modular Reactors Won't Need Large-Scale Emergency Zones," August 22, 2018, https://www.nei.org/news/2018/nrc-staff-agrees-smrs-wont-need-large-epzs.

[112] Executive Order 14300 of May 23, 2025, "Ordering the Reform of the Nuclear Regulatory Commission," 90 *Federal Register* 22587, May 29, 2025, https://www.federalregister.gov/documents/2025/05/29/2025-09798/ordering-the-reform-of-the-nuclear-regulatory-commission.

[113] NRC, "Risk-Informed, Technology-Inclusive Regulatory Framework for Advanced Reactors," final rule, March 25, 2026, https://www.nrc.gov/docs/ML2608/ML26084A489.pdf.

[114] NRC, "NRC Launches Faster, Smarter Environmental Review Program Saving Time and Resources," March 23, 2026, https://www.nrc.gov/sites/default/files/cdn/doc-collection-news/2026/26-034.pdf.

On March 3, 2026, NRC proposed new rules that would shorten "adjudicatory hearings on most license applications, including new reactors and reactor license renewals." The proposal would "accelerate timelines, simplify procedures, reduce burdens, while preserving due process" and is intended to allow licensing to be completed within 18 months.[115] NRC proposed further changes on July 7, 2026, to narrow the scope of National Environmental Policy Act (NEPA) reviews to environmental impacts within NRC's authority.[116]

NRC proposed changes to its radiation protection regulations on July 15, 2026. The proposed rules would remove a regulatory requirement that nuclear facilities keep radiation doses "as low as reasonably achievable" (ALARA) and instead establish specific dose limits and exemption processes. According to NRC, "The draft regulatory analysis finds that this proposed rule provides cost savings while maintaining exposure to ionizing radiation within safe limits."[117] In opposing the change, the Union of Concerned Scientists said that, "in eliminating its use of the ALARA principle, the agency's sweeping new proposed rule would allow nuclear facility workers and the general public to be exposed to higher levels of cancer-causing radiation just to save the nuclear industry money."[118]

Some of the Trump Administration's actions have raised congressional concern about NRC's regulatory independence and focus on safety. At a January 2026 hearing in the House Energy and Commerce Committee, the Administration was criticized for terminating a Democratic NRC Commissioner without cause, issuing a requirement that all NRC rulemakings be approved by the Office of Management and Budget, alleged improper DOE influence over NRC, and other nuclear regulatory actions. It was argued that Congress created a separate NRC to ensure that nuclear safety regulation would not be influenced by DOE's role in promoting the industry.[119] Others praised the Administration for implementing regulatory reforms consistent with the ADVANCE Act to eliminate unnecessary impediments to nuclear industry growth.[120]

The Subcommittee on Energy of the House Committee on Energy and Commerce approved five safety regulatory bills on July 14, 2026. H.R. 5549 would eliminate a statutory requirement for uncontested nuclear licensing hearings. H.R. 9613 would require the NRC Advisory Committee on Reactor Safeguards to receive NRC approval to conduct certain safety reviews and establish other parameters for committee action. H.R. 9612 would remove certain environmental review requirements for uranium enrichment plants and allow earlier construction to begin. H.R. 9614 would authorize the NRC chairman to raise the pay for NRC Senior Executive Service officials

[115] NRC, "NRC Proposes Significantly Restructured Hearing Timeline to Minimize Delays," March 3, 2026, https://www.nrc.gov/sites/default/files/cdn/doc-collection-news/2026/26-027.pdf.

[116] NRC, "Implementation of the National Environmental Policy Act," 91 *Federal Register* 42086, July 7, 2026, https://www.federalregister.gov/documents/2026/07/07/2026-13687/implementation-of-the-national-environmental-policy-act.

[117] NRC, "Reforming and Modernizing the NRC's Radiation Protection Framework," 91 *Federal Register* 43456, July 15, 2026, https://www.federalregister.gov/documents/2026/07/15/2026-14208/reforming-and-modernizing-the-nrcs-radiation-protection-framework.

[118] Union of Concerned Scientists, "NRC Proposes to Weaken Radiation Protections, Putting Workers and Communities at Risk," July 2, 2026, https://www.ucs.org/about/news/new-nrc-radiation-rules-put-workers-communities-risk.

[119] Energy and Commerce Committee Ranking Member Frank Pallone, Jr., "Pallone Blasts Trump Administration's Dangerous Sabotage of Nuclear Energy Safety at Subcommittee Hearing," press release, January 7, 2026, https://democrats-energycommerce.house.gov/media/press-releases/pallone-blasts-trump-administrations-dangerous-sabotage-nuclear-energy-safety.

[120] Energy and Commerce Committee Chairman Bob Latta, "Chairman Latta Delivers Opening Statement at Subcommittee on Energy Hearing on Nuclear Energy," press release, January 7, 2026, https://republicans-energycommerce.house.gov/posts/chairman-latta-delivers-opening-statement-at-subcommittee-on-energy-hearing-on-nuclear-energy.

10% above the existing maximum rate. H.R. 9084 would require DOE to post public announcements about changes to DOE nuclear safety standards, new nuclear safety analyses at DOE facilities, and DOE authorizations for nuclear facilities.

Selected Hearings

Hearing to Examine Build Nuclear with Local Materials Act, and Discussion Drafts of RECHARGE Act and Enrichment Licensing Modernization Act, Senate Committee on Environment and Public Works, Subcommittee on Clean Air, Climate, and Nuclear Innovation and Safety

Examined bills on using commercial-grade steel and concrete in non-safety-related structures at nuclear power plants (S. 4529), draft language on environmental reviews of proposed reactors at industrial sites, and enrichment plant licensing. Held May 20, 2026, https://www.epw.senate.gov/public/index.cfm/hearings?ID=2EFC9A31-9B87-4EF4-8B81-BBB1B4160787.

Hearing on Nuclear Regulatory Commission: Oversight of Activities, Priorities, and Fiscal Year 2027 Budget, House Committee on Energy and Commerce, Subcommittee on Energy

Examined NRC's actions to increase nuclear licensing efficiency without reducing safety, along with current nuclear regulatory issues. Witnesses were the five NRC commissioners. Held April 22, 2026, https://energycommerce.house.gov/posts/energy-subcommittee-holds-hearing-conducting-oversight-of-the-nuclear-regulatory-commission.

Hearing on American Energy Dominance: Dawn of the New Nuclear Era, House Committee on Energy and Commerce, Subcommittee on Energy

Topics included nuclear licensing and regulation, expansion of nuclear power, and nuclear supply chains and fuel. Witnesses included representatives of the nuclear industry and national laboratories. Held January 7, 2026, https://energycommerce.house.gov/events/energy-hearing-american-energy-dominance-dawn-of-the-new-nuclear-era.

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Safety of Nuclear Power Reactors, World Nuclear Association, August 23, 2024, https://www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/safety-of-nuclear-power-reactors.aspx.

Improving the Efficiency of NRC Power Reactor Licensing: The 1957 Mandatory Hearing Reconsidered, Columbia University Center on Global Energy Policy, November 21, 2023, https://www.energypolicy.columbia.edu/publications/improving-the-efficiency-of-nrc-power-reactor-licensing-the-1957-mandatory-hearing-reconsidered.

Plant-Specific Safety Enhancements After Fukushima, Nuclear Regulatory Commission, web page, reviewed/updated December 7, 2021, https://www.nrc.gov/reactors/operating/ops-experience/post-fukushima-safety-enhancements.html.

State-of-the-Art Reactor Consequence Analyses (SOARCA) Report, Nuclear Regulatory Commission, NUREG-1935, November 2012, http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1935.

Security and Emergency Response

The level of security that must be provided at nuclear power plants became a high-profile issue after the 9/11 terrorist attacks on the United States in 2001. Since those attacks, NRC issued a series of orders and regulations that substantially increased nuclear plant security requirements, although industry critics contend that those measures are still insufficient. Key measures include an increase in the severity of attacks that nuclear plant security forces must be able to repel, requirements for mitigating the effects of large fires and explosions, and a requirement that new reactors be capable of withstanding aircraft crashes without releasing radioactive material.

NRC also modified its planning requirements for evacuations and other emergency responses after the 9/11 attacks, and the Fukushima disaster illustrated the importance of emergency response to radioactive releases from any cause. NRC issued wide-ranging revisions to its emergency preparedness regulations on November 1, 2011, dealing with duties of emergency personnel and the inclusion of hostile actions in emergency planning drills.[121] In response to Fukushima, NRC staff recommended that nuclear emergency plans be required to address events affecting multiple reactors and prolonged station blackout. NRC told nuclear power plants on March 12, 2012, to provide specific information and analysis on those issues.[122]

The NRC CyberSecurity Directorate was established in June 2013 to coordinate rulemaking, guidance, and oversight of cybersecurity at nuclear power plants and other regulated nuclear facilities. As part of the Directorate, NRC's Cyber Assessment Team responds to cybersecurity events at NRC-licensed facilities and coordinates threat assessments with other federal agencies.[123]

Recent Events

NRC issued a final rule March 14, 2023, on "Enhanced Weapons, Firearms Background Checks, and Security Event Notifications."[124] The rule establishes procedures for nuclear power plants and other licensed nuclear facilities to apply for NRC authorization to arm their security personnel with "enhanced" weapons, such as semiautomatic assault weapons and machine guns, despite any state laws prohibiting such weapons. NRC is authorized to preempt state laws for this purpose under Atomic Energy Act Section 161A, enacted by the Energy Policy Act of 2005 (P.L. 109-58). The rule also modifies NRC requirements for nuclear power plants and other licensed facilities to

[121] NRC, "Enhancements to Emergency Preparedness Regulations," final rule, 76 *Federal Register* 72560, November 23, 2011.

[122] NRC, "Request for Information Pursuant to Title 10 of the Code of Federal Regulations 50.54(f) Regarding Recommendations 2.1, 2.3, and 9.3 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident," March 12, 2012, http://pbadupws.nrc.gov/docs/ML1205/ML12053A340.pdf.

[123] NRC, "Backgrounder on Cyber Security," February 2, 2026, http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/cyber-security-bg.html.

[124] NRC, "Enhanced Weapons, Firearms Background Checks, and Security Event Notifications," final rule, 88 *Federal Register* 15864, March 14, 2023, https://www.federalregister.gov/documents/2023/03/14/2023-03944/enhanced-weapons-firearms-background-checks-and-security-event-notifications.

report events related to physical security and would add requirements for reporting suspicious activities.

On June 26, 2026, NRC issued a proposed rule "to reduce regulatory burden" in ensuring adequate safety and security at civilian nuclear sites. The rules would affect drug and alcohol testing, alter security requirements for spent fuel storage facilities, replace prescriptive rules with performance-based rules, and remove duplicative security clearance requirements.[125]

Concerns about international nuclear plant security have been raised by Russia's ongoing military occupation of Ukraine's six-reactor Zaporizhzhia nuclear power plant (ZNPP)—the largest in Europe. Russian forces captured the plant on March 4, 2022, and it has since lost offsite power several times, increasing the risk of damage to the plant's nuclear fuel and radioactive releases to the environment.

In September 2022, the International Atomic Energy Agency (IAEA) called for "establishment of a nuclear safety and security protection zone" around the plant, but the proposal has not been implemented.[126] The IAEA has negotiated five separate ceasefire agreements around ZNPP to repair transmission lines needed to provide power to cool the plant. The plant most recently lost its main electrical connection in March 2026. IAEA issued a statement that it "continues negotiations with both Ukraine and the Russian Federation to secure a temporary localized ceasefire for repairs." The statement warned, "The presence of drones and explosives at a nuclear power plant is unacceptable, as it dramatically increases the already significant risks to nuclear safety."[127]

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Nuclear Security and Safeguards, Nuclear Regulatory Commission, web page, last reviewed/updated August 5, 2025, https://www.nrc.gov/security.

[125] NRC, "Modernizing Security Requirements," 91 *Federal Register* 38928, June 26, 2026, https://www.federalregister.gov/documents/2026/06/26/2026-12989/modernizing-security-requirements.

[126] IAEA, *Nuclear Safety, Security, and Safeguards in Ukraine*, September 5, 2022, https://www.iaea.org/sites/default/files/22/09/ukraine-2ndsummaryreport_sept2022.pdf.

[127] IAEA, "Update 351 – IAEA Director General Statement on Situation in Ukraine," May 22, 2026, https://www.iaea.org/newscenter/pressreleases/update-351-iaea-director-general-statement-on-situation-in-ukraine.

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Nuclear Plant Security, Union of Concerned Scientists, web page, updated February 25, 2016, https://www.ucsusa.org/nuclear-power/nuclear-plant-security#.W2RtxtJKiUk.

Nuclear Weapons Nonproliferation

Encouraging exports of U.S. civilian nuclear products, services, and technology while making sure they are not used for foreign nuclear weapons programs has long been a fundamental goal of U.S. nuclear energy policy. Section 123 of the Atomic Energy Act requires that any country receiving U.S. nuclear technology, equipment, or materials implement a peaceful nuclear cooperation agreement with the United States. These so-called 123 agreements are intended to prevent the diversion of U.S. nuclear exports for nuclear weapons purposes and to generally discourage the proliferation of nuclear weapons. Section 123 allows nuclear cooperation agreements to take effect after 90 days of continuous congressional session if they adhere to specified criteria.

International controls and inspections are intended to ensure the peaceful use of civilian nuclear facilities and prevent the proliferation of nuclear weapons. However, recent plans or proposals to build nuclear power plants in countries that have not previously used nuclear energy, including several in the Middle East and countries without nuclear experience, have prompted concerns that international controls may not be sufficient to prevent weapons proliferation.[128] Numerous recommendations have been made in the United States and elsewhere to create new incentives for nations to forgo the development of uranium enrichment and spent nuclear fuel reprocessing facilities that could produce weapons materials as well as civilian nuclear fuel.

An extension of the U.S. peaceful nuclear cooperation agreement with South Korea generated controversy but no congressional action to block it. During negotiations on the U.S.-South Korea nuclear cooperation extension, which entered into force November 25, 2015, South Korea had sought advance U.S. consent for spent fuel reprocessing and uranium enrichment. The United States did not provide such consent, on general nonproliferation grounds and because such consent could affect other ongoing issues on the Korean peninsula. The new agreement did, however, establish a bilateral "high level commission" to further consider those issues.

Japan's long-standing nuclear cooperation agreement with the United States automatically renewed on July 17, 2018, and will remain in force indefinitely unless terminated by either side.[129] The agreement allows Japan to reprocess spent nuclear fuel from its U.S.-designed reactors, separating plutonium and uranium for use in new fuel. A long-delayed commercial reprocessing plant at Rokkasho is scheduled to be completed in 2026 at the earliest.[130] Some

[128] World Nuclear Association, "World Nuclear Power Reactors and Uranium Requirements," April 20, 2026, https://world-nuclear.org/information-library/facts-and-figures/world-nuclear-power-reactors-and-uranium-requireme.

[129] DOE, National Nuclear Security Administration, "123 Agreements for Peaceful Cooperation," December 7, 2022, https://www.energy.gov/nnsa/123-agreements-peaceful-cooperation.

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nuclear nonproliferation groups had urged the United States to use the renewal of the U.S.-Japan nuclear cooperation agreement as an opportunity to urge Japan not to begin its reprocessing program. They noted that Japan already has substantial stockpiles of previously separated plutonium that could potentially be used for weapons as well as reactor fuel.[131] Japan approved a Strategic Energy Plan on July 3, 2018, that includes a pledge to reduce Japanese plutonium inventories, reportedly following pressure from the United States and other countries.[132]

Discussions between the United States and Saudi Arabia toward drafting a peaceful nuclear cooperation agreement have prompted controversy. The U.S. nuclear industry supports an agreement, so that it could supply reactors and other nuclear technology to Saudi Arabia.[133] Nuclear nonproliferation advocacy groups have argued that any such agreement should include a binding commitment from Saudi Arabia to forswear uranium enrichment and spent fuel reprocessing on its territory.[134] Then-Secretary of State Mike Pompeo testified to the Senate Foreign Relations Committee on May 24, 2018, that the United States was insisting that Saudi Arabia accept such a commitment as part of any 123 agreement, despite Saudi arguments that the country has a right to enrich and reprocess under international inspections.[135] Then-Secretary of Energy Rick Perry told reporters at a meeting in September 2019 that the United States also would condition any U.S.-Saudi 123 Agreement on Saudi acceptance of the Additional Protocol, which allows strengthened international safeguards on nuclear facilities.[136]

Recent Events

The United States and Israel carried out air attacks on Iranian uranium enrichment and related facilities on June 21, 2025. "Iran's key nuclear enrichment facilities have been completely and totally obliterated," said President Trump immediately afterward.[137] The United States initiated a further military campaign against Iran, called Operation Epic Fury, on February 28, 2026, to "obliterate Iran's ballistic missile arsenal and production capability, annihilate its navy, sever its support for terrorist proxies, and ensure the world's leading state sponsor of terrorism never acquires a nuclear weapon."[138] The effects of the attacks on Iran's nuclear program remain unclear.[139]

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[138] White House, "President Trump's Clear and Unchanging Objectives Drive Decisive Success Against Iranian Regime," April 1, 2026, https://www.whitehouse.gov/releases/2026/04/president-trumps-clear-and-unchanging-objectives-drive-decisive-success-against-iranian-regime.

[139] For more details, see CRS In Focus IF12106, *Iran and Nuclear Weapons Production*, by Paul K. Kerr.

After a state visit to South Korea by President Trump on October 29, 2025, the two countries announced a variety of bilateral agreements, including on nuclear energy. According to a joint fact sheet issued after the meeting, "Consistent with the bilateral 123 agreement and subject to U.S. legal requirements, the United States supports the process that will lead to the ROK's civil uranium enrichment and spent fuel reprocessing for peaceful uses."[140]

Congress prohibited the use of FY2024 funds for Export-Import Bank support for nuclear exports to Saudi Arabia until the kingdom has a 123 Agreement in effect that commits to renouncing uranium enrichment and reprocessing and has signed an Additional Protocol with the IAEA (P.L. 118-47, Division F, §7041(h)). The same provision was included for appropriations in FY2023 (P.L. 117-328), FY2022 (P.L. 117-103), FY2021 (P.L. 116-260), and FY2020 (P.L. 116-94). The United States signed a 123 Agreement with Saudi Arabia on July 22, 2026.[141]

A May 2025 executive order states that the Trump Administration aims to "aggressively pursue at least 20 new 123 Agreements by the close of the 120th Congress to enable the United States nuclear industry to access new markets in partner countries."[142]

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Nuclear Bills in the 119th Congress

This section briefly describes selected nuclear-related bills that have been introduced in the 119th Congress, organized by issue areas.

Advanced Nuclear Technology

Powering the Future of American Space Dominance Act (H.R. 9193, Mike Kennedy)

Would require the National Aeronautics and Space Administration to submit to Congress updated plans for space nuclear propulsion and report on lunar surface power and liability limitations for commercial entities involved in space nuclear power. Introduced June 8, 2026; referred to Committee on Science, Space, and Technology.

Energy and Water Development and Related Agencies Appropriations Act, 2027 (H.R. 9022, Fleischmann)

Would provide FY2027 appropriations for DOE nuclear energy programs and NRC, among other agencies and programs. Reported as an original measure by the House Committee on Appropriations on May 22, 2026.

American Competitiveness for Exports in (ACE) Nuclear Energy Act of 2026 (S. 4228, McCormick)

Would exclude civil nuclear financing from the calculation of the Export-Import Bank's default rate and authorize higher compensation for up to 100 employees at the bank. Introduced March 26, 2026; referred to Committee on Banking, Housing, and Urban Affairs.

Accelerating Reliable Capacity (ARC) Act of 2026 (S. 3814, Risch)

Would authorize DOE payments for qualifying nuclear energy projects that experience specified cost overruns. Introduced February 10, 2026; referred to Committee on Energy and Natural Resources.

Next Generation Nuclear Deployment Act (H.R. 6805, Tim Moore)

Would prioritize DOE testing and development of advanced nuclear reactors on at least 10 different sites. Introduced December 17, 2025; referred to Committee on Science, Space, and Technology.

Advancing Research in Nuclear Fuel Recycling Act of 2025 (S. 3016, Cruz; H.R. 9197, Tim Moore)

Would require DOE to conduct a study on converting spent nuclear fuel into useable fuel for commercial light water reactors, advanced reactors, and other applications. Senate bill introduced October 16, 2025; referred to Committee on Energy and Natural Resources. House bill introduced June 6, 2026; referred to Committee on Energy and Commerce.

Advanced Reactor Modernization for Operational Resilience (ARMOR) Act of 2025 (S. 2389, Andy Kim)

Would require the U.S. Army to carry out a pilot program to build small advanced reactors, which would receive NRC licensing priority, at Army installations. U.S. military departments would enter into operational agreements for advanced nuclear reactors for up to 50 years. Introduced July 23, 2025; referred to Committee on Armed Services.

Nuclear REFUEL (Recycling Efficient Fuels Utilizing Expedited Licensing) Act (H.R. 3978, Latta; S. 2082, Husted)

Would exclude spent nuclear fuel reprocessing facilities from the definition of "production facilities" under the Atomic Energy Act if they do not produce pure plutonium. This could allow reprocessing plants to use a simpler licensing process. Both bills introduced June 12, 2025. House bill approved by the Subcommittee on Energy of the Committee on Energy and Commerce on July 14, 2026; Senate bill referred to Committee on Environment and Public Works.

Strengthening American Nuclear Energy Act (H.R. 3667, Donalds; S. 4267, Lummis)

Would codify into law four executive orders issued in May 2025 about DOE reactor testing, advanced reactor deployment, reactor licensing reform, and the nuclear industrial base. House bill introduced June 2, 2025; referred to Committee on Energy and Commerce and others. Senate bill introduced March 26, 2026; referred to Committee on Energy and Natural Resources.

International Nuclear Energy Act of 2025 (S. 1801, Risch; H.R. 3626, Donalds)

Would encourage U.S. cooperation with allies and partner nations to demonstrate and deploy advanced nuclear reactors, and would authorize support for building international civil nuclear program technical capacities, among other international civil nuclear coordination goals. Senate bill introduced May 19, 2025; reported by Committee on Foreign Relations on June 18, 2025. House bill introduced May 29, 2025; referred to Committee on Foreign Affairs and others.

International Nuclear Financing Act of 2025 (H.R. 1474, Hill)

Would require U.S. officials at the World Bank's International Bank for Reconstruction and Development and other multilateral development banks to advocate for elimination of restrictions on financing nuclear energy projects and for the establishment of nuclear energy assistance trust funds. Introduced February 21, 2025; referred to Committee on Financial Services.

DOE and NSF Interagency Research Act (H.R. 1350, Stevens)

Would require DOE and the National Science Foundation (NSF) to coordinate activities in nuclear fusion and other specific science and engineering fields. Introduced February 13, 2025; referred to Committee on Science, Space, and Technology. Passed House March 24, 2025.

Radioactive Waste Management

Consolidated Interim Storage Facility Restriction Act of 2025 (H.R. 6665, Nehls)

Would prohibit NRC from licensing privately owned interim spent fuel and high-level waste storage facilities located away from the site where the spent fuel was generated. Existing licenses for such facilities would be nullified. Introduced December 11, 2025; referred to Committee on Energy and Commerce.

Nuclear Plant Decommissioning Act of 2025 (S. 3441, Welch; H.R. 6613, Balint)

Would provide grants for communities with nuclear waste from permanently closed reactors, and would provide economic development assistance for communities with permanently closed nuclear power plants. Would establish procedures for state, local, and tribal consultation on nuclear power plant decommissioning plans. Introduced December 11, 2025; Senate bill referred to Committee on Environment and Public Works; House bill referred to Committee on Energy and Commerce.

Increasing Nuclear Safety Protocols for Extended Canister Transfers (INSPECT) Act of 2025 (H.R. 4809, Levin)

Would require NRC to assign a resident inspector to a permanently closed nuclear power plant until all spent nuclear fuel had been transferred from pool storage to dry storage. Introduced July 29, 2025; referred to Committee on Energy and Commerce.

Spent Fuel Prioritization Act of 2025 (H.R. 1012, Levin)

Would require that, in determining the order in which spent nuclear fuel will be taken by DOE from nuclear plant sites under NWPA, highest priority shall be given to plants that are permanently closed and are located in the highest-population areas, earthquake zones, and areas that pose national security concerns. Introduced February 5, 2025; referred to Committee on Energy and Commerce.

Nuclear Waste Informed Consent Act (H.R. 466, Titus; S. 101, Cortez Masto)

Would require the Secretary of Energy to obtain the consent of affected state, local, and tribal governments before making expenditures from the Nuclear Waste Fund for a nuclear waste repository. Both bills introduced January 15, 2025. House bill referred to Committee on Energy and Commerce; Senate bill referred to Committee on Environment and Public Works.

Nuclear Plant Economic Viability

To amend the Internal Revenue Code of 1986 to modify certain investment credit rules with respect to nuclear facilities (H.R. 8482, Harrigan)

Would allow nuclear power projects to opt out of requirements to spread tax credits over the licensed life of a plant and allow transfer of the credits to third parties. Introduced April 23, 2026; referred to Committee on Ways and Means.

Economic Recovery for Nuclear-Affected Communities Act (H.R. 7796, Lawler)

Would provide tax incentives, prizes, and grants in communities with permanently closed nuclear power plants. Introduced March 4, 2026; referred to Committee on Transportation and Infrastructure, Committee on Financial Services, and Committee on Ways and Means.

Nuclear Plant Decommissioning Act of 2025 (S. 3441, Welch; H.R. 6613, Balint)

Would provide economic development assistance for communities with permanently closed nuclear power plants and grants for communities with nuclear waste from closed reactors. Would establish procedures for state, local, and tribal consultation on nuclear power plant decommissioning plans. Introduced December 11, 2025; Senate bill referred to Committee on Environment and Public Works; House bill referred to Committee on Energy and Commerce.

Reactor Expenditure Accountability and Compliance Transparency Act (REACT) Act (H.R. 5803, Lawler)

Would require nuclear reactors that are using their decommissioning trust funds to regularly report to NRC the trust funds' earned interest, projected annual rate of return, and detailed expenditures. Introduced October 21, 2025; referred to Committee on Energy and Commerce.

Safety and Regulation

Nuclear Regulatory Modernization Act (H.R. 9658, Spartz)

Would eliminate a requirement that NRC hold uncontested licensing hearings and authorize informal adjudicatory procedures. Construction of uranium enrichment facilities would be allowed to begin before NRC issues a construction permit, with the owner subject to any subsequent licensing conditions. Introduced July 13, 2026; referred to Committee on Energy and Commerce.

NRC Staff Pay Alignment Act (H.R. 9614, Menendez)

Would authorize the NRC chairman to raise the pay for NRC Senior Executive Service officials 10% above the existing maximum rate. Introduced July 9, 2026; referred to Committee on Energy and Commerce.

Nuclear Advisory Committee Reform Act (H.R. 9613, Harshbarger)

Would require the NRC Advisory Committee on Reactor Safeguards to receive NRC approval to conduct certain safety reviews and establish other parameters for committee action. Introduced

July 9, 2026; approved by the Subcommittee on Energy of the Committee on Energy and Commerce on July 14, 2026.

American Enrichment Deployment Act (H.R. 9612, Fry)

Would remove certain environmental review requirements for uranium enrichment plants and allow earlier construction to begin. Introduced July 9, 2026; approved by the Subcommittee on Energy of the Committee on Energy and Commerce on July 14, 2026.

Department of Energy Nuclear Transparency Act (H.R. 9084, Castor)

Would require DOE to post public announcements about changes to DOE nuclear safety standards, new nuclear safety analyses at DOE facilities, and DOE authorizations for nuclear facilities. Introduced June 2, 2026; approved by the Subcommittee on Energy of the Committee on Energy and Commerce on July 14, 2026.

Radiation Health Research Act (H.R. 8852, Lawler)

Would require the National Institutes of Health to study the health effects of nuclear radiation on women. Introduced May 15, 2026; referred to Committee on Energy and Commerce.

Build Nuclear with Local Materials Act of 2026 (H.R. 8812, Donalds; S. 4529, Lummis)

Would require NRC to allow the use of commercial-grade steel and concrete in non-safety-related structures at nuclear power plants unless stricter standards were necessary to address a specific safety risk. Introduced May 14, 2026; House bill referred to Committee on Energy and Commerce; Senate bill referred to Committee on Environment and Public Works.

Reactors at Risk Act of 2026 (S. 4495, Markey)

Would require DOD and DOE to prepare a report to Congress about the dangers of nuclear power plants in current, past, and expected future armed conflict regions. Introduced May 12, 2026; referred to Committee on Armed Services.

Nuclear Energy Innovation and Deployment Act of 2026 (S. 4284, Lee)

Would remove NRC licensing authority over DOE demonstration reactors and nuclear fuel facilities, including those not on federal sites. DOE Nuclear Energy Launch Pad Zones would be authorized for testing the commercial feasibility of advanced reactors and to provide "streamlined licensing opportunities" under NRC. DOE would be authorized to use federal Power Marketing Administrations for the purchase and transmission of nuclear electricity. DOE would be authorized to implement a program to provide surplus plutonium to use in advanced reactor fuel, and the Surplus Plutonium Dilute and Dispose Program would be terminated. Introduced April 14, 2026; referred to Committee on Energy and Natural Resources.

Strengthening American Nuclear Energy Act of 2026 (H.R. 3667, Donalds; S. 4267, Lummis)

Would codify into law an executive order issued in May 2025 on reactor licensing reform, along with orders about DOE reactor testing, advanced reactor deployment, and the nuclear industrial base. House bill introduced June 2, 2025; referred to Committee on Energy and Commerce and

others. Senate bill introduced March 26, 2026; referred to Committee on Energy and Natural Resources.

Efficient Nuclear Licensing Hearings Act (S. 1757, Tim Scott; H.R. 5549, Griffith)

Would replace current hearing requirements for nuclear licenses with authorization for NRC to issue licenses after a 30-day notice without a hearing and to waive the 30-day notice if NRC finds there would be no significant hazards. Senate bill introduced May 14, 2025; referred to Committee on Environment and Public Works. House bill introduced September 23, 2025; approved by the Subcommittee on Energy of the Committee on Energy and Commerce on July 14, 2026.

NRC Office of Public Engagement and Participation Act of 2025 (H.R. 4136, Levin; S. 2161, Markey)

Would establish an Office of Public Engagement and Participation within NRC to support, coordinate, and assist public participation in NRC proceedings and advocate for the public interest within NRC. Introduced July 25, 2025; House bill referred to Committee on Energy and Commerce; Senate bill referred to Committee on Environment and Public Works.

Nuclear REFUEL (Recycling Efficient Fuels Utilizing Expedited Licensing) Act (H.R. 3978, Latta; S. 2082, Husted)

Would change the Atomic Energy Act definition of "production facility" to exclude spent nuclear fuel reprocessing facilities that produce plutonium mixed with other heavy radioactive elements. This could move such facilities to a less stringent licensing category. Introduced June 12, 2025; Senate bill reported by Committee on Environment and Public Works on October 29, 2025; House bill referred to Committee on Energy and Commerce.

Security and Emergency Response

Reactors at Risk Act of 2026 (S. 4495, Markey)

Would require DOD and DOE to prepare a report to Congress about the dangers of nuclear power plants in current, past, and expected future armed conflict regions. Introduced May 12, 2026; referred to Committee on Armed Services.

Sanction Russian Nuclear Safety Violators Act of 2025 (H.R. 475, Gregory Meeks)

Would require the President to impose specified sanctions on any foreign person who has endangered the integrity or safety of ZNPP or has undermined Ukrainian operational control of ZNPP. Introduced January 16, 2025; referred to Committee on Foreign Affairs and Committee on the Judiciary for provisions under its jurisdiction.

Nuclear Weapons Nonproliferation

No Nuclear Weapons for Saudi Arabia Act of 2026 (S. 4243, Markey)

Would prohibit a U.S.-Saudi Arabia agreement for peaceful nuclear cooperation under Section 123 of the Atomic Energy Act from taking effect without approval by a Joint Resolution of Congress. Introduced March 26, 2026; referred to Committee on Foreign Relations.

Expressing the sense of the House of Representatives in support of the International Atomic Energy Agency's (IAEA's) nuclear security role (H.Res. 1210, Foster)

Would express support for IAEA international nuclear security and safety roles and reaffirm U.S. "vital interest in preventing the spread of nuclear weapons and securing nuclear materials." Introduced April 23, 2026; referred to Committee on Foreign Affairs.

Nuclear Weapons Abolition and Conversion Act of 2025 (H.R. 1888, Norton)

Would require that after all countries with nuclear weapons "verifiably and irreversibly" begin complying with the Treaty on the Prohibition of Nuclear Weapons, the United States redirect resources from nuclear weapons programs to climate and infrastructure programs. Introduced March 5, 2025; referred to Committee on Foreign Affairs and additionally to Committee on Armed Services.

Affirming the Threats to World Stability from a Nuclear Weapons-Capable Islamic Republic of Iran (S.Res. 101, Lindsey Graham; H.Res. 105, Moskowitz)

Would demand that Iran cease all threats to the national security of the United States and its allies, including uranium enrichment and development of nuclear warheads. Senate resolution introduced February 27, 2025; referred to Committee on Foreign Relations. House resolution introduced February 4, 2025; referred to Committee on Foreign Affairs.

Calling on the United Kingdom, France, and Germany (E3) to Initiate the Snapback of Sanctions on Iran Under United Nations Security Council Resolution 2231 (2015) (H.Res. 139, Tenney)

Urges the United Kingdom, France, and Germany to impose snapback sanctions on Iran under UN Security Council Resolution 2231 for Iran's increases in its uranium stockpile, enrichment of uranium to 60% uranium 235, and other efforts toward developing nuclear weapons. Introduced February 14, 2025; referred to Committee on Foreign Affairs.

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