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US Nuclear

SMRs to fuel AI dominance

Trump administration targets growing US nuclear energy capacity from c100 GW to 400 GW by 2050

All technologies are needed to meet this goal, including new small modular reactors (SMRs) for AI data centers

We have a Buy on Oklo and a Hold on NuScale Power

Why read this report?

- US nuclear capacity to grow from c100 GW currently to a target of 400 GW by 2050
- All technologies are needed to meet this goal, including small modular reactors
- We have a Buy rating on Oklo Inc. and a Hold on NuScale Power

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Nuclear for national security, energy independence, and AI dominance. Nuclear is clean energy with bipartisan support, but the US lags China and Korea in scaling deployment. Whether building from scratch, restarting, or power uprating, nuclear is a multi-year process of planning, licensing, inspection, equipment purchasing, refurbishment, workforce training, and fuel management. Restarts and power uprates are fastest with lower upfront costs, with Holtec's Palisade on track to be the first plant to restart later this year (a 3.5-year process). Building from scratch is the next most advantaged, especially if deploying established technologies with Korean ECPs. Developing new technologies is the most challenging, but more than a dozen advanced reactor designs are progressing toward deployment including SMRs.

With significant support from the US government, we think the US nuclear industry is well positioned for a "renaissance", 2.0 style. We recently launched coverage of two SMR companies—Oklo and NuScale—differentiated in their approach to commercialization.

- **Oklo Inc.** (OKLO US, TP USD96.00, Buy, CMP USD62.61): Vertically integrating power, fuel and isotope production with balance sheet funding opex and capex near term.
- **NuScale Power Corp.** (SMR US, TP USD13.00, Hold, CMP USD11.67): Singularly focused with more capital raises likely needed as projects advance.

Challenges are plenty, including the lack of a domestic fuel source, supply chain and experienced workforce. The next few years are crucial for SMRs and the broader US nuclear sector to compete. However, insatiable AI data center power demand could prove to be more powerful and provide a long investment tailwind. The regulatory environment combined with broad social support and energy demand has created an urgency that could optimistically pull forward commercialization of a new technology.

This is our latest report on the Energy Transition theme. If you want to subscribe to any of our nine big themes, *click here*.

US nuclear: Summary of ratings and valuations

Company/ticker	Currency	Current price	Mkt cap (USDbn)	TP	Rating	26e Div yield	26e EV/ EBITDA	26e EV/ CF	26e P/ CF	26e FCF yield
Oklo Inc. (OKLO US)	USD	62.61	10.9	96	Buy	0.0%	-39.2x	-70.2x	-20.5x	--
NuScale Power Co. (SMR US)	USD	11.67	4.0	13	Hold	0.0%	-4.5x	-8.0x	-5.8x	--
GE Vernova (GEV US)	USD	991.30	269.6	740	Hold	0.2%	49.2x	68.6x	39.9x	2.5%
Brookfield Asset Management (BAM US)	USD	48.22	80.8	53	Buy	4.1%	--	27.6x	--	--
Baker Hughes (BKR US)	USD	60.25	59.3	67	Buy	1.5%	11.4x	24.6x	15.6x	6.4%
Emerson Electric (EMR US)	USD	144.83	82.2	170	Buy	1.5%	17.3x	29.8x	18.5x	5.4%

Source: Bloomberg, HSBC estimates.
Priced at close of 21 April 2026

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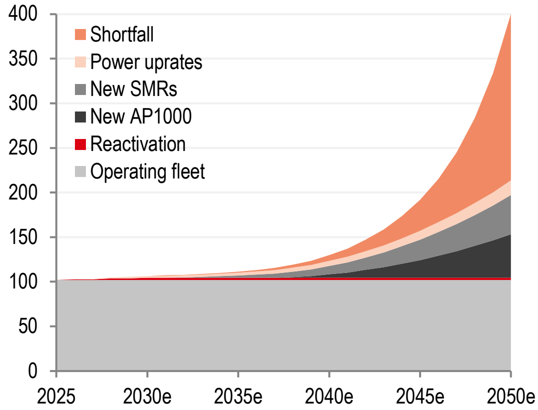
Key charts

US nuclear capacity (GW)



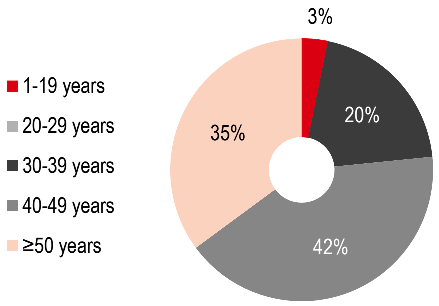
Source: HSBC estimates

The Trump administration targets growing US nuclear energy capacity from c100 to 400 GW by 2050, with the DOE to assist in 10 new large reactors and 5 GW of power uprating commencing construction by 2030.

Three decommissioned reactors are being reactivated for 2 GW of capacity, with 800 MW restarting at Palisades imminently. The NRC expects to received application for 2.1 GW of power uprating over the next five years, but new large reactors and small modular reactors (SMRs) are unlikely to begin operations until the 2030s.

Construction would need to ramp materially after 2040s to achieve the administration's 2050 target.

US operating fleet age (% of 94 active reactors)



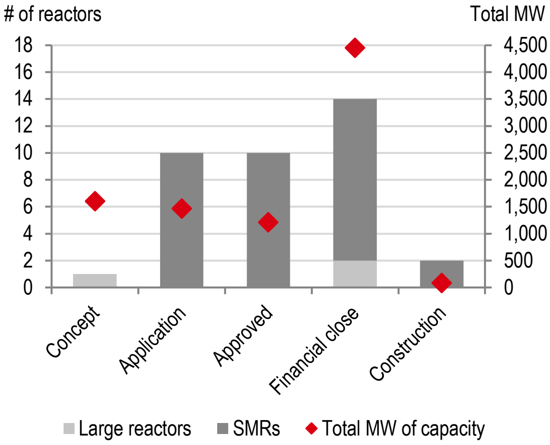
Source: Rystad Energy, HSBC

The US fleet of 94 commercial nuclear reactors range from 1 to 56 years of age. A vast majority of the fleet is over 40 years old and operating on their renewal license for years 41-60.

Subsequent license renewals have been issued for years 61-80 for 20 reactors. The NRC is reviewing applications for an additional 5 reactors, with 22 more applications anticipated within the decade.

Extending the operating life of a nuclear plant provides opportunities for power uprates and equipment upgrade.

New reactor development status



Source: Rystad Energy, HSBC

Excluding reactivations, Rystad Energy is tracking more than 8 GW of new nuclear reactor capacity in various stages of development. This does not include Fermi America's plans to build 6 GW of nuclear generation by 2038.

Facts and figures

94

Active nuclear reactors currently operating in the US

100 GW

Current US nuclear capacity for c20% of national consumption

The US fleet of 94 nuclear reactors in 54 sites consists of large light water reactors averaging 1,085 MW each, of which 63 are pressurized water reactors (PWRs) and 31 are boiling water reactors (BWRs)

400 GW by 2050

The Trump administration targets growth of the US fleet for national security, energy independence, and AI dominance

10

new large reactors and

5 GW

of uprating at existing reactors

by 2030

with assistance from the Department of Energy

USD750bn

from Japan and Korea to support critical US energy projects

New Gen III+ and IV reactors extend nuclear technologies beyond traditional applications, providing opportunities for export while also providing zero-carbon electricity and climate mitigation

50-350+ MW

Small modular reactors can be scalable and easier to install

<50 MW

Microreactors can be used for non-electric and mobile applications

Glossary of terms

Advanced reactors: a new class of reactors that incorporates innovative technologies such as passive safety features, alternative fuel or coolant types, and/or smaller reactor sizes. The NRC refers to all reactors that differs from the US fleet of primarily light water reactor (LWR) as advanced reactors, including the AP1000.

- Gen III+: light water reactors with passive safety features
- Gen IV: reactors that use coolants other than water

Combined operating license (COL): a license required from the US Nuclear Regulatory Commission (NRC) to construct and operate a nuclear power facility at a specific site.

Early site permit (ESP): a permit granted by the NRC for one or more proposed sites for a nuclear power facility; valid for 10-20 years and can be renewed for additional 10-20 years; independent of a specific nuclear plant design or application for a construction permit or combined license.

Fission: the splitting of an atom to release energy in the form of heat for producing electricity.

Fusion: combining a heavier and more stable nucleus from two lighter and less stable nuclei, which results in a release of energy similar to that given off by stars.

Gigawatt (GW): a unit of power equivalent to 1,000 megawatt (MW), 1,000,000 kilowatt (kW), or 1,000,000,000 watts. A watthour (Wh) is a unit of energy equal to one watt of power steadily supplied to an electrical circuit for one hour (or exactly 3.6×10^3J).

Light water reactor (LWRs): nuclear reactors that use "normal" water as coolant and neutron moderators. The US fleet of commercial reactors generally consists of LWRs, including **Pressurized Water Reactors (PWRs)** and **Boiling Water Reactors (BWRs)** where the reactor's core heat up pressurized water and boiling water, respectively, to power a steam generator. **Small modular reactors (SMRs)** are a subset of light water reactors that are more compact and scalable.

Non-light water reactor (non-LWRs): nuclear reactors that use other substance than common water to cool the reactor core, such as heavy water (water that contains heavy hydrogen or deuterium, D_2O), gases (carbon dioxide), or liquid metal. Reactor technologies are generally named based on the primary coolant type, such as **High-Temperature Gas Reactors (HTGRs)**, **Sodium Fast Reactors (SFR)**, and **Molten Salt Reactors (MSR)**.

Power uprate: the process of increasing the maximum power level (nameplate capacity) at which a commercial nuclear power plant may operate. The NRC regulates the plant's operating license and technical specifications, and a power uprate requires the NRC to amend the plant's operating license and technical specifications.

Uranium: a radioactive element (U) with the atomic number 92 and atomic weight of c238. Found in natural ores, uranium is mined and comes in two principal natural isotopes (forms, atomic configurations) of uranium-235 (0.7% U) and uranium-238 (99.3% U). Uranium enrichment is the process of increasing the concentration of U in uranium-235 to create a fuel, typically 3-5% for nuclear reactors and 20-90% for nuclear weapons.

Regulatory agencies

Atomic Energy Commission (AEC): Established by Congress in 1946 to oversee the development, use, and control of atomic energy for military and civilian applications (medical, space, energy). The AEC began promoting nuclear power in 1954, which enabled the development of commercial nuclear power and designated the AEC for regulating its safety. Congress abolished the federal agency in 1974 following the 1973 oil crisis and replaced it with the Nuclear Regulatory Commission (NRC), the Energy Research Development Administration (ERDA), and the Energy Resources Council.

- **Nuclear Regulatory Commission (NRC):** Established as an independent regulator of US commercial nuclear power plants and nuclear materials (i.e. for industrial, medical, research, and other applications). The NRC issues licenses for operation and research, with a focus on public safety and security following the 1979 Three Mile Island accident. Consisting of five presidentially appointed commissioners serving staggered five-year terms and c3,000 employees, the NRC's mission to "protect public health and safety and "advance the nation's common defense and security".
- **Energy Research Development Administration (ERDA):** Established to take over the AEC's research and development arm and combined with R&D activities for other forms of energy including fossil fuels. The ERDA maintained research and production activities for nuclear weapons for the military and merged with the independent Federal Energy Administration (FEA) to form a cabinet-level Department of Energy (DOE) in 1977. As a result, the DOE has significant experience in licensing and operating nuclear energy technology.
- **Energy Resources Council:** Established to coordinate federal energy policy formation and implementation. The FEA provided staff to support the Council and implement energy policies it established, with the council also merging into the DOE in 1977.

International Atomic Energy Agency (IAEA): Intergovernmental organization founded in 1957 based on US President Eisenhower's "Atoms for Peace" speech of 1953. Originally made up to 81 nations to promote the peaceful use of nuclear energy and to inhibit its use for any military purpose, to promote and control the Atom, the IAEA now consists of 180 member states. A 35-member Board of Governors meet five times per year in Vienna to consider a range of issues and set the agenda for an annual conference, as well as maintain an international watch dog.

International Nuclear Regulators Association (INRA): International association established in 1997 to give national nuclear regulators with mature civilian nuclear reactor and materials programs a forum to discuss nuclear safety and security issues of mutual interest. Members include the US, Canada, France, Germany, Japan, the Republic of Korea, Spain, Sweden, and the United Kingdom.

Nuclear Energy Agency (NEA): A specialized agency within the Organisation for Economic Co-operation and Development (OECD), created to assist its member countries in maintaining and further developing the scientific, technological, and legal bases for safe, environmentally friendly, and economical use of nuclear energy for peaceful purposes. Members consist of 33 countries in Europe, North America, and the Asia-Pacific region, which account for c85% of the world's installed nuclear capacity.

US nuclear renaissance 2.0

- The Trump administration targets growing US nuclear energy capacity from c100 GW currently to 400 GW by 2050
- Catalysts are in place near term for extending the life of the existing fleet, power uprating, and deploying new reactors, but …
- …risks are plenty for yet unproven new technologies at scale

Industry overview

US support and enthusiasm for nuclear energy continues to grow, signalling a nuclear "renaissance" is underway. Nuclear power enjoys broad bipartisan support and commercial appeal, with President Trump raising the Biden administration's 2050 target for US generation capacity to 400 GW by 2050 from 300 GW previously and c100 GW currently. Getting near these ambitious targets requires firm policy and fiscal support, both in ample supply under the current administration. This report outlines the path and challenges to growing US nuclear capacity, which requires: 1) extending the operating life of the existing fleet, 2) uprating and deploying new reactors at existing sites, 3) reactivating decommissioned reactors and sites, and 4) deploying new nuclear technologies.

While nuclear has clear advantage in providing zero-carbon, baseload electricity, there are challenges and risks in scaling new technologies within a heavily regulated industry. Near-term headwinds include the lack of a domestic fuel source, supply chain, and experienced workforce. However, insatiable AI data center power demand could prove to be more powerful and provide a long investment tailwind.

Upcoming catalysts include:

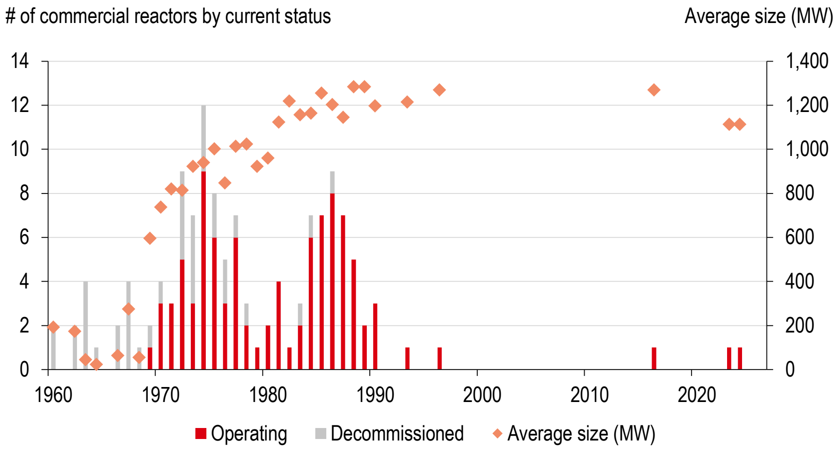
- Ongoing reform of the NRC, including shortened timeframe for permitting
- Federal funding opportunities finalized in the Big Beautiful Bill Act
- New partnership with US government taking financial risk on projects and/or companies
- The DOE playing a greater role in reinvigorating the nuclear industry

We initiated on two US-listed companies in the nuclear renaissance value chain: NuScale Power Corp. at Hold with a TP of USD13.00, and Oklo Inc. at Buy with a TP of USD96.00. These companies are focused on deploying new SMR technologies, which are being considered for new power plants and power uprating at existing sites. Both companies are also evaluating opportunities to export their technology globally, with the next few years being critical for US to compete in the global AI race and to open new markets of opportunities.

Current market dynamics

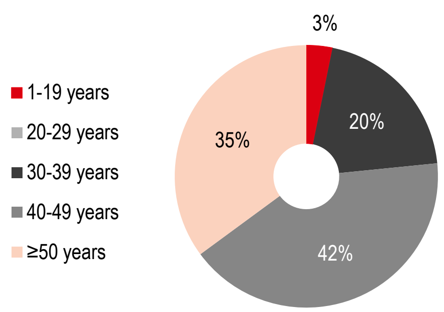
While the US was fundamental to the development and global adoption of nuclear energy, new capacity additions stalled following the 1979 Three Mile Island accident. The partial meltdown of reactor 2 released radioactive gases and iodine into the containment building and remains the most serious commercial nuclear power accident in the US. The 1986 Chernobyl accident ended the constructing of new US nuclear power plants (i.e. end of US nuclear renaissance 1.0) and commercial plants began to close by the early 1990s. A total of 22 plants with nearly 17 GW of capacity were decommissioned from 1993-2022. Three of these 22 plants have plans to be reactivated which, combined with potential power uprating of the existing fleet and license renewal of the existing fleet, could help increase US nuclear production capacity in the near to medium term. To grow capacity towards the Trump administration's 400 GW target by 2050, the industry needs to accelerate deployment of advanced nuclear reactors (Gen III, III+, and IV). Below we outline four paths we see to growing the US nuclear fleet.

Startup year of new U.S. commercial nuclear reactors (94)



Source: US NRC, HSBC

Active US reactors (mix by age)



Source: IEA, HSBC

1. Extend the operating life of the existing fleet

From four regional offices, the US Nuclear Regulatory Commission (NRC) regulates the US fleet of 94 commercial nuclear reactors. The majority 35 reactors (c37%) are in region 2 (Southeast, with NRC headquarter in GA), followed by 21 reactors (c22%) in region 3 (Midwest from IL), 20 reactors (c21%) in region 1 (Northeast from PA), and 18 reactors (c19%) in region 4 (West from TX). Regional offices are responsible for issuing new licenses and renewing existing licenses for plants and plant operators, with the NRC involved in continuous inspection of plant maintenance and safety operations. New licenses are issued for 40 years and extended in 20-year increments. Most of the US fleet is operating on their first license renewal for years 40-60 (72 reactors, c77%).

To obtain a licence renewal, a plant operator must provide the NRC with an assessment of the aging plant, including a review of its technical specs (i.e. system metals, welds and piping, concrete, electrical cables, and reactor pressure vessels) and safety plans. The NRC also evaluates the impact of operating the plant for another 20 years on the surrounding environment and community. Applicants must apply for an extension before their license expires, with operators beginning the process years in advanced to account for the time it takes to prepare and complete technical reviews, audits, inspections, and public comments (historically a 22-to-30 months process).

In 2014, the DOE and Electric Power Research Institute completed a 10-year study determining no technical limit exists for a US nuclear plant to operate for up to 80 years. Of the existing US fleet, the oldest operating plant will be 81 years old by 2050. The DOE may need to complete another study to determine if a nuclear plant can safely operate beyond 80 years. This study could provide guidelines for additional license renewals and avoid a wave of decommissioning for plants approaching their SLR expiration dates.

Upgrades and refurbishment are likely needed to extend the plant's longevity as early nuclear plans were design for 30-40 year operating lives versus 40-60 years for newer plants. For example, rather than decommission four reactors at the Surry and North Anna plants, Dominion's Virginia Power approved USD5bn in capital improvements through 2035 to extend the life of these plants to 80 years (2052-2060). The company will replace each reactor's main generators and condensers, refurbish the reactor's coolant pumps, and convert the plant's instrument and control systems from analog to digital. Dominion also plans to add 80 enhancements to station procedures, such as additional inspections and equipment testing.

Map is as of January 2025 and does not reflect recent subsequent license renewals at Browns Ferry, Dresden, Oconee, Point Beach, and Virgil C. Summer.

Map of U.S. commercial nuclear reactors (94 licensed)

Source: US NRC, HSBC

2. Uprate and deploy new reactors at existing sites

While extending the life of an existing reactor, there could be opportunities to uprate and deploy new reactors at existing (i.e. brownfield) nuclear sites, which offer opportunities to leverage established infrastructure, transmission connections, and an experienced workforce. For example, it costs approximately USD1-2bn to add 150-250MW of generation capacity at an existing site vs USD20bn for a new AP1000 at a greenfield site. Dominion's Virginia Power withdrew plans to add a third reactor at the North Anna site in 2015 when costs ballooned to USD18-20bn, in line with a new greenfield site. New federal funding opportunities could help offset high capex costs, but the operator still needs to amend existing NRC licenses and obtain new licenses, which for Santa Anna includes a Combined Construction Permit and Operating License that took more than 10 years to be issued in June 2017, as well as state and other environmental permits and approvals.

Several reactors with licenses expiring over the 2029-38 timeframe are rated in the c600 MW range, well below the 1 GW average of the US fleet. These reactors average c50 years old and are operating on their first renewed licenses. Investments are likely needed to extend the life of these reactors, which may provide opportunities to incorporate power uprate and other efficiency improvements. Uprates are generally achieved through the use of a greater level of enrichment of the uranium fuel or more fresh fuel. When a reactor produces more thermal energy, it produces more steam, driving the turbines and generators to produce more electricity. But more heat and steam mean the plant's components—pipes, valves, pumps, heat exchangers, electrical transformers, generators, and so forth—must be robust enough to maintain safe performance at higher power.

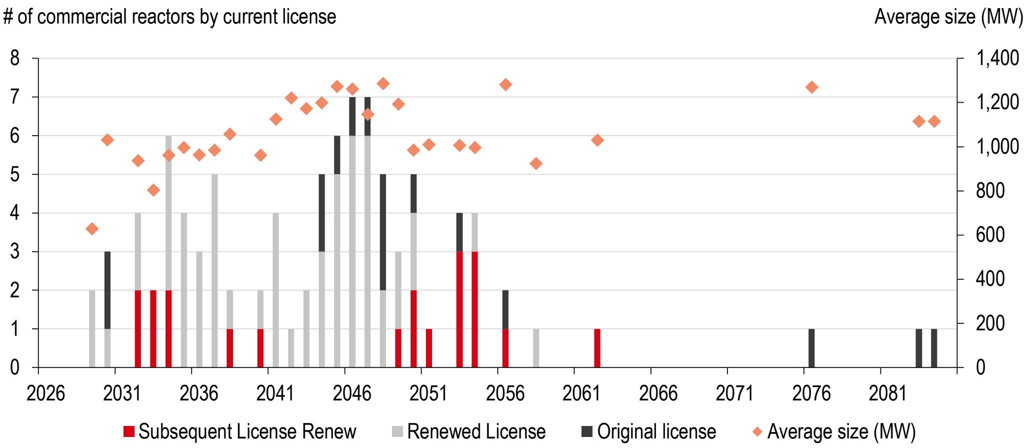
Southern Company received a USD26.5bn loan guarantee from the US DOE's Office of Energy Dominance Financing, which is expected to help finance 6 GW of nuclear power uprates and license renewals, among other capacity and grid investments.

U.S. commercial nuclear reactors with <1 GW capacity and licenses expiring 2029-38

Name	State	Capacity (MW)	Startup year	Age	License expires
Ginna	NY	614	1970	55	2029
Nine Mile Point-1	NY	642	1969	56	2029
Monticello	MN	685	1971	54	2030
Point Beach-1	WI	643	1970	55	2030
Robinson-2	SC	769	1971	54	2030
Point Beach-2	WI	643	1972	53	2033
Prairie Island-1	MN	593	1974	51	2033
Arkansas Nuclear One - 1	AR	903	1974	51	2034
Calvert Cliffs-1	MD	918	1975	50	2034
Cooper	NE	801	1974	51	2034
Fitzpatrick	NY	883	1976	49	2034
Hatch-1	GA	924	1975	50	2034
Prairie Island-2	MN	593	1974	51	2034
Millstone-2	CT	910	1975	50	2035
Beaver Valley-1	PA	923	1976	49	2036
Calvert Cliffs-2	MD	932	1977	48	2036
Davis Besse-1	OH	925	1977	48	2037
Farley-1	AL	888	1977	48	2037
Arkansas Nuclear One – 2	AR	943	1980	45	2038
Hatch-2	GA	924	1979	46	2038

Source: Rystad, NRC, HSBC
Note: Southern Company's Georgia Power subsidiary owns the Hatch-1 and -2 reactors, which could be candidates for power uprates with funding from the US DOE's Office of Energy Dominance Financing

Expiration schedule for U.S. commercial nuclear reactors (94 licenses)



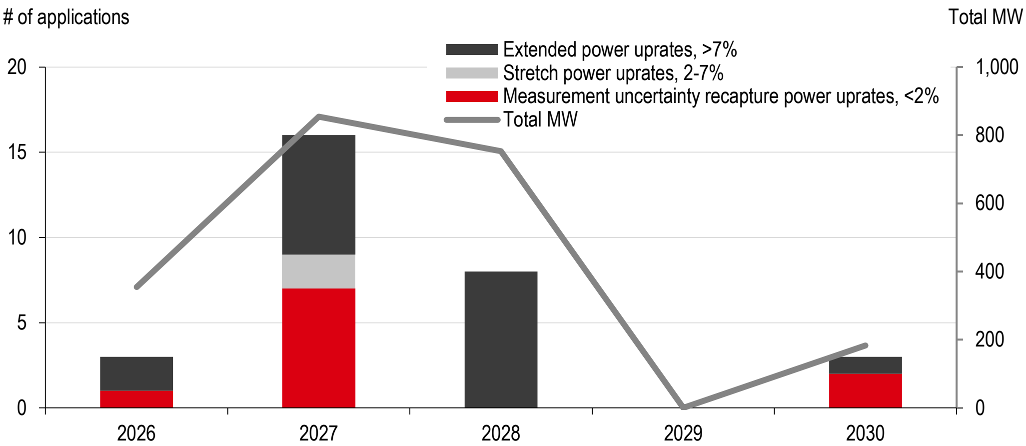
Source: US NRC, HSBC

The NRC has been working to update its Power Uprate Review Readiness since May 2024 to "reflect the best use of resources, commensurate with the safety and risk significance." The NRC approved 72 power uprate applications from 1977-21, with the number of hours needed to approve uprate license amendments increasing from c5,000 hours to c8,000 hours in recent years. A new graded approach was developed to limit power uprate license amendment requests to within 12 months for an extended power uprate, nine months for a stretch power uprate, and six months for a measure uncertainty recapture power uprate.

- **Extended power uprates** are for more than 7% over the original license power level (i.e. capacity) and typically requires significant modifications to the balance-of-plant components, such as high-pressure turbines, condensate pumps and motors, main generators, and transformers.
- **Stretch power uprates** adds between 2% and 7% of the plant's license and usually require changes to instrument setpoints but generally do not involve modifications beyond the high-pressure turbine and possibly the main generator.
- **Measurement uncertainty recapture power uprates** increase the licensed power level by up to 2% and typically do not require significant component upgrades other than new feedwater flow measurement devices and potential modifications to the high-pressure turbine.

In February 2025, the NRC issued a regulatory issue summary (RIS) to all power reactor licensees, requesting information on power uprate-related licensing plans. Responses were voluntary, with the information to assist the NRC in budgeting and allocation of resources based on future power uprating demand. **More than 70% of current reactor licensees plan to request power uprates in the coming years**, according to Michele Sampson, director of the Division of Renewed Licenses in the NRC's Office of Nuclear Regulatory Research. Based on the NRC's web site, 2.1 GW of power uprating is expected from 30 applications through 2030.

Expected applications for power uprates



Source: US NRC, HSBC

The DOE estimates there could be opportunity for 60-95 GW of new nuclear added at existing sites nationwide, per the Advanced Nuclear Commercial Liftoff report. Generation costs at multi-unit nuclear plants are 30% cheaper per MWh than single unit plants.

3. Reactivate decommissioned reactors and/or sites

Shifting energy markets and other economic factors resulted in 13 US commercial reactors closing early in the decade from 2013-22. The Nuclear Energy Institute estimates it costs USD500m-1bn to decommission a nuclear reactor vs USD1.5-3bn to restart a decommissioned reactor, which implies an equivalent power cost of USD70/MWh. Factors driving costs and the decision to reactivate a decommissioned commercial reactor depends on many factors, including how far along the plant is in removing and safely storing spent nuclear fuel. Reactors that have been decommissioned longer face greater economic hurdles for reactivation, with equipment likely needing to be refurbished.

The NRC grants 60-year licensees to fully decommission a nuclear reactor, as the labor-intensive process includes decontaminating radioactivity, dismantling structures, transferring contaminated materials to disposal facilities, and releasing the property for other uses. Given the long time frame, the NRC classifies reactors going through decommissioning, with the majority in the **DECON** phase where the site is released from the NRC's regulatory control and dismantling or decontamination of the site for re-used is anticipated within a decade. In contrast, **SAFSTOR** or safe enclosure refers to a site that has been configured for the radioactive material to be removed over a longer period of 40-60 years. Very few sites have completed the decommissioning process, with only the onsite used fuel storage in an ISFSI (independent spent fuel storage installation) waiting for the DOE (for storage in a national repository) or where the operating licence has been terminated.

All three reactors being reactivated were in SAFSTOR mode.

Decommissioned US commercial nuclear reactors

Project name	State	Capacity (MW)	Year Startup	Year Decommission	Op Age # of yrs	Status
Kewaunee	WI	560	1974	2022	48	DECON
Palisades	**MI**	**812**	**1972**	**2022**	**50**	**SAFSTOR**
Indian Point-3	NY	1,012	1976	2021	45	DECON
Duane Arnold-1	**IA**	**680**	**1975**	**2020**	**45**	**SAFSTOR**
Indian Point-2	NY	1,299	1973	2020	47	DECON
Pilgrim-1	MA	670	1972	2019	47	DECON
Three Mile Island-1	**PA**	**981**	**1974**	**2019**	**45**	**SAFSTOR**
Oyster Creek	NJ	550	1969	2018	49	DECON
Fort Calhoun-1	NE	502	1973	2016	43	DECON
Vermont Yankee	VT	563	1972	2014	42	DECON
San Onofre-1	CA	456	1967	2013	46	DECON
San Onofre-2	CA	1,127	1983	2013	30	DECON
San Onofre-3	CA	1,127	1984	2013	29	DECON
Crystal River-3	FL	890	1977	2010	33	DECON
Maine Yankee	ME	900	1972	2005	33	
Haddam Neck	CT	603	1967	2004	37	
Millstone-1	CT	684	1970	1998	28	SAFSTOR
Zion-1	IL	1,085	1973	1998	25	
Zion-2	IL	1,085	1973	1998	25	
Big Rock Point	MI	71	1962	1997	35	
Trojan	OR	1,155	1975	1993	18	
Yankee Nps	VT	180	1960	1993	33	

Source: Rystad, NRC, HSBC

Three reactors have commenced reactivation, with Palisades on track to be the first restart later this year. Reactivating a decommissioned reactor or site requires coordination with the NRC, with the operator to 1) gain NRC approval to restore the license of the plant to an operational status, 2) return plant components to supports safe operation; and 3) make any upgrades necessary as required by the operational license. NRC staff reviews documentations, inspect new and restored components, and provides ongoing oversight of the facility, with a dedicated project Restart Panel coordinating all activities across the agency to ensure the site meets the NRC's safety, security, and environmental standards. The process includes many hurdles and milestones, including public meetings and comment periods, and a NEPA (National Environmental Policy Act) review.

4. Deploy new advanced reactors

Between 2007-09 (the start of what we dub **US Nuclear Renaissance 2.0, Take 1)**, the NRC received combined operating license (COL) applications for 28 advanced nuclear reactors. New nuclear technologies must be qualified by the NRC, which approves design certification applications for new reactors developed by the industry and the DOE, as well as issue construction permits and operating licenses for each new reactor. The NRC had approved a Generation III reactor design in 1997 (GE-Hitachi's Advanced Boiling Water Reactor or ABWR) and OEMs were advancing newer Generation III+ designs with additional safety features, fewer parts, and greater operating efficiency. The NRC concurrently reviewed new COL applications while qualifying new unlicensed Gen III+ reactor designs, of which the Westinghouse AP1000 and GE-Hitachi's ESBWR were approved in 2011 and 2014, respectively.

COL applications (28) between 2007-09 and status (issued and outstanding, terminated, suspended, or withdrawn)

			Key COL dates				
Project name (8)	**State**	**Operator**	**Submitted**	**Issued**	**Expires**	**Reactor type**	**Vendor**
*Vogtle-3 and -4	GA	Southern Nuclear	03/28/2008	02/10/2012	2062 and 2063	PWR (AP1000)	Westinghouse
Fermi-3	MI	DTE Energy	09/18/2008	05/01/2015	TBD	ESBWR	GE-Hitachi
William States Lee III-1 and -2	SC	Duke Energy	12/13/2007	12/19/2016	TBD	BWR (AP1000)	Westinghouse
*North Anna-3	VA	Virginia E&P	11/27/2007	06/02/2017	TBD	ABWR	GE-Hitachi
Turkey Point-6 and -7	FL	Florida Power	06/30/2009	04/12/2018	TBD	PWR (AP1000)	Westinghouse

Project name (6)	**State**	**Operator**	**Submitted**	**Issued**	**Terminated**	**Reactor type**	**Vendor**
Virgil C. Summer-2 and -3	SC	SC Electric	03/27/2008	03/30/2012	03/06/2019	PWR (AP1000)	Westinghouse
Levy-1 and -2	FL	Duke Energy	07/30/2008	10/26/2016	04/26/2018	PWR (AP1000)	Westinghouse
South Texas-3 and -4	TX	STPNOC	09/20/2007	02/09/2016	07/12/2018	ABWR	GE-Hitachi

Project name (4)	**State**	**Operator**	**Submitted**	**Suspended**		**Reactor type**	**Vendor**
Shearon Harris-2 and -3	SC	Duke Energy	02/18/2008	05/02/2013		PWR (AP1000)	Westinghouse
Comanche Peak-3 and -4	FL	Luminant Generation Co	09/19/2008	11/07/2013		US-APWR	Mitsubishi

Project name (10)	**State**	**Operator**	**Submitted**	**Withdrawn**		**Reactor type**	**Vendor**
*Victoria-1 and -2	TX	Exelon	09/03/2008	06/11/2010		ESBWR	GE-Hitachi
Nine Mile Point-3	NY	UniStar	09/30/2008	11/26/2013		US EPR	AREVA NP
*Grand Gulf-3	MS	Entergy	02/27/2008	02/09/2015		ESBWR	GE-Hitachi
Calvert Cliffs-3	MD	UniStar	07/13/2007	06/08/2015		US EPR	AREVA NP
Callaway-2	MO	Ameren	07/24/2008	08/12/2015		US EPR	AREVA NP
River Bend-3	LA	Entergy	09/25/2008	12/04/2015		ESBWR	GE-Hitachi
Bell Bend	PA	Talen	10/10/2008	08/30/2016		US EPR	AREVA NP
Bellefonte-3 and -4	AL	Tennessee Valley Authority	10/30/2007	03/28/2016		PWR (AP1000)	Westinghouse

Source: NRC, HSBC
* = received an early site permit; AREVA NP withdrew its application for a standard design certification of its 4500 MWt PWR on 02/25/2015.

From 28 applications for new advanced reactors, applications for 10 reactors were withdrawn between 2010-16 and for four reactors were suspended at the request of the operator.
The NRC issued 14 COLs between 2012-18, including a license for a third reactor at D's Santa Anna site. COLs applications were withdrawn or suspended along with new reactor designs, as the lengthy and costly process of qualifying new technology was mirrored in COL applications, accelerated by the 2011 Fukushima accident. The NRC took an average of 7.3 years to issue 14 COLs, with applicants terminating six reactors as gas prices fell from the emergence of cheap US shale supply and as coal-to-gas conversion soared through the 2010s.

Of the remaining eight COLs, only two new advanced nuclear reactors were constructed, Vogtle-3 and -4, of the AP1000 design. Revisions to the AP1000 design contributed to delays in issuing the COLs, driving construction delays and cost overruns at Vogtle and contributing to utilities shifting away from nuclear power. With significant state and federal support including USD12bn from the DOE's Loan Program Office, Vogtle-3 and -4 finally commenced operations in 2023/24 and is operating on their initial 40-year license through 2062/63.

Six COLs remain outstanding, suggesting four and two GE-Hitachi reactors could be relatively quick to develop. Recall in November 2023, Cameco quoted a Massachusetts Institute of Technology study that estimated the cost of a new AP1000 reactor at USD6-8bn. Considering annual inflation rates for US construction costs spiked by c10% in the 2021-22 time frame and has moderated at c5%, a new 1 GW power plant costs could cost USD8-10bn by 2030, implying an equivalent power cost approximate to about USD9,000/kW.

New business opportunities

New nuclear technologies are emerging beyond the existing fleet of utilities-scale light water reactors. While based on the same light water technology, SMRs and microreactors are smaller in size (≤300 MW vs 1 GW for a large reactor) and modular, with major components placed within a single pressure vessel (eliminating the need for a primary circuit pipeline) and assembled in a factory. SMRs are being advanced globally, with companies in a race to develop and deploy the technology. These reactors are transported for installation at the plant site, which reduces construction time and cost, requires a smaller footprint, and contains many passive safety features. The NRC has approved two SMR designs to date, NuScale Power's 50 MW and uprated 77 MW modules, which will be integrated in 12 and 6 module system to meet the power needs. Construction and operating licenses are still needed for new nuclear plants using these licensed technologies but given the government support for nuclear overall, we see approvals happening faster than before.

NRC's approved advanced reactor designs

Vendor	Design	Power (MWt)	Submitted	Certified	Note
General Electric	Advanced Boiling Water Reactor (ABWR)	3,926	03/31/1989	05/12/1997	Renewal application began on 12/7/2010
Westinghouse	Advanced Passive 1000 (AP1000)		03/28/2002	12/30/2011	c20 revisions delayed design certification, which has been extended 40 years to February 2046
GE-Hitachi	Economic Simplified Boiling-Water Reactor (ESBWR)	4,500	08/24/2005	10/15/2014	Include passive safety features and uses natural circulation for normal operations.
Mitsubishi Heavy Industries	US Advanced Pressurized-Water Reactor (US-APWR)	4,451	12/31/2007		Review is ongoing
Korea Electric Power Corporation (KEPCO) and Korea Hydro & Nuclear Power Co Ltd (KHNP)	Advanced Power Reactor 1400 (APR1400)	4,000	12/23/2014		Review is ongoing
NuScale Power	NuScale Small Modular Reactor (US600)	12 x 160 (50 MWe)	03/15/2017	09/11/2020	Integrated assembly of 12 modules for 600 MWe
NuScale Power	NuScale Small Modular Reactor (US460)	6 x 250 (77 MWe)	12/31/2022	05/29/2025	Integrated assembly of 6 modules for 460 MWe

Source: NRC, HSBC

While the US has built few reactors since the 1990s, several new reactor designs are in the pre-application stage with the NRC. Decades of research by the DOE on nuclear technology through the Office of Nuclear Energy (NE) and its network of national laboratories and universities has resulted in the development of new advanced **Generation IV** technologies utilizing non-water coolants (i.e. liquid metals, gases, or salts). Gen IV reactors generally incorporate a combination of new and existing technologies and materials, with the main objectives to drive down costs, use less fuel, and improve safety features vs earlier designs. Several companies and universities have notified the NRC of pending applications for new reactor designs, which can be categorized by their main coolant technology:

- **Sodium cooled fast reactors (SFR)**: Fast neutron reactors cooled by liquid sodium (between 98ºC and 785ºC), with the wide temperature range permit the coolant to operate at higher temperatures and lower pressures than light water reactors.
- **Molten salt reactors (MSR)**: Reactors that are cooled by molten fluoride salt or chloride salts flowing over solid fuel result in using less fuel and producing shorter-lived radioactive waste than other reactor types.
- **Very high temperature reactors (VHTR)**: Very high temperature reactor (between 750ºC and 950ºC) cooled by flowing gas (helium), which makes it ideal for process heat applications.

NRC's pre-application activities for advanced reactors

	Gen III+	Gen IV			Other
Coolant	**Light water SMRs**	Gas	Liquid metal	Molten salt	
Examples	**- Pressurized water reactor - Boiling water reactor**	**- Very high-temperature gas reactor - Boiling water reactor**	**Sodium cooled fast reactors**	**- Fluoride high-temperature reactor - Molten chloride fast reactor**	
Typical fuel	LE, LEU+	HALEU	HALEU	HALEU	
Power output	c300°C	c750°C	c500°C	c750°C	
Outlet temperature	Small	Small, micro	Small, micro	Small	
Reactor designers	- Deep Fission - GE-Hitachi BWRX-300 - Hadron Energy - Last Energy - REPLOY Power - Rolls-Royce SMR - Holtec SMR-300 - Westinghouse AP300	- Energy Northwest - General Atomics - General Atomics Electromagnetic Systems - Radiant Industries (Kaleidos) - Terra Innovatum (SOLO) - University of Illinois at Urbana-Champaign – NANO Nuclear Energy - Westinghouse eVinci - X-Energy LLC (Xe-100) - X-Energy LLC (XENITH)	- Aalo Atomics - ARC Clean Technology (ARC-100, 510C) - Oklo Aurora powerhouse - Terra Power & GE-Hitachi Natrium	- Abilene Christian University - Kairos Power (FHR 650C) - Natura Resources - TerraPower (MCFR) - Terrestrial Energy USA (IMSR 700C)	- Antares Nuclear - Appalachian Power Company - Blue Energy - Deployable Energy - Duke Energy – Belews Creek, NC - Japan Atomic Energy Agency - Shepherd Power LLC - Texas A&M University – REELIS Campus

Source: NRC, HSBC

Progress on proposed projects

Interest in nuclear energy has grown with the increased availability of federal funding, which accelerated with the Bipartisan Infrastructure Law (BIL, November 2021) and the Inflation Reduction Act (IRA, August 2022). Billions have been appropriated to support the existing nuclear fleet and to advance new reactor deployment, with the DOE playing a leading role in validating new technologies. Below we highlight select projects within our framework for reviving the US nuclear sector.

1. Extend the operating life of the existing fleet

Nearly all active reactors will need to have their operating license extended before 2050, with the oldest reactors needing a third renewal license to operate for 81-100 years.

Congress appropriated USD6bn to the **Civil Nuclear Credit Program** (CNCP) in the BIL, which was created to support the continued operations of nuclear energy facilities at risk of being shut down. On 17 March 2024, the DOE's Grid Deployment Office awarded the Diablo Canyon power plant USD1.1bn in NRC credits to offset license renewal application and amendment costs. Reactors -1 and -2 were scheduled to cease operation when their original licenses expired in 2024 and 2025, respectively, but California lawmakers opted to extend the state's lone nuclear reactors for a cost of USD9-12bn to ensure grid reliability. The two reactors supply c9% of California's annual electricity and c17% of the state's low-carbon generation. The DOE failed to provide additional CNCP funding to the reactor fleet as energy markets shifted. Further, under the Trump administration, unobligated CNCP balance has been repurposed for small modular reactors and a uranium strategy per the Nuclear Fuel Security Act of 2023.

To achieve the administration's 400 GW target for 2050, all 94 reactors need to continue operating for a combined c102 GW. A total of 75 reactors for 82 GW need to be extended to 2050 (vs 19 reactors for 19.7 GW currently licensed for 2050-84), with 3 reactors (Diablo Canyon, Watts Bar) needing renewal licenses for years 41-60 and 56 reactors needing subsequent license renewals (SLRs) for years 61-80. The oldest reactors will need a third renewal license for years 81-100 as we approach 2050.

- **License renewals:** The NRC is currently reviewing two renewal license applications for the Diablo Canyon plants in California (detailed below) and expects to receive a renewal license application for Watts Bar later this year. Diablo Canyon will also need subsequent license renewals to operate beyond 2050.
- **Subsequent license renewals:** The NRC is reviewing five subsequent license renewals for years 61-80 and anticipates receiving SLR applications for 22 reactors over the next five years (2026-30). Twenty reactors have already received their SLRs, with the NRC recently approving the SLRs for five reactors at Browns Ferry and Dresden in December 2025. Including Diablo Canyon, a total of 58 reactors will need to be granted SLR to operate beyond 2050.
- **Third license renewal:** The oldest reactor will be 80 years old in 2049 and will need to be issued a third license renewal to continue operations in 2050. Another 27 (of 94) reactors have licenses expiring in 2050-54, of which all but four reactors will require licenses for operations for years 81-100. The NRC will need to provide guidelines to operate nuclear plants safely beyond 80 years.

2. Uprate and deploy new reactors at existing sites

The NRC expects to receive 30 applications for 2.1 GW of power uprating from 2026-30.

The Trump administration instructed the DOE to assist in the construction of 10 new large reactors and 5 GW of power uprating at existing reactors by 2030. In the One Big Beautiful Bill, Congress expanded the IRA's 45Y clean electricity production tax credit to provide 10% bonuses for new advanced nuclear facilities in nuclear energy communities. However, the 2034 construction start deadline could put the administration's 2030 target at risk. As shown on page 11, the NRC expects to receive 30 applications for 2.1 GW of power uprating from 2026-30 (see *Status of Power Uprate Applications*). More applications are likely forthcoming, as recent headlines suggest operators are reviewing opportunities for large reactors of more than 1 GW capacity.

- Constellation Energy accounts for 14 of 30 applications anticipated by the NRC through 2030. Split equally with seven applications for extended power uprates for more than 7% capacity increase and seven applications for measurement uncertainty recapture of up to 2%, CEO Joseph Dominguez indicated the company has identified about 900 MW to 1 GW of power uprate opportunity across its nuclear fleet. Large projects include 190 MW at **Calvert Cliffs** while small projects include a 30 MW uprate of the **Clinton** plant in Illinois for a new 20-year PPA commitment from Meta Platforms. Constellation avoided premature closure of the 1.1 GW Clinton-1 reactor in 1917 thanks to the state's Zero Emission Credits program (set to expire in mid-2027 with the original license). A December 2025 request for proposal resulted in more than 50 submissions from qualified customers, with Meta agreeing to buy all power generated from the plant (through clean energy attributes to match 100% of its electricity use) over 20 years beginning in 2027. The NRC recently approved a 20-year license renewal of the Clinton-1 reactor, allowing it to operate through 2047. Constellation is investing more than USD370m to relicense the Clinton-1 and Dresden-1 and -2 reactors (also renewed to operate through 2049/51), which at Clinton includes new transformers and chillers. Constellation is also pursuing construction of new SMRs at existing sites to leverage operating and maintenance (O&M) costs.

- Following an 18-month analysis, the Bonneville Power Administration recently approved a USD700m extended uprate plan for the **Columbia** plant in Washington State. The six-year project will add 186 MW of capacity to the 1.2 GW plant by 2031, making it one of the largest nuclear reactors in the US. The uprate consist of c30 projects to upgrade and replace existing equipment for 162 MW of capacity, such as turbines, heat exchangers and the generator, as well as increasing the size of pumps and motors during the plant's biennial refueling outages in 2027, 2029, and 2031. Energy-efficiency upgrades during the fuel outages will add the remaining 24 MW of capacity. The plant operator plan to submit a license amendment request for the power uprate with the NRC in 2028 and will likely apply for a subsequent license renewal to operate beyond 60 years before its renewed license expires in 2043.
- DTE Energy may uprate the **Fermi-2** reactor by 150 MW, with the seven-to-eight year project targeting a 2032 completion date at the earliest. The large 1.2 MW reactor is operating under its original license but has already been approved to operate for an extra 20 years. In 2015, the Michigan site was approved for a combined operating license to build a second large reactor (**Fermi-3**, as Fermi-1 was a decommissioned 150MW demonstration reactor) but construction did not begin due to insufficient state and federal funding. DTE must complete its next integrated resource plan (IRP, a long-term plan required by state regulators) by the end of 2026.

3. Reactivate decommissioned reactor and/or site

Two of three nuclear reactors being reactivated in the US have secured low interest loans from the Department of Energy.

Three decommissioned reactors are being reactivated, with two (of three) projects to receive loan guarantees from the DOE's Loan Programs Office (renamed the Office of Energy Dominance Financing). Holtec's Palisades is on track to be the first-of-a-kind to resume operations imminently, followed by the formerly named Three Mile Island-1 in 2027 and Duane Arnold-1 in 2029. All three reactors were in SAFSTOR (safe enclosure) decommissioning status and remained under NRC regulatory control, allowing the NRC to established restart panel for each reactor to coordinate licensing, inspection, and oversight activities. Subsequent license renewals are anticipated for all three reactors. The remaining decommission fleet is in DECON mode and may be more difficult for reactivation, as the site has been released from the NRC's regulatory control and dismantling or decontamination for re-use is anticipated within a decade.

- **Palisades Nuclear Plant:** Entergy Corp announced plans to close the Palisades Nuclear Plant in 2016 as part of its strategy to exit the nuclear merchant power business. The 800 MW pressurized water reactor (PWR) began operations in 1991 and permanently ceased operations in May 2020, with Entergy selling the plant to Holtec International to fully decommission the site by 2041. With state and federal support, privately held Holtec expressed interest in returning the plant to operating status in early 2023, ushering a first-of-a-kind (FOAK) effort to restart a shuttered plant. Numerous NRC meetings, inspections and oversight activities occurred to assess Holtec's readiness to restart the Palisades plant, with the NRC officially transitioning the license from decommissioning status to operating on 28 July 2025. ***Holtec is now authorized to receive and load new fuel, with further inspections, testing, and maintenance as the final steps before a return to operation.***

  The plant is expected to provide commercial power to two rural electric cooperatives in 2026 (see *US Clean Tech: USDA selected 16 recipients for new IRA loan program*, 9 September 2024). The project received a USD1.5bn loan guarantee from the DOE, which also awarded Holtec USD400m for developing small modular reactors or SMRs at the Palisades site. Holtec and Hyundai has plans to build and deploy two 300 MW SMRs at Palisades by 2030, and 10 GW of SMR across the US longer term.

- **Three Mile Island-1:** The Three Mile Island site in Pennsylvania hosts two PWRs, with a major accident at reactor 2 causing damages that shut operations in 1979 while reactor 1 was shuttered in 2019 despite being issued a license renewal in 2009 for operations to 2034. In October 2024, Constellation Energy notified the NRC of its intention to pursue a subsequent license renewal for reactor 1, making it the second decommissioned reactor to be reactivated. The company is investing USD1.6bn to reactivate the 837 MW reactor, backed by a 20-year PPA with Microsoft. A NRC's restart panel is working to revise the operating license, with Constellation formally changing the site's name to the **Christoper M. Crane Clean Energy Center** in January 2025. Pending final approval, the reactor could restart commercial operations as early as 2027, a year ahead of schedule following approval of an early interconnection request by the grid operator and significant progress made on hiring and training reactor operators and major equipment purchases, per Constellation. Meanwhile reactor 2 remains non-operating with a DECON decommissioning status.

  In November, the DOE announced the renamed Office of Energy Dominance Financing had closed a USD1bn loan to Constellation for restarting the Crane Clean Energy Center. The NRC expects a subsequent license renewal to be submitted for Crane in 1Q 2029.

- **Duane Arnold Energy Center:** The 680 MW boiling water reactor (BWR) at the Duane Arnold Energy Center in Iowa began operations in 1974 and permanently ceased operations in August 2020 after 45 years. NextEra Energy elected to close the plant after a storm sustained damages to the cooling tower. Fuel had been transferred on an on-site dry storage facility when NextEra began the long process of reactivating the reactor in early 2025, noting the NRC of its plan to file a license change request. NextEra had signed a 25-year power agreement with Google and the Central Iowa Power Cooperative, and will upgraded the plant with a new generator, cooling towers, and transformers, as well as a new administrative building. NextEra will need to file a subsequent license renewal to operate Duane Arnold for years 60-81, with the company anticipating commercial operations to resume in 1Q 2029.

  NextEra also signed an agreement to explore the development of new nuclear generation nationwide with Google and is evaluating the capabilities of various SMR OEMs. CEO John Ketchum estimates the company has 6 GW of SMR co-location opportunities at existing nuclear sites. The company is offering 1.7 GW of capacity from its Point Beach and Seabrook station plants in Wisconsin and New Hampshire, respectively, and believe there could be opportunities to develop new greenfield sites as well.

4. Deploy new advanced reactors

The DOE is tasked to assist with the construction of 10 new large reactors by 2030.

President Trump issued an executive order on 23 May 2025, calling for the DOE to assist in the construction of 10 new large reactors by 2030, with funding to be provided by recent trade deals with Japan and Korea. Constructing new reactors required NRC approval and candidates include potential new projects such as Fermi America's plan to build four Westinghouse's AP1000, as well as outstanding COLs issued by the NRC between 2012-18. Recall the NRC issued six COLs with up to 60 years for construction to be completed, as well as six COLs that were terminated by the operator in 2018-19 as construction costs spiralled. Operators would need NRC approval to reinstate the terminated COLs, with Santee Cooper finalizing plans to sell two abandoned reactors to Brookfield Asset Management (via its funds and affiliates) to complete construction at V.C. Summer. More recent applications include Oklo's Aurora Powerhouse at the Idaho National Laboratory, which was denied a COL "without prejudice" in early 2022 due to "insufficient information" provided during the pandemic, and Fermi America's Project Matador in Texas. Fermi is expected to complete the final submission for four reactors by year end, kicking off an 18-month timeline for the NRC to complete its review.

COLs for new reactors

			Key COL dates					
Project name (5)	**State**	**Operator**	**Submitted**			**Capacity (MW)**	**Reactor type**	**Vendor**
Aurora-INL	ID	Oklo Power						
Matador-1, -2, -3, and -4	TX	Fermi America	06/17/2025			4,000	PWR (AP1000)	Westinghouse

Project name (6)	**State**	**Operator**	**Submitted**	**Issued**	**Expires**	**Capacity (MW)**	**Reactor type**	**Vendor**
Fermi-3	MI	DTE Energy	09/18/2008	05/01/2015			ESBWR	GE-Hitachi
William States Lee III-1 and -2	SC	Duke Energy	12/13/2007	12/19/2016			BWR (AP1000)	Westinghouse
*North Anna-3	VA	Virginia E&P	11/27/2007	06/02/2017			ABWR	GE-Hitachi
Turkey Point-6 and -7	FL	Florida Power	06/30/2009	04/12/2018		2,200	PWR (AP1000)	Westinghouse

Project name (6)	**State**	**Operator**	**Submitted**	**Issued**	**Terminated**	**Capacity (MW)**	**Reactor type**	**Vendor**
Virgil C. Summer-2 and -3	SC	SC Electric	03/27/2008	03/30/2012	03/06/2019	2,300	PWR (AP1000)	Westinghouse
Levy-1 and -2	FL	Duke Energy	07/30/2008	10/26/2016	04/26/2018		PWR (AP1000)	Westinghouse
South Texas-3 and -4	TX	STPNOC	09/20/2007	02/09/2016	07/12/2018		ABWR	GE-Hitachi

Source: NRC, HSBC
Note: 1) * = received an early site permit; 2) AREVA NP withdrew its application for a standard design certification of its 4500 MWt PWR on 02/25/2015.

- Fermi America plans to deploy its first of 4 Westinghouse AP1000 in 2032, followed by one each annually from 2034-36, at the Donald J. Trump Generating Plant (also known as Project Matador) in Texas. The 10.7 GW behind-the-meter “Hypergrid” project expects to produce 1 GW of non-nuclear power by the end of 2026 and has partnered with Doosan Enerbility for heavy nuclear components and 2 GW from small modular reactors, Hyundai E&C for nuclear energy components, and Siemens Energy for nuclear turbine generator packages. Overall, the data center dedicated compound is designed to host 6 GW of nuclear capacity across two nuclear islands. Fermi has submitted Part 1 (general and financial information) of the Part 52, Subpart C COLA and Part 2 (non-site specific technical chapters of the Final Safety Analysis Report), with Part 3 (site-specific information) being the next steps in the regulatory process. The NRC schedule a 28 February deadline for an environmental impact statement and 31 December deadline for the final submission, with Fermi determined to be the first new nuclear reactor to be built in the US.
- South Carolina’s state-owned utility Santee Cooper is working with Westinghouse to complete construction of 2 AP1000s at the V.C. Summer site. The project was less than 50% complete in 2017 when it was abandoned due to spiralling costs (estimates soared to USD20bn) and as Westinghouse filed for bankruptcy. With more than USD9bn spent, a strategic decision was made to maintain the equipment and Santee launched a competitive bidding process in early 2025 for a sale of the assets or completion of the reactors. More than 70 potential bidders expressed interest and 15 formal proposals were received, including a proposal from Brookfield Asset Management (via its funds and affiliates) to complete construction of the reactors with private money. A feasibility study has commenced, with Santee Cooper to receive USD2.7bn cash and a targeted 25% stake of the facility and capacity should both parties reach a Final Investment Decision (FID by 2H 2027) to resume construction.
- Duke Energy recently updated its long-range resource plans to include a potential 2037 start for new nuclear capacity. The company had plans to build six advanced reactors but suspended or terminated COL applications for four reactors after it determined the estimated 10-13 year construction timeline would fall outside of the company’s 15-year planning window. In the 10 years it took the NRC to review COL for two reactors at the William States Lee (WSL) Station in South Carolina, Duke converted the old coal-fired power plant to natural gas-fired. In addition to evaluating potential new large light water reactors at WSL and the Shearon Harris site in South Carolina, Duke recently submitted an early site permit (ESP) application with the NRC for potential new SMRs and Gen IV reactors at its Belews Creek Station in North Carolina. A technology neutral ESP is good for 10-20 years and can

be renewed for an additional 10-20 years but still requires a construction permit or combined construction and operation license (COL) for each new reactor. Duke targets adding 600 MW of new advanced nuclear systems by 2037 and also has plans to add 245 MW of new nuclear capacity through power uprate projects at three sites.

5. New business opportunities in SMRs and microreactors

The ADVANCE Act and DOE's Reactor Pilot Program aims to accelerate SMR deployment.

The NRC has yet to receive a COL application for its two approved SMRs designs (NuScale Power's US600 and US460) but recently approved a construction permit for TerraPower's 345 MW Natrium design. Part of the DOE's Advanced Reactor Demonstration Program (ARDP), the technical review of the Kemmerer-1 power station in Wyoming took less than 18 months to complete (from the May 2024 acceptance date), making it the first reactor to be approved by the NRC in more than 10 years. Two other distinct new Gen IV reactor designs are under review, with the X-Energy project also part of the DOE's ARDP to build two advanced nuclear reactors within seven years. The NRC expects to complete all safety and environmental review of X-Energy's Long-Mott demonstration reactor by November 2026 (implies c18 months from June 2025 acceptance date). The Tennessee Valley Authority's Clinch River project has plans to use GE-Hitachi's BWRX-300, which has been issued a construction license by the Canadian Nuclear Safety Commission (CNSC) and is covered by an agreement between the NRC and CNSC to cooperate in reviewing advanced reactor and SMR technologies. More recently the NRC received applications for an early site permit from Duke Energy for Belews Creek and a limited work authorization from Holtec for Palisades.

Current COL applications

				NCR's COL review process			
Project name	**State**	**Operator**	**Submitted**	**Safety**	**Environment**	**Reactor type**	**Vendor**
Kemmerer Power Station, DOE sponsored demonstration of TerraPower and GE-Hitachi Natrium (345 MW)	WY	TerraPower	03/28/2024	Completed in December 2025,	Completed in October 2025	Pool-type sodium fast reactor (Natrium)	GE-Hitachi
Long Mott Generating Station, DOE sponsored demonstration of X-Energy Xe-100 power reactor (4 module plant for 320 MW)	TX	Long Mott Energy	03/31/2025	Target November 2026 completion	Target June 2026 completion	high-temp gas-cooled (Xe-100)	X-Energy
*Clinch River Nuclear Site	TN	Tennessee Valley Authority	04/28/2025	Target October 2026 completion	Target April 2026 completion	SMR (BWRX-300)	GE-Hitachi
Belews Creek	NC	Duke Energy	12/30/2025				TBC
Palisades SMR-300, Pioneer Units 1 and 2	MI	Holtec International	12/31/2025				Holtec

Source: NRC, HSBC
Note: * = received an early site permit

- Tennessee Valley Authority (TVA), a federally owned electric utility, has plans to build its first light water small modular reactor (SMRs) at the Clinch River Nuclear Site. TVA began exploring SMR technology in 2010 and submitted an application for an early site permit (ESP) in May 2016 to build a plant with two or more SMRs totalling up to 800 MW. The ESP application provided the NRC with parameters for a future commercial power plant but does not identify a specific reactor design, giving TVA more time to finalize its development plans while the NRC proceeds with safety and environmental reviews. NRC issued Clinch River the ESP in December 2019 (after 3.6 years), which is about the same time GE-Hitachi began pre-application activities for its new light water SMR (BWRX-300). The Canadian Nuclear Safety Commission (CNSC) completed the vendor design review of the BWRX-300 in March 2023, coinciding with a joint announcement from GE-Hitachi, TVA, Ontario Power, and Synthos Green Energy to advance global deployment of the BWRX-300. The CNSC authorized Ontario Power to construct the first BWRX-300 reactor in Canada in 2025, with TVA submitting an application to build at least one reactor in Tennessee shortly after.

The NRC and the CNSC has a Memorandum of Cooperation (MOC) on advanced reactors and SMRs, and in 2022 agreed to collaborate on regulatory and safety issues in the licensing of the BWRX-300 to reduce duplication of efforts.

Map does not include Project Matador in Texas.

Map of active U.S. commercial nuclear reactors applications

Source: US NRC, HSBC
* reviews suspended for proposed new reactors

New reactor economics

Many factors drive the decision to construct a new nuclear reactor, the most important of which are cost and time-to-power. Costs can be broken down between upfront capital (capex) costs and operating & maintenance (O&M) costs, which assume 60 year lives for new reactors. Costs should decline over time but are heavily impacted by construction timelines and the pace of new technology deployment. Narrowing the construction timeline from a first-of-a-kind (FOAK) to a commercial Nth-of-a-kind (NOAK) deployment drives the learning rate (LR), with costs falling overall from operational and design improvements, as well as establishment of supply chain and trained labor force. The Idaho National Laboratory (INL) estimates the LR for between-of-a-kind (BOAK) reactors to be 8% for large reactors, 9.5% for SMRs and 12.6% for microreactors in an Advanced pace of construction.

The Advanced scenario was the basis of the Biden administration's DOE Liftoff report, which determined 200 GW of nuclear could be feasible deployed by 2050.

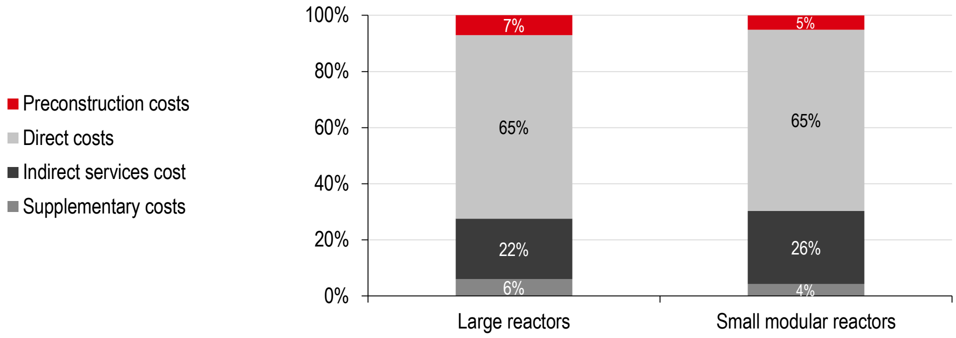
Summary of economic parameters for large, SMRs and microreactors in three scenarios

Reactor size	Parameters	Advanced	Moderate	Conservative
Large reactors	BOAK[1] OCC[2] (USD/kWe)	5,250	5,750	7,750
	Fixed O&M[3] (USD/kW-yr)	126	175	204
	Fuel Costs (USD/MWh)	9.1	10.3	11.3
	Variable O&M[3] (USD/MWh)	1.9	2.8	3.4
	Total O&M[3] (USD/MWh)	40	35	26
	Learning Rate (LR)	8%		
SMRs	BOAK[1] OCC[2] (USD/kWe)	5,500	8,000	10,000
	Fixed O&M[3] (USD/kW-yr)	118	136	216
	Fuel Costs (USD/MWh)	10	11	12.1
	Variable O&M[3] (USD/MWh)	2.2	2.6	2.8
	Total O&M[3] (USD/MWh)	41	30	27
	LR	9.5%		
Microreactors	BOAK[1] OCC[2] (USD/kWe)	9,074	14,745	19,282
	Total O&M[3] (USD/MWh)	79	113	153
	LR	12.6%		

Source: INL, HSBC
1. BOAK – Between-of-a kind, 2. OCC – Overnight construction cost, and 3. O&M – operation & maintenance

- **Capital costs:** Capex costs are grouped into pre-construction costs (land, permits), direct vs indirect service costs during construction, and supplementary costs such as taxes and insurance. Direct costs are the largest component of capex at 65% for both large reactors and SMRs, followed by indirect service costs of 22% and 26%, respectively.

Capex cost of a new reactor



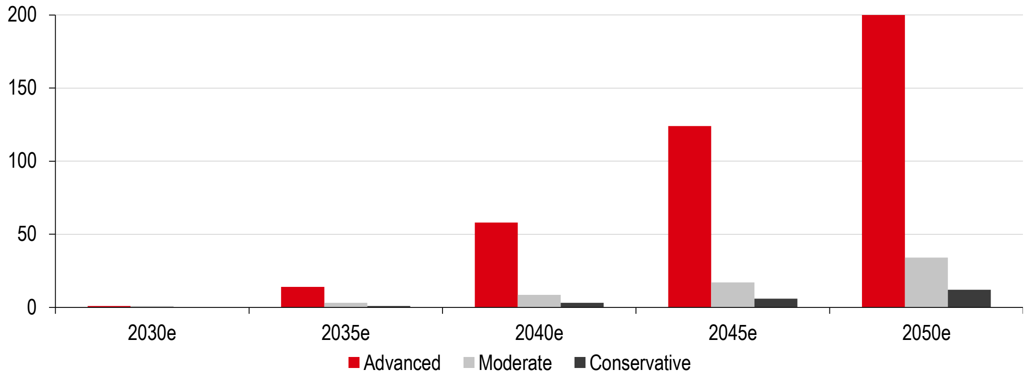
Source: NREL Annual Technology Baseline, HSBC

- **Operating & maintenance costs:** O&M costs include variable non-fuel costs that are based on power-dependent consumables, fuel costs which are relatively fixed for baseload nuclear power, and fixed costs like staff, property taxes, and regulatory inspections and decommissioning payments (required to build a reserve over time). O&M costs exclude potential upgrades over the 60-year operating life.

The Advanced scenario assumes construction timelines of 60 months (five years) for large reactors, 43 months (3.5 years) for SMRs, and 24 months (two years) for microreactors.

In the Advanced scenario, which assumes continued government support and incentives drive the private sector to achieve technology breakthroughs, large reactors achieve a 32% reduction in the overnight construction cost (OCC) and 44%/19%/44% reductions in the fixed, fuel, and variable costs, respectively, from a Conservative (FOAK) scenario. However, total O&M costs increase by 54% on a MWh basis to account for the shorter construction timeline and overall increase in deployment. The Advanced scenario assumes construction timelines of 60 months (five years) for large reactors, 43 months (3.5 years) for SMRs, and 24 months (two years) for microreactors, with continuous improvements driving market penetration to support the Bidden administration's DOE Liftoff report for 200 GW of new nuclear capacity to be deployed by 2050. This averages to 10 GW over 20 years (2030-50) and compares to average US deployment of 4.5 GW/year in the 1970s, with a peak of 11 GW deployed in 1974.

Deployment schedule in three scenarios (# of GW)

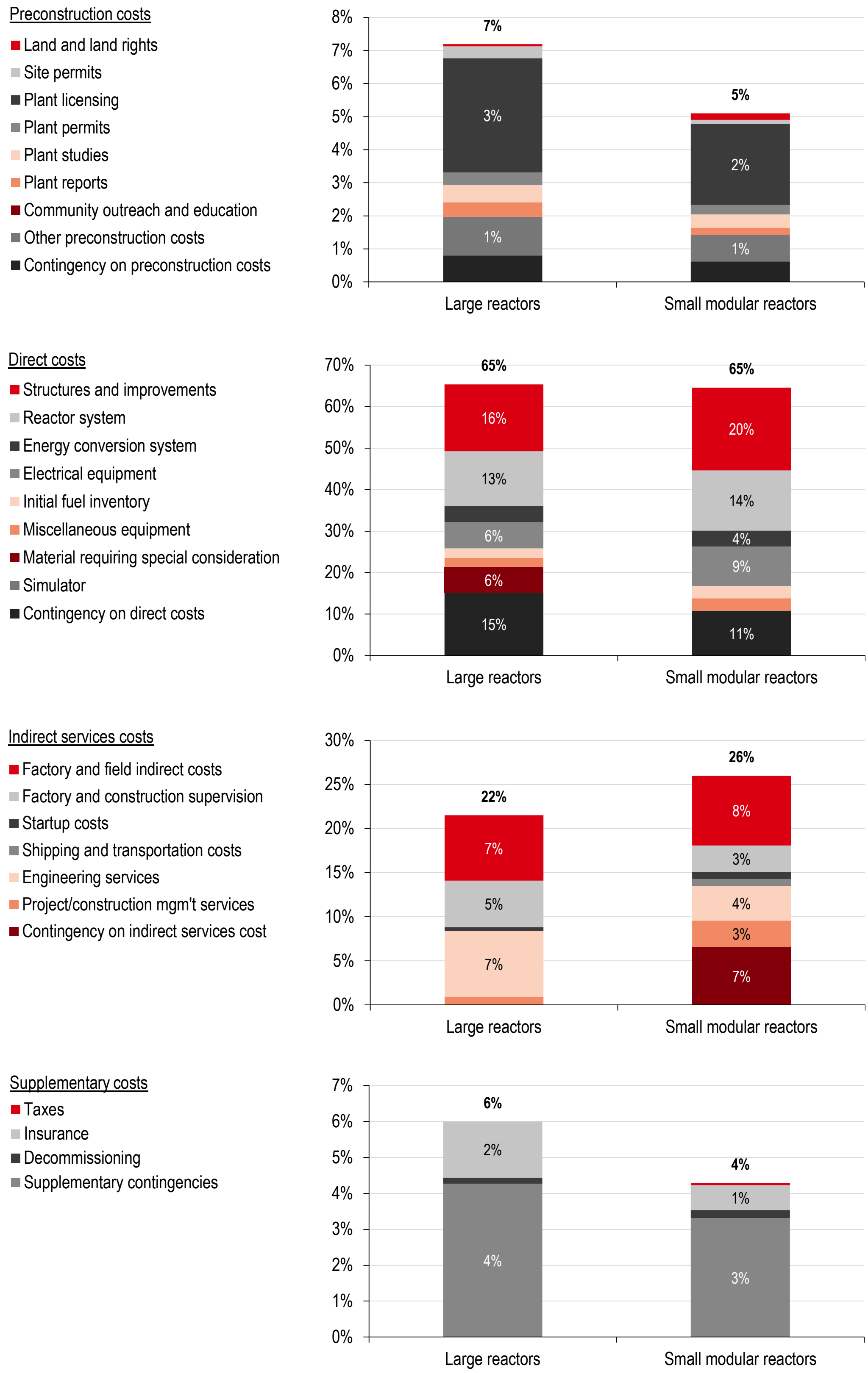


Source: NREL Annual Technology Baseline, HSBC

Moderate construction timelines of 82 months (6.8 years) for large reactors and 55 months (4.6 years) for SMRs would add 34 GW of new nuclear capacity while Conservative construction timelines of 125 months for a large reactor and 71 months for SMRs adds only 12 GW.

The physical structure of a new nuclear reactor is the single largest capex cost.

Detailed capex costs for …



Source: NREL Annual Technology Baseline, HSBC

US strategy of bipartisan support

Nuclear energy enjoys broad bipartisan support in the US. The Inflation Reduction Act of 2022 included several measures to support the existing fleet while the ADVANCE Act of 2024 aimed to catalyze growth of new technologies, with Congress passing the bill by a vote of 393-13 in the House and 88-2 in the Senate. The Big Beautiful Bill (BBB, H.R. 1) accelerated the end of several IRA tax programs but only modestly amended credits for nuclear to align US tax policies with the Trump administration's energy priorities, which views nuclear as key for national security, energy independence, and AI dominance.

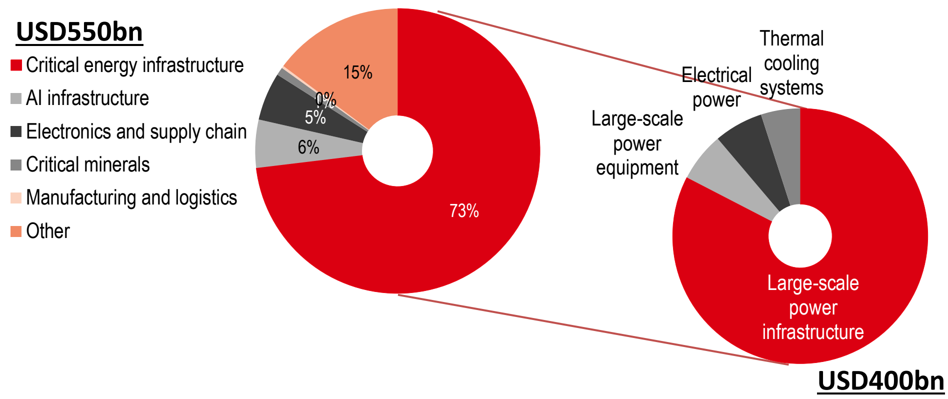
Trump orders a nuclear renaissance

President Trump signed four executive orders on 23 May 2025, calling for the DOE to lead a multi-agency effort to: 1) reinvigorate the nuclear industrial base, 2) reform nuclear reactor testing at the national labs, 3) reform the Nuclear Regulatory Commission, and 4) deploy advanced nuclear reactors for national security (see *US Clean Tech: Trump executive orders set ambitious nuclear targets*, 28 May 2025). The executive orders directed the DOE to utilize the Loan Program Office to facilitate the private sector in constructing 10 new large reactors and 5 GW of power uprating by 2030. The administration also established an ambitious goal for US nuclear energy to grow from c100 GW currently to 400 GW by 2050, up from the Biden administration's 300 GW target. While the executive orders duplicate many features of the ADVANCE Act and Inflation Reduction Act, the administration has since made a number of additional announcements in support of its nuclear policy:

At the 2 December cabinet meeting, the US Secretary of Commerce indicated nuclear power is a top priority for USD750bn in investments from Japan and Korea.

- On 13 November 2025, the US government finalized a trade deal with Korea that included a USD350bn commitment to rebuild and expand critical US industries. Korea pledged to invest USD150bn in the US maritime sector and USD200bn in other industries (semiconductors, nuclear energy, artificial intelligence, and quantum computing) in exchange for a 15% tariff rate on Korean goods. *South Korea's parliament met on 12 March to advance the trade agreement, creating a new state-run US investment corporation.*
- On 28 October 2025, the US government and Japan finalized a trade deal for Japan to invest up to USD550bn to revitalize the US industrial base in exchange for 15% tariffs. A majority of pledged commitment (c73%, USD400bn) targets energy infrastructure, with Japan to invest USD332bn in large-scale power including the construction of large nuclear reactors and SMRs. *Japan announced three projects worth USD36bn in round one including a gas power plant for data centers, while round two for USD73 include USD40bn for two GE Vernova-Hitachi SMR manufacturing plants.*

US and Japan commitment



Source: White House Briefing Room, HSBC

- Separately on 28 October, the US announced a partnership with Westinghouse Electric and its co-owners Brookfield Asset Management (via its funds and affiliates) and Cameco Corp., to deploy at least USD80bn of new large-scale nuclear reactors. The initiative is expected to accelerate the deployment of nuclear power for AI data centers, with the US government arranging financing and facilitate permitting and approvals for new reactors. *Brookfield CEO Bruce Flatt has indicated the US government will buy and own the nuclear power plants, with profit sharing to be split 50/50 until the principal is repaid. Westinghouse has affirmed a commitment to the White House to build 10 large nuclear reactors in the US by 2030. The company has partnered with Google Cloud to deploy a custom AI platform to optimize and accelerate construction, with its orderbook consisting of 4 reactors from Fermi Americas. Brookfield is also finalizing plans to acquire and finish the partially built VC Summer reactors (see page 19).*

DOE executes President Trump's executive order

The DOE launched two new programs to implement President Trump's executive orders, calling for it to: 1) accelerate permitting of new and existing reactors to within 18 months and one year, respectively, and 2) develop new programs for deploying advanced nuclear technologies at military bases and DOE facilities. The Reactor Pilot Program and Fuel Line Pilot Program provides "expedited pathways" for licensing new reactor designs and uranium enrichment, respectively, that the national labs and Defense Department have already tested and approved.

The DOE's new Reactor Pilot Program targets at least three reactor designs to be fast-tracked for "achieving criticality" by 4 July 2026.

- On 12 August 2025, the DOE announced the selection of 11 recipients of the new **Reactor Pilot Program (RPP)**. The program was initiated on 18 June in response to Executive Order 14301: "Reforming Nuclear Reactor Testing at the Department of Energy" and targeted the selection of at least three qualified test reactor designs to be fast-tracked for "achieving criticality" by 4 July 2026. Applicants are responsible for all costs associated with constructing and operating their test reactors, which are only for research, development and demonstration purposes and not to provide commercial power. The RPP allows recipients to opt out of the NRC's lengthy standard design certification process. *The DOE has since executed Other Transactional Agreement (OTA) with several selected recipients, enabling them to fast-track commercial licensing of their new reactor designs through the DOE-led licensing process per the RPP.*

Reactor Pilot Program

Selected companies	Project / reactor name	Type	Location
Aalo Atomics	Aalo-X	10 MWe sodium-cooled reactor	Idaho
Antares Nuclear	Mark-0	Advanced microreactor design	Idaho
Atomic Alchemy	Radioisotope pilot facility	Versatile isotope production reactor	Idaho
Deep Fission	Gravity nuclear reactor	15 MWe deep fission borehole reactor	Kansas
Last Energy	PWR-20	20 MWe pressurized water micro-reactor	Texas
Oklo	Oklo Aurora-INL	Sodium-cooled fast reactor	Idaho
	Oklo Pluto	Plutonium-fuelled fast-spectrum reactor	Nevada
Natura Resources	MSR-1	1 MW liquid-fuel molten-salt reactor	Texas
Radiant Industries	Kaleidos	1 MW helium-fuelled microreactor	Idaho
Terrestrial Energy	Project TETRA	390 MWe integral molten salt reactor	Texas
Valar Atomics Inc.	Ward250	High temperature reactor	Utah

Source: Company reports, US DOE, HSBC
Note: Oklo was selected for 2 projects

- On 30 September 2025, the DOE selected four companies for the new **Fuel Line Pilot Program (FLPP)**, adding to the selection of Standard Nuclear on 4 August. The program was also initiated on 18 June in response to President Trump's executive order (14299: "Deploying Advanced Nuclear Reactor Technologies for National Security") but focuses on developing a domestic supply chain for advanced nuclear fuel. Companies are "fast-tracked" for commercial licensing of their fuel fabrication facilities, with the DOE again providing an alternative licensing pathway to the NRC. Certain companies for the FLPP have also been selected to deploy test reactors through the RPP. Each company selected is responsible for all costs associated with the construction, operation, and decommissioning of their fuel fabrication facilities, and must also manage the sourcing of nuclear material feedstock. *Other Transactional Agreements (OTA) have also been executed with select FLPP recipients, with DOE-approved fuel line designs to be fast-tracked for future NRC licensing.*

Fuel Line Pilot Program

Selected companies	Description
Oklo	Build and operate three fuel fabrication facilities to support their Aurora and Pluto reactors, and possibly other fast reactors
Standard Nuclear	Build and operate TRISO fuel fabrication facilities
Terrestrial Energy	Develop the Terrestrial Energy Fuel Line Assembly to demonstrate a fuel salt fabrication process in a phased approach
TRISO-X	X-Energy's fuel fabrication segment will build and operate an additional fuel fabrication laboratory facility to enable pilot-scale integration, training, and system validation to support the TX-1 commercial TRISO fuel fabrication facility
Valar Atomics	Support TRISO fuel fabrication for the Ward250 reactor deployment and potentially other high-temperature gas reactors

Source: US DOE, HSBC

DOE aligns IRA and DOE funding programs with presidential priority

The DOE's Office of Energy Dominance Financing is "committed to financing American energy and manufacturing projects that meaningfully contribute to U.S. energy security, grid reliability, and lowering costs for all Americans."

With the exception of nuclear energy, the DOE under Secretary Chris Wright has largely terminated its support for clean energy. The DOE eliminated the Office of Clean Energy Demonstrations (OCED) and Office of Energy Efficiency and Renewable Energy (EERE), and cancelled over USD7.5bn in 321 financial awards for 223 wind, solar, EVs, and various decarbonization and energy efficiency projects that do not align with the Trump administration's energy policies. The Loan Program Office (LPO) was renamed the Office of Energy Dominance Financing (EDF), with the DOE restructuring, revising, or eliminating more than USD83bn in LPO loans and conditional commitments. With more than USD289bn in available loan authority, the EDF has restructured to prioritize nuclear along with fossil fuels (coal, oil, gas, and hydrocarbons), critical materials and minerals, geothermal, grid and transmission, and manufacturing and transportation. EDF recently finalized a USD26.5bn loan package for Southern Company to make various investments including 6 GW of nuclear power uprates and license renewals, as well as a USD1bn loan to Constellation for restarting the Crane reactor in Pennsylvania, and continued to make loan disbursements to Holtec for the restart of Palisades. The DOE has also continued to execute on a couple of nuclear programs funded by the Bipartisan Infrastructure Law and Inflation Reduction Act.

- On 3 December 2025, the DOE announced awards of USD400m each to the Tennessee Valley Authority (TVA) and Holtec to accelerate the deployment of SMRs. Funded by the Bipartisan Infrastructure Law, the DOE reissued solicitations for the USD900m **Generation III+ Small Modular Reactor (SMR) Program** on 24 March to exclude community benefit requirements. The 10-year milestone-based award provides 50% cost sharing to the first-mover teams of TVA, which has submitted a construction permit with the NRC to deploy GE-Hitachi's BWRX-300 at its Clinch River Site, and Holtec to deploy two of its own SMRs at Palisades in Michigan. The DOE has yet to award the remaining USD100m available in the program for fast follower deployment support, which is expected to address industry gaps in design, licensing, supplier development, and site preparation.
- On 5 January, the DOE announced awards of USD900m each (USD2.7bn total) to three companies to provide domestic enrichment services of low-enriched uranium (LEU) and high-assay low-enriched uranium (HALEU). Part of the **HALEU Availability Program** created in 2020 and funded by the Bipartisan Infrastructure Law (USD2.5bn) and Inflation Reduction Act (USD700m), the 10-year milestone-based award includes task orders designed to transition the existing US nuclear fleet away from foreign sources of uranium

(LEU), as well as develop a domestic HALEU supply chain for a new generation of advanced reactors. The three selected companies were narrowed from six contracted by the DOE in the year prior to bid on future work, as well as from four companies selected during the Biden administration to split the USD2.7bn award (UK-based Urenco fell off the October 2024 list of selected companies). *The DOE also recently awarded USD11m to five companies to develop HALEU transport capabilities and has selected a total of eight companies to receive HALEU through its HALEU Availability Program.*

LEU and HALEU enrichment services award

Selected companies	Fuel type	Details
American Centrifuge Operating	HALEU	Supports HALEU enrichment at its Ohio facility, with the company also expanding its Oak Ridge centrifuges manufacturing plant to support commercial LEU enrichment in the US
General Matter	HALEU	Signed lease with DOE to reuse federal land at former Paducah Gaseous Diffusion Plant in Kentucky for a new commercial uranium enrichment facility
Orano Federal Services	LEU	Project IKEK – new USD5bn enrichment facility in Oak Ridge, Tennessee, delivering production at start of 2030s

Source: US DOE, HSBC
Note: Unenriched uranium contains 0.7% of fissile uranium-235 (U-235), LEU contains 3.5-5% of U-235, LEU+ contains 5-10% of U-235, and HALEU contains 10-20% of U-235

BBB expanded IRA's nuclear funding

Although the Big Beautiful Bill of 2025 (BBB) repealed and rescinded financial support for many clean energy funding programs that Democrats passed in the Inflation Reduction Act (IRA) of 2022. The bill also preserved and expanded key programs for nuclear energy. Recall the IRA passed shortly after the Kewaunee reactor began major decommissioning and dismantlement activities, and as a result, the bill contained funding programs to support reactors at risk of being retired. Three years later, US nuclear reactors were no longer at risk of being retired and data centers were beginning to drive demand for incremental nuclear power capacity.

- **45U – Zero-Emission Nuclear Power Production Credit**: The IRA created the new 45U nuclear power production tax credit (PTC) to incentivize the continued operation of existing nuclear plants. Effective at the beginning of 2024, the PTC provides up to USD15.00 per MWh for electricity produced from existing reactors through 2032. The credit gradually decreases if the price of power rises above USD25.00 per MWh, but it does not phase out completely until energy prices reach around USD44.00 per MWh. *The BBB generally left the 45U tax credit unchanged but stipulated phase down by 20% increments from 2029 through 2032 while imposing new restrictions on the use of certain imported nuclear fuel from covered nations (i.e. foreign entity of concern or FEOC) after 2027.*

The IRA leveled the playing field for new nuclear development, providing 30-50% reduction in capital costs with phase out to begin in 2032.

- **45Y / 45E – Clean Electricity Production / Investment Credits**: The IRA expanded both the 45Y PTC and 45E ITC (investment tax credit) to be technology agnostic for the development of new sources of clean electricity generation. Applicable for new emissions-free electricity generation that goes on line after 2025, the 45Y PTC provides at least USD30.00 per MWh for the first 10 years of the plant's operating life while the 45E ITC provides developers with 30% tax credits for construction expense when the plant goes into service. Both tax credits begin to phase down when the US fossil-generation mix falls 75% below 2022 levels, with the 45Y PTC also phasing down for projects that begin construction in 2032. Both tax credits include 10% bonuses for power plants that are 1) built in legacy energy communities and 2) constructed with high domestic content. *The BBB terminated both credits for wind and solar but expanded the 45Y PTC to include bonuses for new advanced nuclear facilities in nuclear energy communities. Nuclear projects must begin construction by 2034 to claim either credit.*

We estimate the LPO was evaluating USD48bn of loan applications for advanced nuclear projects at the start of the second Trump administration.

- **Loan guarantees**: The IRA expanded the DOE's abilities to make loans to the private sector for energy investments, with Congress appropriating the DOE with USD5bn through 30 September 2026 to make up to USD250bn in loans. It created a new funding mechanism called the Energy Infrastructure Reinvestment (EIR) Program to provide loans covering up to 80% of eligible costs for projects that retool, repower, repurpose, or replace energy infrastructure that has ceased operations. For example, the LPO awarded Holtec a USD1.5bn loan in September 2024 to repower and upgrade the Palisades Nuclear Plant, with the first-of-a-kind loan funded by the EIR program. The EIR program was designed to fund projects that would repurpose shuttered fossil energy facilities and retool shuttered power plants for new clean energy uses, with the IRA providing an additional $40 billion in loan authority for entities that develop or use innovative technologies—including nuclear—aimed at avoiding the production of greenhouse gases. *The BBB rescinded uncommitted LPO funding and terminated the EIR program, replacing it with a new DOE loan authority with effectively the same objective to "fund enhancements at existing energy projects, repurpose decommissioned energy projects, and for other purposes." Projects must be certified in advanced by the President, with Energy Dominance Financing to "(1) retool, repower, repurpose, or replace energy infrastructure that has ceased operations; or (2) enable operating energy infrastructure." Congress appropriated USD660.5m to the DOE to implement the program through 30 September 2028. We estimate the LPO was evaluating USD48bn of loan applications for advanced nuclear projects at the start of the second Trump administration.*

Restructuring the NRC to implement the ADVANCE Act and executive orders
On 4 February, the NRC announced a reorganization of the 50+ year old commission to "streamline decision making, consolidate functions, and align with national goals for more efficient licensing and deployment of new nuclear technology." Established by Congress in 1974 to serve as an independent regulator of US commercial nuclear power plants and nuclear materials, the NRC required reform to enable it to regulate a new class of nuclear reactors. The agency is being reorganized around three core business lines of new reactors, operating reactors, and nuclear materials and waste, with licensing and inspection functions to be integrated within each business line. The NRC previously separated licensing, inspection and oversight activities into individual organization lines, making it cumbersome for companies to interact and navigate within the agency. Companies will instead have a single point of contact within the NRC, which is targeting completion of its reorganization by September.

With three of five commissioners nominated by President Trump, the NRC is executing on Executive Order 14300 ("Ordering Reform of the Nuclear Regulatory Commission") and the Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy Act or ADVANCE Act of 2024, which instructed the NRC to make various changes including update its mission statement and increase licensing efficiency. The NRC's mission statement was updated in early 2025 to emphasize *efficiency* in conducting its licensing and regulatory processes.

> **"The NRC protects public health and safety and advances the nation's common defense and security by enabling the safe and secure use and deployment of civilian nuclear energy technologies and radioactive materials through efficient and reliable licensing, oversight, and regulation for the benefit of society and the environment.**
>
> **NRC Mission, 24 January 2025**

The NRC has established new guidelines to complete certain activities, such as 5,500-hours for environmental reviews of operating reactor license renewals (a 30% reduction from previous estimates). The NRC is also assessing a streamlined, phased approach to licensing microreactors with potentially a generic environmental impact statement for each application and an "e-portal" to provide transparency and timely communication between all parties involved in the review process. Other guidelines that have been established include:

- **18 months** for 1) design certifications and standard design approvals for all reactors, 2) licenses for all reactors, uranium recovery, and fuel cycle facilities, 3) construction permits, early site permits, and limited work authorizations for all reactors, and 4) restart activities for all reactors.
- **12 months** for license amendments including power uprate and renewals for all reactors, uranium recovery and fuel cycle facilities.

The NRC also lowered its hourly service fee by c50% effective 1 October 2025, to USD148.00 per hour from USD318.00 per hour for preapplications, licensing, inspection, special projects, and other annual activities. Recall the NRC is self-funded by fees charged to applicants and license holders. The NRC proposes an annual budget to Congress that must be 90% recovered from the services it provides. For fiscal year 2026, the NRC proposed a 2.9% increase in its budget request to USD971m.

Broad state-level support

New York, Tennessee, and Texas are among US states providing financial incentives for nuclear development.

In addition to bipartisan federal support, the US nuclear industry is receiving broad state-level support and incentives. More than 60 bills were enacted from 350+ introduced in 45 states over the past year, with 11 state governors highlighting nuclear energy in their State of the State addresses. New York leads with a 20-year extension for four reactors estimated by opponents to cost USD33bn, as well as USD40m in workforce investments. A call for adding 1 GW of new nuclear capacity drew interest from 23 developers, leading to the governor to call for building four additional GW of new nuclear capacity. Notably, Tennessee is providing the Tennessee Valley Authority with USD50m to construct SMRs, adding to the USD400m grant from the DOE, while Texas has set aside USD350m for new nuclear projects. Recall state level support was essential in Holtec's decision to reactive Palisades in Michigan. Meanwhile, states like Connecticut and Rhode Island could soon join New Jersey, Illinois, Kentucky, Montana, West Virginia, and Wisconsin in repealing outdated moratoriums on the construction of new nuclear facilities.

Select state-level support for nuclear development

State	Incentives
Tennessee	Home of the Oak Ridge National Laboratory, there are plans for several fuel factories, at least 3 SMRs and potentially a fusion reactor, as well as a microreactor factory. The state authorized USD50m and USD10m to the Tennessee Valley Authority for SMR construction and workforce development, respectively.
Texas	A top destination for new AI data centers, the state authorized USD350m for nuclear projects, established the Texas Advanced Nuclear Energy Office to serve as a focal point for developers, and distributed USD2bn through the Texas Nuclear Energy Fund.
Virginia	2022 energy plan calls for SMR deployment within 10 years; state legislatures allocated USD122m in cost recovery for Appalachian Power to advance SMRs.
North Carolina	Expand Construction Work in Progress program to allow utilities to collect financing costs for a project before construction is complete.
Utah	Establish a nuclear energy consortium and join regional pacts with Idaho and Wyoming, with the goal to double the state's power production over the next 10 years.
Indiana	Create SMR partnership pilot program, cost recovery for pre-construction expense, 20% tax credit for SMR manufacturing.
New York	Extend the life of existing fleet by renewing the New York zero-emission credit program by 20 years, direct the New York Power Authority to build at least 1 GW of advanced nuclear capacity and 4 GW of new nuclear capacity per the New York Nuclear Plan and Nuclear Reliability Backbone initiative.
New Jersey	Introduced a bill to establish state-level incentives to develop 1.2 GW of new nuclear capacity.

Source: HSBC

Key risks to watch

Future government shutdowns may delay reform at the NRC and put project development at risk. The 2025 government shutdown ceased normal operations at the NRC, which is implementing numerous reforms while undergoing restructuring. NRC staff must complete various licensing activities within shorter 12 and 18 month caps and lower hourly fees, with the Office of Management and Budget also calling for the furlough of more than 1,800 employees at the NRC (c70% of total agency employees). Overall, a government shutdown risks further scaling back NRC resources while the Trump administration and Congress ask the agency to do more and faster.

Politicalization of the NRC may result in unintended consequences. The NRC is expected to operate as an independent body, consisting of five commissioners serving staggered five-year terms. President Trump fired Christopher Hanson in June 2025, whom he appointed in 2020 and former President Joe Biden reappointed and named as Chair in 2024. President Trump replaced him with David Wright as Chair in January 2025. Mr Wright's role on the commission was confirmed for a third term (lasting until 2030) beginning on 31 July, 2025, though there was a month's gap between his second term ending and his third term beginning. President Trump has since nominated Ho K. Nieh to the NRC and designated him as Chair in January 2026, but politicalization of the NRC resulted in it operating for much of 2025 with only three commissioners. Nuclear energy enjoys broad Congressional and public support, but politicalization of the NRC may drive inefficiencies and result in unintended consequences for US companies.

Safety risk could increase as NRC/DOE staffing and funding declines. The NRC is likely understaffed, shrinking by 23% in the six years leading up to 2022 while one-third of staff were eligible for retirement in 2024. The DOE also lost 20% of its staff in 2025 from early termination of probationary employees and employees taking deferred resignations. The NRC and DOE may be insufficiently staffed going forward, which could compromise safety; the Trump administration is proposing a FY2026 budget that would cut the DOE's Office of Nuclear Energy budget by 24% and the Advanced Reactors Demonstration Program by one-half.

Costs could jump sharply as activity increases. Rising demand for nuclear power could drive inflationary pressures, particularly as the US domestic supply chain (nuclear fuels, equipment and materials, workforce) remains underdeveloped. The nuclear fuel supply chain in particular needs to expand significantly to meet capacity growth ambitions. Meanwhile, the industry needs to drive down costs through standardization of reactor and plant design, with the key to increasing nuclear energy's competitiveness in minimizing time between projects and delivering projects on time and within budget.

Sourcing nuclear fuel may be increasingly difficult as the waiver deadline approaches. Waivers for importing Russian uranium are set to expire on 1 January 2028, forming a critical deadline for the US to establish a domestic nuclear fuel supply chain. Recall President Biden signed the Prohibiting Russian Uranium Imports Act on 13 May 2024, banning the import of Russian nuclear material and fuel from August 2024 through 2040. The law authorizes the DOE to provide waivers in cases where no alternative source of uranium is available to maintain the operating fleet or nuclear company, or where importing uranium is a national interest. However, the waiver system must end by 1 January 2028 and new Congressional legislation is needed to extend the waiver deadline. Failure to extend the deadline or to establish new supply chains could put growth of restarting the US nuclear industry at risk.

Companies mentioned in this report

Company	Market	Bloomberg ticker	Currency	Share price (local ccy)	Market cap (USDbn)	Rating
Alphabet	US	GOOGL US	USD	332.29	4,008.7	Buy
Amazon.com	US	AMZN US	USD	249.91	2,686.8	Buy
Baker Hughes Co	US	BKR US	USD	60.25	59.8	Buy
Brookfield Asset Mgmt Ltd	US	BAM US	USD	48.22	79.0	Buy
BWX Technologies	US	BWXT US	USD	216.66	19.8	Not rated
Cameco Corp	US & Canada	CCJ US	USD	116.61	50.8	Not rated
Centrus Energy	US	LEU US	USD	191.55	3.8	Not rated
Chart Industries Inc	US	GTLS US	USD	207.91	10.0	Hold
Constellation Energy	US	CEG US	USD	277.73	100.6	Not rated
Dominion	US	D US	USD	61.09	53.7	Not rated
Doosan Enerbility	Korea	034020 KP	KRW	115,700.00	50.1	Buy
DS Dansuk	Korea	017860 KS	KRW	20,200.00	0.2	Not rated
DTE Energy	US	DTE US	USD	143.47	29.8	Not rated
Duke Energy	US	DUK US	USD	125.67	97.8	Not rated
Emerson Electric	US	EMR US	USD	144.83	81.4	Buy
ENI	Italy	ENI IM	EUR	22.41	79.7	Hold
Fermi America	US	FRMI US	USD	5.06	3.2	Not rated
GE Vernova	US	GEV US	USD	991.30	266.5	Hold
General Electric	US	GE US	USD	286.73	299.2	Not rated
Hitachi, Ltd.	Japan	6501 JP	YEN	5,189.00	147.6	Not rated
Honeywell International	US	HON US	USD	222.22	140.8	Buy
Hyundai E&C	Korea	000720 KP	KRW	174,900.00	13.2	Buy
Meta Platforms	US	META US	USD	668.84	1,697.8	Buy
Microsoft	US	MSFT US	USD	424.16	3,149.7	Buy
Mitsubishi Heavy Industries	Japan	7011 JP	YEN	4,522.00	95.7	Not rated
NANO Nuclear Energy Inc	US	NNE US	USD	23.78	1.2	Not rated
NextEra Energy	US	NEE US	USD	90.60	188.9	Buy
NuScale Power	US	SMR US	USD	11.67	4.0	Hold
Oklo Inc	US	OKLO US	USD	62.61	10.9	Buy
Palantir Technologies	US	PLTR US	USD	145.97	349.1	Buy
Rolls-Royce	UK	RR/ LN	GBp	1,180.40	133.9	Not rated
Samsung C&T	Korea	028260 KP	KRW	304,000.00	33.3	Buy
Siemens Energy AG	Germany	ENR GR	EUR	165.26	167.1	Buy
Solstice Advanced Materials	US	SOLS US	USD	80.33	12.8	Not rated
Southern Company	US	SO US	USD	91.92	103.7	Not rated
Terra Innovatum (SOLO)	US	NKLR US	USD	6.33	0.4	Not rated
Terrestrial Energy USA	US	IMSR US	USD	7.09	0.8	Not rated

Source: Bloomberg, HSBC
Priced at close of 21 April 2026

Covered US companies

Oklo Inc

- US focused with data centers for c95% of 15 GW pipeline
- Accelerating regulatory timelines with US federal support
- Commercial power sales targeted for around 2030

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SMR focused play on US data center development

Oklo Inc. (OKLO US, Buy, TP USD96.00, CMP USD62.61) is a US nuclear technology company pursuing three integrated business units of power, fuels, and isotopes. The company is pioneering a "owner-operator" model for its next-generation of fast fission small modular reactors (SMRs), which it will develop, build, own, and operate while selling power-as-a-service to data centers through 20+ year power purchase agreements (PPAs). Oklo's reactor design is based on two DOE demonstrations of liquid sodium cooled fast reactor technology, which operate at high temperature without pressure and is compatible with commonly available alloys like stainless steel. This enables Oklo's reactors to be factory built with 70% non-nuclear and 30% conventional nuclear supply chains. The company has standardized its Aurora powerhouses into 50 and 75 MW designs, with Oklo also leveraging its expertise in ancillary businesses of nuclear fuel foundry and recycling and radioisotopes production.

Oklo is executing six construction projects concurrently, including two projects each within its three business units of power, fuels, and isotopes. One project each has been selected to advance through the DOE's new Reactor Pilot Program (RPP) and Fuel Line Pilot Program (FLPP), which accelerates the timeline for licensing of new reactor designs and development of a domestic fuels supply chain. Oklo's management is confident the company will meet or beat the DOE's 4 July timeline for "achieving criticality" at its Aurora-INL and Groves isotope projects. The DOE-led license will need to convert into a NRC license before commercial development of Aurora-Ohio for Meta, with Olko targeting startup of Phase 1 for 150 MW around 2030 and the full 1.2 GW campus by 2034. We estimate c95% of Oklo's 15 GW pipeline is with data centers.

With no debt and approximately USD2.5bn in cash and equivalents, Oklo expects to book its first revenue later this year from the Idaho Radiochemistry Laboratory. The company sees revenue growth accelerating after 2030 as commercial power and fuel production commences. The company is incurring high upfront costs in the near term, guiding to operating losses and USD400m of annual capex over the next two years. While Oklo is offsetting high upfront first-of-a-kind (FOAK) capital costs with customer pre-payments and third party investments, the company could benefit from economies of scale and a vertically integrated fuels business. Longer-term Oklo may finance capex with multiple forms of financing including project financing against LT PPAs and federal loans. Our base case is for the company to fund its near-term investments with primarily cash on the balance sheet, with the test reactor starting in 2028e and a commercial 75 MW powerhouse in 2030, scaling to 20 powerhouses in 2035 and 40 powerhouses in 2040—vs 90 in our bull case and 15 in our bear case.

Recent notes

Initiate at Buy: Right company for the right time, 22 April 2026

NuScale Power Co.

- First-mover advantage with NRC licensed nuclear technology and global partners
- Targeting first deployment in the early 2030s
- Beneficiary of global pledge to triple nuclear capacity by 2050

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A capital light approach to SMRs

NuScale Power (SMR US, Hold, TP USD13.00, CMP USD11.67) has the only US NRC licensed small modular reactor design, which positions the company to capture both domestic and international opportunities amid rising power demand. The 50MW and uprated 77MW modules can be configured into 2, 4, 6, 8, and 12 module systems, with the company advancing two projects: 1) a 6 module (462 MW) plant in Romania to replace a decommissioned coal power plant, and 2) up to 6 GW of new power generation for the Tennessee Valley Authority (TVA). A 12 x 77MW module system can provide nearly 1GW of power for AI data centers, with the company also targeting process companies for heat and power. Based on company announcements, NuScale has signed MOU with more than 20 companies to deploy its SMRs in over 10 countries.

While NuScale holds the NRC licenses and more than 500 patents globally, the company will not own the power plants outright. The strategy is to work with global supply chain partners such as Doosan Enerbility in Korea to build the equipment, with NuScale to provide NRC licensing support and capture pre-and-post module sales services over the 60-year life, as well as module sales revenue. Recurring service revenue should grow as deployment increases, with margins improving from operating leverage in the asset-light model. Deployment of the first module is targeted for the early 2030s (i.e. 2030-31); Doosan Enerbility has begun production of 12 NPMs ahead of NuScale having firmed an order.

NuScale has a unique commercial model with ENTRA1, its exclusive partner for developing and owning future plants. Four sites have been identified for TVA and detailed site evaluations are underway, with ENTRA1 positioned to receive USD25bn in investment from the US-Japan trade deal. Our base case is for ENTRA1 to place an order for 24 NPM in 2027, which could trigger milestone contribution payments from NuScale to ENTRA1 but kick off plant-related services revenue that should make up the largest percentage of NuScale's future revenue. The company is likely to require additional financing in the medium term to fund rising milestone contribution payments as volumes rise. Our base case is for the first power module to begin commercial operation in 2030—vs 2028 in our bull case and 2032 in our bear case—with volumes rising to 20 NPMs by 2035e and 40 NPMs by 2040e.

Recent notes

Initiate at Hold: Asset light yet capital intensive, 22 April 2026

GE Vernova

- Large installed base for power uprating and plant restarts
- Leads race to deploy SMR in North America
- SMR could be USD2bn business by early-to-mid 2030s

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Leading SMR deployment in North America

GE Vernova (GEV US, Hold, TP USD740.00, CMP USD991.30) has an installed base of 65 large boiling water reactors in the US and even more internationally. Demand is increasing for steam turbine services to extend reactor life, with CEO Scott Strazik indicating in January 2025 there could be an opportunity to add 5 GW of nuclear power at existing US plants through power uprates and upgrades. GEV is also engaged in restarting nuclear plants in Japan (20 candidates for restart) and building new plants at emerging markets of Poland and Sweden.

GEV is leading the race to deploy small modular reactors (SMRs) in North America. Construction began on the first-of-a-kind **BWRX-300** for Ontario Power Generation's Darlington site, with the 300 MW SMR to replace a coal plant with commissioning targeted for 2029. The Tennessee Valley Authority (TVA) submitted an application with the NRC to build the BWRX-300 at its Clinch River Site, kicking off the process to qualify GE's SMR design. The federal-owned electric utility has plans to build two or more SMRs totalling 800 MW and was selected to receive a USD400m DOE grant for the Generation III+ Small Modular Reactor (SMR) Program.

The Trump administration targets 18 months caps for the NRC and DOE to approval new reactors, pulling forward commercialization of new reactor designs. GEV previously viewed SMRs to be a play for 2032 and beyond, growing to a **USD2bn business by the mid-2030s**. However, revenue could pull forward as GEV and Hitachi have plans to deploy SMRs in Southeast Asia. The partners also have plans to build SMRs in Tennessee and Alabama, supported by up to USD40bn of Japanese government investments. GEV has partnered with US government owned and public utilities to invest in and commit towards building SMRs by 2032-34, with utilities looking to fit SMR into their active nuclear sites.

In Europe, GEV has submitted the BWRX-300 to Great British Nuclear for approval. The UK targets net zero by 2050 and GEV got funding to qualify its equipment. There are separate regulatory processes throughout Europe, but GEV has utilized a standardized design with a common denominator and customized features for Canada, US and select European markets. The company has a strategic alliance with Samsung C&T to advance its BWRX300 design outside of North America, specifically targeting five SMRs for Vattenfall in Sweden. GEV's strategy is to build one SMR for the world and industrialize at scale. The company views SMR as reliable and cost-effective, increasing R&D to drive down costs.

Recent notes

Hold: Bumper backlog builds in Q4, 30 January 2026
Hold: Q3 order boom comes with a margin drag, 23 October 2025
Hold: On the crest of a gas wave, 24 July 2025

Brookfield Asset Management

- Deploying AP1000 reactors globally
- Developing AP300 SMRs and eVinci microreactors
- Partnering with US government for USD80bn of reactors

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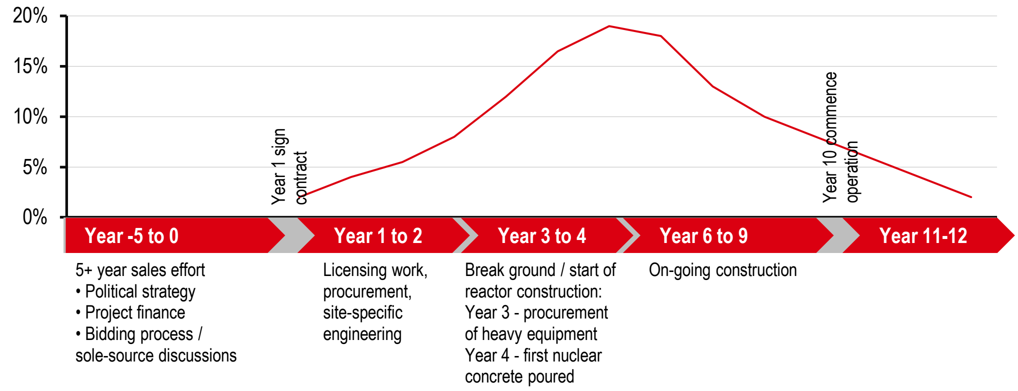
Building on strength

Brookfield Asset Management (BAM US, Buy, TP USD53.00, CMP USD48.22), via its funds and affiliates, owns 51% of Westinghouse, which was acquired with Cameco for USD7.9bn in late 2023. Westinghouse provides fuel, engineering and reactor technology worldwide, including a Gen-III design (AP1000) with passive safety systems. There are six AP1000s in operation globally (two at Vogtle, four in China) while 14 are under construction and five more are under contract for Poland, Ukraine, and Bulgaria. Westinghouse is also developing a small modular reactor (AP300) and microreactor (eVinci), with the AP300 in pre-application with the NRC.

Once a utility selects Westinghouse's reactor design, the project generate multi-year revenue for engineering services. The company does not provide construction services or assume any construction risk, with its role limited to the design, development, engineering and procurement of equipment for the new reactor, followed by reactor services and fuel supply once operational.

Illustrative framework of Westinghouse revenue stream for a new reactor



Source: Company reports, HSBC

Brookfield and Cameco have a partnership with the US government to construct at least USD80bn worth of new Westinghouse reactors. Per Cameco in late 2023, the cost of constructing new AP10000 was USD6-8bn, with 25-40% for engineering and procurement work. Brookfield is also finalizing plans to acquire and finish the partially built VC Summer reactors.

Recent notes

Buy: A defensive play in current times, 25 February 2026
Buy: Refining estimates after the 4Q25 results, 9 February 2026
Buy: 4Q25 earnings a beat, 4 February 2026

Baker Hughes

- Broad power systems portfolio for upgrades and uprating
- Pending Chart acquisition adds new capabilities for nuclear
- Working with 10 SMR developers longer term

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Growing exposure

Baker Hughes (BKR US, Buy, TP USD67.00, CMP USD60.25) is a global energy technology company with growing exposure to the nuclear industry. The company does not participate in the reactor design but has a power systems portfolio to support a nuclear power plant, such as steam turbine and generator, as well as valves and pumps. With a global manufacturing and services footprint, Baker has partnered with 10 SMR developers and views nuclear as long-term clean energy solutions, similar to geothermal.

On 29 July 2025, Baker announced plans to acquire Chart Industries (GTLS US, Hold, TP USD210.00, CMP USD207.91) for USD13.6bn. The deal is expected to close in 2Q 2026 and should accelerate Baker's vison of becoming a leading energy and industrial solutions provider. Baker will gain certain capabilities that it did not have previously, such as heat exchangers and cold boxes, as well as exposure to new markets (metals and mining).

Baker management noted emerging new markets of space, water treatment, and nuclear, where Chart has a small components sales business (tanks, fans) for existing reactors in Europe and Africa. At the 12 December 2024 Capital Market Day, Chart indicated nuclear could be a USD300m opportunity for the company over the next three years. That value has likely increased with the growth of data center power demand. Chart previously indicated it had partnered with X-Energy for high-pressure, high-temperature SMR.

Combining Baker's turbines and generators with Chart's industrial chillers and cryogenic tanks could result in more energy efficient systems for data centers. Utilizing waste heat from turbine exhaust and chip level thermal load could also drive lower energy intensity. Baker could also be well positioned for power uprating and upgrading cycle of the US fleet, as extending the life often comes with the need to upgrade with more efficient steam turbines, generators, valves, and pumps.

There could also be opportunities to integrate new nuclear technologies for non-electric applications such as process heat production for industrial facilities, desal and hydrogen production, as well as data centers.

Recent notes

Buy: 2026 guidance tops consensus estimates; raising TP to USD67.00, 27 January 2026
Buy: Strength in balanced portfolio, 27 October 2025
Baker Hughes to acquire Chart Industries, 30 July 2025
Buy: Ahead of plan in data centers and New Energy, 24 July 2025
Buy: IET visibility largely offsets OFSE variability, 23 April 2025
Buy: New partner for CCS, power gen, and data center, 03 March 2025

Emerson Electric

- Valves and measurement on c90% of nuclear reactors globally
- Positioned for upgrade and modernization of nuclear fleet
- Ovation 4.0 control systems to unify entire nuclear site

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Global automation player

Emerson Electric (EMR US, Buy, TP USD170.00, CMP USD144.83) is an industrial technology company focused on automation. In the power sector, the company provides solutions for operating coal, natural gas, and nuclear power plants, as well as other energy facilities. Emerson is seeing growth for automation technologies to modernize facilities, including digital solutions for electrification and modernization of the grid. The company estimates its technology (Ovation) is used in 50% of US power generation facilities, 90% globally from a capacity perspective and 30% on a consumption perspective.

In nuclear, Emerson's valves and measurement instruments are in c90% of global reactors. The company typically gets USD40m plus of content for a new greenfield facility, which includes the control system, instrumentation, and valves that make up the automation scope. Emerson has partnered with Westinghouse, as a unique supplier of systems for the AP1000 in the US and Eastern Europe, and other SMR developers with CEO Lal Karsanbhai optimistic the SMR story could "move a little bit more to the left, into 2030 versus the 2035".

> **I don't think there's a nuclear facility out there that doesn't have a Fisher valve**
>
> **Lal Karsanbhai, 18 February 2026**

Emerson anticipates high-single-digits to low-double-digits growth over the next three-to-five years, from investments across combined cycle in US, coal and nuclear in China, and nuclear broad-based across Eastern Europe and the UK.

Recent notes
Buy: Accelerating demand trend continues in Q1, 2 February 2026
Buy: Underlying FY26 resilience despite Q1 slowdown, 6 November 2025
Buy: Robust end markets uphold Q4 expectations, 7 August 2025

Covered non-US companies

- ADVANCE Act lifted ban of foreign ownership in US nuclear power plants
- New US-Japan and -Korea trade deals prioritize the nuclear sector
- Korean EPCs have expertise in building large and small reactors

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Doosan Enerbility

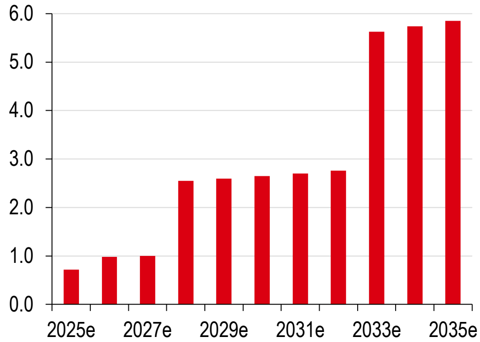
Doosan Enerbility (034020 KS, Buy, TP KRW150,000, CMP KRW115,700) is a one-stop-shop for key components and services required by the nuclear industry. The company has a near monopoly on nuclear steam supply systems with an installed base of 34 reactor vessels and 124 steam generators globally. A fully integrated production complex provides significant operating flexibility, with Doosan managing initial casting and forging to the final delivery of long lead time items (five to ten years). With global demand rising, the company is expanding its production capacity for gas turbines (from eight to 12) and building a new dedicated facility for SMRs (from eight to 12-20 modules). Doosan has partnered with several US SMR companies to build modules, including NuScale (currently in production), X-Energy, and TerraPower, as well as Westinghouse for large reactor vessels and steam generators. Doosan is also working with KHNP & KEPCO (team Korean) and has ongoing discussions with GE Vernova and Rolls-Royce.

Global installed base (# of units)

Location	Reactor vessels	Steam generators
Korea	23	80
US	4	24
Vogtle	*2*	
V.C. Summer	*2*	
China	3	12
UAE	4	8
Total	**34**	**124**

Source: HSBC estimates

New SMR orders (KRWtrn)



Source: HSBC estimates

Recent notes

Buy: US nuclear projects from 2026, 12 February 2026
Buy: One-stop-shop tour takeaways,12 November 2025
Initiate at Buy: Expensive, yet justifiable premium, 9 September 2025

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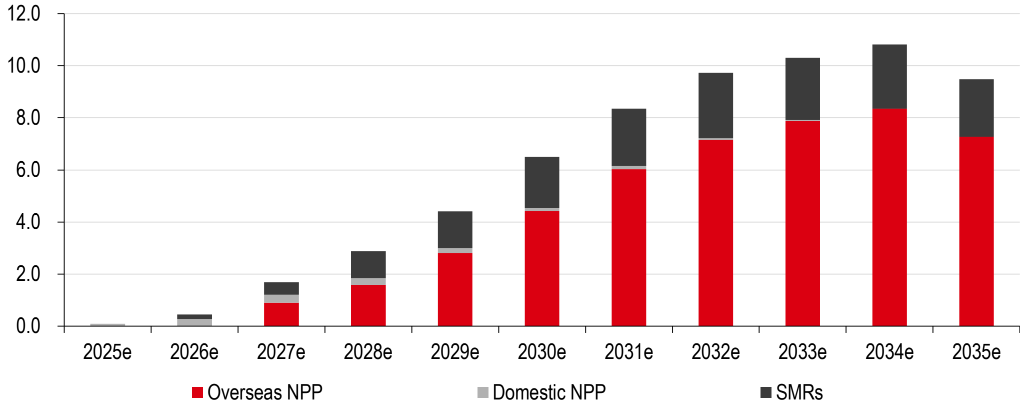
Hyundai E&C

Hyundai E&C (000720 KS, Buy, TP KRW215,000, CMP KRW174,900) built two-thirds of Korea's domestic nuclear power plants and has proven expertise in delivering nuclear power plants on time and within budget. The company is the exclusive construction partner of Holtec's Palisades SMRs, which could commence construction this year following receipt of an EPC (engineering, procurement, and construction) contract. The company is also engaged in FEED work for Fermi America's Matador project, where four Westinghouse AP1000 large reactors could receive a final investment decision later this year. Hyundai E&C is positioned to support Holtec and Westinghouse in deploying SMRs and large reactors longer term; HSBC forecasts the company to conduct four overseas nuclear projects and two SMRs projects by 2030.

Hyundai E&C nuclear division revenue (KRWtrn)



Source: HSBC estimates
Note: Overseas NPP = International nuclear power plant, Domestic NPP = Korean nuclear power plant

Recent notes

Buy: 4Q25 review – conservative 2026 guidance, 4 February 2026
Buy: Groundbreaking year for nuclear in 2026, 20 January 2026

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Samsung C&T

Samsung C&T (028260 KP, Buy, TP KRW405,000, CMP KRW304,000) has strong nuclear capabilities and is involved in numerous project developments globally. The company did the FEED for the NuScale Power's Romania SMR project and expects a final investment decision in late 2026 or early 2027. On the SMR front, Samsung C&T is also a strategic partner with GEV-Hitachi and has plans to cooperate in the EU, Southeast Asia, and Middle East. On large-scale nuclear power projects, the company is working with Fluor in Romania and has experience and a track record for both domestic and overseas APR1400 reactor projects. Samsung C&T could have opportunities in the US, either through Team Korea or other partnerships as the US is pushing for many new builds but has a limited number of engineering, procurement, and construction (EPC) operators with strong capabilities and experience of NPP projects.

Recent notes

Buy: More to show in 2026, 29 January 2026
Buy: Improvement expected in all areas, 28 October 2025

Other notes and reports

Korea Nuclear EPCs: Who stands to benefit from US-Korea nuclear co-operation? 18 March 2026
Nuclear and uranium (3) - US nuclear and Asia Impacts: Our post-call reading, 2 February 2026
Korea Nuclear: Asia marketing feedback: what are the upcoming catalysts?, 1 December 2025
Nuclear and uranium (2) - China – stepping up efforts in nuclear power, 11 September 2025
Nuclear and uranium - Where China stands on nuclear power, 19 June 2025

Not covered companies

- Companies exposed to the US nuclear sector include utilities, reactor developers, fuel providers, ECPs, and others
- Nuclear fuel companies are heavily reliant on US federal contracts
- Next gen reactor designs are primarily spun out of SPACs

BWX Technologies

BWX Technologies (BWXT US, not rated, CMP USD216.66) supplies components, materials and fuels to the US government (c75% of revenue) and commercial nuclear operators. The company has a record USD7.4bn backlog that has more than doubled over the past year, due to recent DOE contracts for naval nuclear reactor components (USD2.6bn) and fuel (USD1.6bn). Fundamental to the development of a domestic nuclear fuel supply chain, BWX is producing high-assay low-enriched uranium (HALEU) and tri-structural isotropic (TRISO) particle fuel for several test reactors in the DOE's Reactor Pilot Program. The company also supplies commercial reactors with a variety of products and services, including steam generator (315 installed base), fuel, pressure vessels, and heat exchangers. BWX has a Memorandum of Understanding (MOU) with Rolls-Royce to collaborate on their 470 MW SMRs, which could require three nuclear steam generators. The company is building a dedicated fuels facility in Tennessee and expanding its Ontario manufacturing facility.

Centrus Energy

With origins that date back to the founding of the US nuclear industry, **Centrus Energy** (LEU US, not rated, CMP USD191.55) brokers uranium supply and provides associated enrichment and technical services for nuclear operators (US, Europe, Asia) and the US government. The company has a backlog of USD3.8bn that extends into 2040, comprised of USD2.9bn for low enriched uranium (LEU) and USD0.9bn for technical solutions. A subsidiary process used uranium into enriched uranium, with Centrus licensed to produce both LEU and high-assay low-enriched uranium (HALEU) from its Ohio enrichment facility. The American Centrifuge Operating subsidiary was selected by the DOE for a USD900m HALEU task order that entails expanding the Ohio facility for commercial-scale production, with Centrus targeting production growth from 1 ton in 2025 to 12 tons after 2030. The company is expanding its centrifuge manufacturing facility in Tennessee and has plans to add 150 net new employees between the two facilities. Centrus estimates its annual total addressable market for LEU is USD4.3bn from the existing reactor fleet while HALEU could be a USD2.2bn market by 2030 and USD6.2bn market by 2035.

Fermi America

Fermi America (FRMI US, not rated, CMP USD5.06) is a private energy developer building a first-of-a-kind behind-the-meter "HyperGrid" in Texas for AI data centers. The 11 GW project will initially be powered by combined-cycle natural gas turbines, utility grid power, solar power, and battery energy storage while the company work with Hyundai E&C to build 4 new Westinghouse AP1000 reactors. A COL application has already been accepted by the NRC for the new reactors (Project Matador), with approval expected by 2026 for construction to begin for completion by 2032-36. Fermi has plans to add 2 GW of SMRs for a net 6 GW of nuclear generation by 2038. Fermi began trading on the New York Stock Exchange on 1 October 2025 at USD21.00, with co-founder Toby Neugebauer serving as CEO. The Board has since removed Mr. Neugebauer as CEO without cause and initiated a strategic review including appointment of a new board chairman and CEO.

Korea Electric Power Corp

Korea Electric Power Corporation (015760 KS, not rated, KRW46,300) is the parent company of **Korea Hydro & Nuclear Power** (KHNP), which has signed strategic collaboration agreements with several US nuclear developers including X-Energy, Centrus Energy, and Fermi America. The company has over 50 years of experience building nuclear plants and recently made an investment in TerraPower to support the construction of its Natrium plant in Wyoming. A potential joint venture with Westinghouse remains under discussion, but KHNP is building two APR1400 reactors in the Czech Republic.

Nano Nuclear Energy

Nano Nuclear Energy (NNE US, not rated, CMP USD23.78) is a nuclear technology developer specializing in microreactors. The KRONOS MMR (micro modular reactor) is a stationary 15 MW high-temperature (helium) gas-cooled reactor design that utilizes TRISO fuel while the LOKI MMR and ZEUS are portable systems rated for 0.5-3 MW and 0.05-0.5 MW, respectively. Scalable to 1 GW, Nano plans to build its first commercial prototype at the University of Illinois for 2029/30. There could be opportunities to accelerate development, with the company having engaged the NRC in preapplication activities. Nano is exploring a second opportunity at the Chalk River site in Ontario with Canadian Nuclear Labs for 2030 production and has signed a MOU with DS Dansuk (017860 KS, not rated, CMP KRW20,200) to develop MMRs in Korea.

Rolls-Royce Holdings

Rolls-Royce (RR/ LN, not rated, CMP GBp1,180.40) manufactures nuclear propulsion systems for the UK Royal Navy, which serves as the foundation for its expansion into small modular reactors (SMRs). The company's 470 MW system has been selected for the first SMR project in the UK and Czechia, with the company having been earmarked GBp2.6bn from the UK's 2025 Spending Review and GBp600m form the National Wealth Fund for the supply chain. The company plans to manufacture its first (of three) SMRs in the 2030s, with volumes ramping at mid century for new nuclear products to be launched in the 2040s. Rolls-Royce also has a Memorandum of Understanding (MoU) to explore deploying its SMR technology in Türkiye.

Solstice Advanced Materials

Spun out of Honeywell International (HON US, Buy, TP USD286.00, CMP USD222.22) in October 2025, **Solstice Advanced Materials** (SOLS US, not rated, CMP USD80.33) is a specialty chemical company that produces uranium. With a 60-year operating history, the company's Metropolis Works facility is the lone US site producing uranium hexafluoride (UF_6). Backed by a USD2bn backlog, Solstice has plans to increase production from c9,000 tons in 2025 to more than 10,000 tons in 2026. Despite the planned production increase, the company is effectively sold out through 2030 and is evaluating further opportunities to expand its production capacity.

Trump Media & Technology Group

The Trump Media & Technology Group (DJT US, not rated, CMP USD9.82) announced plans to merge with **TAE Technologies Inc**., a hydrogen-boron fusion technology developer founded in 1998 and backed Google, Chevron Technologies Venture, and Goldman Sachs Group. The transaction values TAE at more than USD6bn. TAE plans to begin construction of a utility-scale fusion plant next year, with the company having advance siting process in Alabama, Ohio, and Texas. The company targets 50 MW of power generation in the early 2030s, with future plants in the 350-500 MW range.

Privately held companies

- Nuclear Energy Agency estimates more than 120 SMR technologies are in various stages of development globally
- New fission and fusion designs are seeking to drive down costs
- Gen IV developers may vertically integrate fuel production for quality control and to manage costs

Commonwealth Fusion Systems

Spun out of the Massachusetts Institute of Technologies in 2018, **Commonwealth Fusion Systems** is developing nuclear fusion (atoms are combined) technologies utilizing high-temperature superconducting magnets. Like fission, fusion reaction create heat to power steam turbines and generators. Validated by the DOE's Milestone-Based Fusion Development Program, the company has commenced regular serial production of its magnets to support construction of its first commercial power plant. The 400 MW ARC power plant in Virginia targets first power in the early 2030s, with power sold to Google and ENI. The company is also backed by a consortium of 12 Japanese companies and has plans to deploy its reactor design in Japan in the late 2030s or early 2040s, following Japan's new national strategy to adopt fusion energy and construct a demonstration plant in the 2030s.

Deep Fission

Deep Fission is a Berkeley, California-based startup building a patent-pending borehole reactor in Kansas as part of the DOE's Reactor Pilot Program. The company combines small, pressurized water reactors fuelled by low-enriched uranium (LEU) with drilling techniques from the oil and gas industry. A small 15 MW gravity reactor will be installed one mile (c5,000 feet or c1,600 meters) underground at the bottom of a 30-inch vertical borehole, heating submerged water that rises as steam to power conventional turbines and generators. The process is expected to significantly reduce surface infrastructure costs, with Deep Fission estimating an 80% reduction in construction costs. The company recently raised USD80m through sale of 5.3m in restricted shares to finance the pilot project, which it expects to achieve a levelized cost of electricity of USD0.05-0.07/kWh from the first-of-a-kind deployment. With a customer pipeline of 12.5 GW, Deep Fission plans to expand the pilot site for commercial deployment of up to 1.5 GW. The company has commenced pre-application activities with the NRC and recently completed a reverse merger with Surfside Acquisition Inc.

General Fusion

General Fusion is a Canadian company that has entered into a definitive merger agreement with Spring Valley Acquisition Corp. The company expects the de-SPAC merger to be completed in mid-2026, making it the first publicly traded pure-play fusion company. General Fusion intends to use proceeds from the transaction to further scale up its technology (the Lawson Machine 26, LM26).

General Matter

General Matter is a San Francisco-based startup focused on nuclear fuel enrichment. The company was founded in late 2023 by venture capitalist with aerospace engineering expertise and has a mission to "accelerate the growth of nuclear energy, restore US leadership, and power the next wave of progress." General Matter signed two leases with the DOE to reuse former nuclear facilities for fuel enrichment, with one site supported by a 10-year USD900m milestone-based award from the DOE's HALEU Availability Program.

- The former Paducah Gaseous Diffusion Plant in Western Kentucky will be re-developed into a new domestic uranium enrichment facility. Site clearance has commenced and construction is expected to begin later this year, with the proposed project costing USD1.5bn to create a domestic uranium enrichment facility that employs approximately 140 people. The DOE lease includes the supply of at least 7,600 cylinders of uranium hexafluoride (UF_6), which is needed to produce both low-enriched uranium (LEU) and high-assay low-enriched uranium (HALEU). The DOE estimates reprocessing its inventory of uranium hexafluoride saves US taxpayer USD800m in avoided disposal costs while providing General Matter with raw material for its enrichment.
- The Hanford's Fuels and Materials Examination Facility in Central Washington could also be reused for production of advanced nuclear fuel and materials. The site was intended to support the DOE's Liquid Fast Breeder Reactor Program but was never used in any nuclear capacity. General Matters is evaluating opportunities to utilize the site, which has been dormant in surveillance and maintenance status since 1993.

Helion Energy

Helion Energy is a Washington state-based nuclear fusion company backed by OpenAI, Meta, and Microsoft. The company is on the 7th generation of its fusion generator (Polaris) but has begun construction of a commercial power plant in Washington targeted to come online in 2028. The 50 MW Orion power plant will include thousands of the company's own capacitors to deliver surges of electricity to a fusion generator and capture the energy it produces. Helion plans to manufacture its own components (capacitors, magnets, and semiconductors) and begin installing assembly line equipment later this year, with the plant to provide power to the grid for a nearby Microsoft data center. Helion has a long-term goal to deliver power at a LCOE of USD0.01/kWh.

Holtec International

Florida-based **Holtec International** makes equipment to store nuclear waste and decommission existing nuclear plants. In 2023, the company announced plans to reactivate the shuttered Palisades reactor in Michigan. With significant financial support from the US government and state legislature, Palisades is on track to begin commercial operations imminently (1H 2026), commencing power sales to two local utilities. Holtec has plans to build two of its self-developed small modular reactors at the Palisades site. The company received a USD400m grant from the DOE's Generation III+ Small Modular Reactor (SMR) Program and has submitted the first part of a phased construction permit application for the SMRs with the NRC. *The company has confidentially filed an S-1 with the SEC to go public, with CEO Krishna Singh disclosing to Barron's on 25 June 2025 that c20% of the company's shares could be made available in an initial public offering.*

Kairos Power

California-based **Kairos Power** was founded in 2016 by Berkeley and Stanford scientists and engineers. The company has been working with the NRC to advance Hermes, its fluoride salt-cooled high-temperature reactor. With NRC construction permits in hand, Kairos is building both a demonstration reactor and commercial-scale plant in Oak Ridge, Tennessee. Configured as a pair of 75 MW reactors for a minimum 150 MW system, Kairos plan to manufacture its own reactor components, plant equipment modules, fuel, and molten salt coolant to drive down costs and maintain quality control. Scalable to a standard design of 6 reactors for 450 MW or advanced designs of 4-6 pairs of reactors for 600-900 MW, Kairos has engaged the NRC in pre-application for its Gen IV reactor design utilizing TRISO fuel. The company has a deal to supply Google with 500 MW of by 2035 and has signed a binding deal to deliver 50 MW of power from the Oak Ridge demonstration plant to the Tennessee Valley Authority.

The Nuclear Company

The Nuclear Company is a South Carolina-based startup founded in 2024 with leaders from the Vogtle design and construction team. With a goal of deploying 6 GW by the mid-2030s, the company is working with Palantir Technologies to develop AI software for constructing large reactors. The Nuclear Company aims to improve construction into a data-driven, predictable process by leveraging NRC approved sites for a "design-once, build many" approach to deploying new reactors.

TerraPower

Backed by Bill Gates, the SK Group, and Korea Hydro & Nuclear Power, **TerraPower** is building an advanced nuclear reactor at a former coal site in Wyoming targeting first power in 2031. The company was recently granted a construction permit by the NRC for its first 345 MW Natrium power plant (Kemmerer-1), making it the first commercial plant to be approved in more than 10 years. Natrium uses sodium rather than water as a coolant and incorporates a thermal battery made of molten salt, which increases the peak power output to 500 MW. The low-pressure, low-temperature reactor design does not require a high-pressure containment system, resulting in lower construction costs with CEO Chris Levesque targeting half the cost of a traditional nuclear plant. TerraPower was awarded funding from the DOE's Advanced Reactor Demonstration Program to construct Kemmerer-1. The company recently agreed to develop up to eight Natrium reactors (2.1 GW) and energy storage system plants for Meta, with two reactors targeting first power by 2032.

X-Energy

X-Energy is also receiving funding from the DOE's Advanced Reactor Demonstration Program to construct its Long Mott Generation Station in Washington. The 320 MW power plant will consist of four helium gas cooled reactors, with X-Energy targeting first power in the early 2030s for Amazon. Designed to be scalable and transferrable by road, the Xe-100 is an 80 MW reactor sold in packs of four units for 320 MW. X-Energy is building its own fuel facility to produce a proprietary fuel made of graphite pebbles containing uranium kernels encased in ceramics, with the company recently securing NRC approved to build two TRISO pellets production facilities in Oak Ridge, Tennessee. X-Energy has plans to deploy reactors for Dow Inc. at its manufacturing facility in Texas and SMRs for Amazon in Washington state. *The company has filed an S-1 to raise USD814m in an initial public offering, with a listing on the Nasdaq under the symbol XE US.*

Nuclear Energy 101

This section outlines the basics of nuclear energy, including key nuclear technologies.

Background on nuclear energy

In his December 1953 "Atoms for Peace" speech before the United Nations, US President (and former Supreme Allied Commander) Dwight D. Eisenhower called for using nuclear technology in civilian applications for the "peaceful pursuits of mankind" instead of military weapons. Specifically, Eisenhower called for nuclear experts to "mobilized" and "apply atomic energy to the needs of agriculture, medicine and other peaceful activities." Nuclear was to serve a "special purpose" and "provide abundant electrical energy in the power-starved areas of the world." The Soviet Union was about to fire the world's first nuclear power plant in 1954, and Eisenhower's speech served to rally the nation around a new nuclear race. The US did not fire its own nuclear power plant until 1957, but the US helped shade the creation of the International Atomic Energy Agency (IAEA), with the intergovernmental organization founded in 1957 with 81 original members. The IAEA's mission is to promote the peaceful use of nuclear energy and to inhibit its use for military purposes.

> **"Against the dark background of the atomic bomb, the United States does not wish merely to present strength, but also the desire and the hope for peace.**
>
> **Dwight D. Eisenhower, President of the United States of America, to the 470th Plenary Meeting of the United Nations General Assembly, 8 December 1953**

Congress passed the **Atomic Energy Act of 1954**, permitting the development of commercial nuclear power and designating the Atomic Energy Commission (AEC) for regulating its safety. The 1973 oil crisis led Congress to reorganize federal agencies focused on energy and the regulatory components of the AEC was split from its research and development efforts. The Nuclear Regulatory Commission (NRC) was established in 1974 as an independent regulator of US nuclear power plants and materials (for industrial use, medicine, research, and other applications) while the Energy Research Development Administration (ERDA) took over the R&D duties for nuclear and other forms of energy, including the development of nuclear weapons for the military.

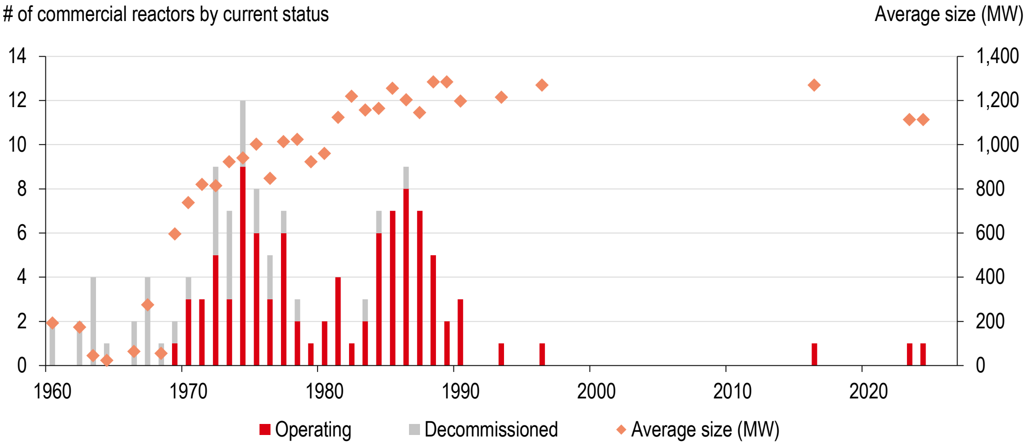
- The NRC consists of five presidentially appointed commissioners in staggered five-year terms and c3,000 employees. Its objective is to provide "reasonable assurance" of "adequate protection" for public health and safety, as well as common defense and security.
- The ERDA worked on research of various energy technologies, including new nuclear technologies. The ERDA merged with the Federal Energy Administration to form a cabinet-level Department of Energy (DOE) in 1977.

A nuclear power plant is similar to a coal power plant in that heat produces steam from water to spin a turbine and drive a generator to produce electricity. A nuclear plant differs in that a reactor must contain and control the fission reaction (splitting of an atom to release energy), adjusting for variations in size, pressure, temperature and radiation. The release of radioactive materials can contaminate the surrounding environment and cause death and cancer.

US nuclear power development grew slowly at first but accelerated throughout the 1970s and into the 1980s. At its peak, the US built 12 reactors in 1974, adding an average of 940 MW for a total of 11 GW of new nuclear capacity. The average new plant increased in size from c600 MW to c1.2 GW in the 1980s, raising public concerns about radioactive contamination and overall nuclear safety.

The first US nuclear renaissance occurred in the 1970s and 1980s, when more than 100 reactors were built, with the US fleet averaging a built time of 8.1 years since the 1950s.

Startup year of new U.S. commercial nuclear reactors



Source: Rystad, HSBC

The NRC expanded its focus on public safety and managing nuclear waste following the Three Mile Island accident in March 1979. The partial meltdown of reactor 2 released radioactive gases and iodine into the containment building and surrounding environment, with the incident rated a Level 5 in the 7-point logarithmic International Nuclear Event Scale. The Level 7 rated Chernobyl accident of 1986 cemented the end of US nuclear power development and commercial plants began to close in the early 1990s. US uranium fuel processing plants closed as well, with the US now importing more than c95% of the c47 pounds of uranium feedstock needed to power the operating fleet of 94 reactors. At one point, the US had been the largest producer of uranium, yielding 30-40m pounds per year.

First attempt at a US nuclear renaissance

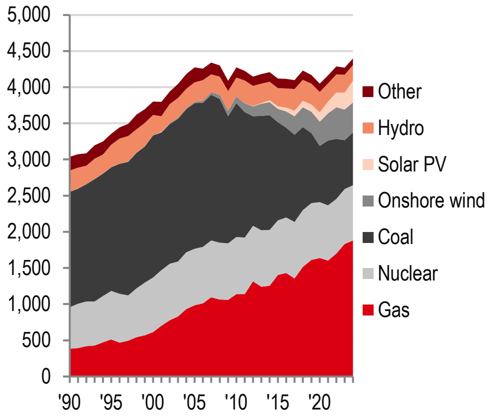
Development of a new generation of advanced reactors kicked off a nuclear renaissance at the turn of the century. The NRC approved a Gen III reactor design in 1997 (GE-Hitachi's Advanced Boiling Water Reactor or ABWR), which included passive safety mechanisms, variable electricity output (to be more flexible with changes in demand), and to provide process heat for industry, transportation, and other sectors. New Gen III reactor designs generated significant interest from utilities, which submitted combined operating license (COL) applications for 28 new reactors with the NRC between 2007-09. However, these COL applications had plans to use newer Gen III+ designs that needed to be qualified by the NRC and only two reactors were built after much delay.

In February 2010, the DOE's Loan Program Office (LPO) agreed to provide a loan guarantee to help fund the first US deployment of a new generation of nuclear reactors. The USD8.3bn conditional loan guarantee represented more than half the estimated USD14bn construction cost and underscored the Obama's administration commitment to "jumpstarting the nation's nuclear power industry." Construction began at Southern Nuclear's Vogtle site in 2009, after the NRC had accepted the COL application on 28 March 2008, but was delayed by the financial crisis and revisions to the AP1000 design. The DOE agreed to provide a second loan to complete the project in September 2017, bringing the total LPO commitment to USD12bn. Vogtle-3 and -4 finally completed construction in 2023 and 2024, respectively, with the 15-year schedule costing USD36bn or more than double initial estimates.

None of the other 26 COL applications for Gen III reactors were completed, with South Carolina's state-owned utility Santee Cooper abandoning construction of two reactors in 2017 due to spiralling costs and Westinghouse filing for bankruptcy. The Gen III reactor pipeline lost out in competitiveness to low gas prices and ease of renewables installation, and as a result, annual US nuclear power generation has stagnated at the 750-800 TW range over the past 25 years while gas and the onshore wind/solar PV mix has soared.

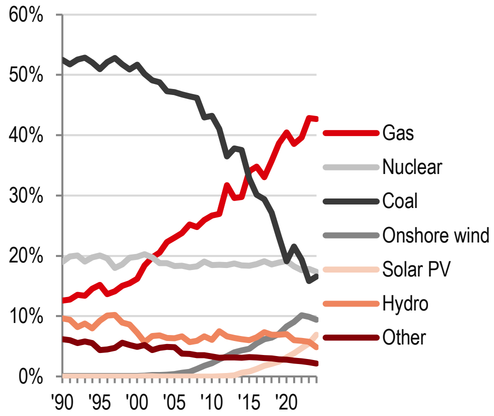
Nuclear has slipped from 19-20% of the US power generation mix in the early 1990s to 17-18% currently while gas has increased from 13% to 43% and onshore wind/solar PV now make up 16%.

U.S. power generation (TW)



Source: Rystad, HSBC

U.S. power generation mix



Source: Rystad, HSBC

Current market dynamics

More recently, US nuclear policies have focused on supporting the existing nuclear fleet and advancing new reactor deployment. Federal funding includes first-of-a-kind projects such as a USD1.25bn loan guarantee to restart the Palisades reactor, a USD900m program to de-risk light-water SMR deployments, and USD2.7bn to secure domestic nuclear fuel production. Nuclear energy enjoys broad bipartisan support; the focus on restarting a domestic industry accelerated under the Biden administration. Congress passed the Bipartisan Infrastructure Law (BIL, November 2021) and the Inflation Reduction Act (IRA, August 2022) with funding provisions for nuclear development, which culminated with the ADVANCE Act (Accelerating Deployment of Versatile, Advanced Nuclear for Clean Energy, June 2024) directing reform of the NRC to accelerate next gen deployment.

- **BIL**: provided USD6bn for a Civil Nuclear Credit Program to provide financial support for existing reactors at risk of closing and being replaced by higher-emitting power resources. The BIL also provided USD2.5bn for the Advanced Reactor Demonstration Program to fund two projects for electricity generation and USD500m in grants for up to five clean energy demonstration projects (including advanced nuclear) on current and former mine land.
- **IRA**: funded a new 45U Zero-Emission Nuclear Power Production Credit to provide a base credit of 0.3 cents/kWh for electricity produced at an existing nuclear power plant from 2024-2032, Department of Energy (DOE) Loan Program Office to make up to USD250bn in loans for the Energy Infrastructure Reinvestment (EIR) Program, USD700m for the DOE Office of Nuclear Energy to support its High-Assay Low-Enriched Uranium (HALEU) Availability Program and USD150m for infrastructure improvements at the Idaho National Laboratory.
- **ADVANCE Act**: authorized the NRC to make reforms to advance American nuclear leadership, develop and deploy new technologies, preserve existing nuclear generation, fuel cycles, supply chain, infrastructure, and workforce, and improve overall NRC efficiency.

Under the Trump administration and declaration of a national energy emergency, nuclear is being viewed as key for national security, energy independence and AI dominance. President Trump signed four executive orders (EO) on 23 May 2025, establishing multi-agencies priorities to unleash America's energy dominance in nuclear.

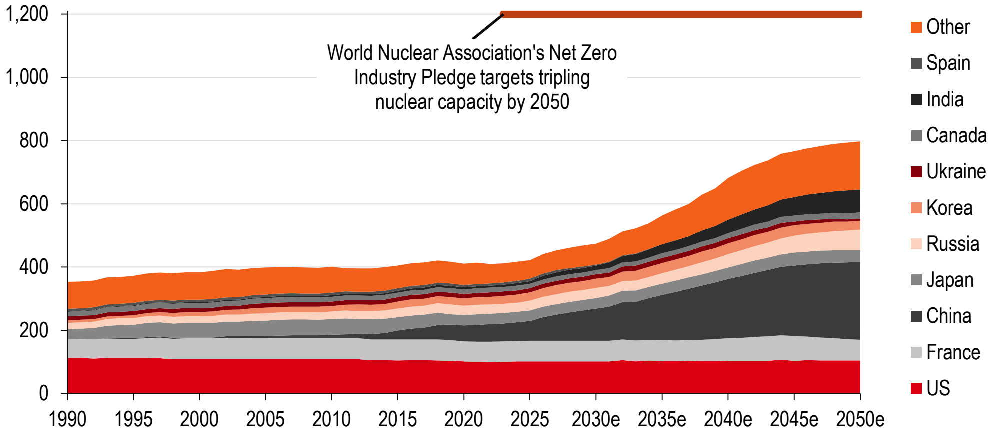
- **Reinvigorate the nuclear industrial base**: 1) strengthen the domestic nuclear fuel cycle, 2) DOE to fund the restart, completion, uprate, or construction of nuclear plants, and 3) expand the nuclear energy workforce
- **Reform nuclear reactor testing at the national labs**: 1) reform the national laboratory process for reactor testing, 2) establish a pilot program outside of the national labs, and 3) streamline environmental reviews
- **Reform the Nuclear Regulatory Commission**: 1) reform the NRC's culture from focus on safety, health and environment towards balance of economic and national security, 2) reform the NRC's structure for the "expeditious processing of license applications and the adoption of innovative technology", and 3) reform and modernize the NRC's regulations to establish fixed deadlines for approving licenses and new reactor designs
- **Deploy advanced nuclear reactors for national security**: 1) deploy and use advanced nuclear reactor technologies at military sites and 2) DOE facilities for AI data centers and other critical national security needs, and 3) promote American nuclear technology for export

The NRC recently approved NuScale Power's second SMR design (uprating the reactor from 50 MW to 77 MW) while review is ongoing for several Gen III+ reactors. The pipeline of new reactor designs is likely to soar in the coming years, with several Gen IV reactors in the pre-application stage with the NRC. The agency is also reorganizing itself to comply with the ADVANCE Act and EOs, with licensing and inspection to be integrated within three core business lines of new reactors, operating reactors, and nuclear materials and waste vs separate licensing, inspection and oversight activities within individual organization lines.

The COP28 triple nuclear energy capacity pledge is in line with the Biden administration's 300 GW target by 2050.

The US officially withdrew from the Paris Agreement on 27 January 2025 but had led the COP28 Triple Nuclear Energy initiative, where 22 inaugural countries set a voluntary goal to triple its nuclear capacity by 2050 (from 2020 levels implies c1.2 TW). Nuclear had been omitted as a zero/low-emissions technology in the Paris Agreement, but COP28 in December 2023 recognized nuclear as part of the Global Renewables and Energy Efficiency Pledge. In partnership with the World Nuclear Association, COP28 resulted in growth of the Net Zero Triple Nuclear Energy Pledge.

Global nuclear capacity (GW)



Source: Rystad Energy estimates, World Nuclear Association, HSBC Global Research

Now comprised of 38 countries, more than 140 companies, 16 major financial institutions, and 18 large energy users including key hyperscalers, members of the Tripling Pledge plan to cooperate in the goal to triple global nuclear capacity by 2050. Rwanda and Senegal are the most recent countries to join the Pledge, with African nations making up 20% of signories. While international financial institutions pledged to include nuclear energy in their lending practices, the World Bank recently ended its ban on funding nuclear energy projects. The World Bank's last loan for new nuclear capacity was in 1959, but in June 2025 agreed to support extending the life of existing reactors and accelerate the deployment of SMRs in developing countries.

COP29 highlighted the importance of next gen nuclear technologies like SMRs, with the International Atomic Energy Agency (IAEA) presenting on its flexibility to power remote communities, energy-intensive industries, and data centers among off-takers. COP30 called for accelerating the deployment of SMRs, with the IAEA forecasting SMRs to contribute a quarter of new nuclear capacity by 2050, based on global nuclear capacity increasing by 2.5 times.

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