APRIL 2026

Nuclear Energy in the U.S.

Past, Present, and Future

Author:

Melanie Fornes
Climate Change Investment Specialist, Sustainable Investing

GLENMEDE
INVESTMENT MANAGEMENT

Contents

Introduction

After decades of expansion, backlash, and stagnation, nuclear technology is being reimagined as a critical part of the future energy landscape. While nuclear power can provide stable, reliable power across the U.S., investors are grappling with a complex set of competing technologies, policy implications, and cost pressures. With rising structural electricity demand in the U.S. driven predominantly by artificial intelligence (AI), a fundamental question has been revived: Can nuclear energy meaningfully expand its role in the U.S. energy transition?

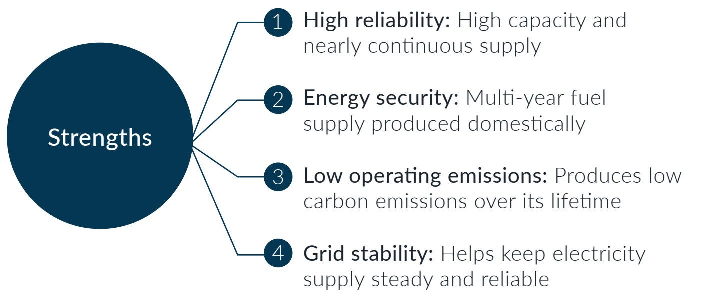
Nuclear Energy in the U.S.—A Brief Overview

The U.S. nuclear industry underwent a postwar shift from defense technology in the wake of the Manhattan project to a civilian commercial power source under the "Atoms for Peace" initiative. By the late 1950s through the mid-1960s, the first commercial nuclear plants were built in the U.S., proving their viability. This growth occurred alongside that of other nations, such as Japan, as nuclear energy gained global momentum. Nuclear's promise, then as now, was in its high reliability, energy security, lower operating emissions, and grid stability (Exhibit 1).

The mid-1960s through the 1970s proved to be construction boom years for nuclear energy. American utilities ordered nearly 200 reactors between 1965 and 1975, with the belief that nuclear power would become the dominant long-term electricity source in the U.S.[1] Its high reliability and energy security became especially attractive during the U.S. oil crisis of 1973 and subsequent periods of fossil fuel price volatility. The industry standardized largely around light-water reactors (LWRs) and built large-scale plants across the country.

The proliferation of nuclear facilities during this time is a successful example of the interplay of technocratic support and effective policymaking. This boom was not a market phenomenon—it was heavily shaped and enabled by federal policy.

Exhibit 1: Strengths of Nuclear Power



Source: Glenmede Investment Management

The first commercial plant was federally funded to prove that it could generate commercial electricity. Early U.S. nuclear growth was enabled by the Atomic Energy Act of 1954, which allowed private companies to own and operate nuclear reactors, and the Price-Anderson Act of 1957, which limited utility liability in the event of accidents. During the nuclear construction boom, the Atomic Energy Commission (AEC) helped shepherd supportive regulations, such as federal loan guarantees and tax incentives, while rising electricity demand and the 1973 oil crisis made nuclear a strategic priority.[2] This combination of financial support, regulatory facilitation, and energy security policy created the conditions for the rapid pace of nuclear construction in the U.S.

Despite this period of success, however, the growth of nuclear plants would falter, largely because of the technology's inherent risks.

Challenges and Stagnation

Nuclear energy's enthusiastic growth began to crack by 1979 after the Three Mile Island accident. Considered the most serious accident in U.S. commercial nuclear power plant history, the Three Mile Island nuclear plant in Pennsylvania was a partial meltdown, involving a combination of mechanical failures and human error that released radioactive gases. The accident raised significant concerns over insufficient oversight and nuclear safety. Reports after the accident concluded

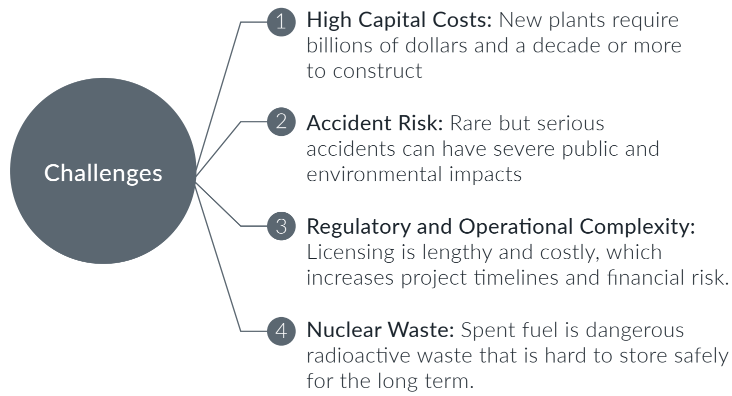
[1] J.L. Jurewitz. "The U.S. Nuclear Power Industry: Past, Present, and Possible Futures," *Energy & Environment*, 13(2), 207–237, http://www.jstor.org/stable/43734471.

[2] "Country Nuclear Power Profiles: United States," IAEA, updated 2018, https://www-pub.iaea.org/MTCD/Publications/PDF/cnpp2018/countryprofiles/UnitedStatesofAmerica/UnitedStatesofAmerica.htm?utm_source=chatgpt.com.

that the AEC prioritized speed to construction and power production over safety and proper operator training.[3] As a consequence, safety requirements enforced by a newly founded Nuclear Regulatory Commission (NRC) were created, prompting a wave of industry reform across operator training, emergency procedures, and safety.

The Three Mile Island accident helped usher in a new era of public opposition. New safety requirements and protocols forced nuclear projects under development to redesign their cooling systems, lengthening construction timelines and often adding billions in costs. Expenses further increased as heightened public scrutiny and legal challenges complicated the licensing process. This new chapter revealed nuclear technology's inevitable risks (Exhibit 2).

Exhibit 2: Challenges of Nuclear Power



Source: Glenmede Investment Management

The U.S. Energy Transition—A New Chapter for Nuclear

U.S. energy demand, once relatively flat and predictable, is now accelerating as structural shifts transform how electricity is produced, delivered, and consumed in our modern economy. Over the next 10 to 15 years, electricity demand will be shaped by the rapid expansion of AI-driven data centers, increased domestic manufacturing and reshoring, and widespread electrification across the U.S. economy. Recent geopolitical disruptions, such as the wars in Ukraine and Iran, have also yet again underscored the value of energy security.[4] Nuclear's reliable output, grid scalability, and the low intensity of its carbon emissions position it as an effective potential solution to these demands.

A new wave of nuclear technologies, moving beyond the legacy LWRs built in the 1960s and 1970s, could help power the next phase of industry growth.

Technology	Prevalence in the U.S.	Status	Description
LWRs	~100% of current commercial nuclear generation	Fully commercial	Conventional large nuclear fission reactors that use water as a coolant and a moderator to produce steam for electricity generation.
Small modular reactors (SMRs)	0 operating commercially	Pre-commercial / early deployment	Smaller nuclear reactors (generally ≤300 MW) designed for modular construction, with lower upfront capital costs and enhanced passive safety.
Next-generation designs	0 commercial power plants	Demonstration / Advanced R&D	Advanced concepts designed for higher efficiency (e.g., fast reactors, molten-salt, and high temperature gas designs).
Fusion	0 commercial plants	Advanced R&D	A non-fission technology that aims to generate energy by fusing light atomic nuclei.

3 "Three Mile Island: The Most Studied Nuclear Accident in History," U.S. Government Accountability Office, published September 9, 1980, https://www.gao.gov/assets/emd-80-109.pdf.

4 Jamie Smyth, "Middle East Energy Shock Revives Interest in Nuclear Power," *Financial Times*, March 12, 2026, https://www.ft.com/content/694d1009-95b6-4cb8-ac3b-3fa639c826d3?accessToken=zwAGTTnJy5kwkc9pTRAJlbZMuNOsOz-mOcgm0w.MEQCIAaZdZ__bK30CLtJg_HaOkh2SPOdJUUUNH0fOHuFb7xbAiBAi97tO5llPnEvVRJNUPZkJsx16YhPeiGnHdagemKftw&sharetype=gift&token=454daa52-6032-4efb-8f1a-215efd1322be.

These new technologies are not silver bullets, however, as they come with their own inherent challenges. While these more innovative designs offer new possibilities for the future of nuclear power, cost is still largely prohibitive for commercial scale. Some estimates of the levelized cost of energy (LCOE)[5] for technologies currently available in the market suggest that nuclear power remains more than six times as expensive as solar and wind.[6] Despite supportive government policies and funding, many next-generation nuclear technologies face the same barrier: their extreme capital intensity limits the pace at which they can scale. Nuclear projects also continue to face not-in-my-backyard (NIMBY) criticisms, despite newer generation technologies such as SMRs promising safer operations. Taken together, this new wave of nuclear technology is more likely to see deployment in select applications over the coming decades rather than through a rapid, nationwide buildout across the U.S.

Reviving nuclear technology as a solution to the U.S. energy transition is not a challenge of technological feasibility, but rather of regulatory execution and economic efficiency. Other countries have demonstrated that nuclear expansion remains possible under coordinated policy frameworks. For example, France generates most of its electricity from nuclear power, achieving both low emissions and grid stability. China is aggressively expanding reactor construction, integrating nuclear into its long-term industrial strategy. However, amid the fragmented policy environment the U.S. often faces, there is valid concern about whether a coordinated U.S. nuclear energy regime is even feasible.

Renewed Interest and Investment

Recent coordinated policy efforts provide some hope. In 2024, the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy (ADVANCE) Act was signed into law, directing the Department of Energy (DOE) and the NRC to accelerate advanced reactor deployment, support the domestic fuel cycle, and reduce licensing barriers.[7] A number of industry-favorable executive orders were issued in 2025 with the goal of restructuring the NRC and promoting deregulation for more streamlined application, licensing, and deployment.[8] Most recently, $2.7 billion worth of grants from the DOE were released to three private companies focused on uranium enrichment.[9]

In addition, private capital has flooded the nuclear energy space across varying technologies. Venture capital and private equity investment dollars have ballooned in recent years. Notable transactions include a $700 million Series C1 raise for X Energy LLC, an SMRs company, led by Amazon's The Climate Pledge Fund; a $650 million Series C raise for TerraPower, a firm specializing in molten-salt reactors, led by NVIDIA NVentures;[10] and Commonwealth Fusion Systems' latest $863 million Series B2 raise, totaling $3 billion in funding.[11]

Momentum behind the U.S. energy transition—reinforced by the ADVANCE Act, significant federal funding commitments, and backing from major technology companies to deploy new technologies—has materially accelerated investor interest in the space.

[5] Levelized Cost of Electricity (LCOE) represents the estimated average cost to generate one unit of electricity over a project's lifetime, incorporating upfront capital, financing, operating, and fuel costs.

[6] Ilona Vovk, and Melanie Fornes, "Navigating the U.S. Energy Transition," Glenmede, October 2025, https://www.glenmede.com/uncategorized/navigating-the-u-s-energy-transition/

[7] Citizens for Responsible Energy Solutions (CRES), "The Issue Brief: Key Federal Policies Fueling Nuclear Innovation and Reinvestment," CRES Forum, January 28, 2025, 01_27_2025_Issue-Brief_Key-Federal-Policies-Fueling-Nuclear-Innovation-and-Reinvestment_Final-1.pdf.

[8] President Donald J. Trump, Executive Order 14300, "Ordering the Reform of the Nuclear Regulatory Commission, The White House, May 23, 2025, https://www.whitehouse.gov/presidential-actions/2025/05/ordering-the-reform-of-the-nuclear-regulatory-commission/?utm_source=chatgpt.com.

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

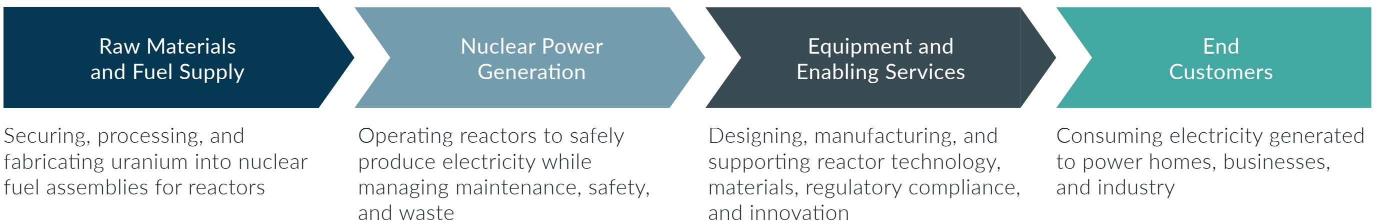
[10] Joanna Glasner, "Nuclear Fission Shows Continuing Popularity (with VCs, At Least)," Crunchbase News, December 9, 2025, https://news.crunchbase.com/venture/public-private-nuclear-fission-funding-2025/?utm_source=chatgpt.com.

[11] Commonwealth Fusion Systems, "Commonwealth Fusion Systems Raises $863 Million Series B2 Round to Accelerate the Commercialization of Fusion Energy," news release, August 28, 2025, https://www.cfs.energy/news-and-media/commonwealth-fusion-systems-raises-863-million-series-b2-round-to-accelerate-the-commercialization-of-fusion-energy.

Current Outlook for Nuclear

We believe understanding the complete supply chain of nuclear energy can create a wider lens of investment opportunities, not only across the venture capital and private equity spectrum but also in the public markets. This approach reveals opportunities both downstream and upstream, from fuel supply, generation, enabling services, and end-use consumers (Exhibit 3).

Exhibit 3: Nuclear Energy Supply Chain



Source: Glenmede Investment Management

Understanding these segments reveals how nuclear energy investment spans multiple sectors and industries. For example, a publicly traded company that has licensed uranium processing plants and inventory holdings can be a strategic upstream investment. At the generation stage, there are major diversified utilities and energy companies that operate nuclear fleets alongside other power assets, meeting rising electricity demand and securing long-term power purchase agreements with large tech and industrial customers. Downstream, industrial companies that supply critical nuclear-grade components and other materials may help capture opportunities further along the supply chain of nuclear energy production. All these opportunities, however, still carry varying degrees of risk, including regulatory barriers, lengthy construction timelines, and technological challenges.

Conclusion

As the demand for reliable, scalable, and cleaner energy continues to rise, nuclear energy technology has the potential to become a key part of the solution. However, investors should exercise caution, as the nuclear space is still on a path of development in need of additional government funding, regulatory discipline, and commercial deployment for new-generation technologies.

- The U.S. government shepherded nuclear from a defense technology to a civilian energy source with new regulation and funding support. Today's resurgence in nuclear energy is bringing deregulation and DOE grant funding. But, as history has shown, the path forward for safe and long-term growth will require regulatory efficiency and discipline.
- Fission has been well established; current investment flows highlight new-generation technology such as SMRs, fusion, and next-generation designs.
- While vast amounts of venture capital and private equity funds have been raised in this space, there are other ways to invest by understanding the nuclear power supply chain holistically. Companies that operate across this supply chain may represent an opportunity to invest in nuclear energy across multiple sectors and industries even in public markets.
- Due to inevitable capital intensity and current scale, nuclear deployment is likely to be in select applications over the next few decades, rather than a quick, widespread buildout across the U.S.

Nuclear energy is just one piece of the puzzle that is the U.S. energy transition. The future will be a mosaic of technologies, with nuclear potentially providing a reliable, low-carbon foundation alongside renewables, storage, and other emerging solutions.

To learn more, please reach out to Glenmede's Sustainable Investing team at sustainableinvesting@glenmede.com or visit us at glenmedeim.com.

GLENMEDE
INVESTMENT MANAGEMENT