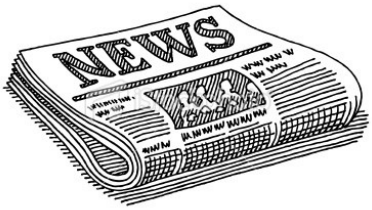

- Recent Legislative Actions:
  - Dec: The International Nuclear Energy Act (S. 4064), a bill aimed at developing a strategy to counter the growing influence of Russia and China on the global nuclear export market, was approved by the Senate Foreign Relations Committee on December 7th. Among other things, the measure will support the establishment of an office to coordinate civil nuclear exports strategy, establish financing relationships, promote regulatory harmonization, enhance safeguards and security, promote standardization of a licensing framework, and create a nuclear export working group.

- December 5, 2022: Lawrence Livermore National Laboratory's National Ignition Facility (NIF) achieved a landmark energy breakthrough, using a laser-triggered implosion of a capsule of deuterium and tritium to yield, for the first time on Earth, more energy from a fusion reaction than was delivered to the capsule. This constitutes an inspiring affirmation of the incremental advances in inertial confinement fusion technology and helps draw more attention to nuclear power – both fission and fusion – as a reliable energy source into the future.

- December 19, 2022: TerraPower announced that the operation date for its Natrium reactor has been pushed back due to lack of High Assay Low Enriched Uranium (HALEU) fuel availability associated with Russia's invasion of Ukraine. TerraPower has been exploring potential alternative sources of HALEU with the DOE, and while federal programs to catalyze domestic production of HALEU are accelerating, they are still in the early stages. TerraPower still intends to submit a construction permit to the Nuclear Regulatory Commission (NRC) in mid-2023 and does not see an impact to the construction schedule for the demonstration reactor.

- December 21, 2022: The NRC has accepted an application from X-energy's fuel subsidiary, TRISO-X, LLC, for a proposed TRISO-X fuel fabrication facility (TF3) in Oak Ridge, TN. A 30-month review schedule has been developed by the NRC that should be completed by June 2025, assuming no delays.

- January 10, 2023: NuScale Power announced its submission to the NRC of a standard design approval application for its updated small modular reactor design, which is based on a six-module VOYGR plant configuration, powered by an uprated 77-MWe module. NuScale submitted all parts of the application on January 1, including the final safety analysis report and all technical reports.

- On January 12, 2023, Kairos Power signed an agreement to produce TRISO fuel pebbles for the Hermes test reactor at Los Alamos National Laboratory's Low Enriched Fuel Fabrication Facility (LEFFF) in New Mexico. Hermes will be sited in Oak Ridge, TN.

- January 13, 2023: Georgia Power announced another delay to the startup of the Unit 3 reactor of Vogtle nuclear power plant due to an issue identified during preoperational testing for the unit. Southern Nuclear is in the process of remediating the problem and intends to file a license amendment with the NRC to help expedite the remediation. Vogtle-3 is now projected to come online in March and enter service in May.

- January 20, 2023: The NRC issued its final rule certifying NuScale Power's small modular reactor (SMR) design, making the Portland, Oregon-based company's power module the first SMR design to be certified by the agency, and the eighth reactor design approved for use in the United States. The rule will go into effect on February 21, 2023, allowing utilities to reference the NuScale design when applying for a combined license to build and operate a reactor.

Vendors and utilities that wish to certify a new reactor design or a potential site or construct and operate a new nuclear power plant must submit an application to the NRC, which will then conduct an in-depth review of safety and environmental aspects related to the design and / or site.

Reactor Design Certifications (DC)

By issuing a DC, the NRC approves a nuclear power plant design, independent of an application to construct or operate a plant. A DC is valid for 15 years from the date of issuance but can be renewed for an additional 10 to 15 years. A DC application (DCA) must include enough information to show the design meets NRC's safety standards and that the design resolves any existing generic safety issues and issues that arose after specific events in the nuclear industry such as the Three Mile Island accident. Applications must closely analyze the design's appropriate response to accidents or natural events, including lessons learned from the Fukushima accident. Applications must also lay out the inspections, tests, analyses, and acceptance criteria that will verify the construction of key design features. Certification reviews identify key information to consider in site-specific reviews for operating licenses. *(From NRC website)*

As of January 2023, eight reactor designs that are being considered for future builds in the U.S. have been certified by the NRC. Two previously submitted designs have been withdrawn from consideration[1].

	VENDOR	TECHNOLOGY	STATUS
Issued	Westinghouse	AP1000	Issued: 12/30/2011
	General Electric-Hitachi	ESBWR	Issued: 11/14/2014
	NuScale Power	NuScale SMR Power Module	Approved, will be issued 02/21/2023
	Korea Electric Power Corp	APR1400	Issued: 9/19/2019
Renewal	General Electric-Hitachi	ABWR	Originally Issued: 5/12/1997 Final Safety Evaluation Report approved in March 2020

[1] AREVA US-EPR – Submitted December 12, 2007, and docketed February 25, 2008; review suspended at the request of the applicant. Mitsubishi Heavy Industries US-APWR – Submitted December 31, 2007, and docketed February 29, 2008; MHI has requested a deferral of the review due to their work on reactor restarts in Japan.

Early Site Permits (ESP)

By issuing an early site permit (ESP), the U.S. Nuclear Regulatory Commission (NRC) approves one or more sites for a nuclear power facility, independent of an application for a construction permit or combined license. An ESP is valid for 10 to 20 years from the date of issuance and can be renewed for an additional 10 to 20 years. In reviewing an ESP application, the NRC staff will address site safety issues, environmental protection issues, and plans for coping with emergencies, independent of the review of a specific nuclear plant design. During this process, the NRC notifies all stakeholders (including the public) as to how and when they may participate in the regulatory process, which may include participating in public meetings and opportunities to request a hearing on the issuance of an ESP. *(From NRC website)*

Six ESPs have been issued and one was withdrawn.[3]

	SITE/LOCATION		UTILITY	TECHNOLOGY REFERENCED	STATUS
Issued	Clinton	IL	Exelon	Plant Parameter Envelope (PPE)	Issued: 3/15/2007
	Grand Gulf	MS	Entergy	PPE	Issued: 4/5/2007
	North Anna	VA	Dominion Power	PPE	Issued: 11/27/2007 Amended 1/30/2013
	Vogtle	GA	Southern	AP1000/ Westinghouse	Issued: 8/26/2009
	Salem County	NJ	PSEG	PPE	Issued: 5/5/2016
	Clinch River	TN	TVA	PPE	Issued: 12/19/2019

[3]Victoria County Station, Texas (Exelon) was withdrawn from NRC review October 2012

Combined Construction and Operating Licenses (COL)

By issuing a COL, the NRC authorizes the licensee to construct and (with specified conditions) operate a nuclear power plant at a specific site, in accordance with established laws and regulations. In a COL application (COLA), NRC staff reviews the applicant's qualifications, design safety, environmental impacts, operational programs, site safety, and verification of construction with inspections, testing, analyses, and acceptance criteria. The staff conducts its review in accordance with the Atomic Energy Act, NRC regulations, and the National Environmental Policy Act. All stakeholders (including the public) are given notice as to how and when they may participate in the regulatory process, which may include participating in public meetings and opportunities to request a hearing on the issuance of a COL. Once issued, a COL is good for 40 years and can be renewed for an additional 20. A COL application may reference a certified design and/or an ESP, or neither. *(From NRC website)*

A COL is valid indefinitely. If a licensee chooses not to construct a plant immediately following the issuance of a COL, it must submit a COL update annually to the NRC to reflect the most recent regulatory requirements and any new or different environmental or design information, or it can request an exemption. To begin construction, the COL must be fully updated. Alternatively, a licensee can choose to withdrawal their COL if they no longer wish to proceed with the plants.

A total of nineteen COL applications have been docketed by the NRC. Eight applications, totaling 14 reactors, have been issued COLs and one is under review. Eight applications were suspended and later withdrawn[4] due to utility, economic or other considerations while two applications remain in "suspended" status[5]. After the COL was issued, three applications, totaling six reactors, were subsequently terminated.[6]

	SITE/LOCATION		UTILITY	REACTOR TECHNOLOGY/ NO. of REACTORS		STATUS
Issued	Vogtle	GA	Southern Nuclear	AP1000	2	Issued: 2/10/2012
	Fermi	MI	DTE Energy	ESBWR	1	Issued: 5/1/2015
	William States Lee	SC	Duke Energy	AP1000	2	Issued: 12/19/2016
	North Anna	VA	Dominion Energy	ESBWR	1	Issued: 6/2/2017
	Turkey Point	FL	Florida Power and Light	AP1000	2	Issued: 4/12/2018

[4] Suspended and Withdrawn: Bell Bend; Bellefonte 3&4 Callaway 2, Calvert Cliffs 3, Grand Gulf 3, Nine Mile Point 3, River Bend 3, Victoria County 1&2,

[5] Remains Suspended: Shearon Harris 2&3, Comanche Peak 3&4

[6] Terminated: Levy 1&2, South Texas Project 3&4, V.C. Summer 2&3

[7] Denied 1/6/2022: Oklo Power LLC, Idaho National Laboratory, Aurora 1

Construction Permit Applications

A construction permit application for a production or utilization facility submitted to the NRC under Title 10 of the Code of Federal Regulations Part 50, "Domestic Licensing of Production and Utilization Facilities" consists of two parts: an environmental report and a preliminary safety analysis report (PSAR).

After receiving the construction permit application, NRC staff begins its review by making an initial determination on completeness and acceptability of the application. Should the NRC staff determine that the application is incomplete or otherwise unacceptable, the staff will inform the applicant and explain how the application is deficient. The applicant will then have the opportunity to correct the deficiencies. Once the staff determines that it has enough information to continue with a thorough technical review of the submittal, the NRC will formally docket the application.

Following an application's acceptance for docketing, there are several significant review milestones including the following: issuance of a request or requests for additional information, preparation of a safety evaluation report, development of either an environmental assessment or environmental impact statement, independent review of the application and safety evaluation report by the Advisory Committee on Reactor Safeguards (ACRS), potential contested hearing(s), mandatory hearing.

Finally, the Commission will make a decision to either grant or deny the construction permit based on the application, NRC staff's safety evaluation report, the recommendations of the ACRS, and the outcome of any contested hearings and the mandatory hearing. As of November 16, 2022, two applications are under review, one of them a new submission as of August 2022.

The newest accepted application, for a Molten Salt Research Reactor (MSRR) at Abilene Christian University (ACU) in Abilene, Texas, is the first ever application for an advanced university research reactor. ACU submitted the application for the Nuclear Energy eXperimental Testing Lab (NEXT), which includes the 1MW, non-power MSRR, in August. The facility will provide a platform to research molten-salt technology, as well as educational opportunities in nuclear science and engineering. ACU is the lead university in the NEXT Research Alliance (NEXTRA), which includes Georgia Institute of Technology, Texas A&M University, and the University of Texas at Austin. The alliance has a $30.5 million research grant agreement with Natura Resources to design and build a university-based MSRR. ACU has worked through several aspects of the MSRR with the NRC over two years of pre-application activities. Due to this proactive approach, the NRC estimates a review schedule of 18 months, and expects that environmental and safety reviews will be complete by May 2024.

	SITE/LOCATION		VENDOR	REACTOR TECHNOLOGY/ NO. of REACTORS		STATUS
Under Review	Abilene Christian University	Abilene, TX	NEXTRA	MSRR	1	Under Review
	East Tennessee Technology Park, ORNL	Oak Ridge, TN	Kairos Power, LLC	KP-FHR	1	Under Review

Fuel Facility License Applications

Fuel cycle facilities must comply with the regulatory requirements established by the NRC. The regulations contain the basic safety standards that the fuel cycle facilities need to meet. Each facility also has an NRC license which contains site-specific requirements that the facility is required to comply with. Each license is unique and is specific to the nuclear material and hazards present at the fuel cycle facility.

A total of five facilities have been docketed by the NRC. Two licensed facilities were terminated[7], and one other facility was issued a construction authorization before it was terminated at the request of the company[8]. One facility has been licensed; however, construction is not currently proceeding[9].

	SITE/LOCATION		VENDOR	FACILITY and FUEL TYPE		STATUS
	American Centrifuge Plant	Piketon, OH	Centrus Energy Corp.	Centrifuge Enrichment	HALEU	Approved
	TF3	Oak Ridge, TN	TRISO-X, LLC	Fuel Fabrication	HALEU TRISO	Under Review

[7,8] Terminated: Eagle Rock Enrichment Facility, GLE Uranium Enrichment Facility, Mixed-Oxide Fuel Fabrication Facility

[9] Suspended: Fluorine Extraction Process and Depleted Uranium Deconversion (FEP/DUP) Plant

Industry Updates

- ★ In June 2021, the NRC approved a license amendment authorizing Centrus Energy Corp to demonstrate commercial production of HALEU at the American Centrifuge Plant. In September, installation of the HALEU demonstration centrifuges in cascade form was halted temporarily until a contract could be competitively awarded for the HALEU demonstration project. That contract was awarded in November 2022 (see below).

- ★ In late December 2022, the NRC accepted an application from X-energy's fuel subsidiary, TRISO-X, LLC, for a proposed TRISO-X fuel fabrication facility (TF3). A 30-month review schedule has been developed by the NRC that should be completed by June 2025, assuming no delays. Additionally, Kairos Power is still in pre-application discussions with the NRC for its Atlas fuel fabrication facility. Both facilities would be located in Oak Ridge, TN, and would manufacture HALEU TRISO particles and pebbles.

- ★ Framatome and UltraSafe Nuclear announced on January 26, 2023 that they intend to form a joint venture to manufacture commercial quantities of tri-structural isotropic (TRISO) particles and UltraSafe's proprietary fully ceramic microencapsulated (FCM) fuel. The companies have signed a nonbinding agreement to integrate their resources and bring commercially viable, fourth-generation nuclear fuel to market for UltraSafe's micro-modular reactor (MMR) and other advanced reactor designs. The companies expect to begin manufacturing TRISO particles and FCM fuel in late 2025.

★ On January 25, 2023, Oklo submitted a licensing project plan to the NRC, outlining the company's plans for a preapplication engagement activities that support the future licensing of a used nuclear fuel recycling facility. The first-of-a-kind facility is intended to produce fuel to support the deployment of Oklo's advanced reactor design power plants. According to Oklo, the preapplication engagement will identify and reconcile regulatory requirements early, enabling an efficient and effective NRC license application review through a process equivalent to a staged licensing approach with the added benefits of flexibility and customization.

DOE Updates

★ In November 2022, the DOE announced an approximately $150 million cost-shared award with American Centrifuge Operating, LLC, a subsidiary of Centrus Energy Corp, to demonstrate the nation's ability to produce HALEU. Advancing domestic capability to produce HALEU will set the stage for larger, commercial-scale HALEU production in the US, providing important fuel stability for advanced reactors to achieve smaller designs, longer operating cycles, and increase efficiencies over existing technologies.

The award includes a $30 million cost share during the first year to start up and operate 16 advanced centrifuges in a cascade at a Department of Energy facility in Piketon, Ohio. The facility represents the only U.S. plant licensed to produce HALEU at present. The cascade is expected to meet the demonstration requirements by enriching uranium hexafluoride gas to produce 20 kilograms of 19.75% enriched HALEU by December 31, 2023. They will then continue production in 2024 at an annual rate of 900 kilograms of HALEU per year, subject to appropriations, with additional options to produce more material under the contract in future years.

DOE is pursuing multiple pathways to produce HALEU through its HALEU Availability Program authorized by the Energy Act of 2020 to meet this pressing need. Following the HALEU demonstration, the centrifuge technology used at the facility will be available for commercial deployment.

★ On December 7, 2022, the DOE's Office of Nuclear Energy (NE) announced the establishment of a HALEU Consortium. The consortium is intended for any US entity, association, and government organization involved in the nuclear fuel cycle, including but not limited enrichers, fuel fabricators, and others working in the front-end fuel cycle. The HALEU Consortium will essentially serve as an information clearinghouse to meet NE's ongoing needs for firm supply and demand data as it supports the development of a commercial domestic HALEU infrastructure to fuel advanced reactors.

NEW PLANT CONSTRUCTION

Vogtle

Georgia Power announced on December 7th that cold hydro testing of Unit 4 has been completed. The cold hydro testing confirmed that the AP1000's coolant system functions as designed and verified that the welds, joints, pipes, and other components of the system and associated high-pressure systems do not leak when under pressure. As part of the testing, the coolant system was filled with water and pressurized to above-normal operating conditions, then lowered to normal design pressure while inspections were conducted to verify that the systems met design standards. Hot functional testing is expected to follow and is conducted by running plant systems at normal operating pressure and temperature to ensure the reactor systems and components function as designed prior to loading fuel into the core.

Following authorization from the Nuclear Regulatory Commission (NRC) that fuel loading and operation may commence at Unit 3, Southern Company loaded fuel in the fall of 2022, with the intent to begin operating in the first quarter of 2023. However, during preoperational testing for the unit, plant operator Southern Nuclear identified 'vibrations associated with certain piping within the cooling system', according to a January 11th filing by Southern Company and Georgia Power with the Securities and Exchange Commission.

Vogtle Unit 3 (Courtesy of Georgia Power/ Southern Company, April 2021)

Southern Nuclear is in the process of remediating the issue and intends to file a license amendment request the NRC to help expedite the remediation. Vogtle-3 is now projected to achieve initial criticality in March 2023 and enter service in May 2023.

The most recent update to the cost projection for the project came in Georgia Power's FY 2022 4th quarter earnings statement. The revised schedule, updated by Georgia Power following the discovery of the vibrating pipe issue in Unit 3, projects an in-service date of the second quarter of 2023 and the fourth quarter of 2023 for Unit 3 and 4, respectively.

VC Summer

At the time of its August 2017 cancellation, the V.C. Summer project was about 65% complete. All four steam generators for Units 2 and 3 were being installed, while two of the four reactor coolant pumps for Unit 2 reactor are on site. Units 2 and 3 were planned to come online in April 2020 and December 2020, respectively.

OPERATING FLEET STATUS

Nation-Wide Status

As the pioneer of nuclear power development, the United States is the world's largest producer of nuclear power, accounting for approximately 25% of worldwide nuclear generation of electricity. Currently, there are 92 reactors operating in the United States. In 2020, the fleet produced approximately 790 thousand Megawatt-hours (MWh), approximately 20% of America's total electrical output and nearly 55% of our emissions-free electricity. Since the early 1970s, the U.S. nuclear industry has significantly improved its safety and operational performance. By the turn of the century, it was among world leaders with a record-breaking capacity factor in 2019 of over 94%.

In deregulated electricity markets, nuclear power plants are facing financial challenges from zero marginal cost variable power sources and a reduction in the price of natural gas. While increased focus on nuclear energy as a critical part of a clean-energy future for the country, significant collaboration will be necessary from government and industry to maintain and grow the U.S.'s nuclear power generating capabilities.

In December 2022, DOE awarded the American Nuclear Society and Energy Communities Alliance Inc. (ECA) a combined $800,000 to connect with communities across the country and establish education and outreach opportunities in nuclear energy. The two organizations are to emphasize energy justice and prioritize their work in localities impacted by or interested in deploying advanced reactors. Funds will be used to broaden the diversity and reach of professional development opportunities for educators, particularly those teaching underserved student bodies, and to engage with local governments and communities on outreach activities to advance the development of nuclear energy technologies and policies.

On a related note, in January 2023 the DOE increased the funding level for its community engagement on consent-based siting funding opportunity announcement (FOA) from $16 million to $26 million. The DOE first announced in September 2021 that it was making funding available to communities interested in learning more about consent-based siting, management of spent nuclear fuel, and interim storage facility siting considerations. The additional funding raises the number of awards that can be competitively selected to communities interested in learning about consent-based siting. The previously extended FOA application period closes January 31, 2023.

License Renewal and Uprate Status

License Renewal

Sixty-one reactors have received 20-year extensions of their operating licenses from the NRC, including Kewaunee, Vermont Yankee, Fort Calhoun, Oyster Creek, and Pilgrim, which are now permanently closed.

On December 8, 2022, the NRC docketed the license renewal application for Comanche Peak Units 1 and 2.

Applications for License Renewal

★ Issued Renewals:
- No recently issued applications.

★ Applications Currently Under Review:
- Comanche Peak Units 1 & 2

★ Anticipated Future Renewal Submittals:
- Clinton Power Station Unit 1
- Perry Unit 1

Subsequent (Second) License Renewal
The NRC staff has defined subsequent license renewal (SLR) to be the period of extended operation from 60 years to 80 years.

Applications for Subsequent License Renewal

★ Issued Subsequent Renewals[10]:
- Surry Units 1 & 2 (Issued: 12/04/19)
- Turkey Point Units 3 & 4 (Issued: 03/05/20)
- Peach Bottom Units 2 & 3 (Issued: 05/04/21)

[10] On February 24th, 2022, the NRC revised the requirements for environmental reviews of SLR applications. The Generic Environmental Impact Statements used on SLRs were deemed invalid beyond 60 years of operation, and applicants will be required to complete an "adequate NEPA review for each application."

★ Applications Currently Under Review:
- North Anna Power Station Units 1 & 2 (Received: 08/24/20)
- Point Beach Units 1 & 2 (Received: 11/16/20)
- Oconee Nuclear Station Units 1, 2, & 3 (Received: 06/07/21)
- St. Lucie Units 1 & 2 (Received: 08/03/21)

★ Applications Received and Under Acceptance Review:
- Monticello Unit 1 (Received: 01/09/2023)

★ Anticipated Future Subsequent Renewal Submittals:
- Browns Ferry Units 1, 2, & 3 (Estimated: December 2023)
- Virgil C. Summer Unit 1 (Estimated: Oct-Dec 2023)
- Edwin I. Hatch Units 1 & 2 (Estimated: Oct-Dec 2025)
- Dresden Units 2 & 3 (Estimated: Apr-June 2024)

★ The NRC announced on January 24, 2023that it will not resume its review of Pacific Gas & Electric's withdrawn Diablo Canyon license renewal application. This decision is a new setback in the long-running effort to extend the life of the plant. PG&E withdrew its license renewal application for Diablo Canyon in March 2018 after determining that California would not need the power provided by the plant to meet its energy demands. In September 2022, California lawmakers passed legislation to extend the life of Diablo Canyon from 2025 until 2030 to improve statewide energy system reliability. In November 2022, PG&E filed a letter with the NRC requesting that the agency resume reviewing its license renewal application to keep the plant running until 2030. However, because the application was withdrawn almost five years ago, it is not up to date. In response, PG&E proposed the alternative request of 'timely renewal' for exemption from a rule requiring a licensee to file a license renewal application *'at least five years before the expiration of the existing license.'* This would protect the existing license from expiring until a decision is made on the new application. On this request, the NRC expects to reach a decision in March 2023.

Operating Fleet Uprate Activities

U.S. nuclear power plants have submitted power uprate applications to the NRC since the 1970s, accounting for an additional 8,010 MWe of output.

- ★ Recently Approved
  - Farley Units 1 & 2 (Approved: 10/09/20)
  - Watts Bar Unit 2 (Approved: 10/21/20)
  - Oconee Units 1, 2, & 3 (Approved: 1/26/21)
  - Millstone Unit 3 (Approved: 11/09/21)
- ★ Pending Applications:
  - No pending applications
- ★ Expected Applications
  - As of March 18, 2022, there are 0 expected applications for power uprates (per NRC). However, several plants have announced their intentions to submit an application.

Operating Fleet Status: Supportive Federal and State Action

Initiatives are taking place at the national and state level to ensure a more competitive market for nuclear power. For example, the states of New York, Illinois, New Jersey, Ohio, Pennsylvania, and California have taken action to level the playing field and include nuclear energy in their clean energy policies and have averted the closure of ten power plants.

★ On September 1st, 2022, the California legislature voted to provide funds to ensure the continued operation of the Diablo Canyon nuclear plant. The Bill reversed the State's 2016 decision to retire the plant by 2025 and approved a $1.4 billion government loan to extend its operation to 2030. In addition to this funding, in November 2022, the plant was formally selected as a beneficiary of the CNC program and will receive additional federal funding to ensure it continues to operate. The NRC is currently considering a request from Pacific Gas & Electric to review the license under timely renewal, which would protect the existing license from expiring until a decision is made on a new application. The NRC expects to make a decision by March 2023.

Thirteen plants (19 reactors) had previously announced they intended to close prior to their license expiration date but have been saved due to Federal and State Actions:

ORIGINALLY PROPOSED CLOSURE YEAR	SITE / LOCATION		UTILITY	LICENSE EXPIRATION (TERM)	POWER (MWe)
2017	FitzPatrick	NY	Entergy	2034 (60)	852
	Ginna	NY	Exelon	2029 (60)	582
	Clinton	IL	Exelon	2026 (40)	1,065
2017-18	Nine Mile Point – 1 & 2	NY	Exelon	2029 / 2046 (60)	1,780
2018	Quad Cities 1 & 2	IL	Exelon	2032 (60)	1,820
2020	Davis-Besse	OH	Energy Harbor	2037 (60)	893
2021	Perry	OH	Energy Harbor	2026 (40)	1,261
	Beaver Valley	PA	Energy Harbor	2036 / 2047 (60)	1,872
	Byron – 1 & 2	IL	Exelon	2044 / 2046 (60)	2,300
	Dresden – 1 & 2	IL	Exelon	2029 / 2031 (60)	1,773
2022	Salem – 1 & 2	NJ	PSEG	2036 / 2040 (60)	2,304
	Hope Creek		PSEG	2046 (60)	1,172
2024-2025	Diablo Canyon 1 & 2[1]	CA	PG&E	2024/2025(40)	2,240
				Total Saved	**19,914**

[1] In review with NRC to determine whether timely renewal may be used while license renewal request is being considered. A decision is expected by March 2023.

Operating Fleet Status: Premature Closure

Some of the nuclear plants now closing are doing so because of state policy pressure (as with New Jersey's Oyster Creek, and New York's Indian Point), and some have had maintenance issues that were too costly to fix. However, most plants are closing or threatening closure because–given the economics in some regions—they have become unable to compete against primarily low-cost, gas-fired generation and, to a lesser extent, subsidized and mandated "variable renewable energy," such as wind- and solar-power.

★ Twelve plants (14 reactors) have closed prior to their license expiration date:

CLOSURE YEAR	SITE / LOCATION		UTILITY	LICENSE EXPIRATION (TERM)	POWER (MWe)
2013	Crystal River 3	FL	Duke	2016 (40)	860
	San Onofre 2 & 3	CA	SoCal Edison	2023 / 2024 (40)	2,150
	Kewaunee	WI	Dominion	2033 (60)	566
2014	Vermont Yankee	VT	Entergy	2032 (60)	620
2016	Fort Calhoun	IN	Omaha Power	2033 (60)	479
2018	Oyster Creek	NJ	Exelon	2029 (60)	610
2019	Pilgrim	MA	Entergy	2032 (60)	685
	Three Mile Island 1	PA	Exelon	2034 (60)	803
2020	Indian Point 2	NY	Entergy	2024 (60)	998
	Duane Arnold	IA	NextEra	2034 (60)	615
2021	Indian Point 3	NY	Entergy	2025 (60)	1,030
2022	Palisades[7]	MI	Entergy	2031 (60)	789
			Total Closed since 2013:		**10,205**

[7]On May 20, 2022 The Palisades Nuclear Power Plant shut down operations and ownership was transferred to Holtec International, with plans to decommission the plant. However, on June 28, 2022, Holtec applied for funds under the CNC Program, with the intention to eventually reopen the plant.

★ Currently, no reactors have announced plans to retire prior to their license expiration date.

PENDING CLOSURE YEAR	SITE / LOCATION	UTILITY	LICENSE EXPIRATION (TERM)	POWER (MWe)
		Total Pending Closures:		**0**

INTERNATIONAL NUCLEAR ACTIVITIES

- ★ December 7, 2022: The British government announced an investment of £679 million (about $828 million) in the proposed Sizewell C nuclear plant in Suffolk, England. The investment makes the government a 50 percent shareholder with EDF in Sizewell C and allows for China General Nuclear Power Corporation's exit from the project (CGN remains, however, a partner with EDF in Britain's Hinkley Point C new nuclear build project, currently underway in Somerset). The funding also represents the first direct government investment in a new nuclear power project since Sizewell B—the last nuclear power station to be built in the United Kingdom, approved for construction in 1987 and in commercial operation as of 1995. Also confirmed in the government's announcement was a commitment to set up Great British Nuclear, a government body tasked with developing a pipeline of new nuclear builds beyond Sizewell C, with further details expected early in 2023.

- ★ December 12, 2022: Korea Hydro & Nuclear Power announced Unit 1 at South Korea's Shin-Hanul nuclear power plant entered commercial operation. The 1,340-Mwe APR-1400 design entered criticality in May 2022 and was connected to the grid in June 2022. The first of four APR-1400s planned for Shin-Hanul, Unit 1 is the third such reactor to enter service in South Korea. Shin-Hanul Unit 2 is slated to enter commercial operation in September 2023.

- ★ December 15, 2022: Westinghouse Electric Company and Polish utility Polskie Elektrownie Jądrowe signed an agreement defining the main principles and path forward for Poland's first nuclear power reactors. The agreement outlines next steps for the project, including site layout, licensing, and permitting support, and site development services and procurement, and establishes the framework for future project delivery contracts. Another agreement is expected to be signed in mid-2023 for the design of the facility.

- ★ January 18, 2023: The International Atomic Energy Agency (IAEA) is deploying teams of nuclear security and safety experts to Ukraine's active nuclear power plants and the Chernobyl site. The agency has already stationed a team of experts at Ukraine's largest nuclear facility, the six-unit Zaporizhzhia plant, which has been under Russian occupation since March 2022. Additional teams will provide operational and safety support at the other nuclear power plants in the country.

- ★ January 27, 2023: GE-Hitachi Nuclear Energy (based out of Wilmington, NC) and Canadian firms Ontario Power Generation, SNC-Lavalin, and Aecon have signed a contract for the deployment of a BWRX-300 small modular reactor at OPG's Darlington nuclear site in Canada. This will be the first commercial contract for a grid-scale SMR in North America. The BWRX-300 is a 300-MWe water-cooled, natural-circulation SMR with passive safety systems. Due to design simplifications, the BWRX-300 is intended to require significantly lower capital costs per megawatt than other water-cooled SMR designs or existing large reactors. It is currently undergoing a pre-licensing vendor design review at the Canadian Nuclear Safety Commission (CNSC).